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THE LOWDOWN ON THE 1942 CARS!
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MECHANIX ILLUSTRATED

DECEMBER
1941

Volume XXVI
Number 8

W. H. FAWCETT, JR., President

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SPECIAL FEATURES

(Continued on page 6)

ELON JESSUP

Elon Jessup, whose unusual article on "Plankton" appears in this issue, has had about as adventurous a life as any of our contributors. After leaving Rochester University, he roamed the Canadian West and Alaska for several years, then worked on newspapers in Salt Lake City, San Francisco and Vancouver. During the last war, he joined a relief expedition taking supplies to typhus-ridden Siberia. He was later decorated by the Yugo-Slav government. He was a member of the staffs of "Adventure" and "Outing" magazines, and lived ten years abroad. He is now living at Woods Hole, Mass., free-lancing. He has written ten books, mostly on recreational subjects.

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46 PAGES OF HOBBIES AND HOW-TO-BUILDS STARTING ON PAGE 85

On The Cover: The Martin PBM-1, 40,000 Pound Navy Patrol Bomber. Color Photo By Rudy Arnold.

ROBERT HERTZBERG, Editor

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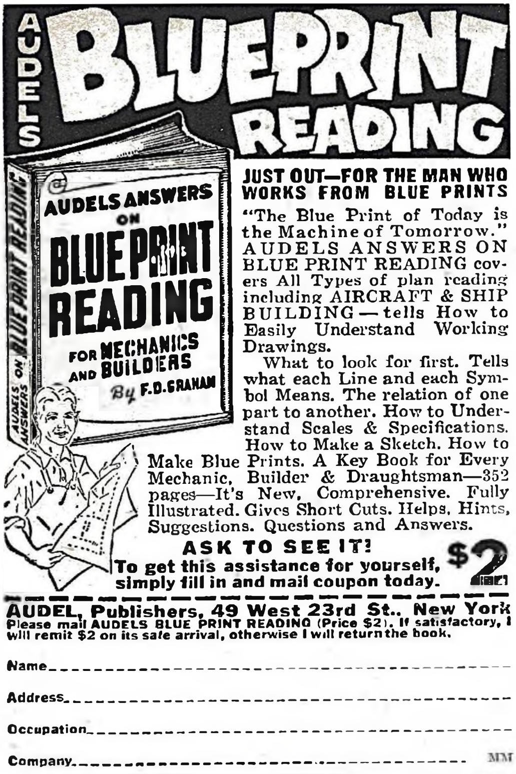

CONTENTS—Continued from page 4

DEPARTMENTS

AVIATION

NEWS OF SCIENCE AND MECHANICS

(Continued on page 8)

America Can't Wait
Industry needs you NOW

Defense Program Needs Trained Men

There is a tremendous shortage of skilled men in almost all branches of industry. Draftsmen, electricians, machine designers, machinists, are wanted for good jobs at fine pay. Executives too; foremen, superintendents, managers, are needed right now to handle the enormous demand for finished products of all kinds. If you are already in one of these fields, you owe it to your country, to your family, and to yourself to make yourself even more valuable, to climb and climb fast and help put through the most important program we have ever had to face.

Opportunities Everywhere

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CONTENTS—Continued from page 6

NEWS OF WAR AND DEFENSE

PHOTOGRAPHY

HOW TO BUILD SECTION

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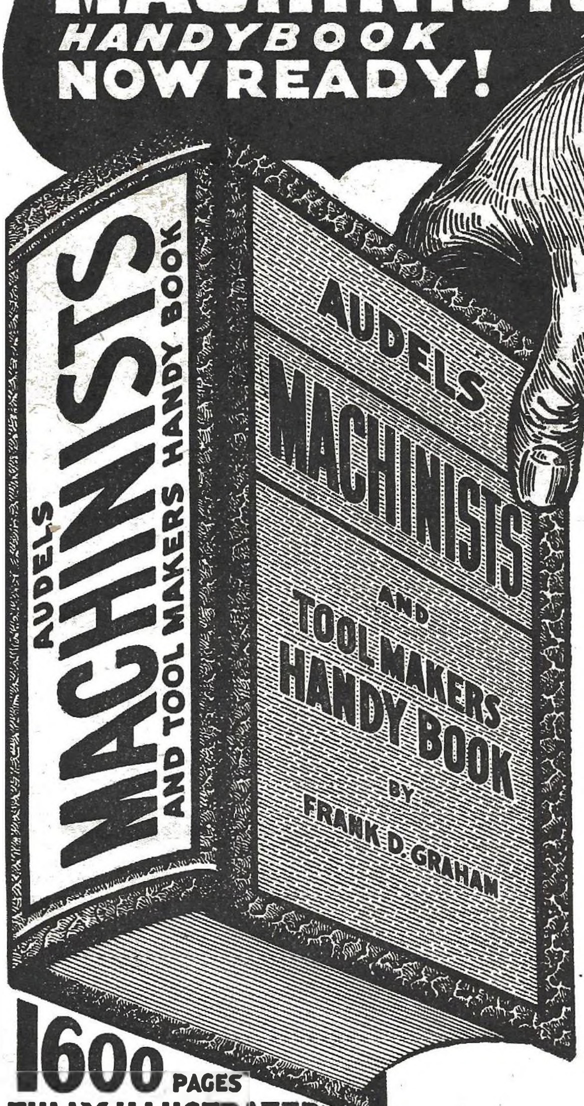

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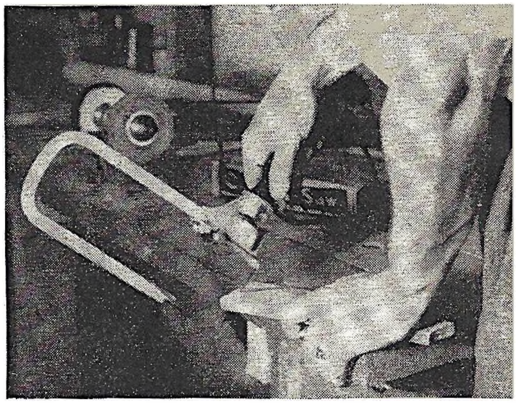
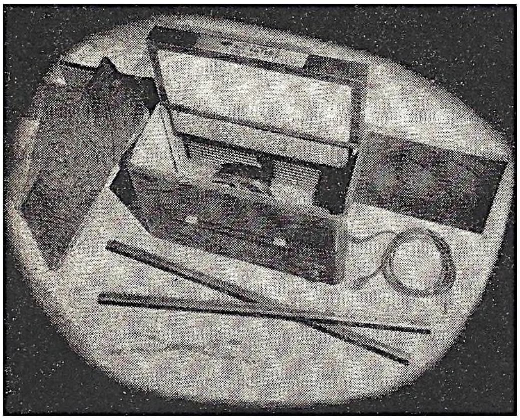
NEW PRODUCTS AND INVENTIONS

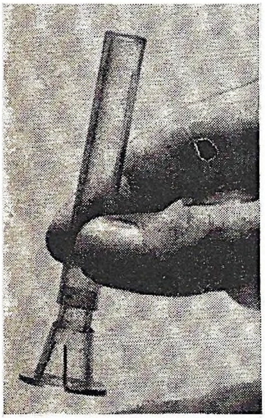
LATEST HOME AND SHOP DEVICES • POPULAR PATENT IDEAS

Recently introduced is a new and improved hand-electric scroll saw which features a blade that can be twisted in any direction while the saw is operating. Made of thin, tough, highly tempered steel, the blade travels more than 7,000 strokes per minute, impelled by a long-lasting electric vibrator motor. The saw has an unusually deep frame, permitting curved cuts to be made well into a panel without changing position. Wood up to ¾″ thick can be handled efficiently by the saw.



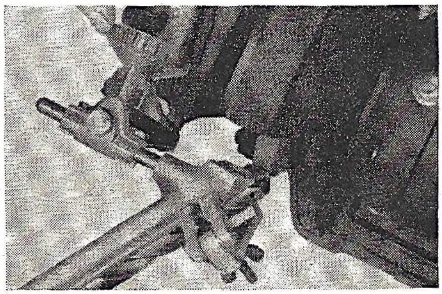


Indoor relief for ragweed-pollen hay fever victims now is available through the device illustrated at left. Placed in the frame of an open window, the unit filters the pollen from the air as it passes into the room. The device was made possible through the development of fibrous glass, from which the filter itself is made. The filter is similar to the famous Dust-Stop Air Filters used in air conditioning and home heating units. The American Medical Association's Council on Physical Therapy has approved the device.



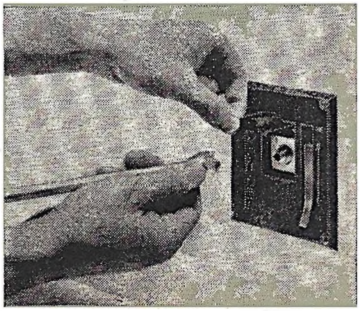
The photo above shows a newly marketed molded plastic container for vitamin B-1 tablets. It is made to fit inside any ⅝″ or ¾″ garden hose, just behind the nozzle. With it the user can treat an entire garden, lawn, etc., in a few minutes.

Newest drill grinding attachment for the home workshop is made of light, strong Lynite, with a stamped, steel-hardened lip that holds the drills in position while sharpening. A knurled adjusting wheel enables drill to be set at correct grinding angles. The attachment may be fitted to any power or hand turned grinder, and can be demounted in a jiffy when grinder is used for other purposes.



Resembling an attractive electrical outlet, a combination gas outlet box and safety shut-off valve adds to the appearance of any room. The gas cannot be turned on unless an appliance is connected to the outlet. This safety factor prevents the danger of gas being turned on when heaters or other appliances are temporarily removed, as for the summer.

Names and addresses of manufacturers of products described above will be sent free to any reader on request, provided a stamped, return envelope accompanies the inquiry. Mention date of issue when writing.



INVENTORS!

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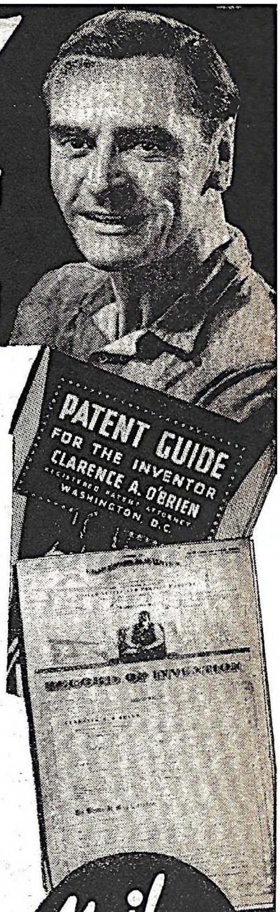

THE AMAZING SUCCESS STORY OF A. L. M. (name on request) TOLD HERE IN HIS OWN WORDS—

"I AM glad to tell the story of how I got started on the road to my present success, because I feel certain that it will be of real interest and possible inspiration to other inventors who are just starting out

"While attending a technical school I became very much annoyed with the inadequacy of one of the tools required in the course of my study. As a result I conceived an idea for an improvement which I felt so surpassed the tool then used, that I was certain other students and professional men would find it very valuable. I demonstrated it to my friends and they were so greatly impressed with its commercial possibilities, that they advised me to get a patent on it. Acting immediately upon this suggestion, I wrote to Clarence A. O'Brien, having been advised that he was a reliable and competent registered patent attorney. Following prompt instructions from Clarence A. O'Brien, I submitted my invention to him for the purpose of making a preliminary patentability search of the Patent Office records. The good word soon came back . . . my invention appeared to be patentable! I believed that this was one of the greatest moments of my life. Armed with this assurance, I promptly filed application for a patent. As soon as the patent was thus pending, I was in a position to commence volume production of my invention. I then arranged an interview with one of the largest manufacturers in the business, and demonstrated the model to him, since in the meantime Clarence A. O'Brien had secured the necessary patent for my invention. The manufacturer was so favorably impressed, that he gave me a substantial order. He was so pleased with the sales results of my invention that he is now reordering in great quantities. Other manufacturers caught up the idea, and today I am supplying most of the market, and am protected against infringement by the patent obtained through the efforts of Clarence A. O'Brien.

"I feel that the whole basis of my good fortune may be traced to the intelligent, careful cooperation of Clarence A. O'Brien in securing a patent on my invention. Without the assistance of Clarence A. O'Brien, my tremendous success would not have been possible . . . I can whole-heartedly recommend his services to any inventor who has an idea worth protecting by a U. S. Patent."

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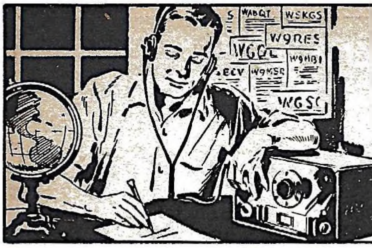

CHIPS FROM THE EDITOR'S WORKBENCH

WE'VE had to make this announcement so often it's beginning to sound like a phonograph record. But the news is—we're adding 16 more pages to MI, beginning with the January issue!

Yes, we know; you've heard that one before. As a matter of fact, you've heard it several times before, and, if MI keeps growing, both in size and in popularity, the way it has been growing for the past several years, you'll be hearing the announcement again in a very few months.

If you're an old-timer among MI readers, you probably remember us when we were just a skinny squirt, trying mightily to make ourselves heard. Then came an announcement—16 more pages! After a little while, another announcement and 16 *more* pages, and 16 more after that. And it was just a few months more than a year ago that we were telling you in this space that we were moving up to 162 pages.

Now we're going up to 178!

We don't know how far this thing will go; it's entirely up to you readers. If you keep shouting loud enough about the extra things you want in MI, we'll keep thinking up ways to add the pages—and at no extra cost to the purchaser, mind you! A thin dime still gets you your greatest of all magazine bargains.

We'd better look out—people'll begin mistaking us for the New York phone book.

* * *

AND here's a little encouragement for all you kind souls who have been writing in to find out when we're going to run another contest. Pssstt!—It'll be very soon now!

We're already drawing up the plans, rounding up the prizes and laying out the actual contest material. We can't tell you much more now than to be prepared. Get your pencils sharpened, start planning some evenings at home, and start thinking about what kind of a prize you'd like to win.

We can tell you this, though—it'll be a bigger contest than last year's was! And all who remember last year's competition will recall that it was the greatest thing of its kind in the mechanical magazine field.

On your marks, boys!

By combining into a single working model the principles of both diorama and planetarium, and by supplementing this with a sound-and-lighting-effects box for which he found the plans in the August issue of MECHANIX ILLUSTRATED, Gerard Bonvouloir of 329 Beech Street, Holyoke, Mass., produced this miniature bit of universe.

"Sunset, sunrise, starry sky and storms can be produced in full natural color effects by working four levers and six switches," writes Mr. Bonvouloir. "Music accompanies these effects. The sky and landscape are made of papier-mache; for the trees I used bread soaked in green paint." Good work, Mr. Bonvouloir, and we are sending you a $5.00 Workbench check as an award.

* * *

SPEAKING of prizes, though, reminds us of the fact that most of the gadgets one is accustomed to buy without giving the matter a second thought soon just won't be available, even with a wad of bills the size of Uncle Sam's. Everything, from coat hangers to airplanes, has been put on the government's priorities list, which means that your local merchant's theme song soon will be—if it isn't already—"We ain't got no more."

Which brings us back to our favorite argument, to wit: if you can't buy it, *make* it! This is the time when an MI reader should have it all over his

[*Continued on page* 15]

AMERICA'S GREATEST MAGAZINE BARGAIN!

That's what MECHANIX ILLUSTRATED will be, starting with the January number. For, beginning with that issue, your favorite mechanics magazine will go up to 178 pages—*16 more pages* than it has ever had in its history!

At the same low price of 10 cents a copy, these added pages will give you the greatest magazine bargain in the country today. You'll get more dope on radio, on photography, on home workshop plans, boats, models, cameras—*everything!*

Order your January MECHANIX ILLUSTRATED *now!*

The 97 Pound Weakling

—Who became "The World's Most Perfectly Developed Man"

"I'll prove that YOU too can be a NEW MAN!"

—*Charles Atlas*

I KNOW, myself, what it means to have the kind of body that people pity! Of course, you wouldn't know it to look at me now, but I was once a skinny weakling who weighed only 97 lbs! I was ashamed to strip for sports or undress for a swim. I was such a poor specimen of physical development that I was constantly self-conscious and embarrassed. And I felt only HALF-ALIVE.

Then I discovered "*Dynamic Tension*." It gave me a body that won for me the title "World's Most Perfectly Developed Man."

When I say I can make you over into a man of giant power and energy, I know what I'm talking about. I've seen my new system, "*Dynamic Tension*," transform hundreds of weak, puny men into Atlas Champions.

CHARLES ATLAS
Holder of title, "The World's Most Perfectly Developed Man."

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Mail the coupon right now for full details and I'll send you my illustrated book, "Everlasting Health and Strength." Tells all about my "*Dynamic Tension*" method. Shows actual photos of men I've made into Atlas Champions. It's a valuable book! And it's FREE. Send for your copy today. Mail the coupon to me personally, CHARLES ATLAS, Dept. 6M, 115 East 23rd St., New York, N. Y.

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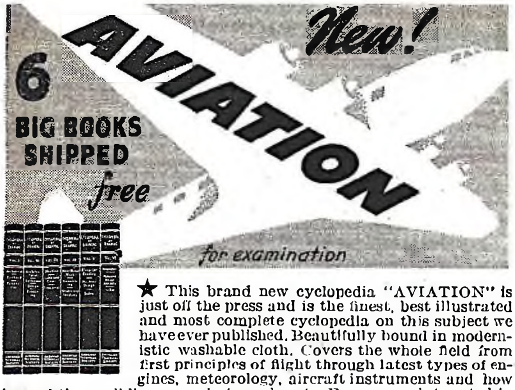

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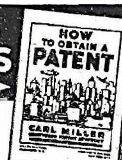

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Editor's Workbench Chips

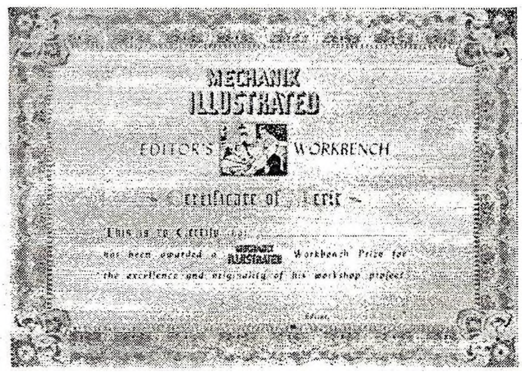
[*Continued from page* 12]

neighbor, since the latter—unless he also reads MECHANIX ILLUSTRATED—will just have to wait around till the war ends before buying that new table for the kitchen or trading in the old car for a new one. An MI reader, on the other hand, will just go ahead and *build* his table and fix up the family car so it's just as good as new.

* * *

FOR a long time now, we here at MI have been convinced that contributors to the Workbench section have been deserving of some greater recognition than the three- and five-dollar cash awards it has been our custom to dispense to readers whose projects have been worthy of inclusion in this space. These contributions have been so uniformly good that their very excellence cried out for a more generous award.

The question in our minds, however, was what to give. Merely increasing the financial payment hardly seemed the answer, since, no matter how much we increased it, the added pennies would fail to do justice to the merit involved. Accordingly, we hit upon this plan:



We drew up the certificate pictured on this page and decided to send one to every reader whose project rates space in this department!

Understand, the certificate won't be sent instead of cash; it will be sent in *addition* to the usual awards. And we're here to tell you, it's a mighty nice thing to acquire, too! Done up in two colors, the certificate will bear the winner's name and a certification by the editor of MI of the excellence of the winner's particular workshop project. The readers with projects in this month's Workbench will be the first to receive these certificates, and we'd like to hear from them as to how they like the idea, what they plan to do with it, and so on.

So, come on! Start sending those photos!

VITAMINS are being given such a play these days that many people find it difficult to believe the accomplishments for which these mys-

[*Continued on page* 17]

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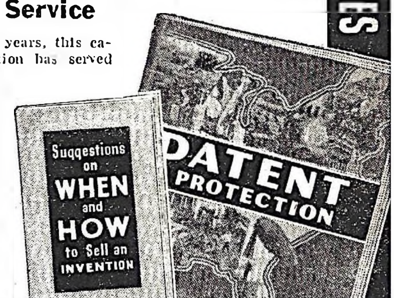

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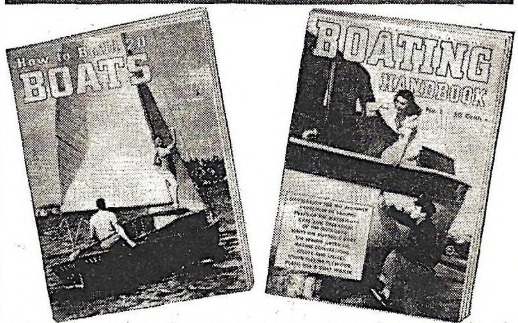

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Editor's Workbench Chips

[*Continued from page* 15]

terious little elements are given credit. As a matter of fact, however, vitamins will do just about anything you ask them to do, provided you don't want them to play the trombone or become a fourth at bridge.

Up in Boston, for instance, Dr. Benjamin F. Sieve, of Boston City Hospital, reported that daily doses of one of the B vitamins had enabled gray-haired and white-haired men and women, up to the age of 69, to grow their locks back in again the same color they'd been before things turned gray. Dr. Sieve reported that he'd tried the stunt on upwards of 300 patients, with astonishingly successful results.

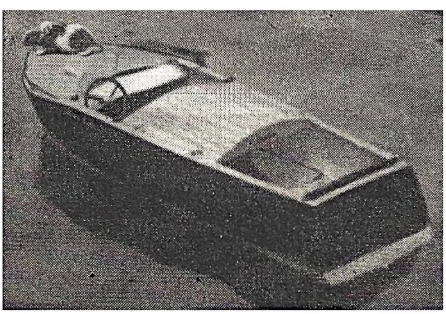
The doctor's results with gray hair, however, are as nothing compared with the accomplishments of vitamins in other fields. Take, for instance, the statement of Col. Albert Clark, head of the base hospital, Fort Lewis, Wash. Col. Clark predicted that, if he could take a troop of ordinary soldiers and train them on vitamins alone, he'd soon have a detachment of supermen who'd be so tough they couldn't be licked. If they lost their weapons, they'd fight with their bare hands.

Well, the colonel was able to experiment pretty much along the lines he wished to. He's now feeding vitamins to his selected troop of men and is able to make a report on how they act. If you're interested in reading his results, you might take a glance at "Captain Marvel Troops For America" on page 42 of this issue. We think you'll find it mighty interesting—if not sensational!

* * *

INCIDENTALLY, you fellows who like to spend the long, hard winters building boats will be interested in the article "Double V For Victory"

[*Continued on page* 19]



A pet mouse evidently finds the bow of this sleek model runabout the right perch for a swift ride. Colonel Larson of Lake City, Minn., used his own drawings in making the boat at a cost of just 54 cents. The hull is $\frac{1}{16}$ in. pine, and the two decks were built up of small pieces glued together. A rebuilt Erector set motor, powered by two flashlight batteries under the back seat, sends the craft through the water at 4 m.p.h. The shaft of the wire steering wheel is connected with the rudder with cord. Larson's expenses of 16 cents for wood, 10 cents for wire, and other parts 28 cents, bring him a profitable return, for he gets an Editor's Workbench check for $3.00.

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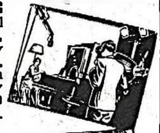

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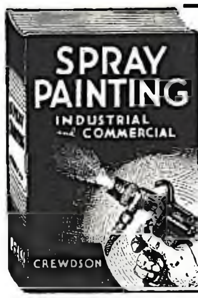

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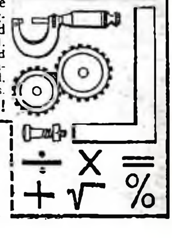

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Editor's Workbench Chips

[*Continued from page* 17]

on page 59. This piece tells of the accomplishments on the west coast of a new kind of boat, a craft which threatens to bring about a revolution in the ideas men have on the best design for racing hulls.

The double V is really nothing more than a boat built with a W-shaped bottom. The idea is that the notched hull enables a speedboat to skid along the water on its two edges, thus creating less drag

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and infinitely greater speed. The story describes Bob Stack's boat (he's the movie actor chap), which has this novel design. And we think if you read it you'll be so impressed you'll want to incorporate the plans into the next boat project you undertake.

And, by the way, just so you won't think we're selling you a bill of goods, we can tell you right now that there'll be at least one double V design in the next issue of "How To Build 20 Boats." Make a note of it and order your copy early.

* * *

ANOTHER yarn in this issue that should fascinate even the most blase reader is "Listening In On Hitler" on page 48. This one records the adventures of the boys on the Federal Communi-

[*Continued on page* 21]

A neat version of the *Snuffy*, made from HOW TO BUILD 20 BOATS plans by John H. Iken, 115 Thirteenth street, Fargo, N. D., is shown above. Mr. Iken says four people can fish from it without crowding. "It is one of the most versatile craft I have ever seen," he writes. A letter to Fawcett Publications, Greenwich, Conn., asking for blueprints No. 955, at $1.50, will bring you plans of the *Snuffy*. For Mr. Iken's snapshot, we're making out a $3.00 Workbench award.

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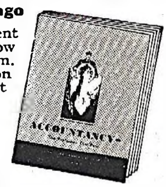

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Editor's Workbench Chips

[*Continued from page* 19]

cations Commission payroll whose job is to listen in on all foreign radio broadcasts to detect evidences of propaganda.

Now, offhand, you'd think the most glamorous job in the world would be just to sit by the radio and listen.

Just among us girls, it's nothing of the sort.

It's one of the toughest jobs in the country today. In the first place, all monitors—as the listeners are called—have to be able to speak at least four languages, and speak them well enough to be able to listen to a conversation in that language and analyze what is being said. That's why most of the monitors are internationalists of one sort or another—ex-college professors from Germany, France and Italy; members of royalty; soldiers who fought with the Czar, etc., etc.

Just try listening to your radio some day for eight hours, copying down a resume of everything that's said. If you're not a raving maniac by the end of the day, you'll then be able to appreciate this story.

* * *

THERE'S been so much talk of inflation lately and so many people have been ready and willing to tell us what to do to get ready for it, that a fellow hardly knows which way to turn. One man suggests putting all your money in stocks; another says there's nothing like real estate to take the worry off one's brow, and a third—and probably the nuttiest—says the best thing is just to take all your cash out of the bank and spend it very quickly.

Well, being an editor, we don't have any money in the bank to worry about, so that lets us out. But we think if we were trying to buy something

[*Continued on page* 23]

The attractive young lady in the picture above is ridng a speedy motor scooter built by George W. Callard, R. F. D. 4, Albion, N. Y. It is powered with a Briggs & Stratton ½ h.p. motor and does 80 miles to the gallon of gas, Mr. Callard writes. Mr. Callard rates a $3.00 Workbench check for his snapshot.

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Editor's Workbench Chips

[*Continued from page 21*]

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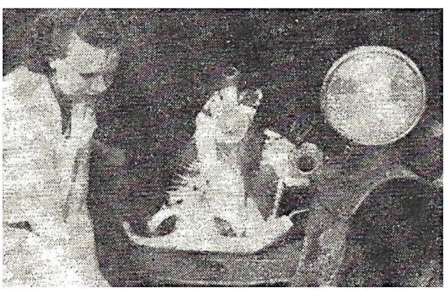
So, if you've got some dough in the bank you're afraid may turn to tissue paper, take our advice—haul it out and invest in a sure thing, your brain.

* * *

WE HOPE you took a good look at our cover this month. It's one of the best shots we've seen of the Navy's new flying battleship, the PBM-1 Mid-Ocean Patrol Bomber. These ships are capable, in case you hadn't heard, of flying across the Atlantic and back again without making a stop.

Which reminds us that we now have a story in the making on the growth of the United States air force from a few creaky biplanes into its present awesome stage of development. This story will go even further, however, and give you a picture of what the great air fleets of the future will be like, describing the great "aerial battleships" which will roam the skies when our sons are the aces at the controls.

—*The Editor.*



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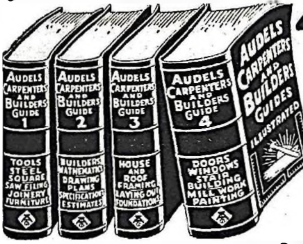

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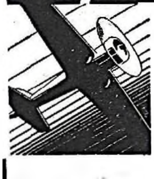

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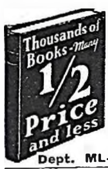

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Letters To The Editor

To the Editor:

In the August issue of MECHANIX ILLUSTRATED you printed a picture on my hobby of building boats in a bottle. Although the magazine has been on the newsstands a short time, I have already received over a hundred inquiries as to just how this feat is accomplished.

Tony Ostroff,
210 N. Lake St., Aurora, Ill.

* * *

To the Editor:

I am most pleased with the results from my letter published in the September issue of MECHANIX ILLUSTRATED inquiring about someone to help me out on an invention.

I haven't contacted any capital yet, as all inventors seem to be in the same boat as I am in that respect, but I have contacted a very good inventor in the line I wanted. I also received other offers of help.

I wanted to tell you of these offers in order that you may be advised of the fine results, and to let you know how deeply I appreciate your help at a time when I almost despaired of being able to find someone who could help me.

Patrick E. E. Coderre,
Port Chester, N. Y.

* * *

To the Editor:

I have been a steady reader of MECHANIX ILLUSTRATED for quite a while. Lately I have noticed an increase in articles on plastics and ersatz materials. I have come to the conclusion that a new field is being opened up here.

Could you give me any information on any school that gives courses on subjects of this nature? I think this is a field with a future and a good one for a young man to get into.

Edward Clancy,
19 Linden St., Passaic, N. J.

We suggest the correspondence schools.

* * *

To the Editor:

I want to tell you about our project here and ask your readers for suggestions as to how we can increase interest in it and attendance to it.

Our project is a Hobby Center. We now have nine workbenches in it for those who desire to take advantage of these facilities, and also 160 mechanical magazines open to everyone for guiding tips on home conveniences. MECHANIX ILLUSTRATED is our preference and it dominates the collection. We can't do without it.

I would like to strike up correspondence with Workbenchers who might care to write, and will appreciate any suggestions for increasing interest in our Hobby Center or improving it. We are making prints of our center for future souvenirs.

William Pedras,
201 North B, Madera, Calif.

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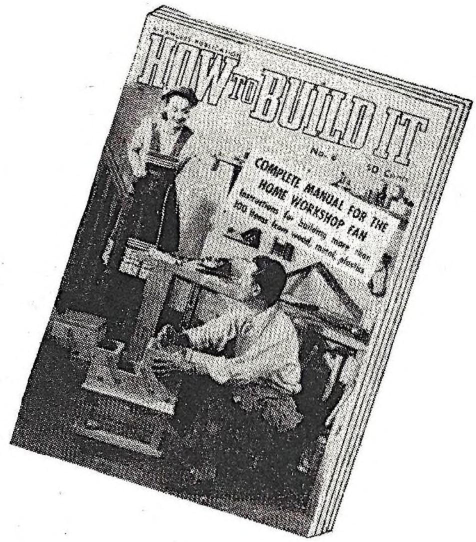

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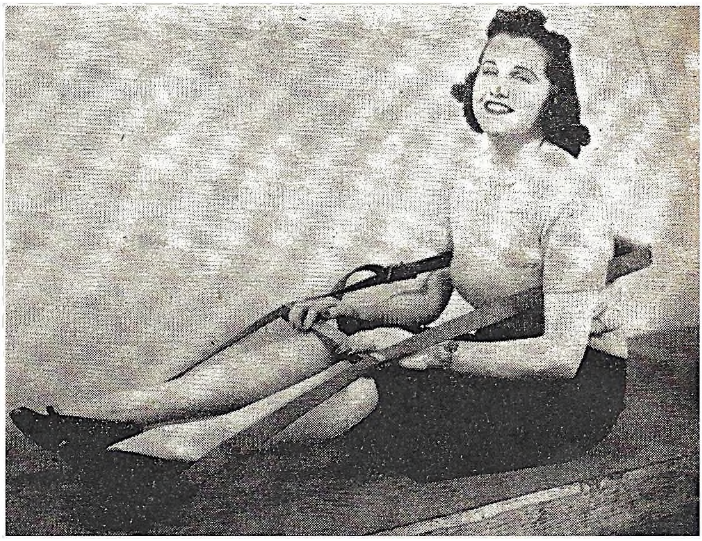

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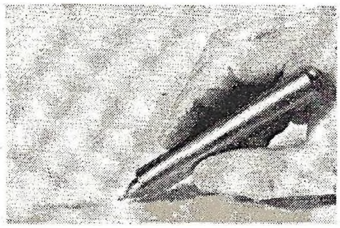

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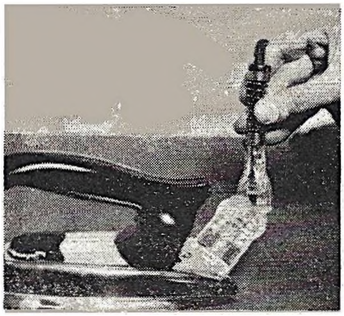

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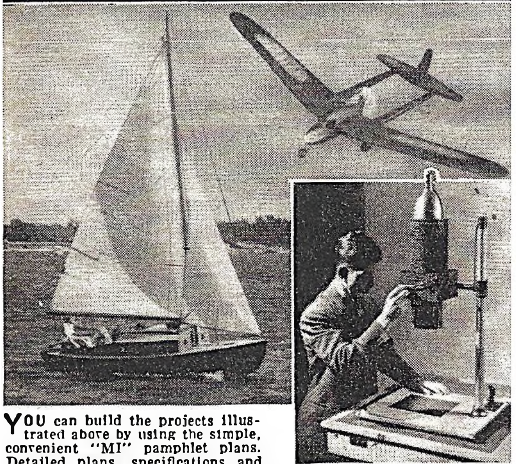

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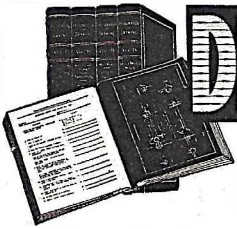

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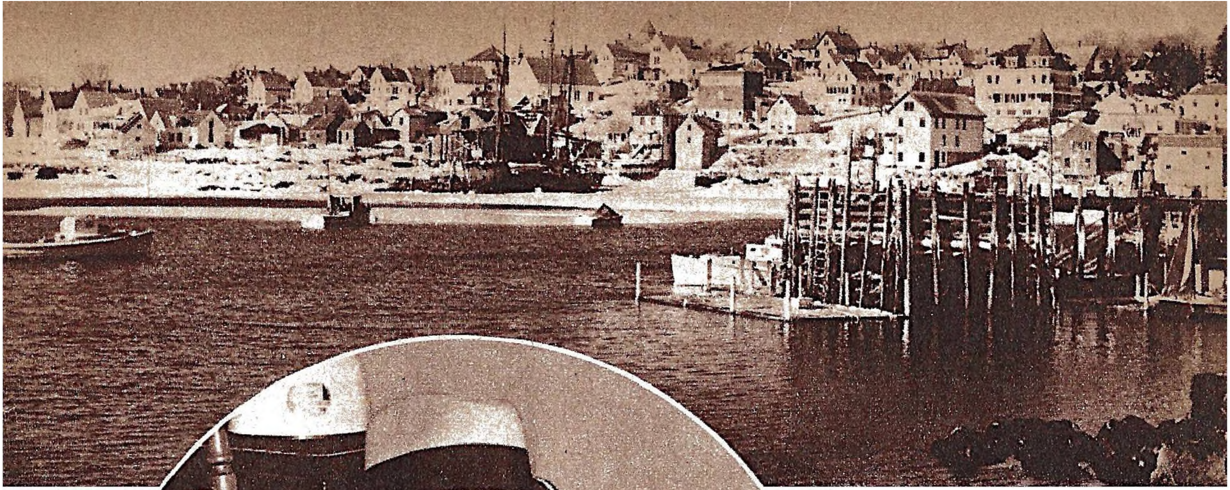

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The Something-Out-Of-Nothing Man

by Bud Martin

"LAD, 'tis best you leave the islands." George Barter spoke to his twenty-six-year-old son just back from World War 1, minus an arm lost in the Argonne. "You've been a good lobsterman, but the old days and the old ways can never be again for you. A seagull can't soar with one wing, and a man can't handle a pitching smallboat with one hand. Better forget it."

Ralph Barter shook his blond head. "Take me away from salt water and I couldn't live."

"You need but one hand to become a radio operator aboard a vessel," suggested the older man.

Maybe marine radio did offer a good career for one-armed ex-service men, but the routine was a pale substitute for the glamour of lobstering; and young Barter yearned for the tangy wind that puts life into the sparkling waters of Penobscot Bay. So he quit Boston and the radio school. Newport, where he tried again, wasn't much better. And anyway, watchman aboard a rich man's yacht was no job for a man who'd hauled his string of two hundred lobster traps from his own boat.

"I understand," George Barter welcomed his thin son back to Deer Island, Maine. "Some Barters couldn't live anywhere except on the islands. You're one of 'em, I guess." He gave his son an interest in a sardine herring weir, then being built on the island. "Hire a 'hand' to do your share of the labor," he cautioned. "You've a good head on your shoulders. Use it."

Young Barter, delighted at being back in the islands again and determined to make good, plunged into the weir-building with all the energy that had been pent up so long—and forgot his father's caution about physical labor. One day he was standing in a dory, driving a wing sapling into the mud in two feet of water. A wave moved the boat. With his left hand, the one he'd lost in the Argonne, he reached out to regain his balance. Ralph Barter went overboard.

To the average islander a ducking is all in the day's work, but to a strong man newly crippled this was a tragic reminder of his deficiency. It seemed to Ralph Barter that he could never overcome the loss of his arm. He'd failed in Boston, failed in Newport, and now he was a failure at home. Despair, black as the mud that covered his face, enshrouded his very soul.

You don't hear much about women in the man's world of the Maine islands but they're there just the same, making snug homes for their men to return to; rejoicing in good times, cheerful in bad; ready always with a quiet sympathy and practical aid for the wounds, body and soul, which the sea inflicts upon

Lobsters comprise just one of Barter's enterprises. They are iced for shipment, right, after passing the warden, below.

Barter's office, above, doesn't look like the high-pressure spot it is, but his store, below, hums with Down East Commerce. By dint of skillful trading, he started with nothing, now does business in coal, fish, lumber and canning—all at a profit!

their fishermen. For three days Mrs. Barter suffered in silent sympathy with her first born. She was prepared when he turned to her at last with, "What can I do now, Mother?"

"You can't wrastle life with one hand, son."

"No."

"Then you must have another arm to fight with. Son, don't you recollect you earned your first nickel with a lobster trap someone else had thrown away? You got your start by using odds and ends!"

"Mebby you're right," Ralph Barter's blue eyes were thoughtful.

"Course I am. And that very knack'll be like a new hand to you, if you use it. 'Stead of trying to wrastle with the two-handed ones on their own home grounds you're going to take the things they can't see any use for and turn them into something worth while. 'Tis your salvation, boy."

"Mother," solemnly Ralph Barter spoke, "that's *just* what I'm going to do!" And that's how Ralph Barter, of Deer Isle, Maine, em-

Tycoon or not, Barter is never happier than when he's bulling with the boys, most of whom depend on him for a living.

barked upon the strange career of making "somethings out of nothings."

Probably there's no place where less is wasted than on a Maine sea island, where even the clam shells are utilized as gravel for driveways. High and low, back and forth across the thirteen miles of granite ledge and thin top oil which is Deer Isle and Little Deer Isle, Ralph Barter searched, and the only thing he could find that no one else wanted was the job of treasurer of the town of Deer Isle. He took it. And a fertile field for the waste-hunter he found town affairs to be. Naively he wondered why the town was borrowing money when so much was due in back taxes on spruce woodlands.

"Nobody'll pay taxes on spruce," the tax collector informed him patiently. "The trees are too small for lumber. And too gnarled, and twisted, and knotty. 'Tis a relief to the owners when the town takes the prop'ty off their hands."

The tax collector's opinion of Deer Isle spruce was corroborated by three different lumber companies which Barter contacted. Not one of them would take it as a gift. Still, the green town treasurer believed the spruce could be used. It seemed a pretty big problem for him to tackle all alone, but he made a trip to the city of Rockland, on the mainland, anyway. Then he took a deep breath and began to buy tax liens, and even tax-paid spruce woodland—all he could get of it. He sold his interest in the weir. He used up his savings from the lobster-fishing days, every nickel. Then he borrowed money from a bank and bought trucks, a portable sawmill, and hired men to cut and haul the spruce no one on Deer Isle wanted.

"He's plain daft," was the island opinion.

"Mebbyso," opined one cracker-box philosopher, "but 'tis the fust time ever I see a banker loan money to a crazy man."

Maybe Ralph Barter was crazy but the banker didn't think so; not when Barter told him of that trip to Rockland to interview the superintendent of maintenance of the Eastern Steamship Company, which operated scores of routes serving the coastal and river towns of Maine. Barter had convinced the super of maintenance that a tidy saving in upkeep could be made by using island spruce because its very twisted, gnarled knottiness

[*Continued on page* 137]

Smoke The Pipe Of Peace

Your Pipe Can Be Your Best Friend Or Your Worst Foe—Here's The Way To Select It, Break It In, And Care For It.

by Rory O'Shane

Don't blame the Little Woman if she feels this way about your hod. Take care of it!

THE saddest men I know are those who have tried everything in the way of pipes and have yet to find something that is sweet, cool, and dry. Most of their complaints about sour pipes and rank tobacco could have been avoided by exercising a little discrimination in the selection and care of a pipe.

The rules for choosing a pipe are on the same par with picking a wife. You look for graceful lines, a sweet disposition, and the ability to improve with age. Three types of pipe embody these characteristics in more or less varying degrees.

Undoubtedly the aristocrat of them is the genuine meerschaum, so-called because of its resemblance to crystallized seafoam. There is no other known quality which is as light, cool, and absorbent.

There are various schools of thought as to the means of breaking in a meerschaum and at the same time turning the bowl to the glow for which it is famous. Perhaps the best plan is to use a fake upper bowl which will fit inside the bowl of your pipe; this prevents the rim of fire discharged by the burning tobacco from overheating and thus undercoloring the upper part of the bowl.

Your meerschaum should be smoked slowly and thoroughly down to the heel of the pipe. Do so indoors, if possible, for a Meerschaum does not take kindly to sudden climatic changes. To prevent the sweet dryness from dissipating, it should never be re-smoked until it has had a chance to cool. Some

smokers think a chamois jacket sewed around the bowl aids the "breaking-in" process. This is not strictly so, but it does protect the bowl from being spotted by the hand, since any grease, dirt, or perspiration on the fingers will discolor the pipe while it is cooling.

There are various imitation meerschaums on the market capable of fooling anyone but an expert. Burnt gypsum soaked with lime in a solution of gum arabic forms a lustrous plaster exactly like meerschaum and with the same polished surface. There is also a hardened plaster of Paris model which almost defies detection. A third kind is an ingenious derivation of the chips and dust collected from the real meerschaum and bonded together with various chemicals. The price of an imitation is about half that of the genuine. It is advisable, therefore, to buy meerschaums only from the most reliable of sources.

Several million pipe smokers in the United States own another kind of meerschaum—the Missouri meerschaum—or just plain "corn-cob" to you.

Selling for a thin dime, it is one of the best things a man can smoke because it is extremely porous and moisture-absorbing. Although their low price makes them convenient to smoke and throw away, you should know that the larger the cob and the woodier the fiber, the better the smoke.

It is said that the corn-cob leads a double life—for every one smoked in public there are ten cached away in office desks, bookcases, and easy chairs. The people who look down their noses at the lowly cob might take a lesson in democracy from Walter Pidgeon, Mayor La Guardia, General Pershing, Burleigh Grimes, Senator Bennett Clark, H. L. Mencken and a host of others, none of whom is afraid to smoke his ten-center in public.

With the experienced pipe smoker the wooden pipe with the short stem has taken its place as the favorite by reason of its excellent consolidation of durability, coolness, and light weight. But the trouble with most native American pipes is their tendency to char and crack under the heat of burning tobacco. Cherrywood is especially sweet smoking, but the interior of the bowl fails to carbonize well.

In the imported *bruyere* we have a wood that heats slowly, is beautifully grained, and absorbs moisture rapidly. It is sapless and non-odor-retaining so that when heated, the fragrance of the tobacco is not mingled with

Pictures from top to bottom: 1. Keep the shank clean at all times; 2. Half a bowl of tobacco, packed lightly, is best to break your pipe in; 3. Never knock the pipe on hard surfaces; 4. Never scrape with a knife; 5. Clean the metal guard often.

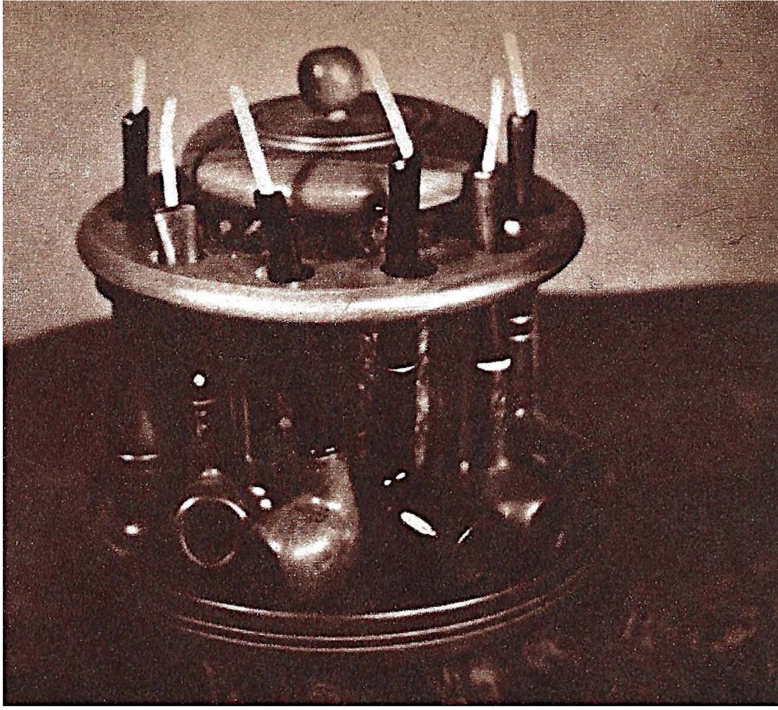
the smell of the wood and lost.

Algerian and Corsican white straight-grained *bruyere* make the best briars because the wood is very old and extremely light. It is doubtful whether or not the direction of the grain augments the smoking quality, but today pipe connoisseurs value highly any briar which has grain running vertically up and down the bowl of the pipe. On the contrary, in former years, the gnarled and knotty parts of the root, when incorporated into the bowl, became its strongest selling point, the idea being that this was the hardest part of the root and thus the most fire-resistant.

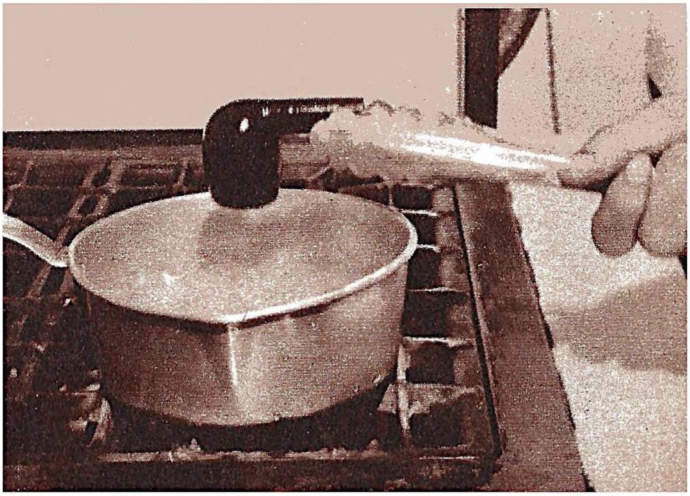
Although a great number of pipe smokers satisfy their aesthetic senses by watching for the flawless beauty of a perfectly grained bowl, the economical buyer would do well to take advantage of the large number of briars called "seconds" on the market. If you follow along the grain with a keen eye, you can see where the wood has been chipped, marred, or wormholed, then refilled with other material. These defects permit a sale at much lower prices, but there is no difference in the smokability, and it is a splendid opportunity to get two good pipes for the price of one.

As far as the sales claims for pipes that are treated with honey or boiled in oil that "imparts to the briar a spicy flavor that is unique and delightful," don't you believe it. The processes function only to sweeten the smoke, not the pipe, and quickly wear away. It is also well to remember that the thicker the wood in a pipe, the cooler the smoke.

Varnished pipes are not too highly recommended since certain types of varnish fill in the pores of the wood and prevent absorption of stale tobacco fluids. These are to be distinguished from briars whose luxurious color is the result of staining or being steamed under low pressure.



A pipe grows "tired" easily. Keep several pipes and rotate them if you are a regular hod-burner, giving them a rest in a rack such as that shown above. Keep a cleaner in each stem. To cure a sour pipe, steam it, as shown in the photo below.



It is desirable to have a stem that meshes with the shank rather than one that must be squeezed in. What very often happens when the pipe is being taken apart to be cleaned is that the thin part of the wood splinters. The proper way to dissemble a briar is to hold the stem in one hand and turn the *bowl* in the other.

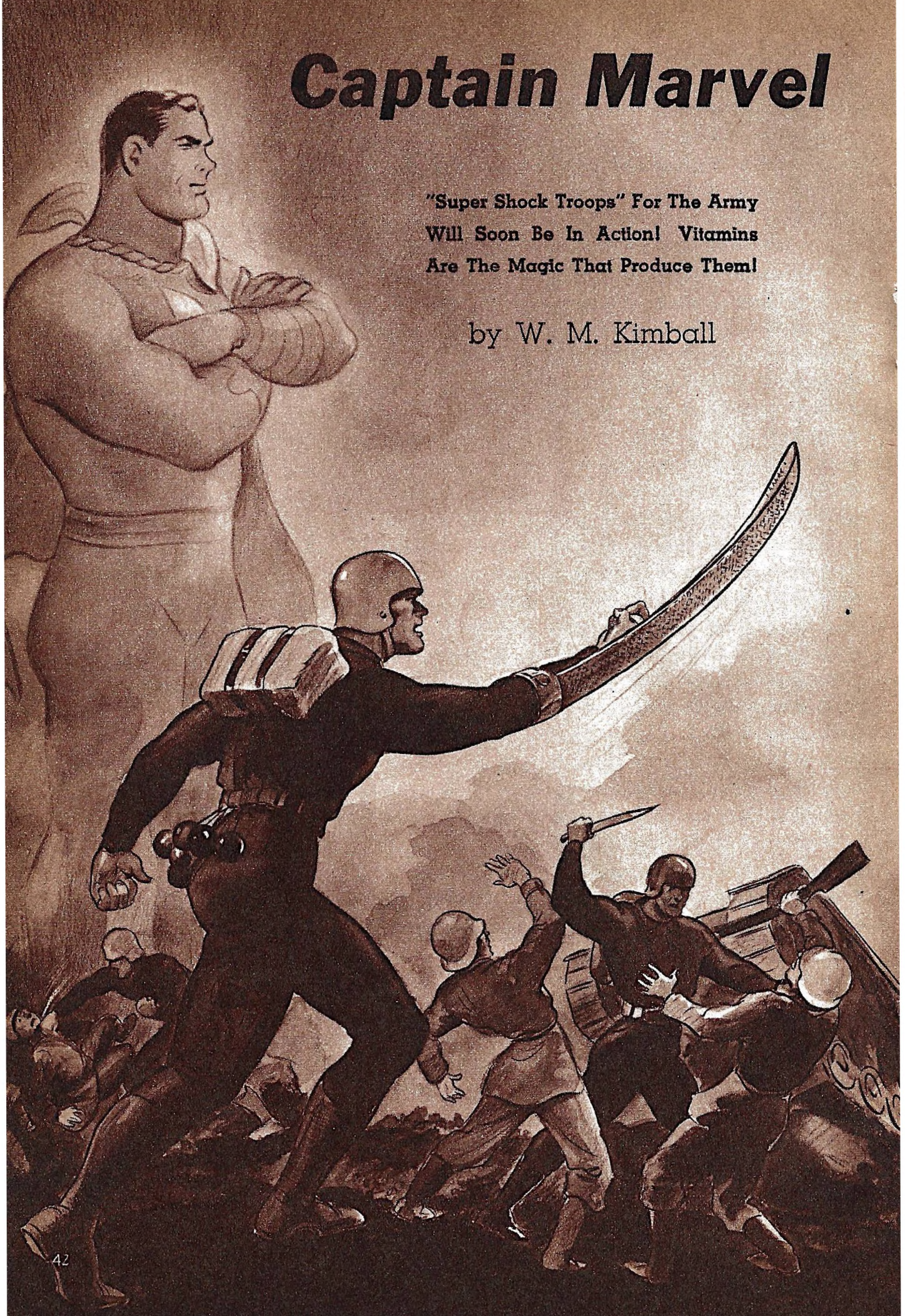
The highly advertised metal inserts are of no practical value either in keeping the pipe cool or in protecting the smoker from bitter tobacco juices. Old-timers generally remove

[*Continued on page* 134]

Captain Marvel

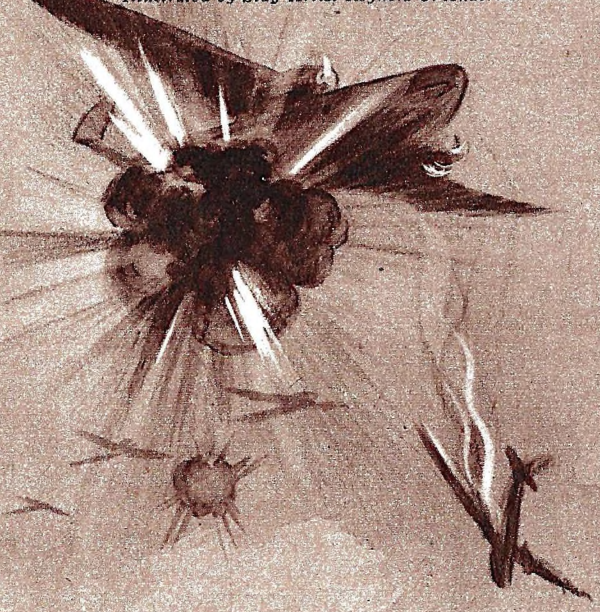
"Super Shock Troops" For The Army Will Soon Be In Action! Vitamins Are The Magic That Produce Them!

by W. M. Kimball



Troops for America!

Illustrated by Staff Artist Reynold C. Anderson

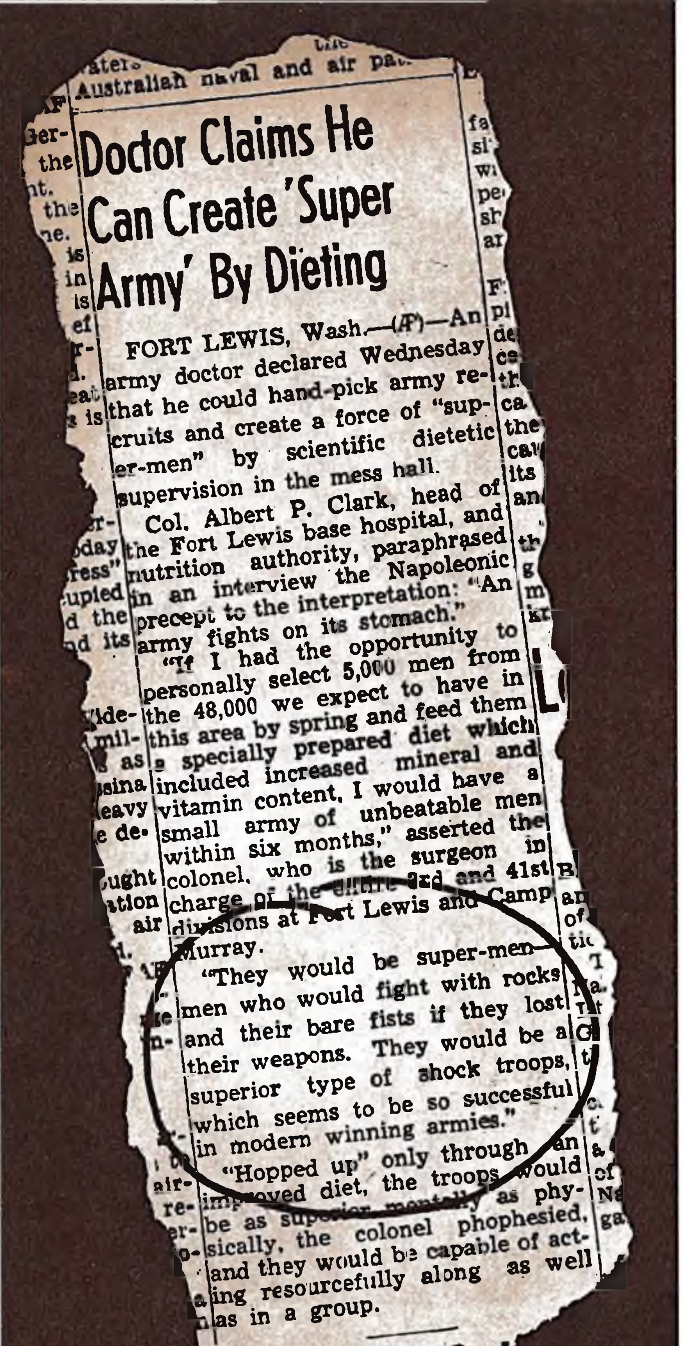


THE gray-clad ship moved into the quiet evening shadows of the secluded cove near Willapa Bay.

Three boats dropped from the davits. In each of them 20 men sat straight, alert on the thwarts. Purring motors beached the boats silently. The shadows were blackening, but the 60 men leaped ashore sure-footedly, their cat-eyes piercing the gloom. They were assured men—tall, lean, brown, certain of every movement.

An observer might have whistled in awe to look at them—and with good reason. For these were the United States Army's "super-shock troops" going into action! The Captain Marvels of America!

Each of them had the strength of ten men. Into each, scientists had instilled the cold, fighting ferocity of a black jaguar. They were "made to order" fighting men, the culmination



Doctor Claims He Can Create 'Super Army' By Dieting

FORT LEWIS, Wash.—(AP)—An army doctor declared Wednesday that he could hand-pick army recruits and create a force of "super-men" by scientific dietetic supervision in the mess hall.

Col. Albert P. Clark, head of the Fort Lewis base hospital, and nutrition authority, paraphrased in an interview the Napoleonic precept to the interpretation: "An army fights on its stomach."

"If I had the opportunity to personally select 5,000 men from the 48,000 we expect to have in this area by spring and feed them a specially prepared diet which included increased mineral and vitamin content, I would have a small army of unbeatable men within six months," asserted the colonel, who is the surgeon in charge of the entire 3rd and 41st divisions at Fort Lewis and Camp Murray.

"They would be super-men—men who would fight with rocks and their bare fists if they lost their weapons. They would be a superior type of shock troops, which seems to be so successful in modern winning armies."

"Hopped up" only through an improved diet, the troops would be as superior mentally as physically, the colonel phophesied, and they would be capable of acting resourcefully alone as well as in a group.

WANT A VITAMIN SANDWICH?

Vitamin B is wonderful—but how can you get it? Dr. Tom D. Spies of the University of Texas described a simple "vitamin sandwich" at a recent symposium at the University of Chicago.

The filling of Dr. Spies sandwich would be peanut butter combined with up to 20 per cent of enriched brewers yeast. The outside of the sandwich would consist of peeled wheat bread produced by the Earle flotation process of manufacture.

The mixture of peanuts and yeast is a good source of the natural vitamins of the B complex and high in protein, fat and calories as well, while the bread, according to Dr. Spies, furnishes more vitamins, proteins and minerals than are contained in white bread or so-called whole wheat bread.

The magic Vitamin B, most potent food weapon, is shown above as the electron microscope sees it.

of all of mankind's laboratory research—the cream of American manhood whose powers had been heightened and multiplied infinitely by a special course of training and forced vitamin feeding under the supervision of Army physicians and nutrition specialists.

On the beach they gathered about their leader, a squat, compact man with a maple leaf on his shoulder. Their equipment was on their backs, packed in light plastic cases. All were dressed in the same misty blue-green uniforms that blended with the Pacific Coast scene of their special mission—a mission that meant protection for the vital plane, power and water supply plants that extend from Canada to Lower California on

"Captain Marvel Troops" are being developed as special shock details among the army air corps' paratroops, seen in this photo.

the Coast. Their equipment was as unusual as the men, themselves; it was especially designed for this particular service: shin-high boots, calked semi-pliable soles; tough rayon ski-pants strapped tight at the waist over a rayon and wool jacket; a long knife at one thigh, a stubby automatic rifle on the other.

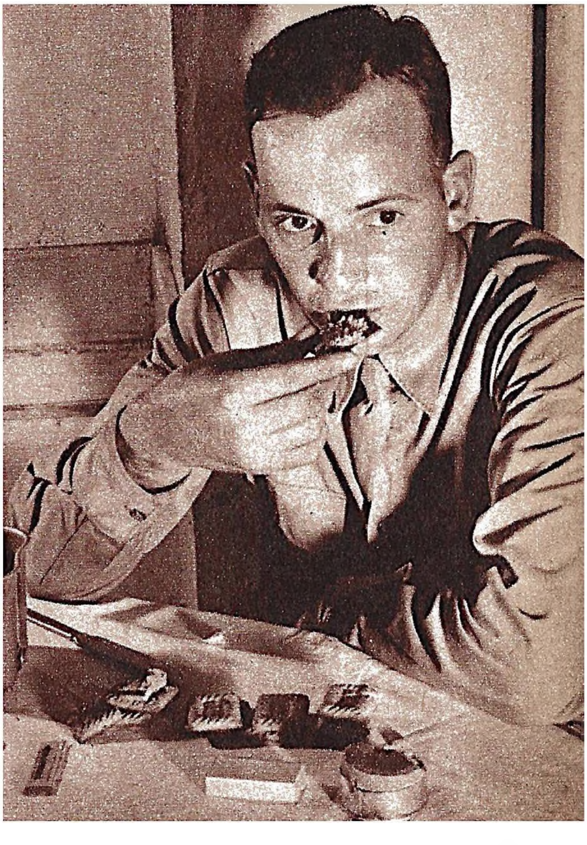
Slots in belts held extra ammunition; waterproof containers for tools, flares—and three tubes of pale, concentrated vitamins!

A special squad of eight men carried an even more unusual weapon, shaped like a monstrous claw but made of rattan woven to form a long, narrow, curving basket. This weapon was an adaptation of the cesta—the throwing device used in the Basque game of Jai Alai. These eight men with cestas constituted the super-grenade throwing squadron of the patrol—and more about them later.

The major spoke as the men gathered about him.

"I suppose you have guessed the purpose of this mission," he said. "G-2 (Military Intelligence) reports an impending attempt to land sabateurs on the North Pacific Coast. Pacific Patrol reports an enemy aircraft

[*Continued on page* 143]

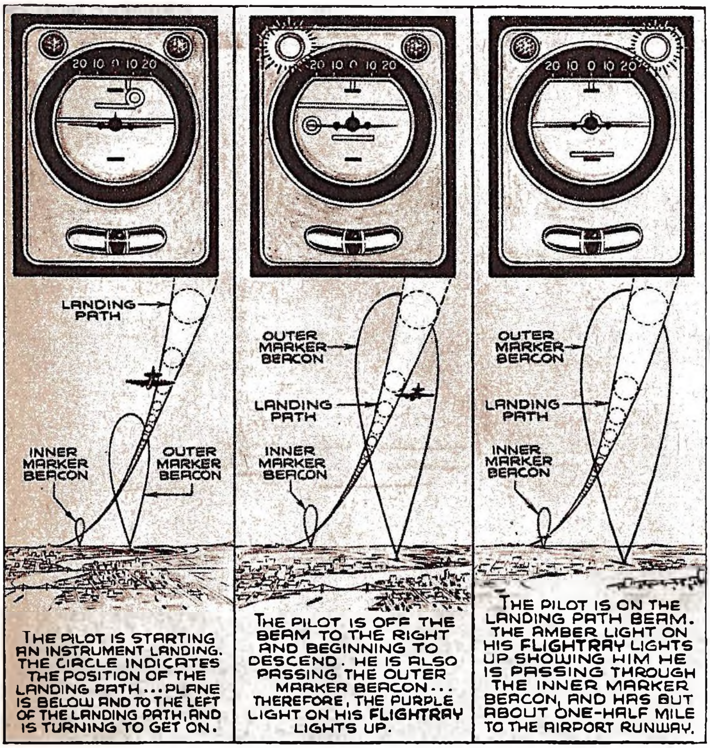


Pvt. Alvin Thompson of Fort Snelling, Minn., nibbles at new concentrated rations developed by army nutritionists, at the right. He doesn't look any too happy, but it's good for him!

The Sperry Gyroscope Company's "flying laboratory," on which aviation's newest and simplest instrument was flight-tested.

A Sixth Sense for The Pilot

by David Robinson George



Steps in a blind landing as it's done with the simple and magic Flightray.

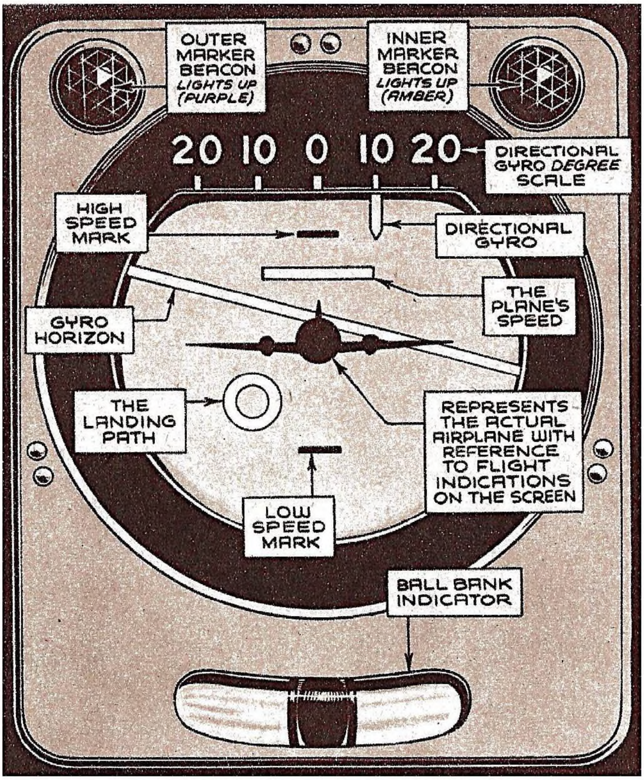
"TWA Flight 42, calling LaGuardia! TWA Flight 42, calling LaGuardia! Come in, please."

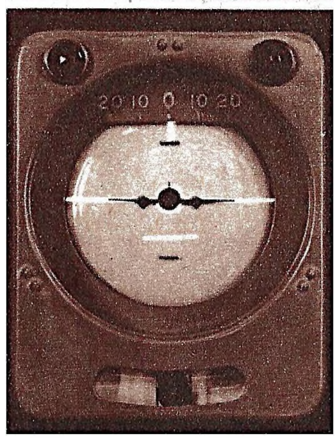
Gliding in toward New York City's great municipal airport, LaGuardia Field, a huge Boeing four-motored stratoliner calls the control tower by radio for a clear runway. It is a foggy evening and visibility is low.

At the plane's controls is the chief pilot, alert and tense as he watches five different dials on the instrument panel, at the same time listening intently to the whistling code signal of the radio landing beam.

As he brings the big ship safely down and its wheels touch the concrete runway, he sighs with relief. For landing blind is his greatest

The Flightray. One Instrument In Five, Soon Will Completely Simplify All Blind Flying.





Functions of the Flightray *are shown in the diagram at left, above. When the ship is off its course, the dial appears as at right, above. She's gaining speed, banking and too far left. Below, all white lines match black—she's in on the beam!*

responsibility and most exacting task. Soon, however, all this will be changed. Instead of the harrowing job of watching five indicators at once while listening to another, the transport pilot will have the comparatively simple duty of studying one instrument!

Ready for commercial use after hundreds of hours of flight-testing by major airlines and the Civil Aeronautics Authority, a miraculous new device will ease the task of the transport pilot and greatly increase the efficiency of blind landings.

The device is the Flightray, developed over a period of three years by the Sperry Gyroscope Company, pioneer maker of air navigation instruments. Incorporated into the Flightray's single luminous dial are the functions of the directional gyrocompass, artificial horizon, altimeter, air speed indicator, radio compass and landing radio receiver.

Installed in the center of the instrument panel of Sperry's "Flying Laboratory," a twin-motored Lockheed, the Flightray performs with uncanny accuracy.

A little black plane in silhouette—looking forward from the tail—floats in the soft green light of the Flightray's dial. Circles and bars appear and move about, amber and purple lights appear and disappear—and to the eye of the pilot, each glimmer and flicker tells an instantaneous story.

The miniature airplane silhouette is imposed on a three-inch ground glass disk and is stationary. The indications of the six instruments are transmitted successively into movements of light patterns projected upon the face of a cathode-ray tube set behind the dial.

Thus the horizon bar, shown in the accompanying drawings, tilts to correspond with the angle of the artificial or gyro-horizon, while the air speed bar rises and falls vertically. When the plane is on precisely the right

[*Continued on page* 132]

LISTENING IN ON HITLER

Bombardment Of America From The Air Is Going On All The Time!
But It's A Propaganda Raid, And Uncle Sam Is Now Beating It Off.

by Charles J. Vests

"U. S. DEFENDERS repel foreign air attack!"

You'd jump, wouldn't you, if you found *that* headline in your morning paper. Yet it's true, today and every day.

A constant bombardment rains down on our shores, a bombardment just as real and dangerous as though it were one of bombs dropped from planes. It is the airborne bombardment of radio propaganda, one of the deadliest weapons of modern war, accompanied by the sinister crackle of messages and instructions to saboteurs and spies.

Aimed straight at the United States, this propaganda barrage is hurled by powerful foreign transmitters into the hundreds of thousands of American homes that today are equipped with short wave receivers. Luckily most of it falls harmlessly on deaf ears, for Americans are a skeptical lot with convictions of their own. But the oily voice of the foreign "commentator" daily lays down the "line" that his eager agents among us will take up and repeat. The highly-colored "newscast"

The news as Adolf Hitler would like us to hear it is picked up at an American listening post, below, and carefully combed.

NBC's foreign listening post at Bellmore, Long Island, is a scene of never-ending attention to every foreign broadcast.

War bulletins picked up by NBC are carefully checked and double-checked for accuracy before being put on your radio.

often betrays, by a change in tone, some impending stroke of tremendous diplomatic or military importance. Not even the "entertainment" is innocent. Coded messages to spies have been played on the piccolo, if you please, in Transatlantic broadcasts!

The broadcasts, as a rule, however, are merely the frontal attack. Flanking them are the more perilous penetrations of secret, unlicensed transmitters which exchange vital information with agents bent on the obstruction of our national defense and the destruction not only of our morale but of lives and property as well.

And is Uncle Sam doing anything about this? Plenty!

The air above us is policed as thoroughly as Times Square in the rush hour by a combination of government and private radio agencies. They cannot choke off the flow of propaganda from licensed foreign stations. But they can do the next best thing by "catching" it, recording it, analyzing it, and moving promptly to counter-act it wherever necessary.

Let's see how they do it. In a house on the eastern shore of Maryland, that looks for all the world like the residence of a suburban business man, a cluster of very intent individuals sits with ears glued to radio microphones. Over the head of each is a card indicating the source of the material pouring through the headsets—Berlin, Rome, Tokyo, London, Moscow.

Every hour of the day, seven days a week, their vigil is maintained, and every syllable of every foreign broadcast is heard, digested, recorded, translated and analyzed. If it seems harmless on the first reading, it is read and read and read again.

But here's the whistling of a foreign transmitter! A thin, dark-skinned man at a corner set of dials listens intently. The recording machine is turned on; quick fingers skip nimbly through a shorthand transcription. There must be no slip-up here, lest one apparently harmless word slip by!

A harmless propaganda broadcast is checked on the map, right, before being put on the teletype, below, for transmission to the FBI or its proper government agency.

The broadcast ends. It has been nothing more than an Austrian station reporting the delights of a vacation in Roumania.

But the men at the Maryland receiving station give the transcription their closest attention. They boil it down; translators jot down the English meaning of every phrase, every idiom. Then, a casual sentence—"Already great numbers of tourists from the Reich are discovering this delightful holiday land."

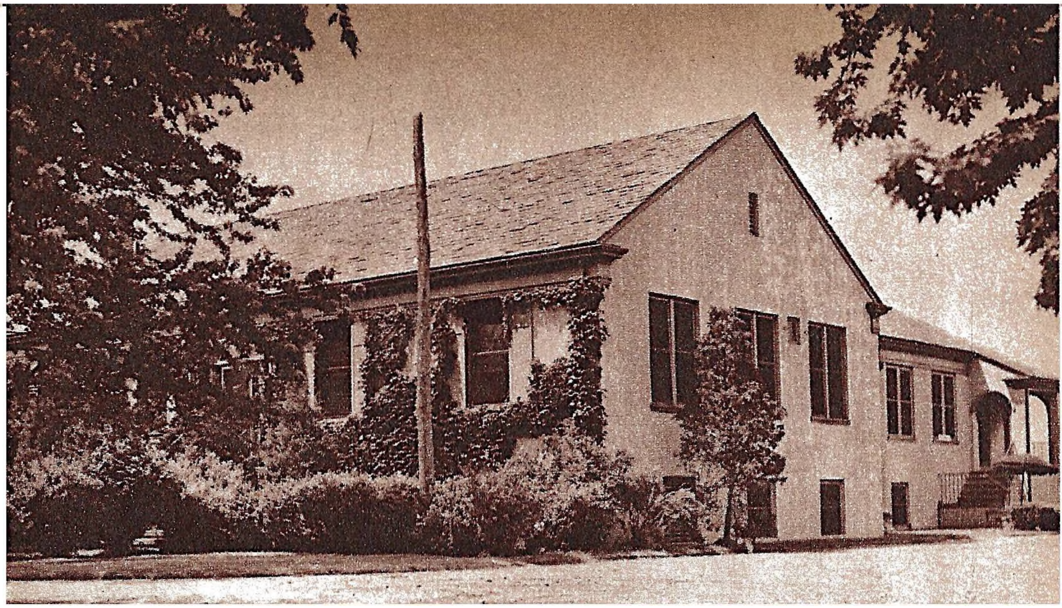
Tourists! The new technique in Nazi invasion thrusts!

Immediately the broadcast is digested and analyzed. A resume is snatched from the typewriter and rushed to the teletype connected with the State Department in Washington. The governmental wheels begin to turn—and another invasion is known before the first gun is fired!

This is the work of the Foreign Broadcast Monitoring Service, a division of the Federal Communications Commission, which does daily battle on a broad front to keep up with the 24-hour barrage of propaganda which pours over our borders from the capitals of Europe and Asia. Its aim is a dual one: to record, analyze and offset harmful propaganda; to winnow out information of diplomatic or military value to the United States.

Eleven major listening posts are maintained on a 24-hour basis in strategic locations in the United States, Hawaii, Alaska, and other key points. Theirs is the job of translating, transcribing and detecting every tell-tale word or phrase in a daily volume of between 600,000 and 900,000 words of foreign broadcast material. The Berlin radio tosses eleven hours of propaganda our way every day; the British send us about six and a half hours, Japan four and a half hours, and Italy more than four hours, to say nothing of a score of lesser fry. In addition, we must keep an ear attuned to the broadcasts directed at our South American neighbors.

Throughout Latin America today, our own propaganda forces are waging a tense struggle against those of the Axis, with much at stake. Uncle Sam's radio watch dogs are trained to growl whenever they detect a telling new trend in the propaganda of our rivals. The eleven monitoring stations are linked together in constant communication and are, in turn, tied up by teletype at Washington to all the key government bureaus that may be called upon to act on the information given them. Thus, a well-aimed propaganda uppercut from Berlin may be noted almost as soon as it lands. Within a few hours, an effective American counter blow is launched from Washington in the form of some statement or action by the State Department or the



It looks like a harmless country home, but, in the building above, are the ever-alert ears of America's ace radio sleuths.

They look relaxed—but these propaganda spotters never miss a foreign air signal.

Chairman of the Senate Committee on Military Affairs. When you watch the papers closely you can sometimes actually see this happen if you are aware of the complicated, little-known machinery by which we achieve such quick results.

Here's another typical Foreign Broadcast Monitoring Service listening post. It stands alone in a mansion on a hilltop. Only the outdoor antennae and the frequent arrival and departure of automobiles testify to the tension of repressed activity within. From room to room the eye sees walls literally paneled with dials and gadgets. There is silence broken only by the occasional squeals of receivers. For the most part the listeners work with ear phones. Pale, tense, young, they wear habitually strained expressions. Youth counts in this business. Listening, just sheer listening, is a terrific nervous strain. Try devoting all the powers of concentration you can muster on a radio speech for 10 minutes and you'll get some idea of what it must be like to put in an 8-hour trick.

Each station is manned by a compact staff of highly trained radio technicians, translators, and analysts. They are specialists, every one. As the listeners pull the broadcasts in from the ether they are recorded and turned over to the translators, each of whom is intricately familiar with at least four languages. In Kingsville, Texas, are specialists on Latin-American affairs, in Portland, Oregon, are men to whom the Far East is an open book. It takes seven hours to transcribe and translate a single hour of recorded broadcasts. Once transcribed, the data must be reviewed

[*Continued on page* 135]

Sight-Seeing In Your Eyes

You can see the blood vessels in your own eyes by gazing intently at the wall in a dark room by candlelight (above).

by Maxwell Reid Grant

EVEN the most avid of photography addicts are prone to forget that they possess two of the world's finest miniature cameras—their eyes. Yet, without any expense for lenses, film or developing, anyone can put his eyes through a wide range of fascinating experiments not possible with an ordinary camera.

These simple tests will introduce you to a new "science of photography" that you will not find in any camera manual. They will enable you to look into the interior of the eyes, to find your own eyes' blind spots, to discover how your eyes deceive you. Here is your opportunity to see into some of the many secrets of sight.

1. Find the flaws in your eye's lens.

Although your eyes are marvelously sensitive natural cameras, they have many imperfections in their lenses. To see them, make a pinhole in a card and look through it at a lamp, beginning at a distance of about twenty feet and walking up closer. Or look at a cloud through the pinhole. The crawly, squirming, mote-like particles you see are really flaws in the eye's lens.

2. Are you near- or far-sighted?

Make two pinholes in a card about ⅛-inch apart. Cover the upper hole with red cellophane, the lower with green. Hold the card close to the eye so that you look through both holes at once. If you see a mixture of colors, your eyes are reasonably near normal. If the red appears to be above, you are far-sighted; if below, you are near-sighted.

3. See the blood vessels in your own retina.

In a dark room, hold a candle or small light bulb some distance from the eye and slightly higher than the line of sight. Look straight ahead (not into the light) and you will see the pattern of the blood vessels of the retina, apparently projected against the dark part of the room.

Your Eyes Are Full Of Magic And Queer Quirks— Here Are A Number Of Fascinating Tricks You Can Perform With Them!

Seeing the interior of the eye is accomplished by peeking through a hole in a hand mirror which lights up the inside of the eye's retina.

4. See where the optic nerve enters the eye.

Sit in a darkened room for several minutes, until your pupils have dilated somewhat. Now roll your eyes rapidly and you will see two luminous circles, corresponding to the revolving points (optic disks) at which the optic nerves enter the eyes. The sensation of light is caused by the traction exerted upon the nerves by the eye movements.

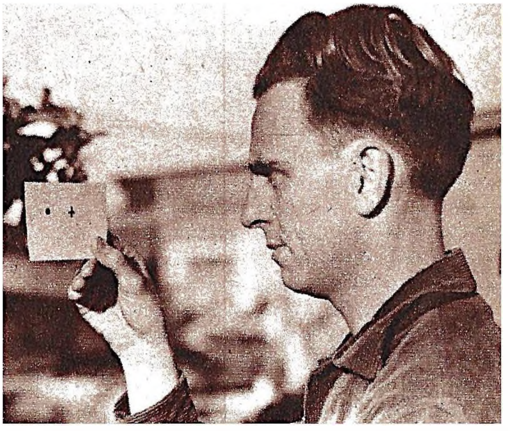
5. Look into the interior of the eye.

Scratch a tiny hole—just big enough to look through—in the silver backing of a small mirror. Face the person whose eyes you are going to look into and place a bridge lamp or other diffused source of light behind and somewhat to the side of his head. As you look into his eye through the pinhole in the mirror, the light reflected from the surface of the mirror will light up the eye's interior. You will see a whitish disk marking the spot where the optic nerve enters, and you will see the blood vessels and tiny veins of the retina. This instrument is a simple ophthalmoscope, similar to that the optometrist uses to examine your eyes.

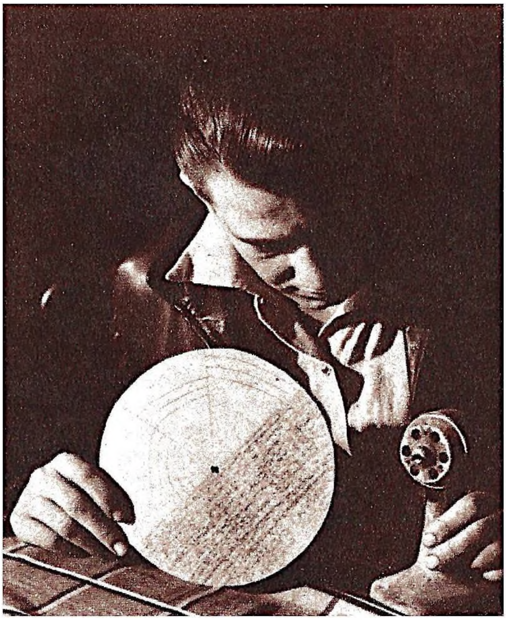
6. Find the blind spot in your eye.

Make a circle and a cross about two inches apart on a piece of paper. Close one eye. look at the cross, and slowly move the paper. keeping it close to your open eye. When the

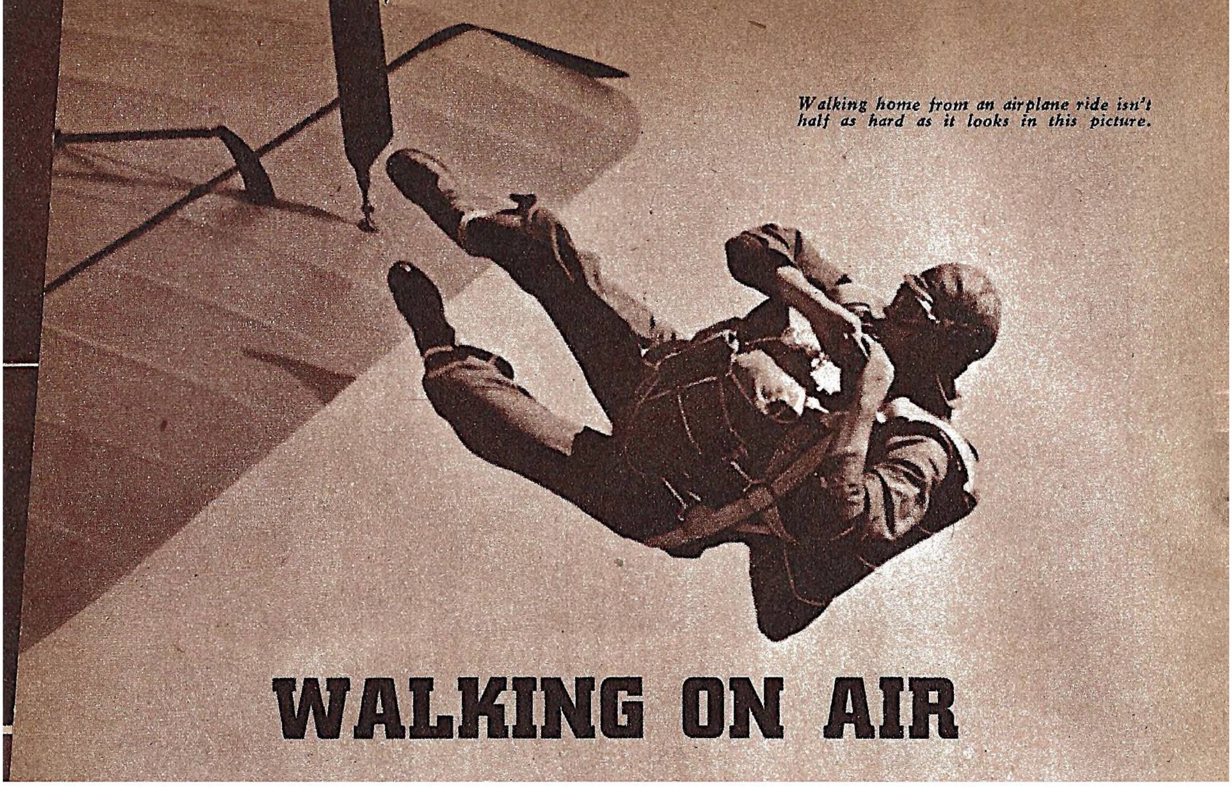
[Continued on page 132]



A circle and a cross on a card, as shown in the photograph above, will make it possible for you to find your blind spot.



Black is red! Construct a disk such as the one shown above and follow Experiment 8 in text, and you can fool your eyes!



WALKING ON AIR

If Your Airplane Gets Balky, Just Step Out Of It And Leave The Blamed Thing Up There! Parachuting Is Easy—If You Know How!

IT WAS a rainy afternoon in late August of the year 1838 when John Wise started for Easton, Pa. The town was only two and a half miles away. The chances of his getting there quickly were excellent. He was traveling straight down in an exploded balloon.

Just before Mr. Wise reached Easton, the torn remnants of his balloon bag got together with the network of cords above the basket, forming a makeshift parachute. Mr. Wise slowed down from approximately 100 miles an hour to maybe 20 miles an hour. His balloon basket hit Easton with a thump and bounced half a dozen feet into the air. Mr. Wise emerged, as the saying goes, without a scratch—and with a wonderful idea.

Came the year 1912, and a certain Captain Berry of the U. S. Army was ordered to test out a new flying machine because some crackpot had written in and suggested that maybe flying machines would be a good thing to have in the Army.

Captain Berry had his own private notions about the whole thing. So, before he went aloft, he rolled up a bundle of cloth, like a wad of dirty clothes, and tucked it under his arm. The bundle was a parachute such as Mr. Wise had envisioned. Captain Berry's suspicions turned out to be well founded. After he'd got the flying machine up a few hundred feet into the air, its two-cylinder motor developed double lobar pneumonia and quit. Captain Berry became disgusted with it and decided he might as well leave the pesky thing up there. So he stepped out, himself. After he'd fallen for some time, he remembered the bundle of dirty clothes under his arm, and let loose of it. The bundle billowed out very satisfactorily and the captain landed in one piece, with a smile on his face—the first man ever to make an emergency jump with a parachute.

Along in 1916, a Mr. Leslie Irvin went to a show one night. On the bill was Houdini, the magician. Houdini did a number of things which Mr. Irvin did not believe. Finally, Houdini produced a fountain pen and pulled a bed sheet out of it. Mr. Irvin did not believe this, either. As a matter of fact, he went around backstage and called Mr. Houdini a liar, or words to that effect. Whereupon, Mr. Houdini took the bed sheet—which was made of very fine silk—and put it back into the fountain pen.

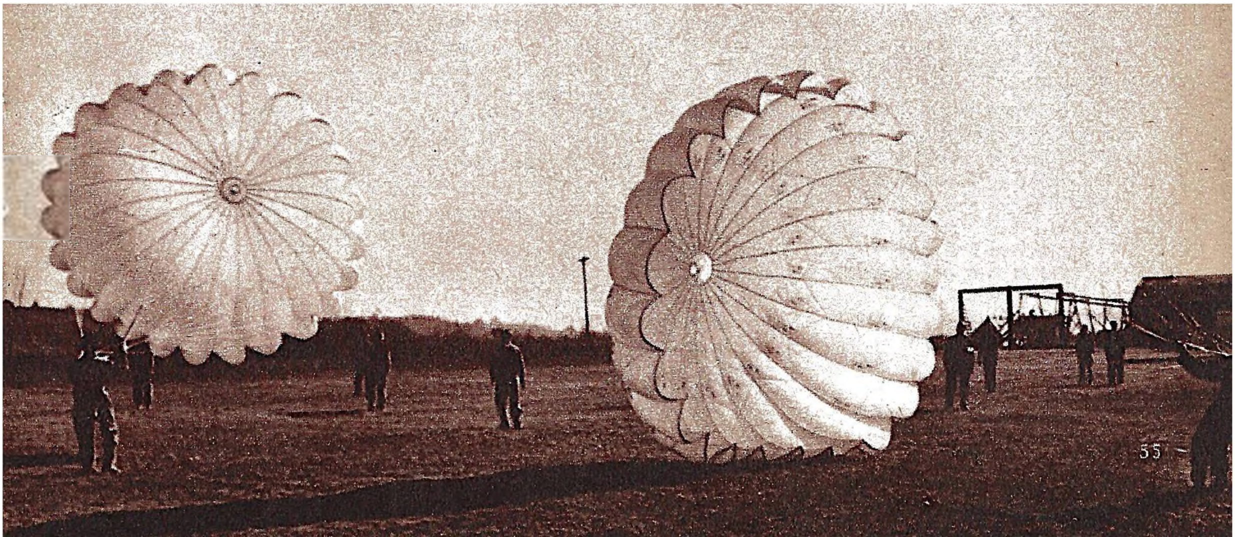
That convinced Mr. Irvin. He went home and, being a professional stunt man, had another idea. By very careful folding along the lines Houdini had used with the bed sheet, he did almost the same thing with a parachute—and thus created the first pack 'chute in history.

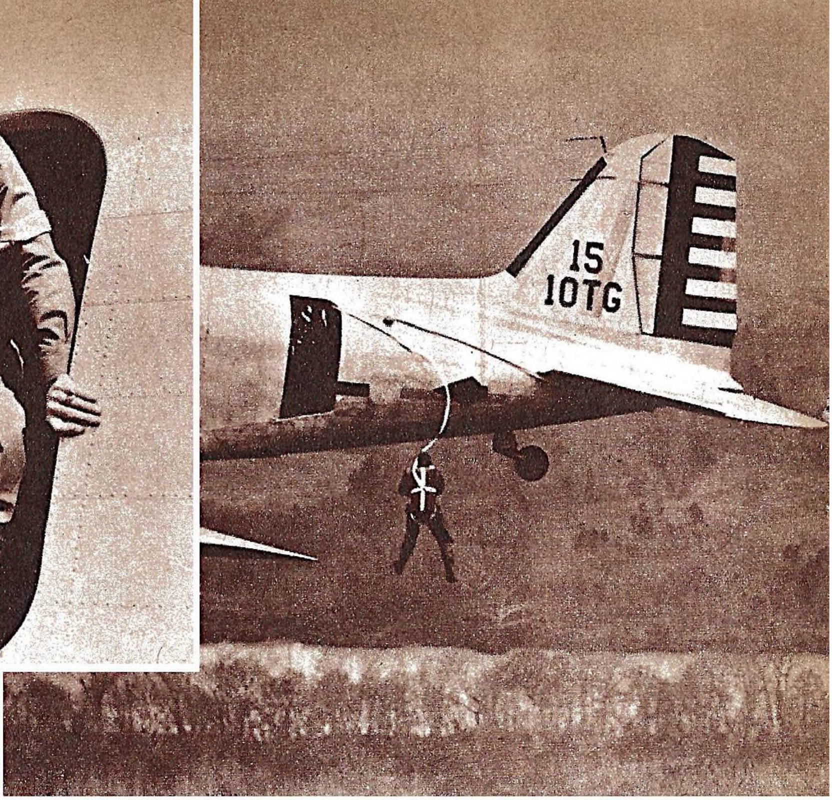
Mr. Irvin became so inspired with his achievement that he went aloft in an aircraft at Dayton, Ohio, on April 28, 1919, and bailed out. His pack 'chute opened nicely, just as he had planned it, and, like Mr. Wise and Captain Berry, Mr. Irvin came to earth in a much more pleasant manner than would have otherwise been possible.

It is interesting to note that Mr. Irvin lived to become the world's foremost manufacturer of parachutes, until another person variously named Schickelgruber or Hitler went into the business.

Mr. Irvin is credited with saving thousands of lives. Mr. Schickelgruber or Hitler, had other ideas, such as those demonstrated at the Island of Crete. The world being as it is, Mr. Schickelgruber gets the credit for giving para-

"Slipping" a chute to change the direction of its fall is simple. Just pull down on one side, as shown above, grasp the shrouds and let 'er slide. Below: The ways to "spill the wind." Either run around canopy to face the wind, or pull the bottom shrouds.





In the Army, parachuters have a few advantages over the ordinary sky-walker. First, there's a man in back to give you the boot if you hesitate. Next, there's an automatic release to open the 'chute.

chuting the greatest boost it has ever had.

Nowadays, almost everyone in the world has suddenly become parachute conscious. If you aren't planning to go into the Parachute Corps, yourself, the chances are you'll be joining a civilian group of parachute spotters. At any rate, parachuting is going to become more and more important to you as the present state of affairs continues. So maybe you'd like to know just what parachuting is like.

Have you ever gone sky-walking? If not, come along and I'll show you how it's done.

First, slip your arms through the shoulder straps of this 24 foot 'chute, snap on the chest buckles, then reach down and do the same for the leg straps. You can adjust them to fit comfortably when you sit down.

Notice how light the pack is? Constructed of silk, it weighs only 19 pounds and is the standard type used by both the Army and Navy. Not only is the canopy of silk, but so are the shroud lines which run over the canopy to the top of the 'chute. Each line will resist a pull of 400 pounds. The harness is thick cotton webbing with a tensile strength of 3,000 pounds, reinforced where the metal parts linking it to the wearer are inserted.

The C. A. A. has certified it, just as it does planes, so wipe that worry off your face and try to waddle over to the plane. At the same time you might be locating the rip-cord on your left shoulder. Fumbling for it as you plunge earthward at 18 feet a second may be an expensive waste of time. They say the parachutist who makes one mistake never gets a chance to make another.

The plane roars loudly as the pilot gives her the gun and heads for the clouds. At two thousand feet we stop spiraling and the pilot eases the tail of the plane into a gentle glide. You're ready to jump now, but before you go overboard let me give you a few pointers.

Contrary to general belief, you don't really *jump*. If you did, the terrific spin you'd go into would get you sick enough to swear off jumping for the rest of your life.

Walking the wing, or the lift-off, as it is sometimes called, is the simplest way to leave a ship. Carefully work your way out to a lower wing until you get close to the end. Then wrap your left arm around a strut and pull the rip-cord with the other. The stream of air from the propeller will pop the parachute open and yank you off the wing. This is perhaps the best way to learn because it eliminates that mental hazard of leaving the ship without knowing whether or not the 'chute works.

The most widely used procedure is that of stepping out of the plane. If you are in the rear cockpit of an open ship or in the cabin of a closed plane with a door that opens clear of the wings, merely fall over the side until you are clear of the ship, then pull the rip-cord. Don't pull it the moment you leave the ship, however, since the inflating silk may foul itself on the tail of the plane or be torn to bits by the propeller.

Falling is ordinarily an unpleasant sensation, but this is fun. Strangely enough, the greater the vertical distance through which you descend, the less terror you feel. It is only when you fall between two earthly objects that you become panic stricken. High in the air, however, you only *know* you're falling, never *feel* that way.

There has been much argument about what number to count before yanking the rip-cord, but the only sure thing to do is to look around for the plane. If you can't see it any more, go ahead and pull the cord. It is a flexible cable fitted with a steel ring at one end. At the other end a number of pins hold the deflated canopy in position. The instant the rip-cord is pulled, the pilot 'chute comes free. It is nothing more than a small parachute over a larger one, and is anchored directly over the vent in the larger canopy. When the rip-cord is pulled, the small 'chute is released, and, as the weight of your body drops you, the little 'chute whips the big one out after it. The strong current

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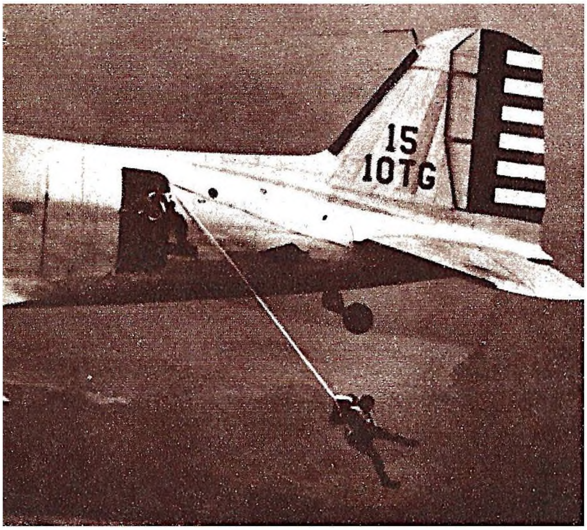
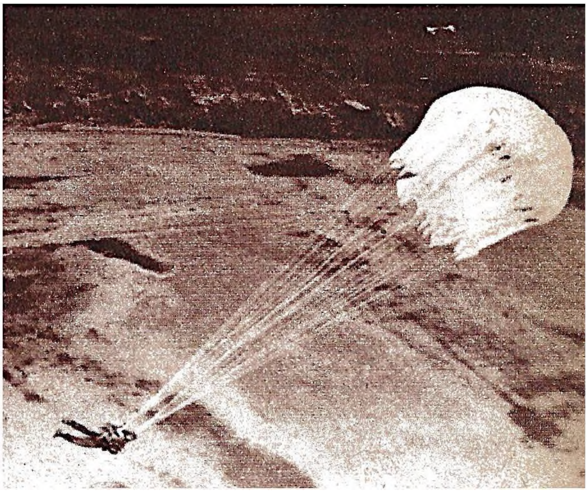
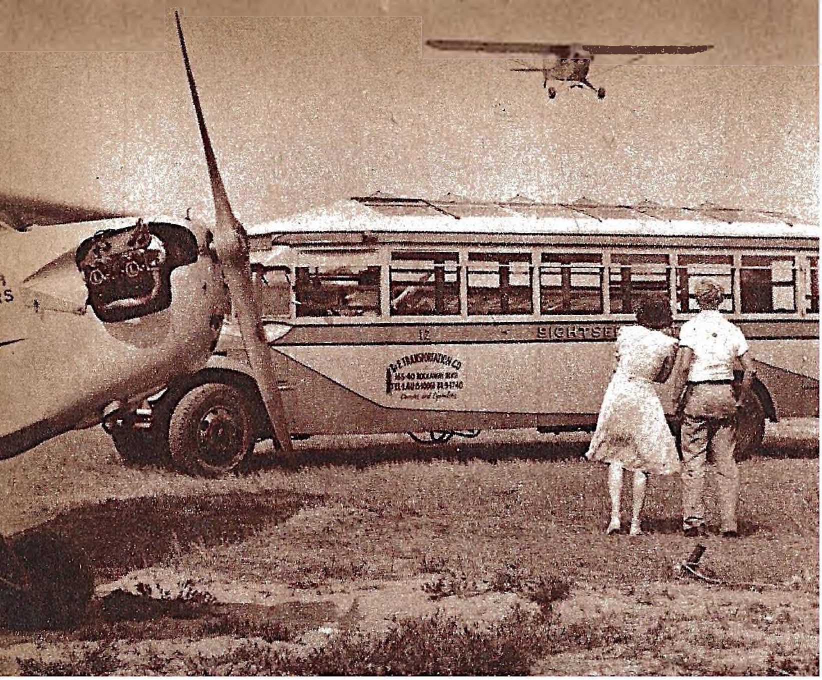




Above, the automatic 'chute release used by Army paratroopers—nothing more than a length of cable, seen in the photo—is about to pull the jumper's canopy out of its pack. And, at right, the 'chute is now opening. Below, the trooper, having landed, is pulling the lower shrouds to "spill the wind."

Back Alley Airport

Anyone Who Thinks America Is Getting Soft Ought To Meet Joe Alta—Unable To Get An Airport, He Built One On An Unused Sandlot!



A student comes in for a landing at Joe Alta's Airport. The bus is the field's administration building!

REQUISITIONING of most of the private airports in and around New York City by Uncle Sam has more or less put the blight on private flying. However, here'e one airport that is determined not to let national defense throw it for a loss.

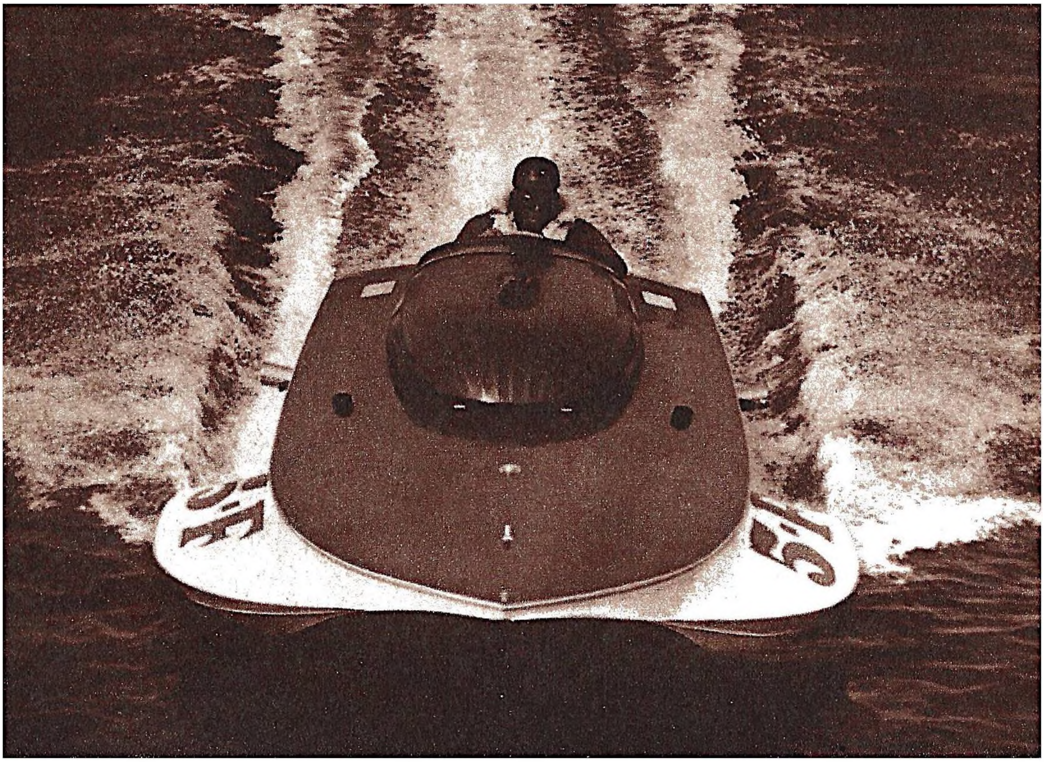
Joe Alta and his Alta Fliers, unable to obtain quarters at any one of the established fields, took over a vacant lot in the suburbs, and now they're going strong again.

Alta has acquired an old sightseeing bus which he uses as a combination office, schoolroom, workshop, meteorological station and recreation room, and, in lieu of hangars, his planes are tethered in the open air. In addition, when the weather's right, classes are held outdoors too.

Oddly enough, the sandlot airport is said to have its advantages. The decentralization of a normal air field is eliminated at Alta's runway, and classes can be conducted with all the intimacy of a select private school. No Alta student can wander very far from his studies without getting completely off the reservation—or into someone's kitchen!

Ah! The bus is a school now, and Instructor Alta, book in hand, calls his class to order! If a point isn't clear, below, Joe just takes the class outside, weather permitting.

DOUBLE V FOR VICTORY



The Thunderbird. *outstanding western speedboat of 1941, driven by Bob Stack, roars along, her double-V nose planing.*

A Real Revolution In Fast Boat Building Is Going On In America, Led By The Three-Point-Suspension Theory.

by Bob Ruskauff

IDEAS about boat construction that old-line builders held dear to their hearts have been tossed overboard with almost complete abandon the past few years by a streamlined batch of marine motor engineers and hull designers. They've started a virtual revolution in the building of small boats.

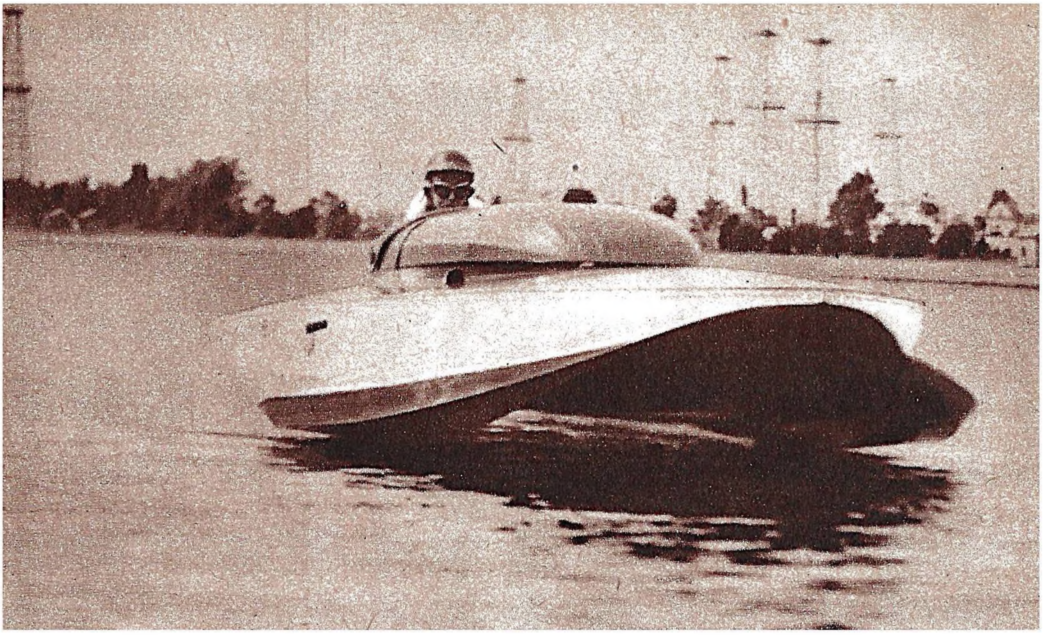
Your men who build motors, and men who build hulls operate on different premises, but they have one common goal—to achieve speed, together with dependability and economy.

A short 20 years ago they didn't have too much of any of the three. Now, as records that have skyrocketed during the past two or three years bear out, they have all. They began to go places the minute that the bulk of our modern designers tossed into the limbo two of the oldest axioms of boat building:

First, that strength in a boat hull must absolutely be predicated upon weight; and, second, that weight of a motor must be increased automatically and in direct ratio to the increase of motor power.

The development of new lightweight metal alloys, used in the important working parts, has of course, been a boon to the motor builders. Development of lightweight, strong construction materials which have allowed often the use of wood substitutes; plus a better understanding of the laws of stress as applied to boat hulls, have put the hull designers on a new high road.

Those are the nutshell reasons for amazing recent performances of boats.



Bow-on, "daylight" is visible through the entire length of the hull as the Thunderbird *rides on her chines.*

Prime in the development are speedboats, where dazzling speed with a reasonable degree of safety is the alpha and omega.

But the work has now gone beyond that. Small seaworthy power boats are being built capable of cruising hundreds of miles under the most testing of sea conditions. Twenty years ago it was at once a feat and a hair-brained piece of derring-do for any owner of a small power yacht to run her much further to sea than marathon swimming distance of the nearest harbor. Power yacht builders today have proved that efficient and fast, small seagoing boats can be built employing many speedboat principles of design.

3-POINT PLANS!

As a result of numerous requests from our boat fan readers, we are happy to announce that complete plans and detailed instructions for building a fast 3-point-suspension hydroplane will be included in HOW TO BUILD 20 BOATS, No. 7. This publication, with which many of you are already familiar, goes on sale January 12, 1942.

It is still true that the factor of weight is a close relative to hull-strength and motor power. But they are not brothers-inseparable.

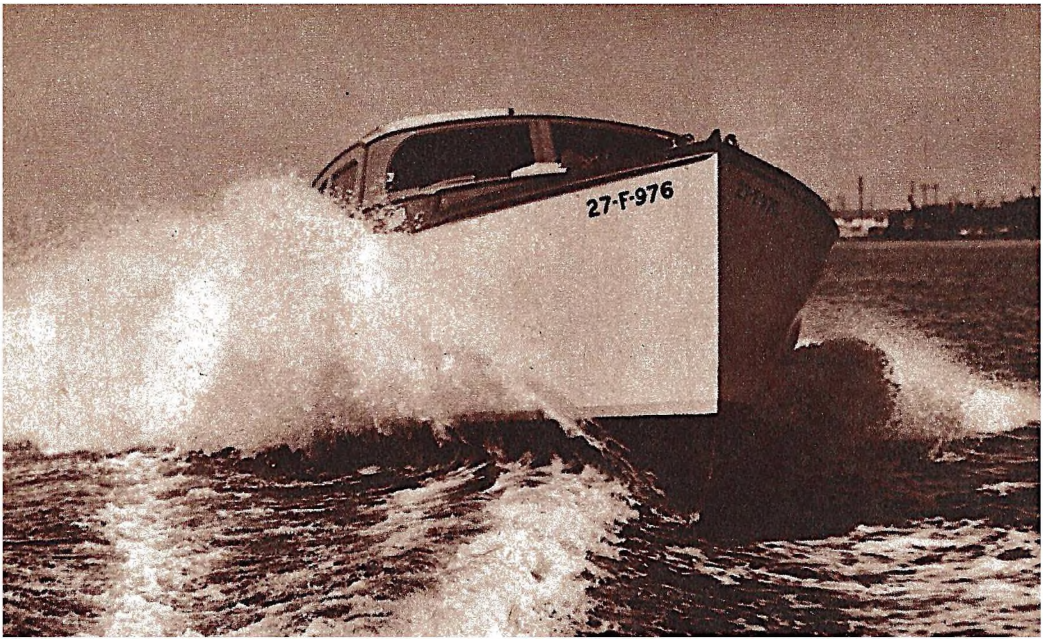
Consider for instance that it is scarcely two decades since a racing motorboat for the first time eclipsed 100 miles per hour. She was the first of the Miss America fleet built by our premier exponent of the weight-plus-power theory, and for nearly a half century one of our greatest motor boat men, Gar Wood, Sr., of Detroit. Weight to make her stay together and the power to push her fast was the theory Wood employed to then-significant effect.

The *Bluebird* which Sir Malcolm Campbell drove to hoist the mark to more than 141-miles per hour sixteen years later, was a boat of scarcely half the weight of the first Miss America.

Still more striking by comparison, is the fact that today in this country there are not less than seven boats of the noted Gold Cup class, which are capable of beating the record of the first Miss America. Yet, these boats are limited by rule to a motor displacement of not more than 732-cubic inches. Boat and motor together, all seven would only weigh around twice as much as *Miss America I.*

A little over a year ago MECHANIX ILLUSTRATED carried a story touching on the "Three-point-suspension" principle of racing bottom, which events since have more fully proved is perhaps the greatest single development in hull design in the history of motorboat racing.

It is borne out by the fact that ninety percent of all records now on the books of the



Speed boat design is definitely affecting design of sea-going boats. See the tendency of this yacht to plane!

American Power Boat Association made by speedboats, either of the inboard or outboard classes, have been set by boats built to the three-point theory of hull design.

Response to the article was tremendous and indicated that throughout the hemisphere "backlot" designers—the backbone of the sport and its prime idea-men—were wildly ambitious to "get hep" to the full three-point theory.

But plans for good three-point boats (with exception of those owned by professional builders who quite naturally prefer to keep their specifications and do their own building) are about as scarce as the proverbial hen's teeth.

It isn't that three-point suspension as a principle is extremely new, or undeveloped. Too many three-point boats have smashed too many records for anyone to believe that. But most of the craft are "idea" boats. Their builders—such as Roy McCullough, owner of the *Yankee Doodle II,* which holds the 135-cubic inch competitive record at 56.639-miles per hour—simply didn't have any plans to start with.

They got the three-point idea fixed in their minds, and, with perhaps a photograph series only to go by, went to work and built a boat. They scaled their model, but to my knowledge there's nary a driver who boasted a full set of plans of his boat even after it was built.

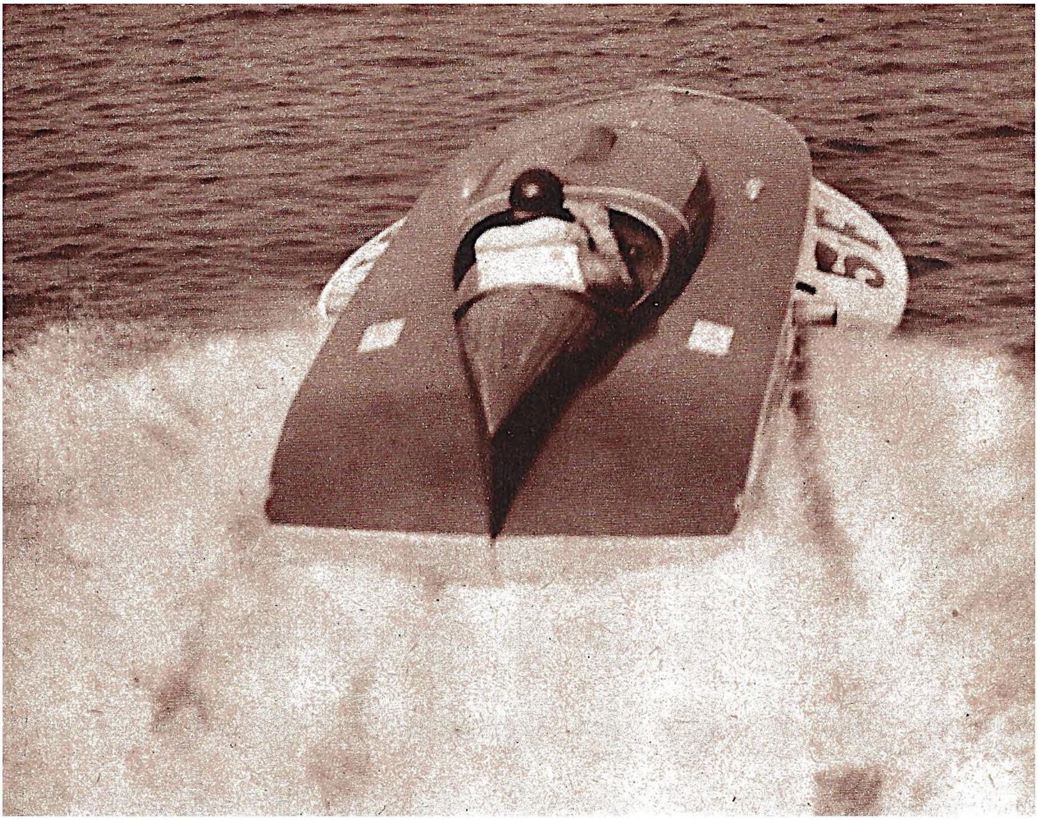
Several outstanding of these "back yard" record speedsters have in fact been changed over a half dozen times since they were built; some were even changed after setting records. An instance of this is Dudley Valentine's *Miss Hollywood,* holder of the 225-cubic inch mile straightaway record in Div. II. Another is the current sensation of the 135-cubic inch class on the Pacific Coast, Richard Hallet's *Holiday III.*

We might repeat Roy McCullough's thumbnail description of a three-point-suspension hull:

"Your three-point boat differs drastically from the conventional V-bottom or modified V-bottom boats. Viewed from the stern the three-point bottom would look something like a block-W. In effect, a chunk is cut out of the bottom clear from stern to bow, so that in action and at planing speed your boat will ride on two wetted surfaces at either side of the boat. This leaves the center riding virtually cushioned on a lateral stream of air running the entire length of the boat.

"If you laid three planks down to make a bottom, then hoisted the center plank a couple of inches you'd have the rough principle of a three-point hull."

Much has been bruited about "secrets" of hull and motor design and unquestionably there are many floating around, locked in the inner vaults of your designers' minds. But



This topside view of a three-point-suspension racer shows her lines plainly. Note the streamlined nacelle.

on the other hand—and again we quote McCullough, whose boats dominated two classes during three years of competition and who plans shortly to essay building another record "135":

"I'm convinced there is still no hard and fast rule for the building of a champion boat. You build one and you get ideas for building a better one. You might make changes in your first hull to the point where you've practically rebuilt her, but there remain other things you've seen that should have been different in the first place—and that's true even if you have a record-breaker."

The fact that the speedboat designers are "on the beam" and that principles they have used can be extended to other fields is evidenced by the fact that recently small, efficient sea-going cruisers have been built, using speedboat theories in design.

A striking example is the power yacht, *Enchanter II,* built by J. L. Munson, Arcadia, California, poultryman.

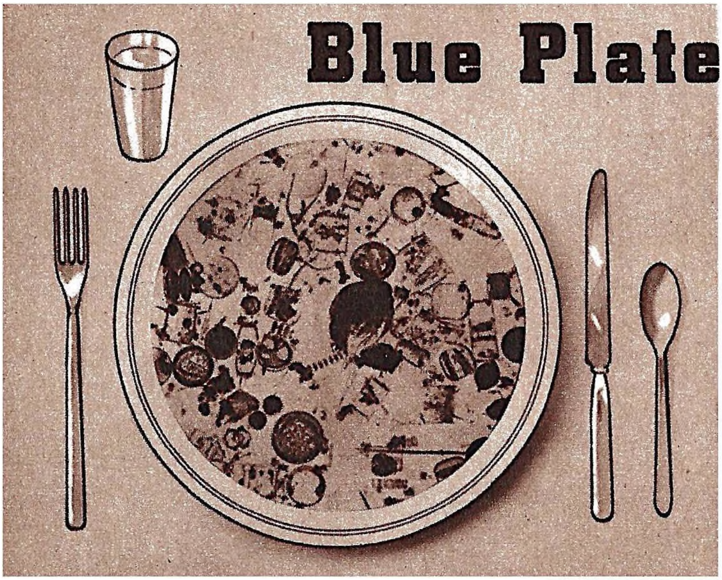
An ex-speedboat racer-designer, Munson built in his 31-footer a boat radically different from her kind. The basic principle is "speedboat," for the *Enchanter II* was built shallow-draft, with all weight emphasis placed below the deck. Wherever possible she is constructed of lightweight materials. Instead of pushing through the water, the boat's tendency is to plane. She is also highly maneuverable.

As a result, a single 125-h.p. motor will handle her at a cruising speed of 15 knots all day long with six additional knots top speed in reserve. The cruising radius of *Enchanter II* is more than 600 miles—comparable to boats twice her size—and her economy of operation has other owners of similar-sized boats practically tearing their checkbooks with envy.

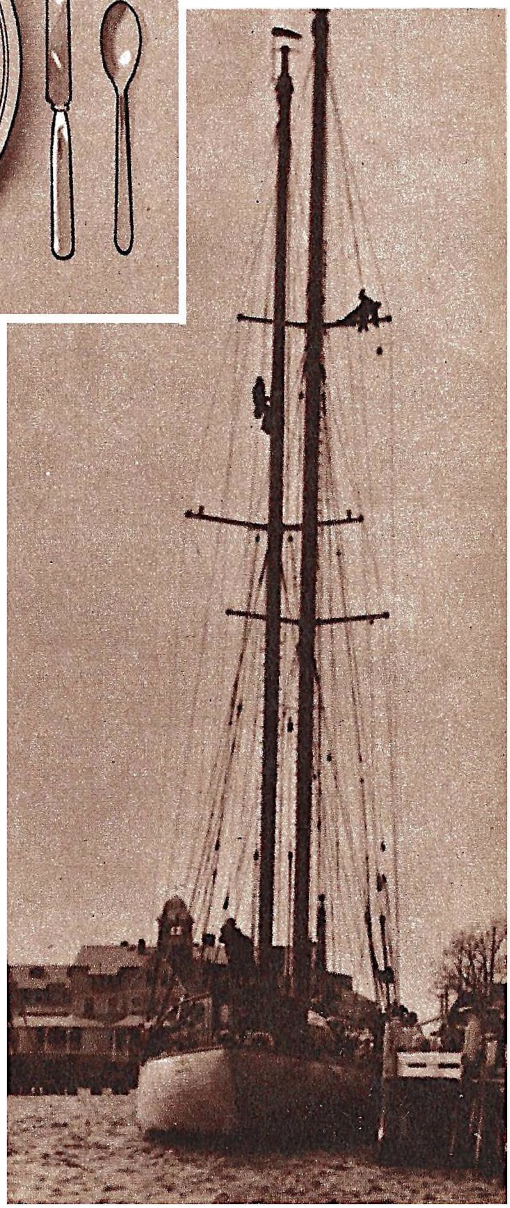
Accompanying this article are three pictures of the Ventnor-built "Thunderbird." It is from such pictures as these that a great many three-point-suspension boats have been built. However, with the publication of detailed plans of a three-point-suspension boat in the forthcoming issue of HOW TO BUILD 20 BOATS No. 7, there will be no need for such "hit-or-miss" building.

Plankton-- Blue Plate Special

Found!—A New Food From The Sea That May Mean The Difference Between Victory and Defeat For The Democracies.



Behold, at left, a plate of plankton, highly magnified. Below, the Atlantis, *plankton research ship.*



by Elon Jessup

CARE for a dish of plankton?
No?

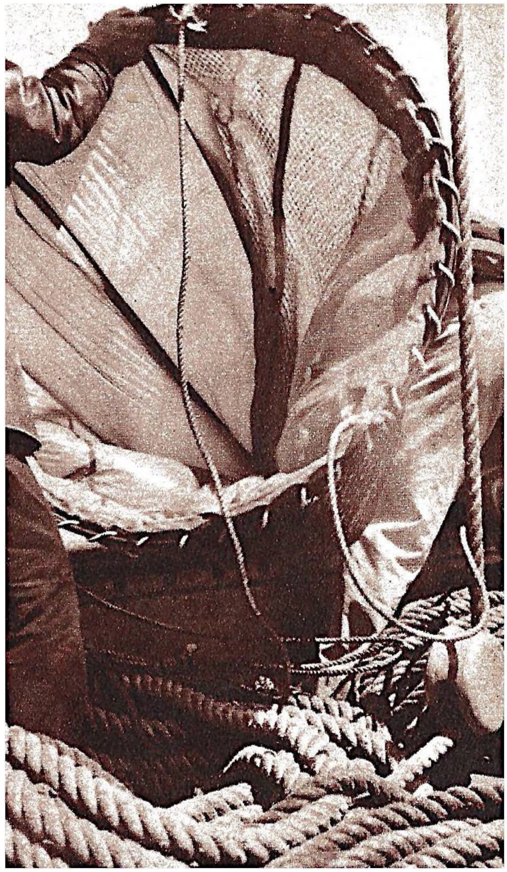
Well, you'd better not turn up your nose at it. If this war really gets tough, the chances are great that you and I and the guy next door may soon have to eat plankton instead of steaks, chops, turkey and candied sweets. As a matter of fact, I think you'd rather like this new table delicacy.

Plankton, in case you haven't heard, is the scientific name for the minute organisms that float by the millions in the sea. It is the basic diet of all salt-water fishlife, and it is so nutritious and abundant that growing whales have been known to put on thirty tons a year from feeding on plankton alone. In addition, it is the source of Mr. Whale's great store of valuable oil.

Plankton always has intrigued marine biologists as a possible source of human food. But now, with the great powers of the world arrayed against each other in a struggle to the death, scientists of Great Britain, Germany and the United States are hurrying their research on this underwater food supply and may soon have it available for regular consumption.

First news of plans to utilize microscopic organisms to supply square meals to a hungry

Researchers from the Oceanographic Station, at Woods Hole, Mass., prepare a plankton net for a drag through the briny deep.



The net, its large iron hoop attached, is made ready for going over the side. The rig is especially built for dragging.

population, came several months ago from strictly-rationed Germany. Without enough fish to go around, Nazi scientists promised something as good, if not better. They explained the extreme nutritive value of plankton, their extraordinary richness in the oils which can satisfactorily substitute for many fats. It was felt the problems of how to catch and turn plankton into human food could be efficiently solved. Suggestions of a pump installation and separating process were advanced.

More recently, similar views have come from science on the other side. Britain's Sir John Graham Kerr, one of the world's leading zoologists, has asked the Britain Food Ministry to investigate the possibility of large-scale collection of plankton for consumption by farm stock and poultry as well as by people. He feels that new developments in mechanical separators have brightened the outlook on the practical problem of utilizing plankton.

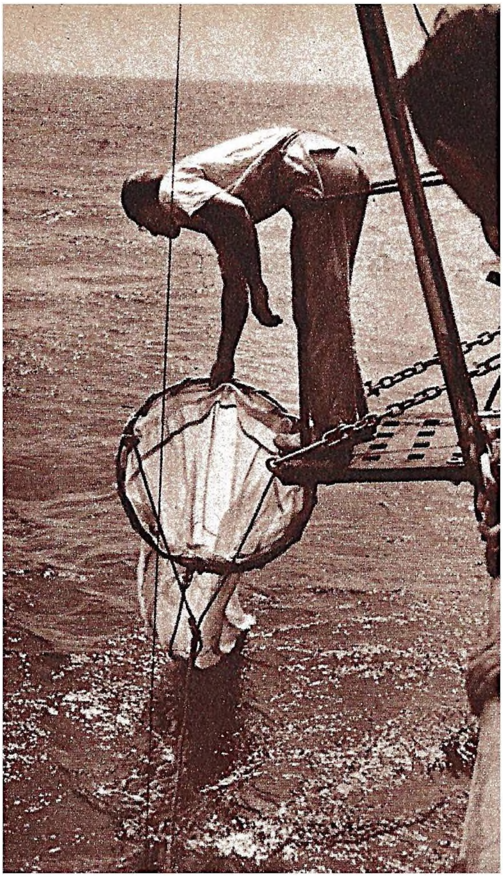
Nor is the United States remaining idle amid all the sudden ado over plankton. Intensive research is going ahead on both the Atlantic and Pacific coasts. The attack of American scientists in learning more about plankton's importance in our food program for the future is less direct than in Europe. Here emphasis is being placed less on plankton as diet for human beings than on the relationship between plankton and our fish supply.

But the extreme importance of this angle is obvious in view of New England's nationally-needed fish supply. Plankton research has even provided an answer to the puzzled questions arising when a five-hundred-million-pound annual catch of fish toboggans mysteriously.

Scientific investigation may discover that hauls have declined at George's Bank, for example, where fishermen have habitually gone because the fish congregate in that relatively small patch of the ocean to feed and breed.

Why there? Because the "pasturage" plankton is good, the scientists reply. Young haddock in common with many other fish and whales feed on plankton. No plankton—no haddock.

The investigators then remind inquirers of



And up she comes! A crew member hauls the net back out of the water for examination by the Woods Hole research staff.

the rip-snorting buster of a storm that swept over the banks in early spring. Eggs of breeding fish and the pasturage were scattered far and wide. Increasing the seriousness of the situation was the fact that the pasturage was at its most promising period of growth.

Unlike bottom-living creatures of the sea, plankton cannot live without the sun. This, and the fact that plankton die whenever the available supply of fertilizing nitrates and phosphates runs thin, are reasons why plankton are termed "grass" or "pasturage."

As in the case of land grass, spring is the season of full and luxuriant plankton growth. Summer brings drought. The race by then has used up much of the nitrate and phosphate supply available. Mortality among the drifting plankton becomes enormous. Fish grow lean. In the fall a new crop of plankton makes its appearance a billion-fold and fish feed heavily once more.

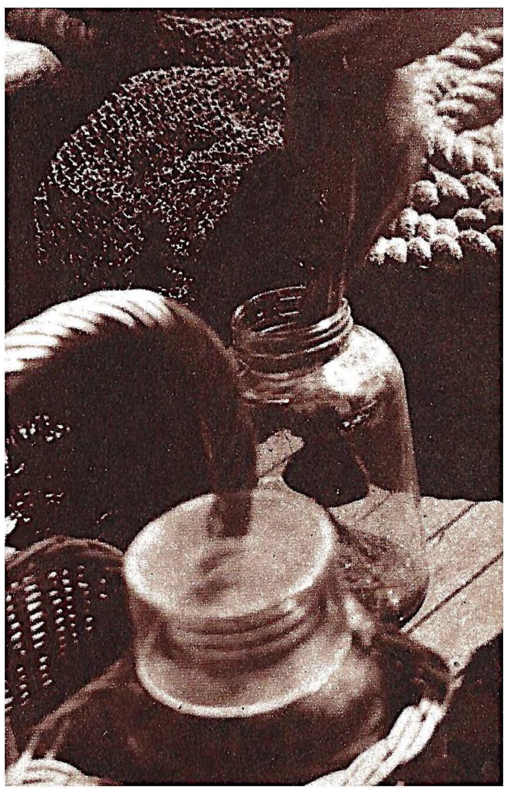
Surprising to many persons is the knowledge that the masses of tidal vegetation familiar to everyone who visits the sea are inconsequential to the life of sea fish in comparison with this food that can't be seen, the plankton aimlessly drifting offshore.

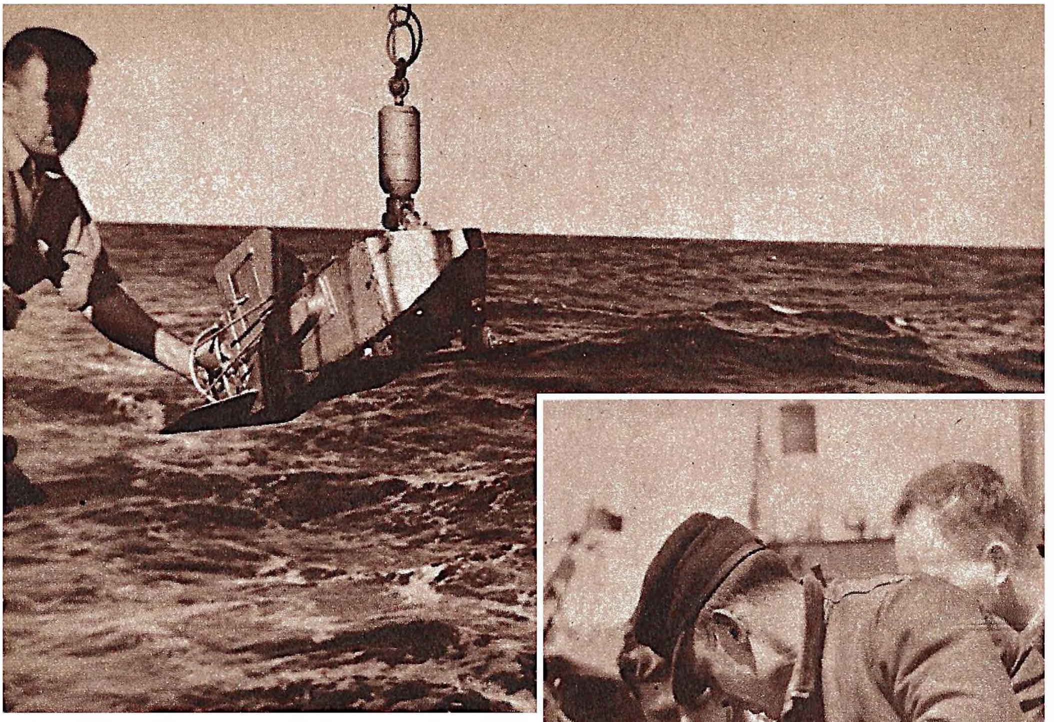
Additional facts are being constantly added to America's store of plankton data by workers at the important Oceanographic Institution at Woods Hole, Mass., Atlantic coast headquarters of research in this field.

Indicating the importance of this work are the huge sums already invested in specialized equipment and years of experiment. Every now and again the tall-masted ketch *Atlantis,* largest in the world, literally a floating laboratory, puts to sea with its plankton-collecting gear for a cruise off George's Banks or elsewhere.

Cone-shaped nets of various sizes, from about two feet to 20 feet in diameter, predominate in the equipment. Some are silk, others gauze. Some are especially designed with a mouth that will automatically clamp shut after sinking to a specific depth of water. An accurate sample of plankton life at that

The catch is dumped into glass jars before being taken below to the ship's specially-built laboratory for various tests.





The latest thing in plankton collectors, an all-metal submarine-like gadget, takes its turn at the catch, while, below, a test is made to determine water depth of plankton.

particular depth is thereby obtained without plankton from other depths seeping in.

Gauze nets trap plankton that run to the major in size but not the far more numerous small fry. For these tight-woven silk is brought into use, but myriads of yet smaller organisms still slip through. These extremely small plankton, Peridians, can be trapped only by the lowering of water bottles that automatically close at a desired depth. Contents are later studied under the microscope, and even counted.

Even those to whom the word plankton is unfamiliar know some planktonic giants like the jelly-fish; others are shrimp-like creatures and the larvae of crabs, starfish, and sea-urchins. Nearly everyone has come to know the nutritive richness and good flavor of this type of fish from eating crustaceans like shrimp, lobsters, etc.

Most impressive of the variegated plankton-collecting tools at Woods Hole is a 150-pound all-metal object looking like a submarine model with airplane wings (see illustration). Inside it is a small machine operated by the force of being towed behind the ketch.

This netting contraption consists of a gear-box, spooled gauze netting, driving rollers, and formalin tanks that automatically preserve the catch.

Some hauls are made from the sea's surface, others from different depths. To get a depth sample, a cable is unleashed with a lead sinker weighing 200 to 1,500 pounds. Varying depth samples disclose strata of plankton like veins in a mountain of rock.

Continued sampling has revealed that

[*Continued on page* 148]

The Big Build-Up

Joe Burger Makes Invisible Step-Ladders For Your Ego!

Junior, seen in the center of the picture at the left, is a shrimp. His girl is taller than he. But Joe Burger (left) can fix it. He build's up Junior's shoes—and see how Junior towers in the photograph below!

JOE BURGER is in the business of building dignity into small men.

Out of a psychological twist and an adeptness at the cobbler's art, Mr. Burger has made a successful business.

The foundation of his business is a slogan: "Don't Be a Shrimp!" His solution for the shrimp: A pair of ingeniously built up shoes which will increase the shrimp's stature by as much as two or three inches.

A member of a family of shoe-makers, Burger, when he started in business for himself, was not satisfied to be an ordinary cobbler. Then, one day, a short man came into Burger's shop and asked Burger to build up the heels of his shoes to increase his height.

Burger was struck with the idea that here was a specialized field of shoe-making, and began experimenting with methods of building up shoes, sole as well as heel.

"I knew several short men who were married to tall women," Mr. Burger says, "and I knew that all of them were sensitive about it. I knew several shrimps in important executive positions, too, and I felt sure that if I could make shoes which would increase

Slanting inner soles of cork are used to make "high heels" inside men's shoes. Below, a cobbler and 26 cork soles for one shoe.

their height and still not be noticeable, I could sell them."

Finally, Burger hit upon a double-barrelled solution to his problem of building up shoes. In the first place, he added cork inner-soles, slanting from the back of the heel to the tip of the toe. As many as 30 of these inner soles can be stacked up and built into the sole of the shoe and still not be noticeable. In the second place, Burger devised and patented an insertable adjustable arch-support, designed not only as a support but also as a secondary elevator.

The effect of these two methods of building up shoes is the same that is achieved by high heels on women's shoes—except that Burger's "high heels" are built inside the shoes.

Most of Burger's customers still are short men who have tall wives or girl friends, but he also does special work for movie stars, Broadway actors and others.

"I could name a governor, a good many matinee idols and a lot of impressive business executives who rely on my shoes for added dignity," Burger says.

Burger's psychological shoe business has grown to the point where he employs ten cobblers steadily.

The Lowdown On 1942 Cars

Characteristic of the advanced body styling of the new cars is the 1942 Buick. Wider bodies, more streamlining are new note.

Exactly What Have War Conditions And Shortages Done To Your 1942 Car? Here's Detroit's Answer To The Challenge.

by Frederick C. Russell

CALL them the 1942 cars if you like, but the glittering dreams that are rolling off the Detroit assembly lines along with tanks, bomber engines and the exciting implements of this bewildering era are, in reality, the latest models of American ingenuity. In former years the new cars were taken for granted, but their appearance today has new meaning. Now we have definite assurance that nothing—not even war, restrictions or fear—can stifle progress.

There is no national automobile show this season but Detroit's latest offerings are slowly but surely edging toward the limelight. It won't be long before a million of them will be on the streets and highways serving the public with safer, more efficient transportation. Whether, with the drastic production cut now in effect, the second million will be reached depends on factors which would worry even a Philadelphia lawyer.

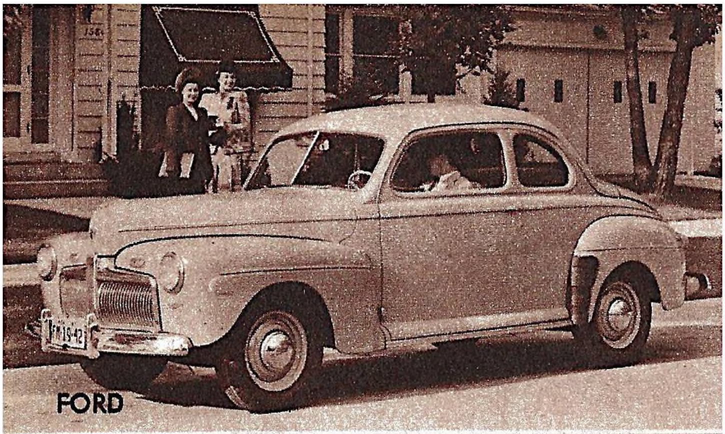
A hint of the impressive improvement in all makes for 1942 is seen in the obvious advance in styling, especially with regard to fender treatment, the flattering of the car body and new front-end designs to give each nameplate individuality. There is more trim than ever before, and a trend toward gaiety that was not supposed to be in the cards.

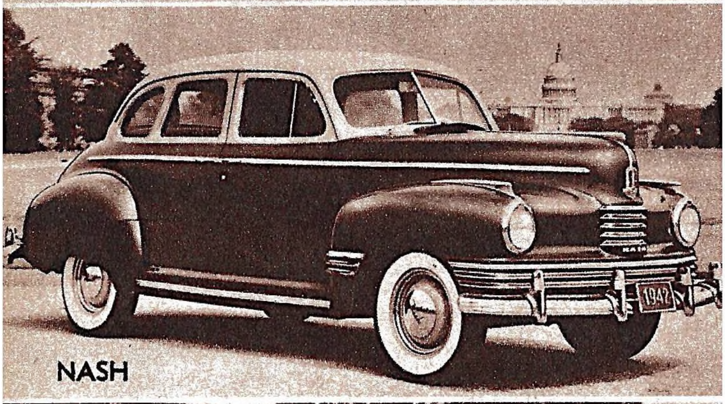
Don't worry about substitution in materials. This has not yet appeared on the grand scale as best evidenced by the fact that plastics have made only a small gain in the number of applications. The real story in materials is the use of alternates, other materials long preferred by many engineers to more commonly used metals. This is particularly evident in the use of steel and iron alloys in place of aluminum for pistons. This change has been a boon to those companies which have believed all along that aluminum was not the material for such parts of the engine.

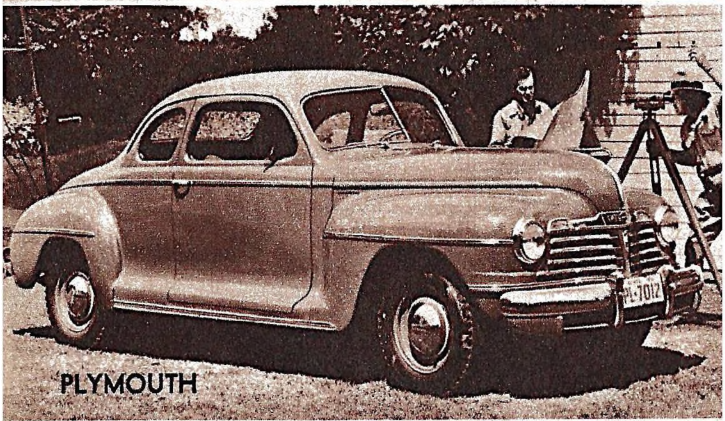
Power is still on the increase, proving again that engineers hold to the idea that a reserve of power is not wasteful.

You can take it for a fact that the 1942's are not the 1941's with a new coat of paint and a gadget or two.

This is best illustrated by the definite trend toward doing away with pedal clutching. Not only have the original Chrysler Fluid Drive and Olds Hydra-Matic been improved for 1942







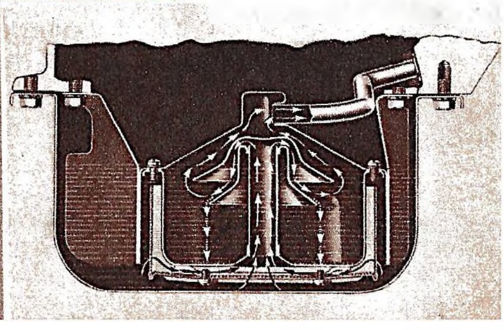
use, but several new versions of power transmission have come into the picture. One of these is Liquamatic Drive offered as an extra cost option on 1942 Lincoln and Mercury cars. With this device the driver need not use shift lever or clutch for all-day normal driving once he has shifted into the forward driving range. Changes in gearing are made by positioning of the accelerator pedal. Merely by speeding up the engine he can hold the car on an upgrade, and compression braking can be used to keep down car speed on a downgrade.

This is made possible on Lincoln and Mercury with the aid of a fluid coupling and a special transmission which can be shifted manually to one of three positions; reverse, an emergency low and the normal forward driving range. Conventional use of a mechanical clutch is used for selection of one of these three gear positions.

In Lincoln cars for 1942 the Liquamatic Drive is combined with automatic overdrive which provides two extra speeds in the forward driving range. Top gear plus overdrive reduces engine speed, in

Right: Detail of Pontiac's new oil cleaner. Oil outlet is concentric with cleaner to eliminate oil eddies.

Left: When gasoline nears top of your Packard gas tank, a whistle sounds, to prevent overflowing!

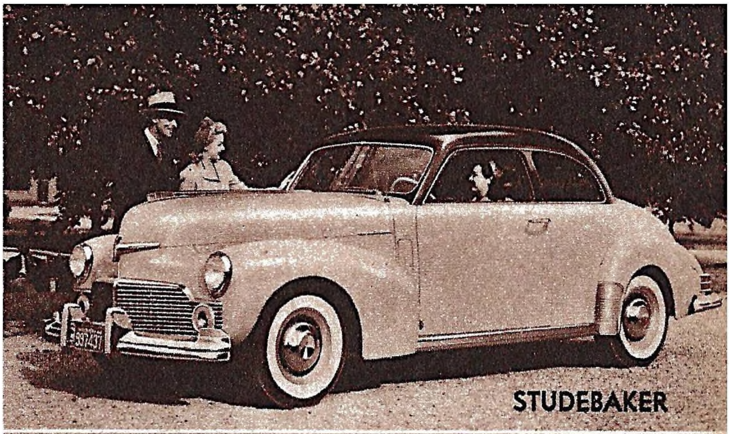


its relation to road speed of the car, by approximately 30 per cent.

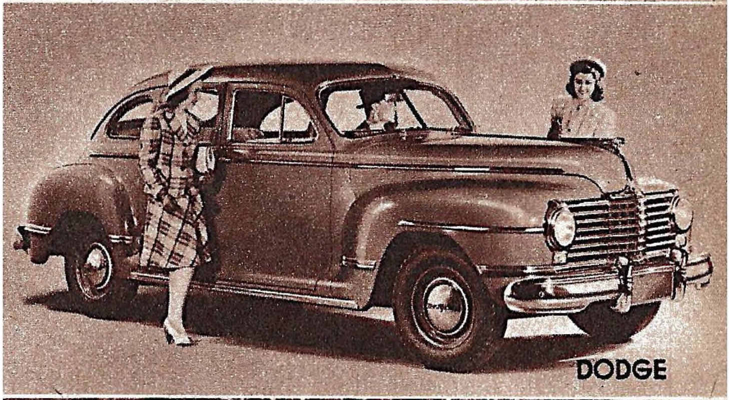
Studebaker has also joined the cars with fluid coupling. Its system is known as Turbo-matic Drive, consisting of a fluid coupling with an automatic overdrive transmission and an automatic clutch.

Dodge continues with the most simplified of all the Chrysler-engineered Fluid Drives. No automatic transmission or overdrive is used in this system, but by reason of a change in the gear ratios the car has faster getaway. Next comes De Soto with Fluid Drive and the Simplimatic transmission which provides four forward speeds with only two forward gearshift positions. Then we have Chrysler itself with the Vacamatic transmission in combination with Fluid Drive. Improvements have been made with a view to obtaining the best possible gear ratios for performance and economy, and the fluid coupling as used in the Sixes has been changed in detail to reduce slippage.

Before introducing the special controls used in Hudson and Packard just a word to emphasize the

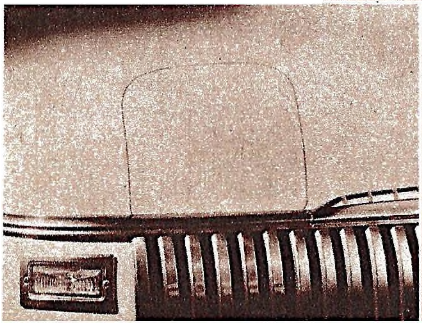


STUDEBAKER



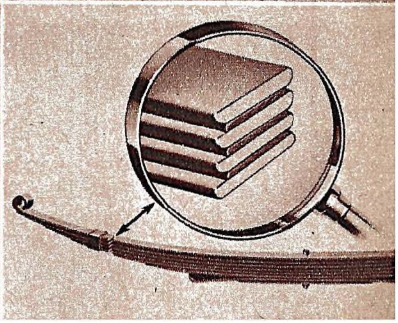
DODGE

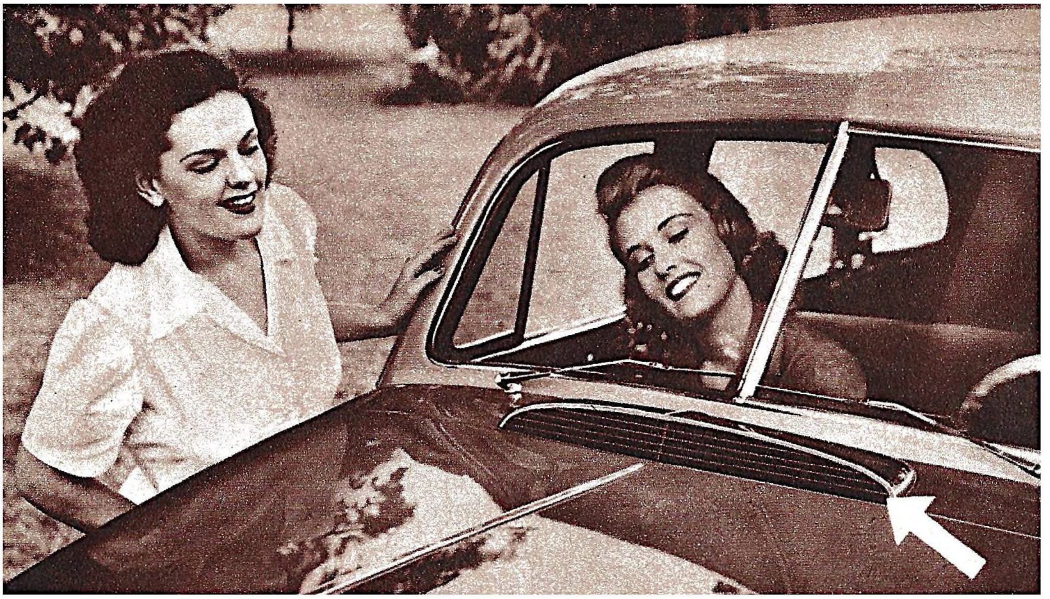
CHEVROLET



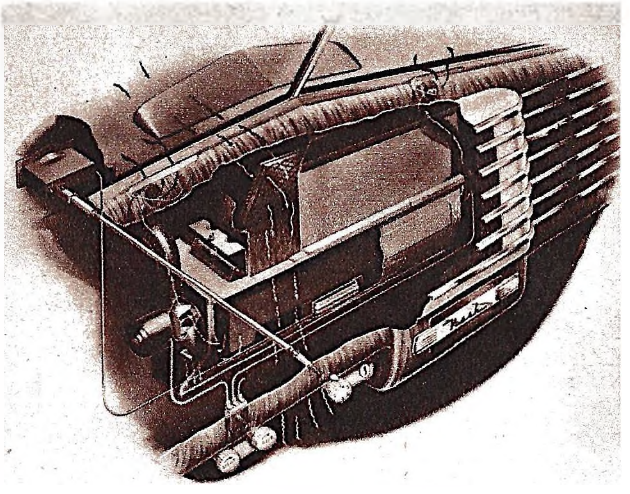
DeSoto headlamps have an "eyelid," shown at left. When you turn on lights, panel slides back, revealing headlamps!

Oil-soaked thin wood strips are inserted between leaves of Pontiac springs, to eliminate all squeaks.





Cowl ventilators on the new cars are done away with or drastically changed. Here, above and at right, is the Nash "Weather Eye" system of air-conditioning, using fresh air for heating.



fact that the 1942 cars are not lacking in novelties. For example, headlights on the new De Soto disappear into the front fenders. When they pop out of their hiding place they are lighted and ready for business. Buick features what is known as a Step-On parking brake which bans the annoyance of leaning over to reach for the pistol grip of the conventional hand brake. The driver merely moves an easily reached control on the instrument panel and then steps on a new small pedal with his left foot. Cadillac features a special hand brake with a "T" handle. After the brake has been set you release it by twisting the handle. Another Cadillac touch this year is a three-way ignition switch which guards against accidental waste of current by the car's accessories.

Packard cars for 1942 carry a protective device known as Ventalarm, an addition to the filler pipe of the gasoline tank which whistles when the tank is nearing the "full" mark. This saves fuel and prevents unsightly evidences of gas spilled over the rear of the car. On Nash you will find unique two-way roller steering for the "600" Ambassador. This is accomplished by reason of the fact that the steering mechanism rides up and down on fixed king pins which are mounted inside the coil springs. Steering and springing mechanisms thus act as a unit and do not fight each other. One of the most interesting of the details seen on the new models is the increase in capacity of the Pontiac oil cleaner which is located inside the crankcase. The oil outlet is now concentric with the cleaner so that all the oil will travel the same distance and at the same velocity. This eliminates oil current eddies which could disturb the settling dirt particles.

Pontiac has an unusual lighting switch.

When the switch is pulled out, the road and instrument panel lights come on, while rotating the knob permits control of intensity of the instrument panel and clock lights. On Plymouth the tonneau light operates when the front door opens, and on De Soto there are locks on both front doors so that a driver can gain entrance to the car on either side. Willys Americar uses 29 pounds of sound-deadening, vibration-absorbing compound on the front floor panel, transmission cover, cowl top and sides, radiator air deflector, rear wheel house panels, fenders and toe boards.

Back to clutches and transmissions for the complete picture of this significant trend toward simplicity in control. When you have added Olds Hydra-matic and the Cadillac version of Hydra-matic Drive you have the complete picture of those controls using fluid. Hudson's Drive-Master is composed of simple, proven units yet provides new ease of control. The operator has three options. He can run the car manually, semi-automatically or automatically. Clutch operation can be entirely eliminated.

Packard is again featuring Electromatic Drive, a system of automatic clutching combined with automatic overdrive and controlled by a number of solenoids which iron out all the wrinkles. Some recent detailed improvements have been added.

"Step-On" emergency brake, by Buick, operates by foot and has dash release to eliminate "fumbling."

One of the amazing things about the 1942 models is that what we called fanciful cars last year have become realities. The new Chryslers are a close approximation of the "Thunderbolt" job which has toured the country to excite the motoring populace. Buick's famous "Dream Car" is actually here with fenders which, on some models, sweep from front to rear clear across the doors. The 1941 Cadillac Special introduced front fenders that extended into the front doors. Then came Packard's Clipper with the fender idea brought down into the popular priced class. Now we find this treatment even in the 1942 Chevrolet. Not to be outclassed Cadillac has lengthened the wheelbase of its famous Sixty Special so that the rear fenders have become a part of the rear doors. You can thus see 1943 styling even as you survey the 1942 lines.

Ford for 1942 is offered in two versions with choice of either the well-known V-8 engine or the new Ford "6" powerplant. This year's bodies have a flatter front with a radiator grille of extremely wide section made up of a number of thin vertical bars of rustless steel. Mechanical improvements have to do with comfort and safety. The Mercury engine has been upped in power with the result that there is an increase in the ratio of power per pound of weight.

Lincoln's front end differs somewhat from conventional styling because, in addition to the use of horizontal bars extending into the fenders, it is gracefully rounded and seems to be in two levels, with the lower skirt sloping forward. On the front of the hood nose is a coat-of-arms adapted from the crest once borne by the Lincolns of Old England. You have this same crest touch on the front of the 1942 Dodge.

But let us lift the hood and see what they have done to the engines.

Plymouth's power plant is up to 95 h.p. at 3,400 r.p.m., which is at a slower speed than used for rating most car engines. This is largely the result of increasing compression ratio to 6.80 to 1. Chrysler superfinishing is now extended to Plymouth motor parts. Used also is a heavier counterweight crankshaft equipped with a vibration damper. Plymouth pistons are now of lightweight cast iron with chilled iron ribs reinforcing the walls. Added economy is obtained through use of a lower rear axle ratio (3.9) so that the engine makes fewer

[*Continued on page* 153]

You're RIGHT — That's WRONG

Here are 25 statements, some of them true, the others false. The trick is to separate the *true* statements from the *false* ones—and it isn't as easy as it looks! Use a pen or pencil and check the correct box under each statement and see how you make out! After you've given yourself the test, try it out on friends and other members of the family and compare scores. They'll enjoy it and so will you.

Are you ready? Let's go!

1. After all, a palindrome is nothing but an aerodrome with a picket fence around it.

   True ☐ False ☐

2. A betting man could win some dough wagering that no horse ever has won the English Derby twice.

   True ☐ False ☐

3. What a party you could throw in Mexico with 50,000 pesas!

   True ☐ False ☐

4. One thing you have to hand the Germans: they were the first to use pigeons to carry war messages.

   True ☐ False ☐

5. In all the cheering for the Brooklyn Dodgers last month, no one mentioned that they got their name from dodging stale vegetables.

   True ☐ False ☐

6. Unteaming a bottle simply means snitching one from a passing brewery wagon.

   True ☐ False ☐

7. Staten Island didn't get its name when someone pointed to it and said: "Is dat an island?"

   True ☐ False ☐

8. Don't worry—you don't need snow to go skiing.

   True ☐ False ☐

9. They may call it "sunny" Italy, but our Atlanta, Georgia, is normally warmer.

   True ☐ False ☐

10. Thank heavens we have more iron in the world than any other metal.

    True ☐ False ☐

11. Sudden starts use extra gasoline, but remember this—so do sudden stops.

    True ☐ False ☐

12. Don't let anyone kid you; Diego Rivera is not a Mexican beach resort.

    True ☐ False ☐

13. Among other accomplishments, we Americans were the first to think of towing gliders into war.

    True ☐ False ☐

WHAT'S YOUR SCORE?

To get your score simply give yourself 4 points for every question you answer correctly and total the result. If your mark is above 90, you are exceptional; if it is between 80 and 90, you deserve high praise; if it's between 70 and 80, you're good; between 60 and 70, fair; and below 60—well, try again next month!

Answers will be found on page 132

14. It's such an important matter, we think you should know right now that fishes are color-blind.

    True ☐ False ☐

15. Speaking of fish, keep in mind that a gold fish's teeth are in his throat.

    True ☐ False ☐

16. A cygnet isn't the same as a signal; it's a small seal, as in a ring.

    True ☐ False ☐

17. The Europeans are trying to outdo us, but we're still killing an average of 109 people a day in the United States.

    True ☐ False ☐

18. Well, well, here's something! Cats have five toes on their front feet and only four in the back!

    True ☐ False ☐

19. It doesn't help the music much, but oak wood makes the best batons for orchestra leaders.

    True ☐ False ☐

20. It's easy to hit a home run because Major League baseballs have a sponge center.

    True ☐ False ☐

21. It didn't take science long to discover that acid stomach does not come from drinking acid.

    True ☐ False ☐

22. Things are so bad now that you have to get permission from Ickes to land a private plane on a government field.

    True ☐ False ☐

23. Snapdragons aren't dragons and they don't snap; they're harmless insects found in buttercups.

    True ☐ False ☐

24. If you live in the country and have an outdoor mailbox, don't get caught painting it; it's ag'in the law!

    True ☐ False ☐

25. One thing they can't take away from the Duke of Windsor is that he was the first of the Royal Family to fly the Atlantic.

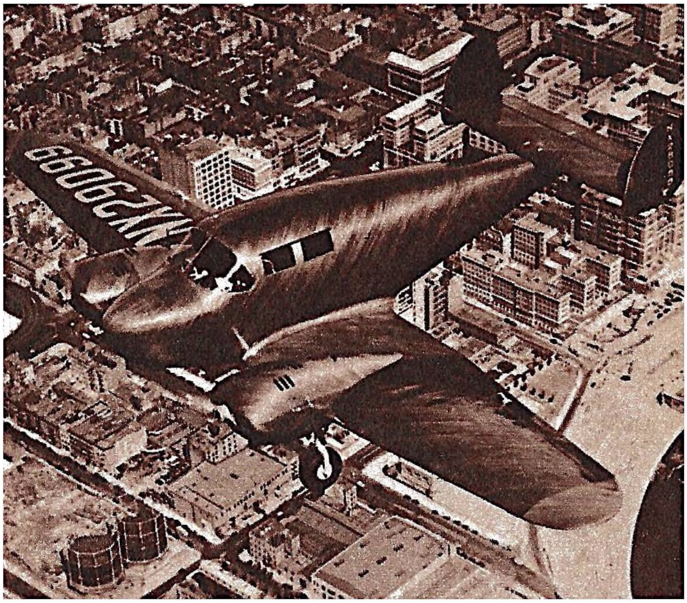
    True ☐ False ☐

NEWS OF SCIENCE AND MECHANICS

GIANT FLYING BOAT KICKLESS GUN—NEW PLYWOOD PLANE—2-WAY PROPELLERS!

All-Plywood Airplane Demonstrates Ability

THE first of a new fleet of airplanes designed for mass production in times of war materials shortage is shown at the right as it was tested in flights over New York City. Fuselage and wings are made entirely of plywood and molded plastic and the ship can be turned out with a minimum of metal, which is needed for fighters and other defense machinery. The aircraft is built by the Langley Aviation Corp. It has two 65-horsepower motors. The plywood used in the test model was all mahogany. It is believed the process will result in cheaper production.



"Aprons" Take Shock From Grid Scrimmage

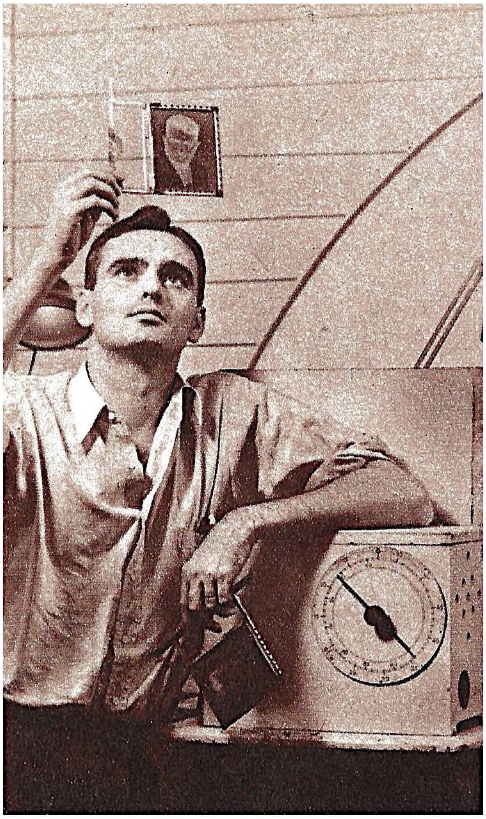
ANOTHER step away from the fierce clash of football as it was played in the days of the "flying wedge" is the "scrimmage apron," invented this fall for use by the elite of present-day college grid stars. In the photo at the right, the Columbia University Lions are shown wearing the new padding device, with Horace Potter shown tackling Paul Governali, the ball carrier. The protectors are designed to be worn only in practice sessions. Their purpose is to eliminate the danger of injury.

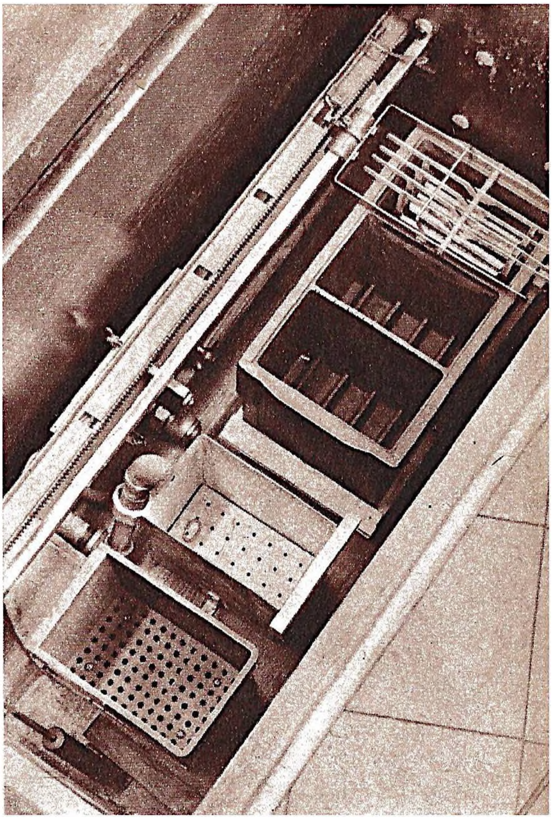
"Tummy Sleeper" Rest For Crick In Neck

ARE you that most unfortunate person who likes to sleep on his stomach—but can't do it without getting a crick in the neck? If so, your troubles are over! Just buy yourself a "Tummy Sleeper," one of the new gadgets displayed recently at the Los Angeles Inventors Congress, and pictured above. It is a padded face rest on a swivel arrangement. Using it, you can *really* sleep face down.

"Man From Mars"? No, A 35,000-Foot Jumper

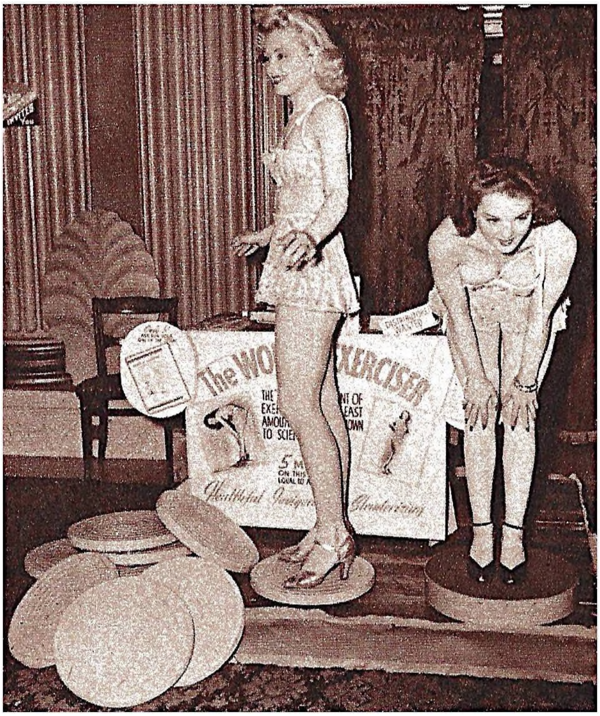
ARTHUR H. STARNES, famous parachute jumper, carries 113 pounds of special equipment for recording of scientific data in making a world's record delayed parachute jump from 35,000 feet to 2,000 feet at Chicago. Starnes was assigned to the jump by Chicago scientists, who wanted physiological and psychological data on the effect of falling. A movie camera is at his side.





An Automatic Film Developing Machine

FONVILLE WINANS, Baton Rouge photographer and inventor, and his motorized film developing tank are shown in the two photographs above. Winans has connected a motor, run with a timing device, to an elongated worm gear having a tripping and raising arrangement. This machine puts the plates into the developing fluid for any desired period then moves them, as set, into shortstop bath, fixer and washer. There is no need to touch them.



A Woggle Mat Will Wiggle Off Weight!

THESE innocent looking little mats roll around, with an unsettling, jiggling motion. They are designed to take off excess pounds.

A "Slot Machine Doctor"!

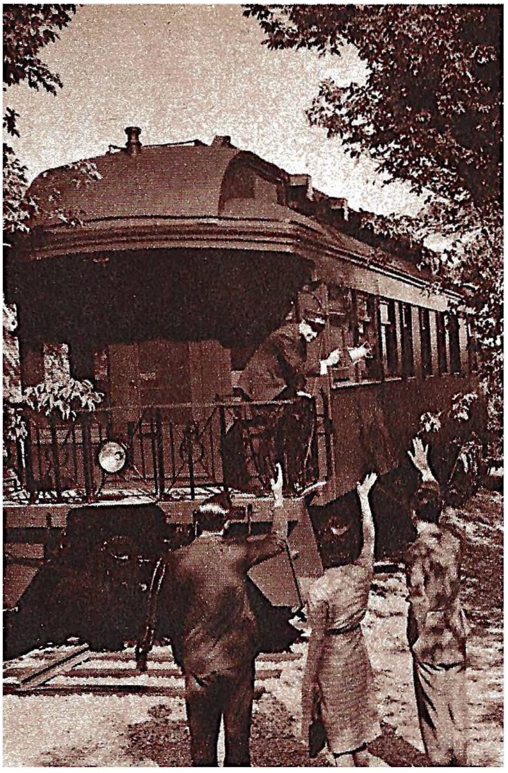
THE slot machine manufacturers will never stop until they have American life completely on a "coin-in-slot" basis, apparently. Now they've devised this machine. Strap your wrist to it, drop in a dime, and read your blood pressure level and pulse rate.

Landing On An Automobile!

ONE of the most unusual aerobatic stunts ever achieved was photographed recently at an air show, where Dannie Fowlie, stunt flier, successfully took off in his plane from the top of an automobile, and then managed a landing on the car top.

This Device Takes The Kick Out Of The Rifle

EDWARD W. RENICK, 41-year-old Kenosha, Wisc., mailman and World War veteran, demonstrates the device which he has invented to reduce the recoil of a rifle. The contrivance is fitted to the muzzle of the weapon. U. S. Army ordnance officers have reported favorably on the invention. The army is said to be particularly interested in applying the principle to hand machine guns used by infantry. Renick's invention is based on gas expansion principles.



"All Aboard"—To Nowhere

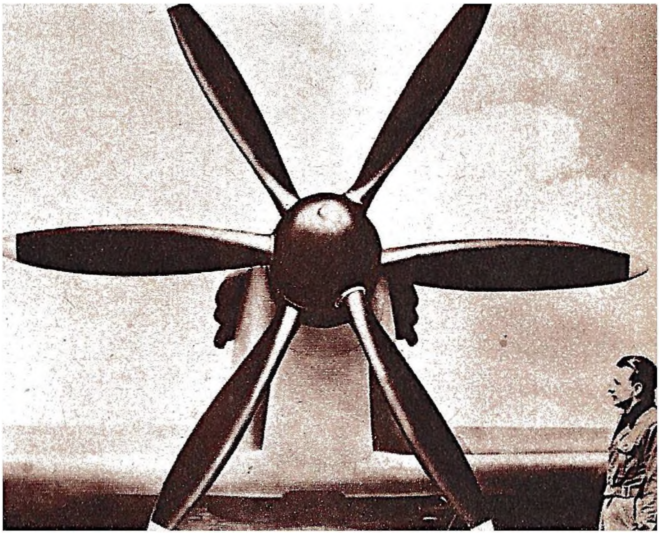
THIS famous old Pullman car is being retired to a "railroad heaven" all its own. In its day, it carried President McKinley, William Jennings Bryan, and others. Now R. M. Hoffman, Illinois manufacturer, has installed it as a playhouse at his home.

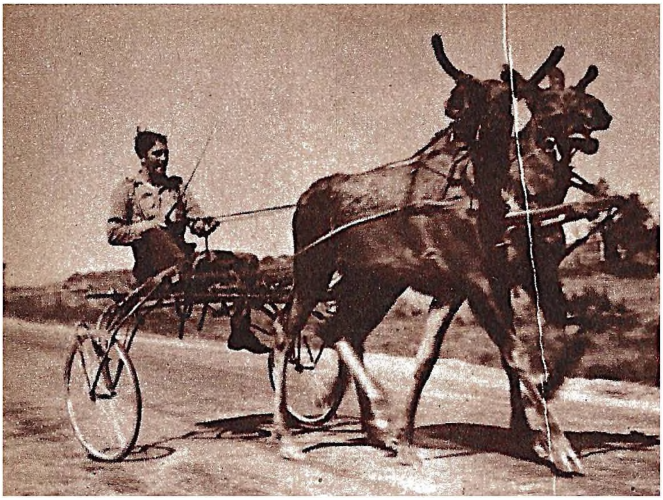
Underwater Socket Tested

A LIGHT socket which can be used under water without short-circuiting is shown in the picture above, in the hands of Helena Brinton, Hollywood model. Miss Brinton doesn't seem to be shocked. We don't know about the socket.

Two-Way Propellers Lessen Air Torque

THE latest development in airplane propellers, the product of English inventors, is called the Rotol Constant-Speed Contra-Rotating Airscrew, shown at the right. Although appearing to be a six-bladed propeller, the contrivance actually consists of two three-bladed propellers which rotate in opposite directions. Among the advantages claimed for the new type prop are complete elimination of torque and improved handling during aerial acrobatics.





Want Trotting Speed? Try a Moose Team!

ALBERT VALLANCOURT, French-Canadian woodsman, has the fastest pair of trotters in his neighborhood—a team of moose which he raised from babyhood at his farm near Sudbury, Ont. Vallancourt insists his team can beat any harness racing records made by horses anywhere. He acquired one of his strange pets when he rescued it from a bear when it was a baby. The other was given to him.

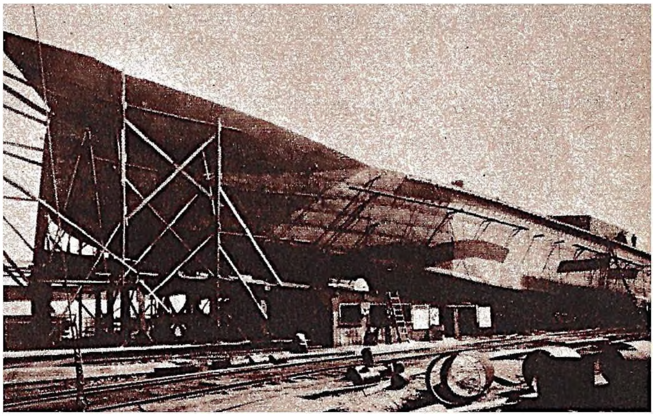
They Look Like Twins But One's A Statue!

IN CASE you have any difficulty with the two characters at the left, we may as well tell you now that the gent on the right is H. E. Coffey, 55-year-old monument maker, of Linville, N. C. He "made" the guy beside him and he did such a thorough job that even his best friends, he reports, can't tell them apart. The way it's done, it seems, is this: the statue is made of cement and painted; Mr. Coffey isn't.

Now They're Putting Babies In Murphy Beds

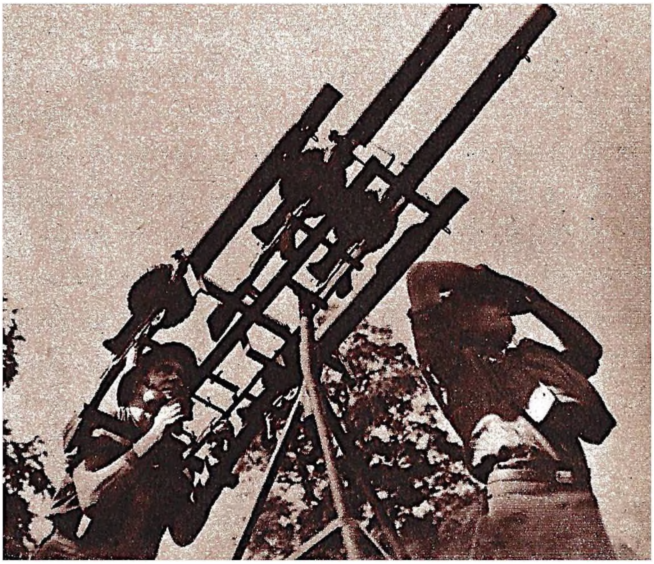
WELL, well! The famous Murphy Bed, which has been lauded in poem, song and movie, finally has been adapted for infant use; though we'll admit the babe at the left seems to be old enough to know better. The idea is that this crib can be hidden away when your offspring isn't in it—which, if you know your Murphy Beds, is the time to fold it away. When folded up, the crib looks like an ordinary closet or bookcase, and takes no extra room.

NEWS OF WAR AND DEFENSE



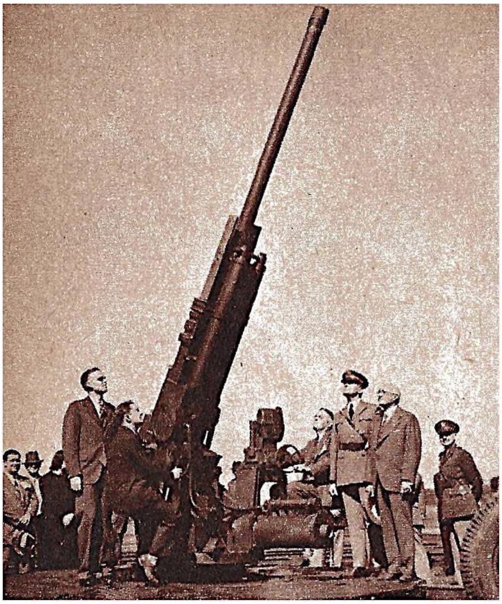
"Sea Otter," Radically New Cargo Boat, Tested

ONE of the "hush-hush" items of America's defense effort is a radically new type of boat known as the "Sea Otter." A one-third size model of the new boat is shown at the top. At right is a full-scale "Sea Otter," showing its novel pointed prow. The propeller is just aft of the center of the ship. Powered with 16 six-cylinder automobile motors, "Sea Otters" can be turned out in two months, will be 270 feet long, carry 1,500 tons of cargo, and have a cruising range of 7,000 miles.



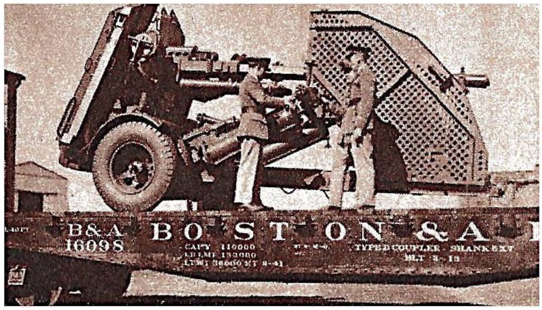
Quadruple Gun Mount For "Lead Avalanche"

A DEADLY hail of bullets pours out of this murderous gun mount, devised by the British, when the gunner pulls the trigger. Four Lewis machineguns operate simultaneously by means of the mechanism, making it a formidable threat to low flying enemy aircraft. It also has many other uses.



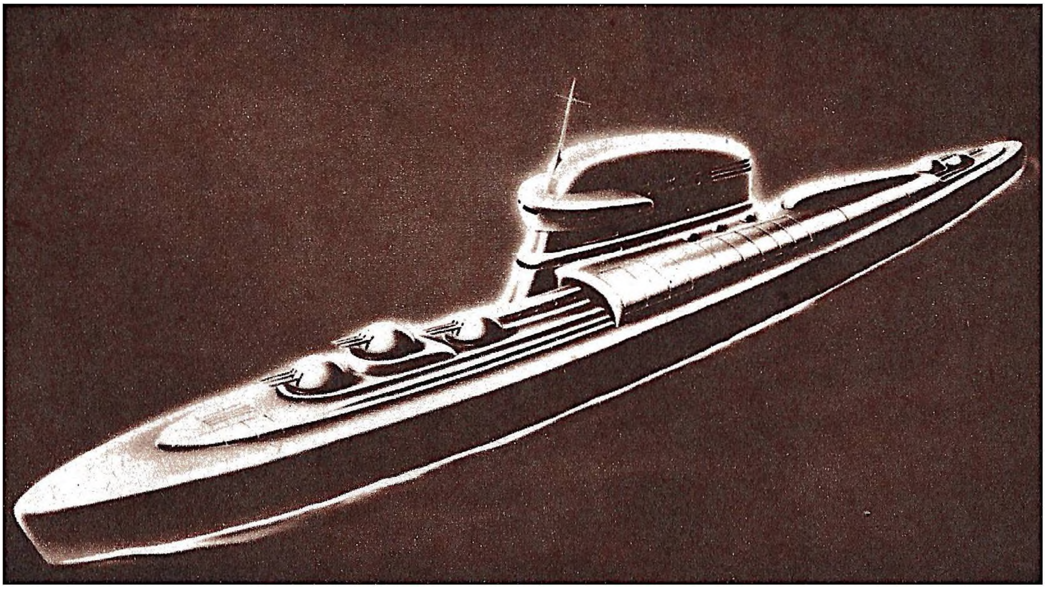
Gun Folds Up Like Jackknife

THE first 90 millimeter anti-aircraft gun ever built by private industry in America is shown here as it was inspected by army officers. The gun, as shown in the picture below, is constructed so that it will fold up almost as quickly as a jackknife snaps shut into position to be hauled by speeding truck. It was turned out by Allis-Chambers Co.



U. S. Planes Strafe Bridge In War Games

THIS striking photograph of new units of the revitalized U. S. Army in action shows three planes strafing a pontoon bridge across the Wateree river in South Carolina. A jeep crew with machine-gun and automatic rifle in the foreground set up protective fire.

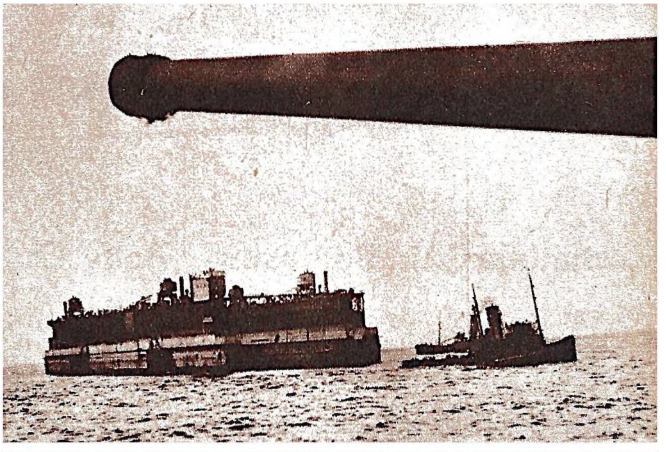


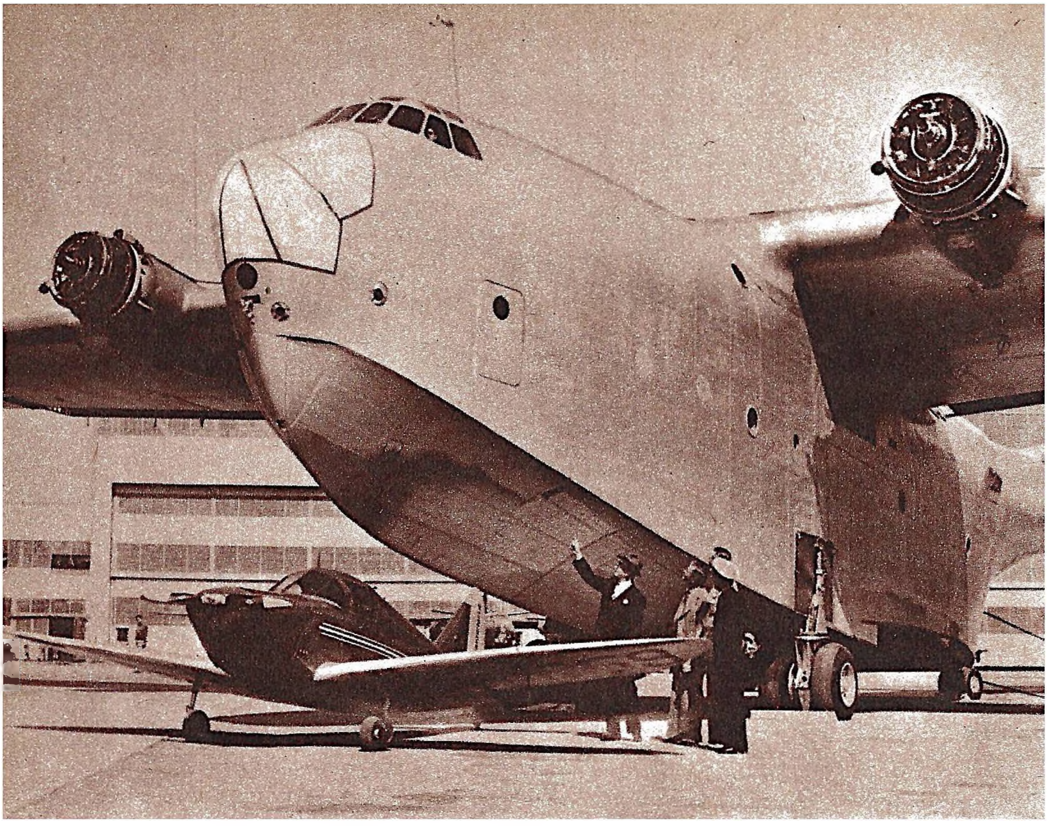
Designer Sees Battle Cruiser Of The Future

HERE, in the illustration above, is a famous designer's idea of how the battleship of the future will look. Its decks, gun-turrets and superstructure streamlined, the ship will offer no flat surfaces to enemy projectiles, and it will be much faster than modern vessels. The design is by George W. Walker.

Floating Docks For Battleship Repairs

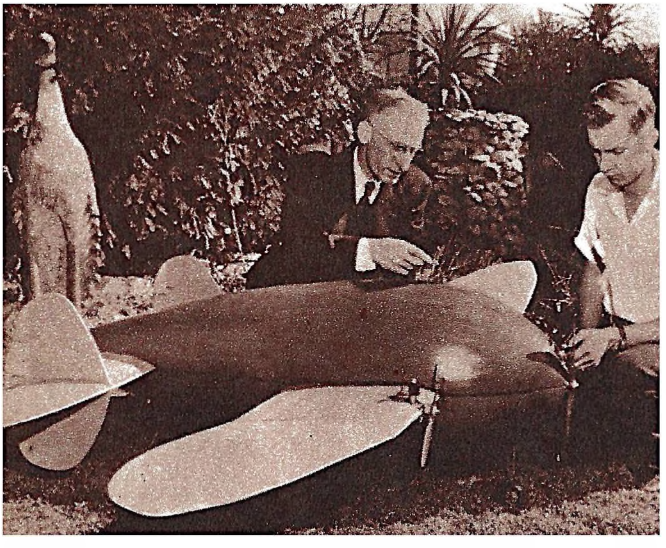
EFFICIENCY of English sea-fighters has been vastly increased by the daring naval achievement pictured here. Huge floating docks were constructed in English shipyards and towed hundreds of miles out into the Atlantic Ocean by a group of tiny tugboats. During the *Bismarck* battle, wounded British destroyers and cruisers were repaired almost on the scene of the naval duel.





Mammoth "Air Battleship" Rolls Out

THE Martin XPB-2-M-1, built for the U. S. Navy, surpassed in size only by the Army's B-19, comes out of her hangar for the first time at Baltimore, Md. A Culver Cadet is shown in front of her to make a comparison in size. She weighs 70 tons.



Gyroscope Controls Radio-Aerial Bomb

JOHN HODGSON, a Mare Island and Navy Yard engineer, has developed the queer looking aerial weapon shown at the left, and the army is now testing it. It is a winged torpedo operating on a gyroscope principle and is designed to fly at 30,000 foot altitudes carrying a full load of bombs. Its inventor claims it may be sent diving at an enemy position by means of radio control waves. Inventor is shown at the left, with Bob Polson, the builder.

CRAFTS AND HOBBIES

PHOTOGRAPHY
MODELS • BOATS
THE WORKSHOP
HOW - TO - BUILD

Photographic "Crayon Drawing"

by Roy Lester

DECORATIVE crayon and charcoal drawing effects are easy to prepare from ordinary photographs. And you needn't be a skilled retoucher to do the job. It is only necessary that you know the simplest elements of paper negative making and that you have an original photograph and the necessary printing equipment to work with.

First, take your ordinary, full-scale photograph and print it by contact on a piece of hard bromide paper, through the back of the latter. Develop, fix, and finish the paper in the normal way. Your result will be a paper negative in which many of the muddy, intermediate tones of the original will have disappeared.

Black or gray freckles and other facial blemishes in the original print are light specks on the paper negative, and they may be spotted out very easily with a soft pencil.

The next step is to print the paper negative by contact, face to face with still another sheet of hard bromide paper. This eliminates still

[*Continued on page* 134]

Make This Portable Background

by
Morris
Germain,
A.R.P.S.

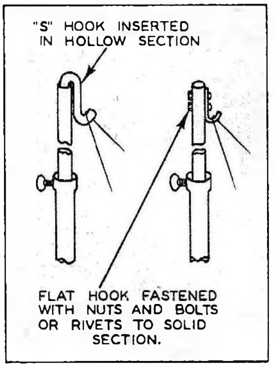


Fig. 1 (left): The portable stand in use; it absorbs light and shows no wrinkles. Right: How background can be hooked to the stand.

ANY amateur photographer who wishes to do portraits in true professional style can easily, and at small cost, construct a suitable background of the type professional photographers use.

Using the plain wall or covering the wall with a wrinkled bed sheet or other inappropriate material will produce a poor portrait. The background must be suspended on a suitable stand so that it can be moved about freely. It must be of light-weight construction and designed so that it can be folded up and stored away with little trouble. The following materials will be required:

[*Continued on page* 132]

Fig. 2 (below): The front material is light-colored monk's cloth and attached to the rear is black rep, which comes in handy for special effects. Fig. 3 (below, right): Rear view of assembled stand.

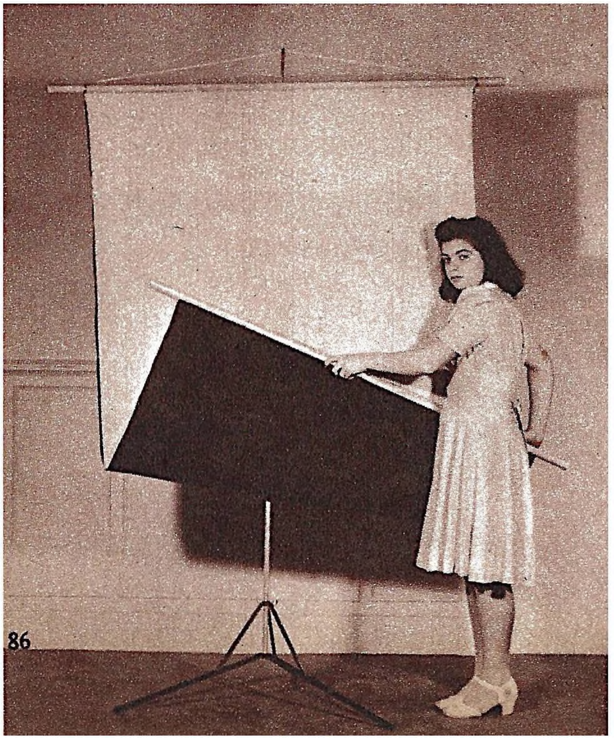
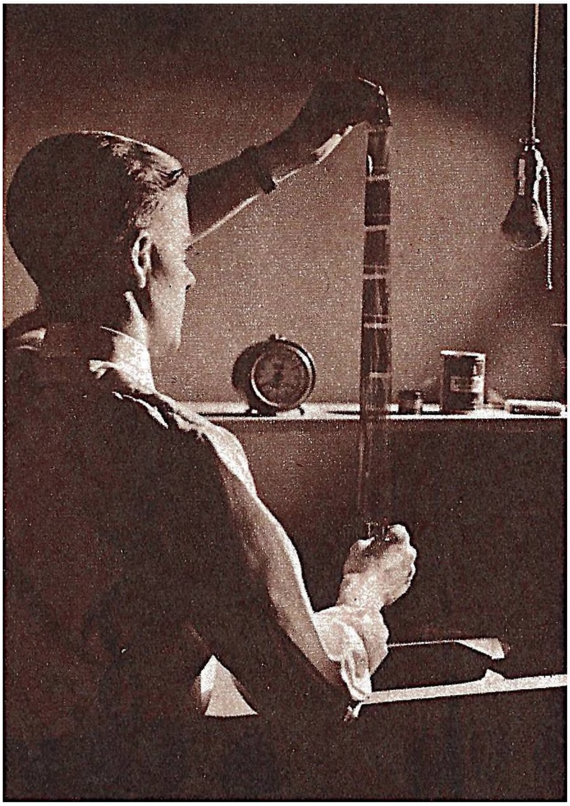
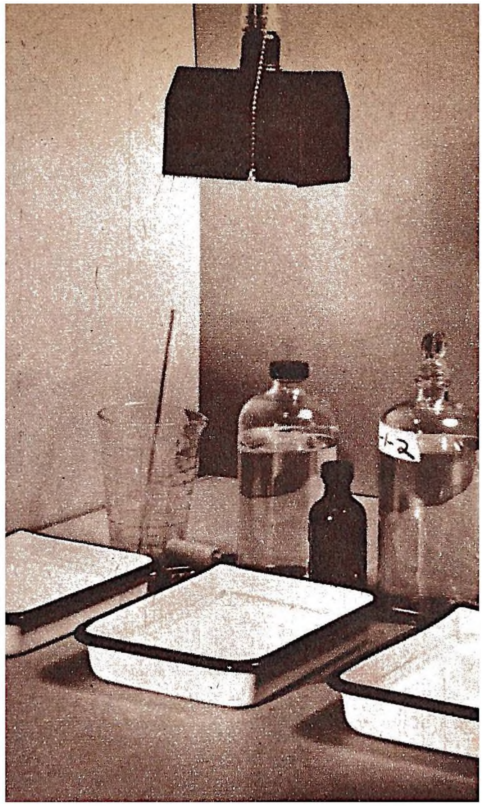


PHOTO CONTEST

FIRST PRIZE ($10.00): "Prairie Pastures" by A. J. Meyer, 1347 13th Avenue, Regina, Sask., Canada. Taken with a 2A folding Kodak on Super XX film developed in DK-60a; f/16, 1/25th sec., with red filter. SECOND PRIZE ($5.00): "Concentration" by Eric Wahleen, 610 12 N., Seattle, Wash. Taken with a Korelle I. on Super XX film by light of sun coming through the window; f/5.6, 1/100th second. THIRD PRIZE ($4.00): "Bottleneck" by William Groom, 176 Murray Street, Binghamton, N. Y. Korelle camera with f/2.9 Cassar lens on Superpan Press film in Agfa 17; f/16, 1/25th second without a filter. FOURTH PRIZE ($3.00): by Edward J. Lewis, P.O. Box No. 63, Montrose, N. Y. Taken with Univex Mercury camera with f/3.5 Tricor lens on Univex Microtomic film in D-76; f/8, 1/1000 second.

Submit monthly contest prints unmounted—no larger than 8x10 inches. With each print, list your camera, film, lens opening and shutter speed, illumination, and developer. Write your full NAME and ADDRESS on the back of each print and wrap securely with cardboard or corrugated stiffeners. If you want unused prints returned, please enclose return postage. (Published prints cannot be returned.) Address: Photography Editor, MECHANIX ILLUSTRATED, 1501 Broadway, New York, N. Y.





LEFT ABOVE: Examination of films (and prints) during development should be within specified time, and not too close to the safelight. RIGHT ABOVE: The safelight giving direct illumination should be at least 18 inches away from developing trays.

Safe Safe-Lighting

by James Wolfe

WITH the coming of faster and faster films and newer types of printing paper whose sensitivity extends to other colors than the usual blue, it is time to reconsider the matter of safe darkroom illumination.

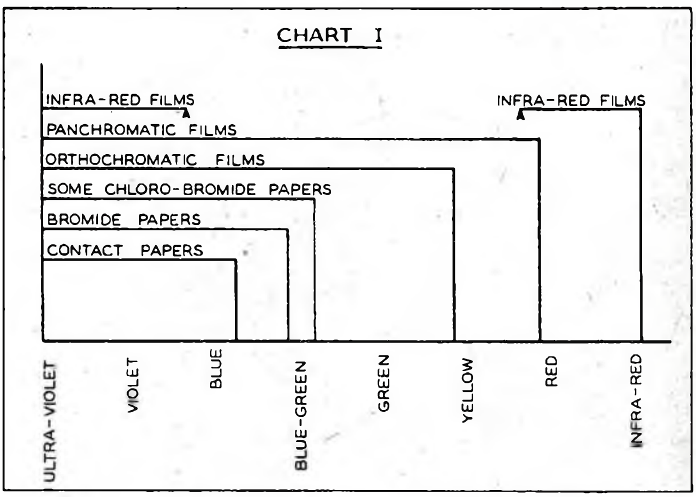
First of all, just what do we attempt to accomplish in lighting the darkroom with a safelight? Actually, there are two things that good lighting in the darkroom should achieve. It should provide as much general illumination as safety will permit, and as much local illumination for examining films or papers as can be tolerated by the sensitivity of the respective emulsions.

The choice of the color and intensity of the safe-light illumination depends upon the sensitive materials that are to be handled. For example, a slow contact printing paper that is sensitive only to blue light can be developed safely under a bright yellow light of proper quality. On the other hand, an orthochromatic film (that is, a film sensitive to green and spectral yellow light) would readily fog under such a light and would need to be developed under a light to which the film is insensitive: red, in this case. Moreover, even the red light could not be very intense, otherwise the film would become fogged.

It is clear, then, that an intelligent approach must be made to the problem of darkroom illumination if a workable light is to be provided, and a safe one.

It has already been mentioned that correct safe-lighting depends upon the spectral sensitivity and the speed of the materials to be handled in the darkroom. By spectral sensitivity, we mean the range of wavelengths which are capable of exposing a given film or paper emulsion. This is sometimes referred to as "color sensitivity," but the trouble with that expression is that it is not always applicable. For example, films and papers are sensitive to ultra-violet radiations and many films are sensitive to infra-red rays, neither of which are colors; therefore, it is better to speak of the responsiveness of emul-

LEFT ABOVE: One of the most efficient safelight combinations: direct illumination 18 inches from tray and indirect general lighting 10 inches from wall. RIGHT ABOVE: Performing simple safelight test on paper. BELOW: Paper and film sensitivity chart.



Here's How To Select Your Darkroom Safelight; Test It, And Place It Where It Is Able To Do Most Good.

sions as "spectral sensitivity."

The accompanying chart shows to what spectral ranges various types of film and paper emulsions are chiefly sensitive.

By examining this chart, the color of the safelight to use for any given material is evident. The rays of light transmitted by the filter glass in the safelight cannot include those wavelengths of light to which the particular emulsion is sensitive. Therefore, the safelight colors for various materials will be as follows:

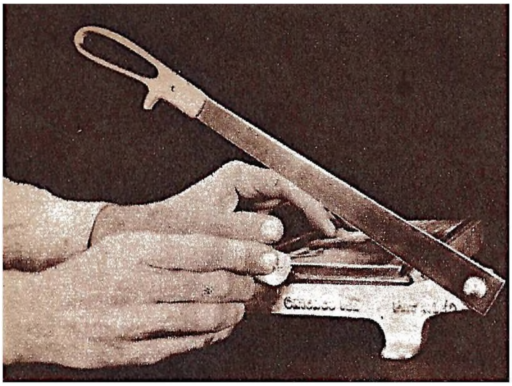
Material	*Sensitive to:*	*Safelight Color*
Contact papers	Ultra-violet & blue	Yellow (green & red)
Chlorobromide papers	Ultra-violet, blue & slight blue-green	Yellow-green
Bromide papers	Ultra-violet, blue & slight blue-green	Yellow-green

Material	*Sensitive to:*	*Safelight Color*
Orthochromatic films	Ultra-violet, blue-green, yellow	Deep red
Panchromatic films	Ultra-violet, blue-green, yellow, orange & red	Dark green
Infra-red	Ultra-violet, blue, red & infra-red	Dark green

It will be noted that a green safelight is the best possibility for panchromatic and infra-red films, in spite of the fact that *pan* films are highly sensitive to all light and infra-red films

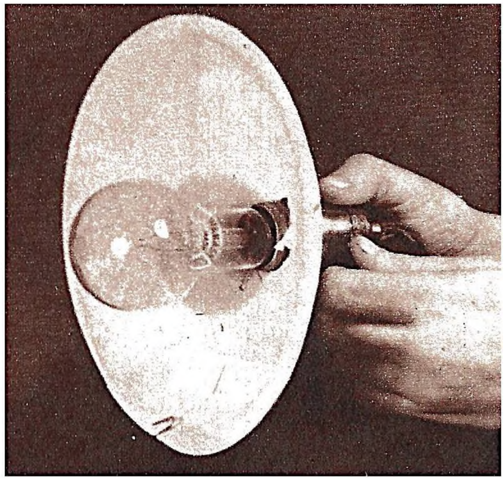
[*Continued on page* 159]

Photo Kinks

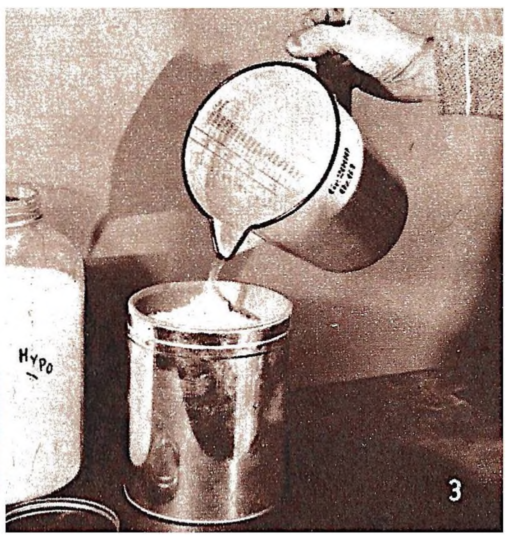


LEFT: The cutting edge of a photographic paper trimmer can be lubricated to improve its efficiency. Hard candle wax is used for the purpose. Simply rub a candle back and forth along each blade and remove any crumbs adhering to them with a piece of dry cloth. That's all there is to it.—Ray J. Marran

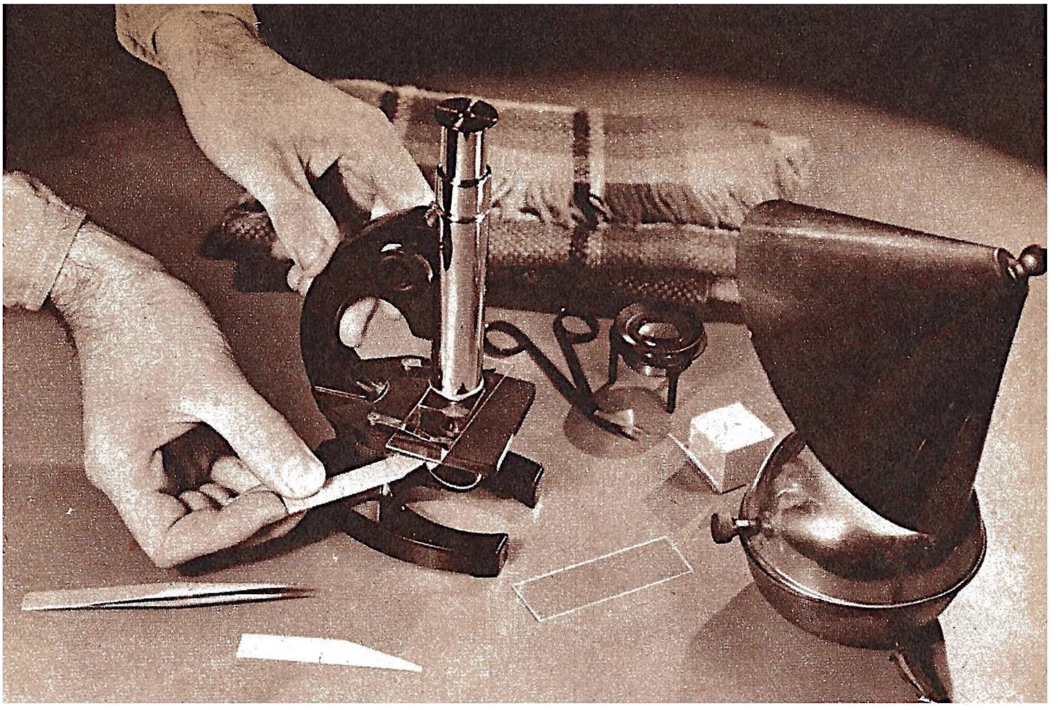
BELOW: In grinding glass for camera focusing screens at home, it will be found that powdered pumice produces a finer grain than carborundum or emery powder. The fine grain screen transmits much more light. Place some powdered pumice with a little water between two sheets of flat glass and grind them with a circular motion, in the usual way.—Kenneth Murray



ABOVE: An emergency photo lamp reflector can be made very readily with the aid of a paper, picnic or pie plate as illustrated. Cut out a small pie-shaped segment of the plate and pull it together into cone-shape. Then cut a hole in the center large enough to take the electric lamp socket. The plate can be held together with a pair of paper clips.—Wm. Swallow



HYPO "DRIP-O-LATOR." Place one pound of hypo in a plastic dish or bowl whose bottom is drilled with holes (using a No. 60 drill—Fig. 1) and set the bowl over a discarded, five-pound sodium sulphite can. Pour hot water over the hypo to dissolve it; the can will hold the necessary two quarts of solution. Keep the water at about 100 degrees F. Another way to use the device is by filling the can with hot water and placing the perforated bowl-full of hypo into it. Dissolved solid drops to the bottom, making for continuous solution of the hypo.—Walter E. Burton.

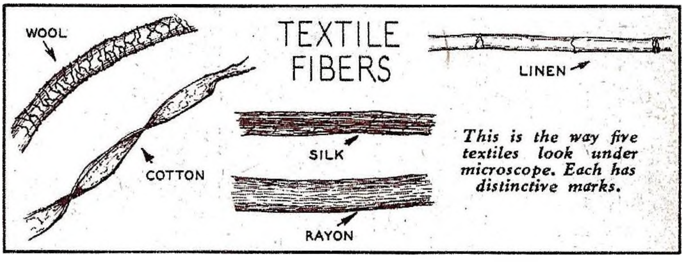


Inserting tapered cardboard strip between mirror and object will produce a darkfield effect to bring out surface detail of textiles.

Testing Textiles With Your Microscope

Is Your New Suit Actually "All Wool"? Your Microscope Will Tell Certainly.

by Walter E. Burton



This is the way five textiles look under microscope. Each has distinctive marks.

IS THAT gift sweater all wool; and did those linen handkerchiefs come from a flax or cotton plant? Such questions, ordinarily difficult to answer with any degree of exactness, are easy when a microscope is available.

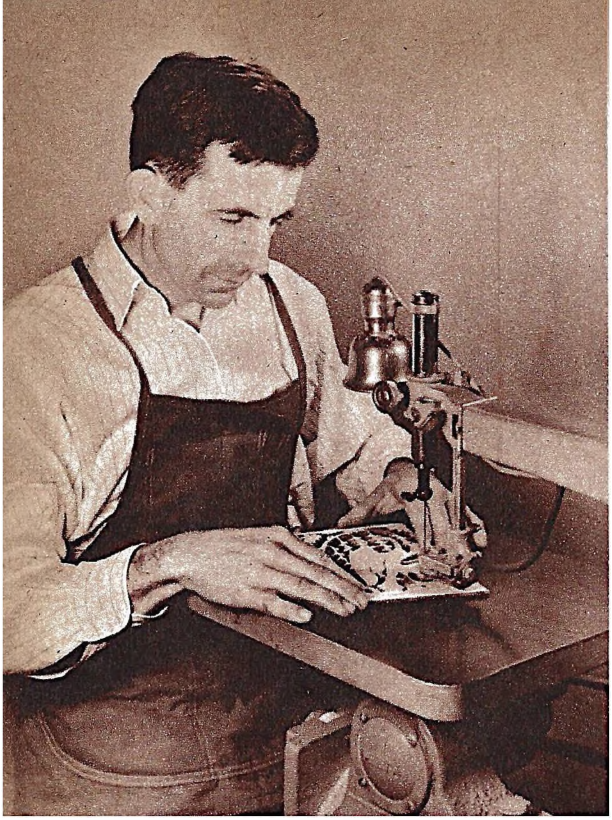
The inquiring eye of even an inexpensive microscope will reveal whether a piece of cloth or other textile material is wool, linen, cotton, or one of the synthetics such as rayon and nylon; and it will show when the cloth is a mixture of two or more of these, and give an approximate idea of the relative quantities. Thus an "all-wool" sweater may, under the microscope, turn out to be half cotton, with each thread consisting of a cotton core and a wool outer layer.

First of all, in order to use a microscope for identifying textile fibers, you will have to acquaint yourself with the appearance of such fibers. Best way to do this is to obtain samples of materials like linen, wool, cotton, and rayon, and study the fibers of each until you can identify them whenever you meet them in the future.

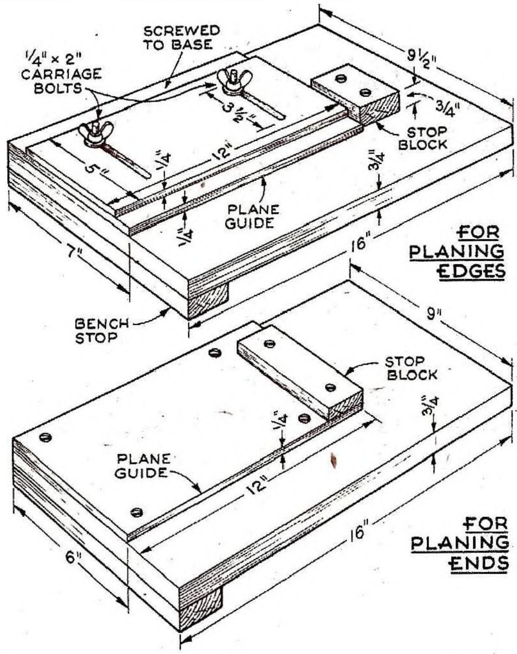
You soon will learn that cotton fibers are somewhat like wood shavings, flattened and curly or irregularly twisted. You will discover that linen fibers show characteristic joints, and look a little like transparent bamboo when undyed—something to be expected because they are jointed strands from flax plants. Undyed natural silk will look like a glassy strand of somewhat varying diameter, and often a line resembling a seam is visible along the middle. Artificial silk appears more uniform in diameter and is usually somewhat coarser; and it is marked

[*Continued on page* 142]

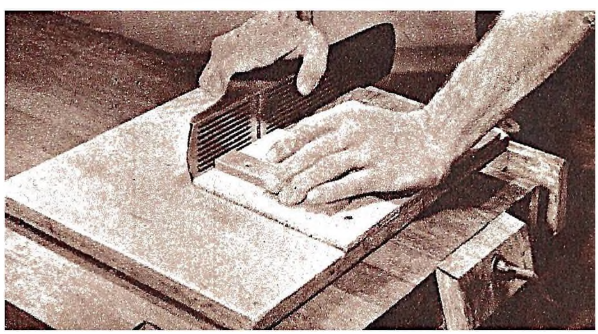
Formicraft In



Above: The four designs for tileboard described in this article. They are (1) cigarette box, (2) plaque, (3) tray, (4) lamp base. Left: Scroll saw is used to cut plaque.



Accurate squaring up of tileboard pieces is accomplished by means of this jig, or "shooting board."



by Edwin M. Love

THOSE glossy and brightly colored plastic-surfaced wallboards that are being used nowadays to dress up swanky restaurants, model kitchens, and luxury bathrooms offer a new material for the home craftsman. Work it up as an all-over veneer, with the appearance of a marble mosaic; pierce it in intricate design, as if it were ivory; combine it with painted wood, or point it up with the shining aluminum and chrome moldings that are made to go with the board.

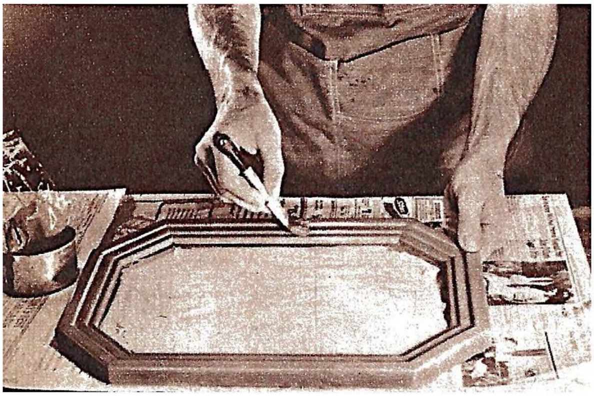
This material is obtainable from any lumber yard or building material firm. The plain variety, not scored to represent tiles or strips, is best, and costs about 25c per sq. ft. Less easy to obtain, and more expensive, are the highly decorative boards fashioned by a photographic process to resemble veined marble, onyx, and rare figured hardwoods, but they are worth the price.

Four projects are described here to illustrate the craft possibilities of this splendid material. The simplest is the scroll-sawed plaque. Copy the design by sketching through ½" squares, and rub the back with a pencil for use in transferring, as carbon paper does not "take" well on the polished surface. If a

The Workshop

Modern tileboard and Formica panels make an excellent material for attractive and useful shop projects. These composition boards have a beautiful, hard, glossy surface and are easily worked with ordinary home workshop tools.

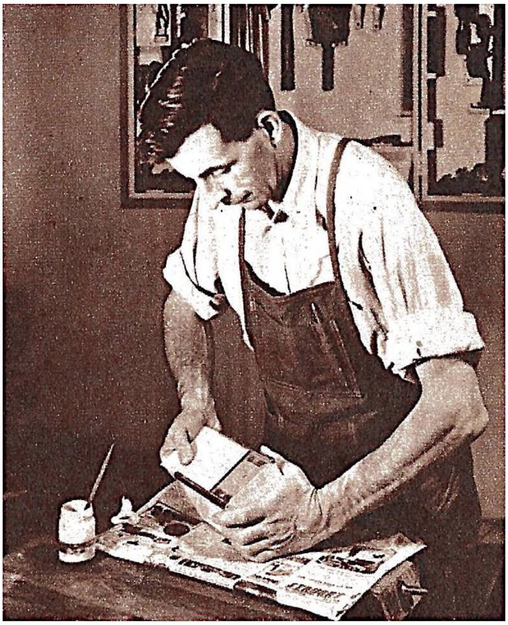
Above: Edges of pieces are touched up with paint before inserting the mitered "in between" sections.



power scroll saw is not available, the plaque can be cut by hand. Use masonite or 1/4" three-ply stock for the background, fitting it with a hanging tab, and stretch the velvet over the face, gluing the edges at the back. Attach the plaque with a brass escutcheon nail driven through the eye of the bird, so that it can be pried off for ease in cleaning the velvet.

The tray is an example of the wallboard combined with wood. Use the board for the

[Continued on page 116]



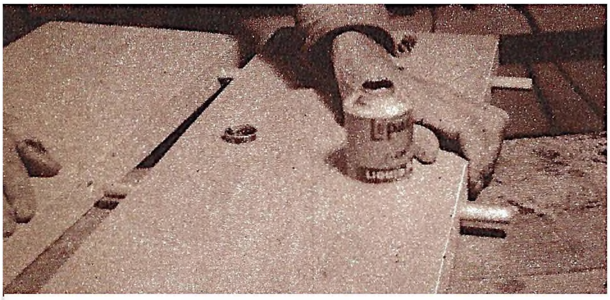
Top: The tray is good-looking and light in weight. Above, left: Waxed paper covering the bottom of the tray protects it from smearing while the frame is being painted. Above: Pushing a side in place on the lamp base. Metal corner molding holds the edges securely.

Wheelbarrow Seat

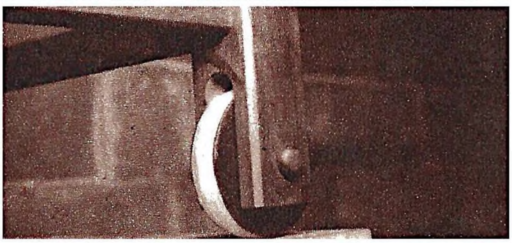
by Dale Van Horn

THIS dual-purpose piece of furniture is called a wheelbarrow seat because you simply lift one edge to wheel it about. It is upholstered and covered with leather (or a leather substitute) and will accommodate two or three people comfortably. The seat is especially appropriate for the small apartment where space is not abundant—where a davenport is out of the question. It can be left permanently in a corner and there will seat two nicely. Or it can be used as a screen for the cold fireplace to hide the black, dead hole when there is no fire. To serve as such, you simply raise the round seat to the vertical position and wheel it up to—almost into—the fireplace. Then too, this practical affair will repay its cost on the porch or terrace.

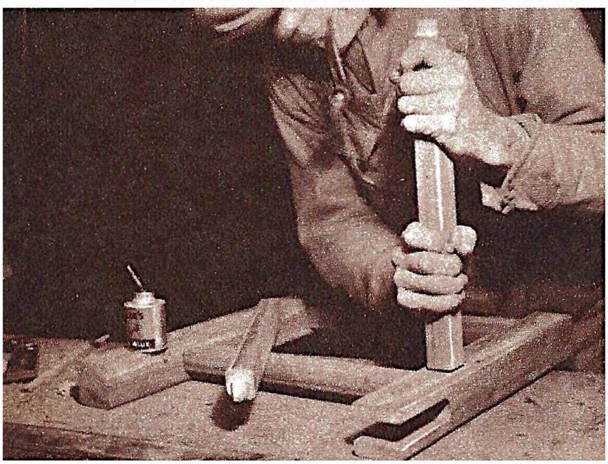
Four walnut legs are connected by walnut spreaders and rails. Two of the legs carry rubber tired walnut wheels. The round seat is of 1⅜″ white pine glued together with dowels running well through adjacent edges of the timbers. The top edge of the seat is rounded with the shaper or with a rasp or plane. Two pounds of cotton fill the top—



To add lateral strength, the top pieces of pine are reinforced with hardwood dowels, driven in edgewise and glued in place.

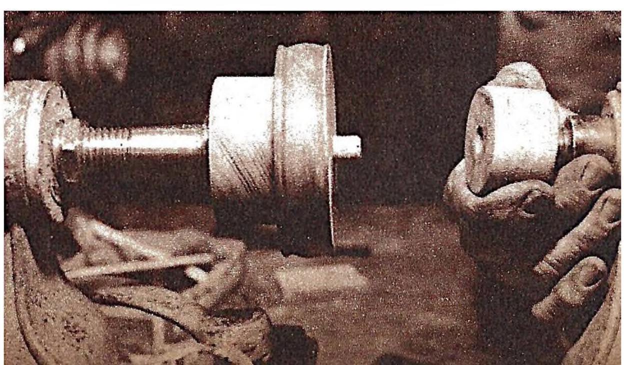


Left: Group of top rails and closeup of rubber-tired wheel. Note that tenons on ends of rails are turned off center.



Above: Fitting a side together. Slot in leg is for front wheel. Right: To insure perfect centering of the wheel holes a hole is first bored in wood block and tested over snug dowel with tail stock brought against it.

Above: Cotton padding is arranged evenly and built up from the edge to a well crowned center.



The completed Wheelbarrow Seat is seen at right. It is large enough to seat three people without overcrowding. Top raises on hinges and wheels in legs make for easy moving around.

and three pounds will be even better—then the leather is stretched over it and tacked. A walnut rosette is attached to the center of the top, while binding hides the tacks in the edge. That, in brief, is the plan of the wheelbarrow seat.

Cut two walnut legs 2¼"x18" long. Cut the other two legs 2¼"x17¼" long. Round each edge a little either with a shaper or router, or by placing the legs in the lathe and cutting slightly with chisel or rubbing with sandpaper. You can also do it by hand almost as fast with a rasp and sandpaper. A slot 1⅛" wide and 3½" deep is cut in the lower end of each of the short legs. The top of each slot can be rounded evenly if a hole is first bored through the leg with a 1⅛" bit. Then saw cuts are made to it.

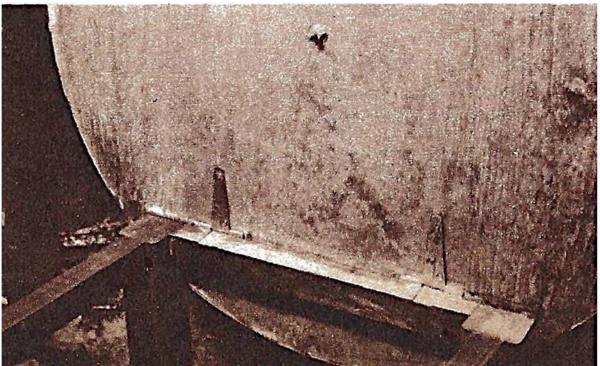
Bore a hole ½" in diameter, centered, through each front leg for the wheel axles. These consist of tenons or dowels turned to fit, with a button about 1" in diameter on one end of each. The dowel is long enough to pass through the outside half of the leg, through the wheel and half way through the inside half of the leg. To complete filling the hole and to finish the inside, another short dowel with button to match is made and pushed into the hole, with a touch of glue on it to hold it fast. The long one can be removed if necessary.

Each wheel is of walnut 1" thick, 4" in diameter. Wheel rims are turned with a high crown and shoulders at each side to hold the rubber tire. Bands about 1¼" wide cut from an old 3 or 3½" tube, are stretched evenly around the wheels. These tires are not essential but do cushion the seat against the floor.

Top rails are 1¼" square and 14" long, plus

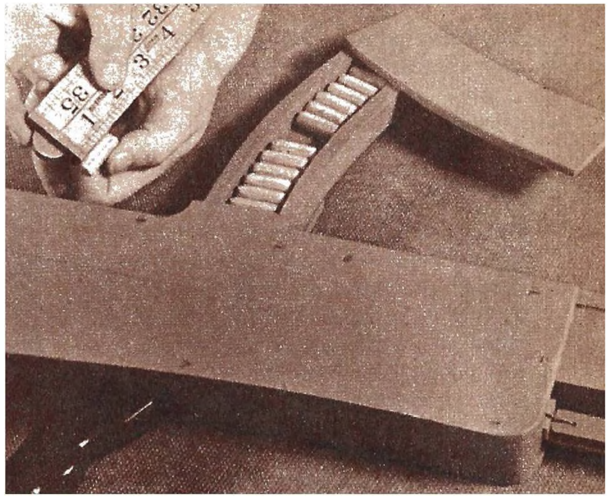
[*Continued on page* 130]

Leather is next stretched over top and tacked down around edges. Trim covers, tacks and rosette tightens center of seat. Below: Recessed hinges of top and lower end of bolt which holds walnut rosette in place.

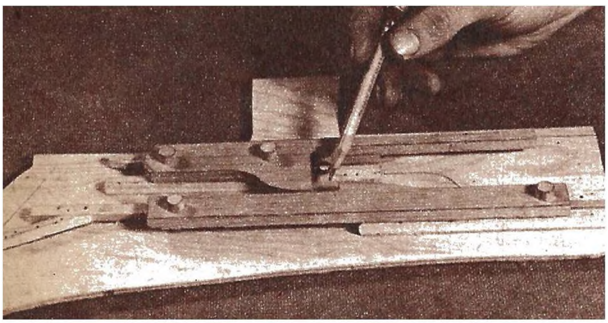


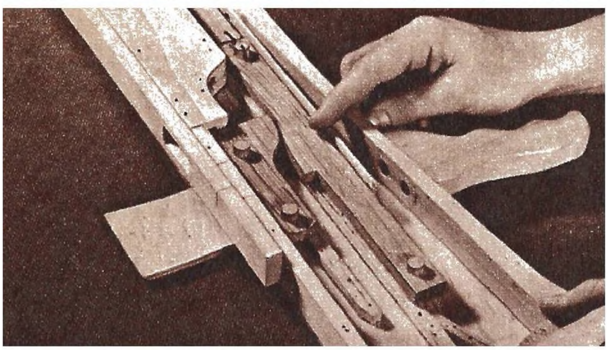
Rubber tire is cut from 3-inch inner tube. Photo also shows binding or trim which goes around edge of seat and hides tacks.

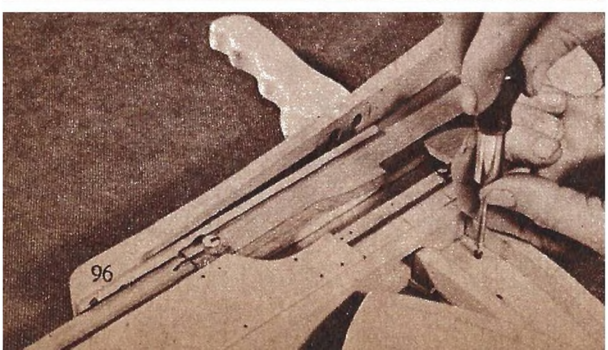
Small dowels are used for ammunition. Ends are chamfered to prevent possible jamming in the magazine.



MODEL SUBMACHINE







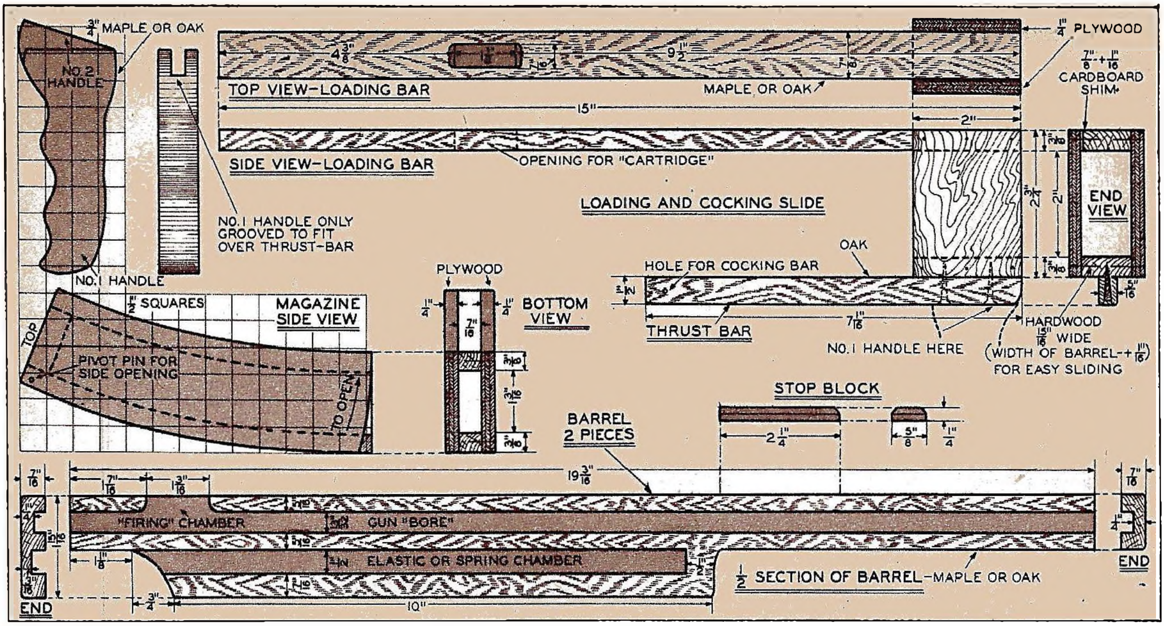
Here Is A Repeating Action "Submachine Gun" That Will Delight That Boy Of Yours. While Certainly No Lethal Weapon It Will Knock Over Toy Soldiers Quite Easily. Holds Fifteen Wooden "Bullets" Firing As The Front Handle Pumps Back And Forth.

by Reginald O. Lissaman

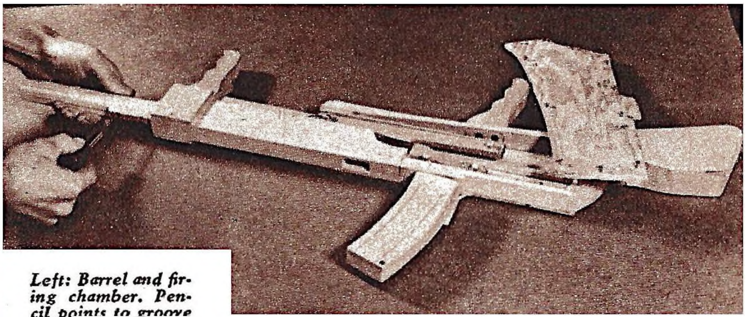
ANY small boy will want, and be delighted with this toy submachine gun, which holds fifteen shots in the magazine and fires them continuously, until empty, as the "tromboning" action is worked. Made entirely from wood, simple of construction, and employing no "hard to get" parts, this gun would make an excellent mass production product for any guild club doing such work for gift or sale.

The body of the gun, housing the mechanism, is built up on the side plate having the projection to which the magazine is secured. If the modeler makes up a set of full sized

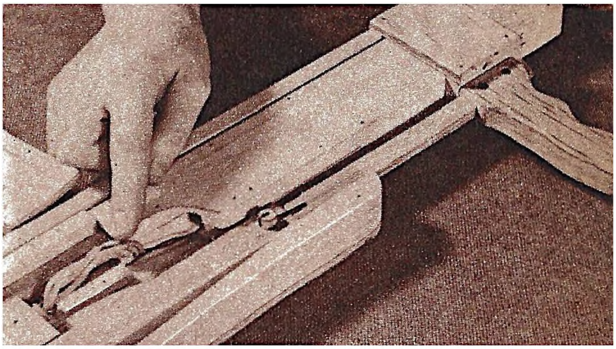
Top left: Cocking bar and firing pin are in place on side plate. A small screw eye (next to pencil point) is used for attaching spring or rubber band fire power. Center: Attaching magazine to gun. Leave room for loading bar to slide freely beneath. Bottom: Cocking bar and firing pin are guided by short projecting dowels which slide in "tracks" formed by bradding small rippings to side plates. Finger points to wooden spring causing cocking bar to engage firing pin.



GUN Performs Realistically



Left: Barrel and firing chamber. Pencil points to groove for placing rubber band "power." Above: Small block screwed to barrel stops forward sliding action. Right: Two or three rubber bands are pulled in place with stovepipe wire.



drawings of all the parts on light card or heavy paper and makes cut-outs from them, much of the fitting and adjusting may be done before actually cutting the parts from wood. This minimizes the chance of error caused by working from small drawings.

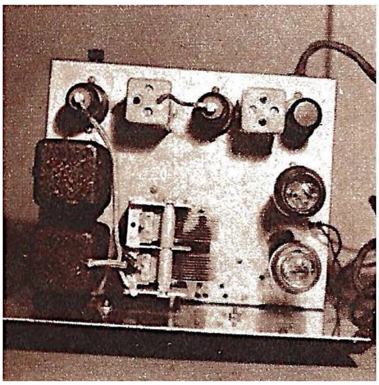
The short dowels which project through the firing pin and cocking bar should slide freely, but not too loosely in the tracks formed by the small rippings, which are

[*Continued on page* 120]

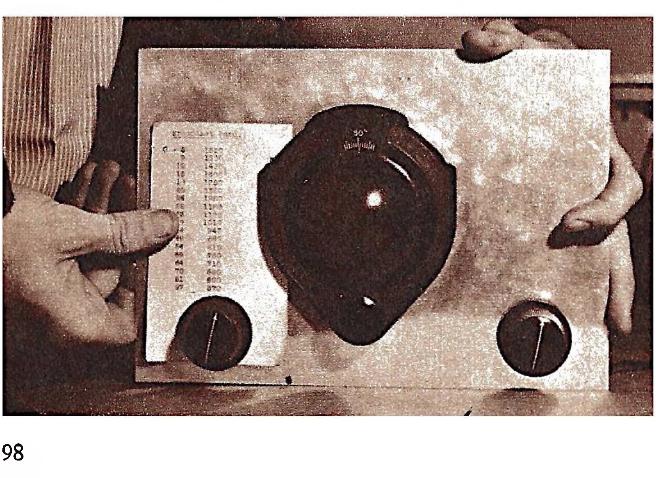
Right: While casein glue may be used at points in construction where removal will be unnecessary, do not use any when attaching covering side plate. Small screws hold it down and permit removal for adjustments, fire power renewal, etc.

The MI Three Bander

The large speaker gives clarity of tone usually associated only with much bigger receivers. Paper on panel is partial list of stations logged during tryouts.



These two views show arrangement of parts on chassis. Compare with drawings before starting work. Below: Metal control panel is simple and compact.



Long, Short And Standard Broadcast Bands Are Covered By This Powerful Little 5-Tube AC-DC Receiver.

by John H. Potts

HERE is a new receiver you can build—one which meets the demand for a simple, yet extremely sensitive radio which will bring in stations not only on the standard broadcast and short-wave bands but also on the less commonly explored long-wave bands. The latter is a very unusual feature in a simple set. Most receivers for long-wave stations are very elaborate affairs, far too expensive for the average individual to buy or to build. Yet the enormous development of aviation in recent months has tremendously increased the importance of this long-wave band, and with our new receiver you will find it possible to listen in on the airplane communication, weather reports, beacon signals—special features found only on the long-wave band.

This receiver is an ac-dc type employing but five tubes. A 6A8 pentagrid converter serves as oscillator and mixer and is followed by a very high-gain i-f stage, using a 6K7. The new 6SQ7 double-diode, high-mu triode performs three duties, acting as second detector, automatic volume control (avc) and high-gain first audio stage. The output stage is a 25L6G beam-power tube, which feeds a large 9½″ elec-

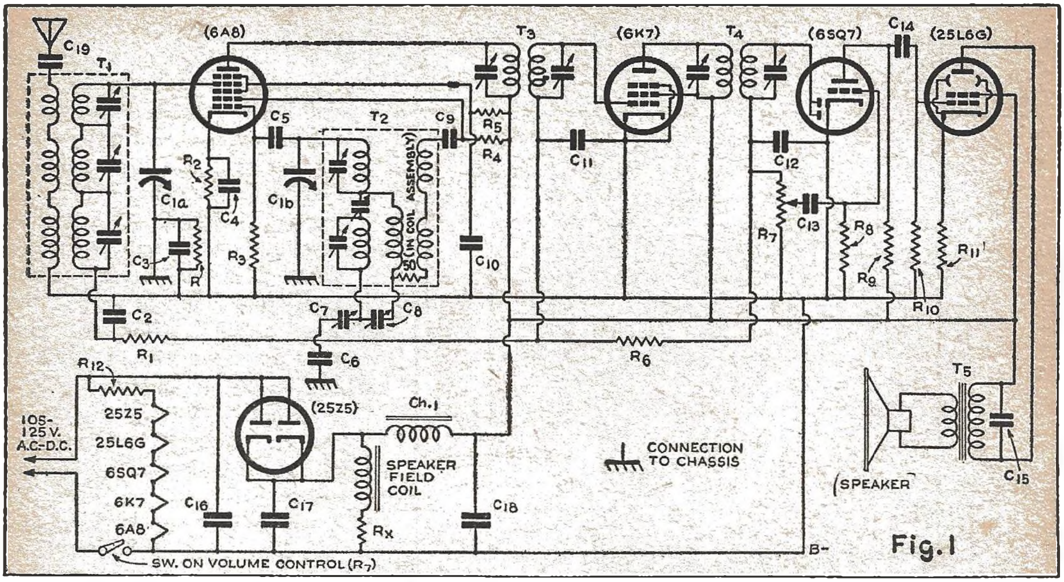


Fig. 1

PARTS LIST

C1a, C1b—Gang Condenser, two sections, 365 mmf., each section, Meissner or Trutest
C2, C4, C10, C11, C16—Aerovox tubular condensers, paper, .05 mfd., 400 volt, type 484
C3—Aerovox tubular paper condenser, 0.5 mfd., 400 volt, type 484
C5, C12—Aerovox mica condensers, .0001 mfd.
C6—Meissner mica condenser, .003 mfd., (part of padder kit No. 22-5202)
C7, C8—Meissner padder condensers, adjustable (parts of padder kit No. 22-5202)
C9—Aerovox mica condenser, .002 mfd.
C13, C14, C15—Aerovox tubular paper condensers, .01 mfd., type 484
C17—Cornell-Dubilier electrolytic condenser, type 4015, 40 mfd., 150 volt
C18—Aerovox electrolytic condenser, 25 mfd., 150 volt
C19—Aerovox mica condenser, .002 mfd.
R, R1—IRC carbon resistors, 200,000 ohms, ½ watt
R2—IRC carbon resistor, 700 ohms, ½ watt
R3—IRC carbon resistor, 50,000 ohms, ½ watt
R4—IRC carbon resistor, 25,000 ohms, ½ watt
R5—IRC carbon resistor, 30,000 ohms, ½ watt
R6, R9, R10—IRC carbon resistors, ½ megohm, ½ watt
R7—IRC volume control, 500,000 ohms, with switch
R8—IRC carbon resistor, 10 megs., ½ watt
R11—IRC carbon resistor, 150 ohms, 1 watt
R12—Ohmite power cord, 165 ohms
Rx—Wire wound resistor, 10 to 20 watts, see text
T1—Meissner antenna transformer No. 14-1015
T2—Meissner oscillator transformer, No. 14-1017
T3—Meissner i-f transformers, No. 16-6658, interstage type, 455 kc
T4—Meissner i-f transformer, No. 16-6660, 455 kc, diode input
T5—Output transformer (to match speaker)
CH-1—Midget choke, 10 henries, 150 to 300 ohms
1—7x10 panel (see text)
1—7x9 chassis (see text)
4—Octal sockets, Amphenol
1—Six-prong socket, Amphenol
1—6A8 tube
1—6K7 tube
1—6SQ7 tube
1—25L6G tube
1—25Z5 tube
1—Loudspeaker, any type, electrodynamic or permanent magnet, (see text)
Binding post, tie posts, wire, bus bars, screws, nuts, two small knobs
1—Kurz-Kasch 4-inch dial

tro-dynamic speaker. This tube has ample power to drive through with considerable volume even the lowest notes now being broadcast. In recognition of this feature, unusual care has been taken to filter the power supply to a degree seldom approached in ordinary commercial receivers. This is necessary to avoid excessive hum being reproduced in consequence of the broad low-frequency range of the speaker and audio system.

The high sensitivity of this receiver is obtained by operating each tube and circuit at maximum efficiency and by the use of high-efficiency i-f transformers. Note that no cathode bias is employed on the 6K7. As a result, the gain of the tube is greatly increased. Yet a limiting bias, derived from the avc circuit as a consequence of the small residual current which always flows in diode circuits, even when no signal is applied, serves to provide about one-volt negative bias to all grids under avc control and thus prevents overload. This is applied likewise to the converter and increases the efficiency of the conversion action when the cathode bias resistor is omitted, which we'll discuss later on. As shown in the schematic (Fig. 1), the usual bypass condenser across the power tube bias resistor has been omitted; this is done purposely to cause degeneration, which improves the fidelity of reception and reduces noise and hum. The unusually large power supply filter condensers, C17 and C18, which have a capacity of 40 mfd and 25 mfd respectively, serve to provide an extraordinarily clean and hum-free power supply. These

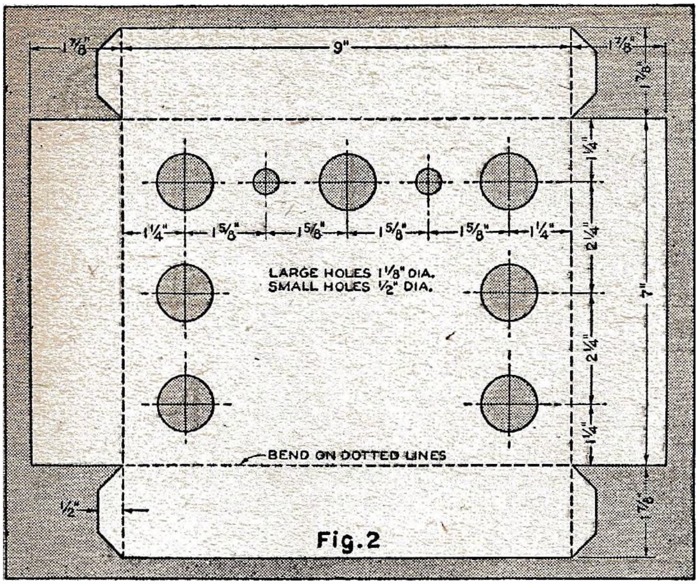


Fig. 2

features result in a set which has sufficient sensitivity to pull in London on the short-wave band, and miniature 5-watt stations on the long-wave band, even with an antenna consisting of only a few feet of wire. Yet the fidelity of reproduction on local broadcasts causes many to remark that it sounds like a big, expensive console—not a midget.

The chassis layout is shown in Fig. 2. This is a standard size chassis and can be bought very reasonably. But, if hard to get due to the shortage of steel, it may be bent to the dimensions shown, using any scrap sheet metal you can get hold of. Only the principal holes are shown, those for the sockets and i-f transformers—the other components may be laid out as shown in the photographs. The layout is not particularly critical, but the leads to the band switch should be kept short; likewise those to the i-f and detector tubes.

The panel measures 7″ x 10″ and is of metal. Originally the set was intended to fit a small cabinet, but it was later decided to mount it in the bookcase as shown, so there is no real need for the small panel, if the constructor intends to install it similarly. The plywood frame, which surrounds the present panel, may just as well replace it entirely. But make certain that the wood is treated to minimize warping—drying it out and coating it with hot wax will do the trick.

Before proceeding with the assembly and wiring, the band switching should be carefully studied. This is the most difficult part of the circuit of any multi-band receiver. Accordingly, separate diagrams have been drawn to clarify this portion of the circuit. These supplement the instructions included in each coil box for the specified parts.

The schematic for the band switch and the antenna and oscillator transformers is shown in Fig. 3. In operation, the band switch shorts out coil sections not required for the particular band in use. In the long-wave position, all coils are in operation; this is the position shown in the schematic. When the band switch is turned one position counter-clockwise (as viewed from the rear of the switch) the upper segment of the antenna switch section moves to point D, which connects to the correspondingly lettered point on the antenna coil assembly. This segment then shorts points D and F, which are terminals of L3, leaving only L2 and L1 in operation in the antenna circuit. When the switch is turned two positions counter-clockwise, points E and F in the upper segment are connected, shorting out coils L2 and L3. This leaves only the short-wave coil L1 in operation in the antenna circuit.

Meanwhile the lower segment of the antenna coil switch likewise moves the same amount in the same direction, shorting out corresponding sections of the secondary. And, in the oscillator section, a single segment moves to short-circuit in the same manner oscillator coils not required for the particular band in use. In each case, the lettered points on the switch are joined to the correspondingly lettered points on the coils. The latter points are brought out to terminals at the end of the coil assembly.

Note that but two switch wafers are shown. The band switch specified in the parts list is made with three sections, to adapt it for a receiver incorporating an r-f stage. Since no r-f stage is used in this receiver, the middle section should be removed. This is done by unscrewing the two nuts at the ends of the side rods holding the wafers in place, removing the middle switch wafer and replacing the end wafer. The switch should be shortened by sawing off the spacers and threaded side rods until the space between the two switch wafers is 1¾". Make certain to replace each section in exactly the same position as when it was removed. When viewed from the rear, they will then look just like the sections illustrated in Figs. 3 and 4.

In building the set, first get all the holes drilled, even those for tie posts for the resistors and condensers. Then mount all parts before starting the wiring. Make certain that the antenna and oscillator transformers are so mounted that the trimmer holes are accessible from the side of the chassis. Before mounting the band switch in place, attach leads to the antenna and oscillator transformer terminals so that they may be conveniently connected to the band switch. Each terminal shown in Fig. 4 connects to a correspondingly lettered point on the band switch, or other portion of the circuit, as the case may be.

The padder condensers, C7 and C8, are mounted close to the oscillator transformer, on the side of the chassis. The padder condenser with the fewer plates is C8, and is for the long-wave band. C7 is for the broadcast band and C6, which is fixed, is the short-wave padder. Holes should be drilled in the side of the chassis to make accessible the trimmer adjustment screws for C7 and C8.

Wire in the filaments of all tubes first, then complete the wiring of the power supply. Use a piece of heavy bus bar for the B-minus lead, which should be mounted on insulated posts. *The B-minus bus should not touch the chassis.* Note that the only components which touch the chassis are the gang condenser frame—which can't be helped—and C3 and R13. The condenser C3 provides a return path for the gang condenser to B-minus and the resistor R13 is used to allow any charge which forms on C3 to leak off. The object of keeping the B-minus bus from touching the chassis is of course to avoid any shock hazard which would otherwise result, since B-minus is also one side of the power line. If bakelite, plywood or other insulating material is used both for the panel and chassis, these precautions may be ignored and the B-minus line may be used directly for the return for all points. Then C3 and R13 may be omitted.

Note that the cathode of the 6A8 converter is shown returning to B-minus through R2, which is shunted by C4. If the set is carefully wired, this resistor may be omitted and the cathode may be connected directly to B-minus, thus giving maximum sensitivity. This is the way the author's set is wired. But, until the shortest possible connections to the various coils was obtained, some regeneration was present which required the addition of R2 and C4 for its elimination. So maybe you, too, can eliminate these components.

In series with the speaker field coil is a 10-watt resistor, Rx. This resistor is necessary only if the resistance of the field coil is less than about 3000 ohms. That is, if you have an 1800-ohm speaker field, you will need to add a resistance Rx to increase the total resistance to 3000 ohms. The object here is to prevent overload of the 25Z5 and also to prevent excessive current through the speaker field.

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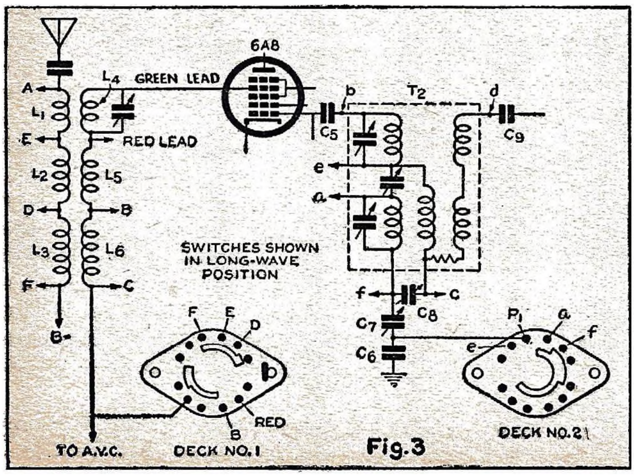


Fig.3

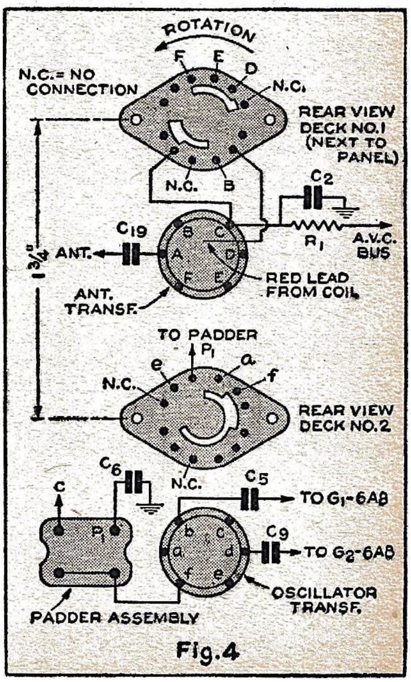
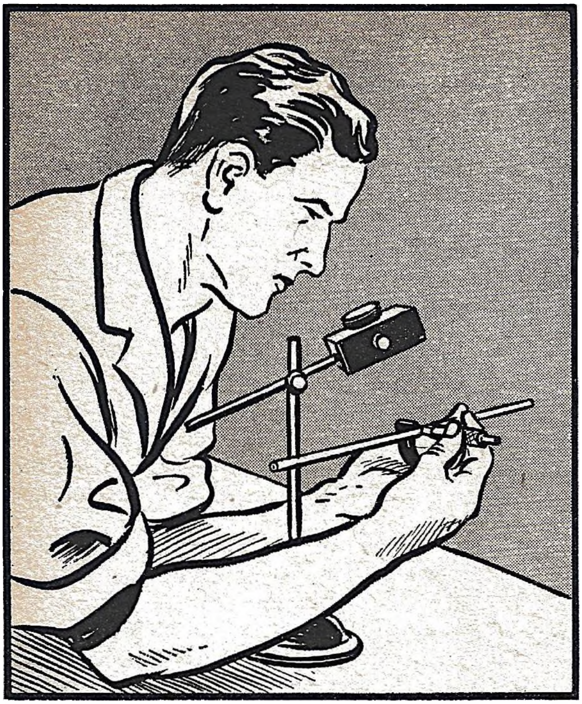


Fig.4

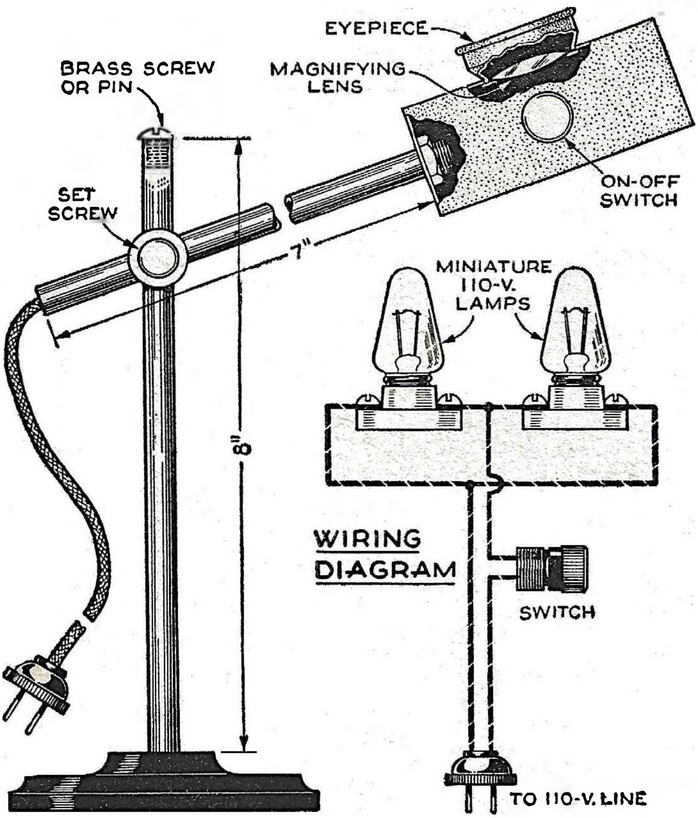


Workbench Magnifying Aid

THIS little bench magnifier will be found very useful around the shop when continuous reading of scales, rules, gauges, micrometers, etc., are necessary. It is an excellent aid for the model maker, particularly those working to small, accurate scale, and will be welcomed by the stamp collector, coin collector and other hobby enthusiasts. Near sighted persons will also find the magnifier a great help in reading.

In use, the work to be magnified is held under the lens where it appears greatly enlarged and illuminated by the switch controlled lights concealed within the body of the "lamp." The whole unit stands on a sturdy base and may easily be carried to any desired location. The height and length of the magnifier arm may be adjusted by means of two set screws. For use as a reading aid the base and stand is dispensed with, the extension arm being held in the reader's hand and moved about at will.

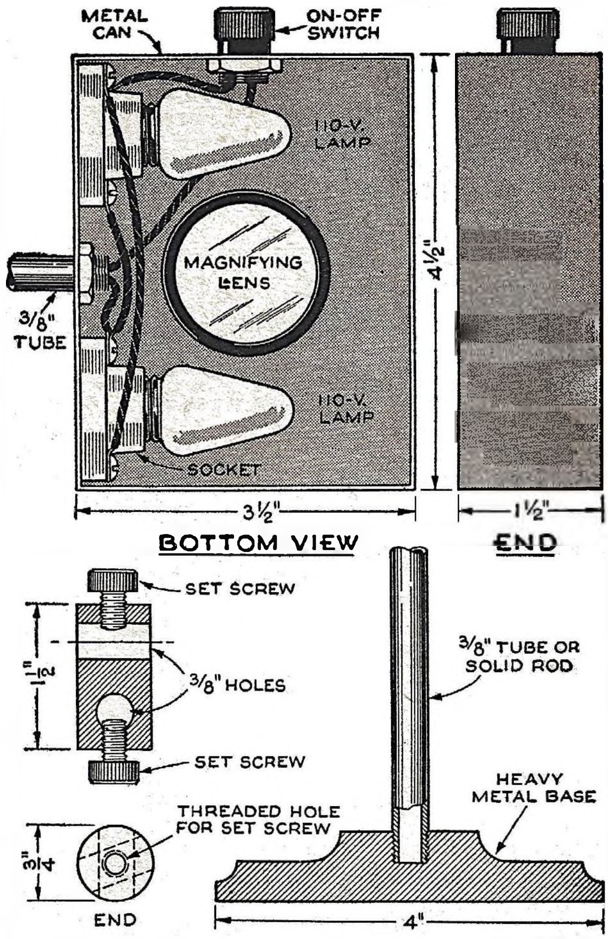
Any available metal parts may be used. With the exception of the lens assembly, soldering or brazing is unnecessary, so non-solderable metal can be employed. The dimensions given were used on the original magnifier and are not mandatory. They may be altered to suit the material and size of lens at hand. The arm and stand are made from 3/8" metal tubing (preferably brass). The base may be retrieved from an old



Extension arm adjusts for height and length, though the angle in relation to the stand remains fixed. Dimensions may be altered, if desired.

Any Small Lens May Be Used In This Adjustable, Field-illuminating Shop Magnifier.

by Herman R. Wallin



Top drawing gives bottom and end layouts of the box. Small sketch at lower left is cross-section of the adjuster piece. Stand goes through one ⅜" hole, arm through the other.

lamp or improvised from any flat, heavy piece of metal. As a matter of fact, the base could even be lathed turned or carved from hard wood, with a hollowed underside into which lead could be poured to weight it. Thread the bottom end of the stand tube or rod, with corresponding threads tapped into the base. If a wood base is used obtain a small pipe flange of correct size, screw it to the base and screw the stand, in turn, into the flange.

Height and length adjustment of the arm is accomplished by means of a ¾"x1½" piece of brass rod, drilled for the arm and stand, and tapped for set screws as shown in the detail. By loosening one or both of these set screws the arm may be raised or lowered on the stand as well as extended or shortened in the horizontal direction.

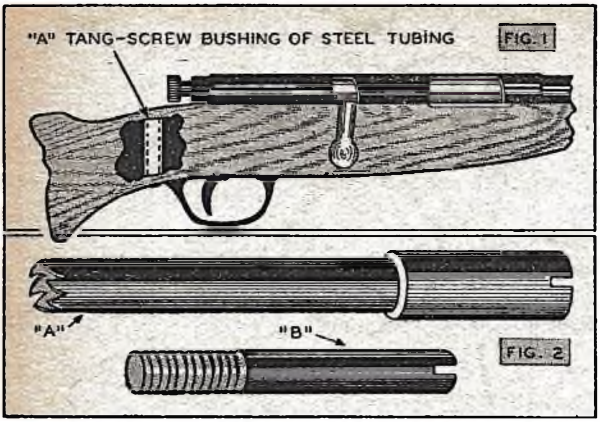
The lens and light box is cut and shaped from brass, copper or "tin" sheet. Small bolts or rivets are used to hold it together. As alternatives, a plywood box may be constructed, and aluminum painted on the inside, or an old metal candy box with the lid removed will serve the purpose. An eyepiece fastened to the box, as indicated, holds the lens. This eyepiece may be an old lens tube or cap, or merely a short piece of tubing. The lens is set at the lower end by soldering a wire ring on both sides of the lens rim.

Small sized sockets are attached to the inside of the box. The sockets, with 110-volt bulbs to fit, are obtainable at any five-and-ten cent store. Place a small radio "on-off" switch on the outside of the box and wire the whole thing up. Run a length of silk covered wire from the sockets out through the extension arm and attach an outlet plug to the end. The box is held to the arm, the end of which should have been previously threaded, by means of a nut and washer. The washer doesn't show in the drawings, but it is best to use one anyhow.

Paint the outside of the box in any desired color. Crackle lacquer, sold by radio supply stores, will give the box a very finished, professional appearance. It is also suggested that the base be treated with this same lacquer. When not in use, cover the eyepiece with a metal or bakelite cap, in order to prevent dirt and dust from smearing the lens. When you have once built and tried this little magnifier you will wonder how you ever got along in your workshop without it, so diversified are its many uses.

HOW TO MAKE CHRISTMAS MERRIER
There's nothing like cheery, original decorations and Christmassy touches around the home to brighten up the Yuletide season—plus unusual gifts for family and friends. The January issue of MECHANIX ILLUSTRATED, which goes on sale December 1st, will cover all these things and be packed with swell ideas to make your 1941 Christmas the merriest ever. Be sure to reserve your copy.

Workshop



Tool Fits Tang-Screw Bushing

WHEN restocking the Springfield, Mauser, Krar, Winchester, Remington, or other high powered bolt action rifle, the most difficult, as well as the most important, part of the job is the correct fitting of the small tubular bushing which surrounds the rear tank-screw—A, Figure 1. Not equipped to do the job properly, some shops have eliminated this bushing entirely—a very bad practice which frequently results in the stock being split from the recoil. Figure 2 shows a simple tool combination which may be made in an

[*Continued on page* 148]

Mechanic's Tool

AN OLD pair of scissors can be easily made into a very handy tool for removing two different styles of wrist-pin locks and also for replacing split cotters which act as valve-stem spring locks. The points of the scissors are filed or ground circular (A), and a shallow notch (C) is cut on the inside of each of these

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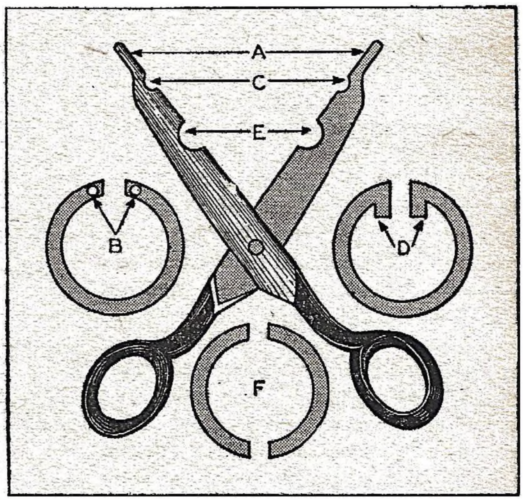
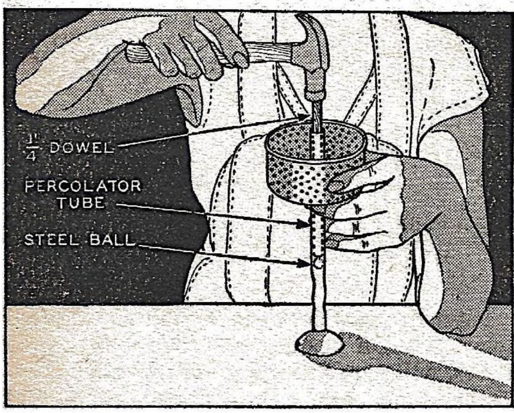
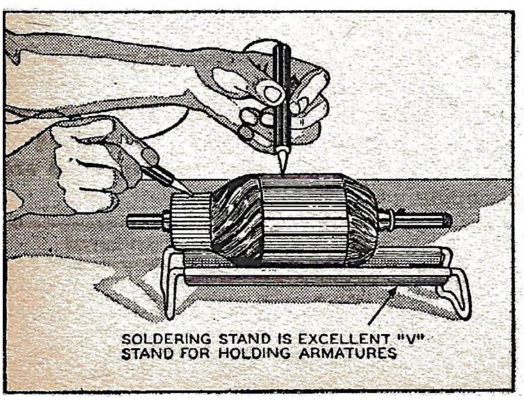




← Ball Repairs Percolator

DENTED percolator tubes can be remedied by dropping oil down the tube followed by a steel ball bearing of proper diameter. This is driven clear through by a wood dowel. Tube will be straightened nicely.—*A. H. W.*

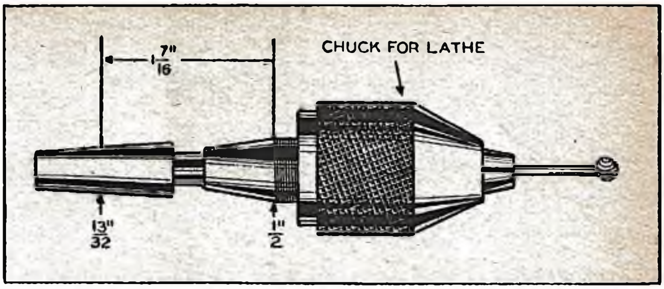
Iron Rest Holds Armature



THE metal rest usually furnished with any electric soldering bit is just the thing to support a small or medium sized armature while making tests or repairs on it. The curved cradle acts as a V block and holds the armature steady when required but easy to turn to a new position.—*W. C. W.*

Shortcuts

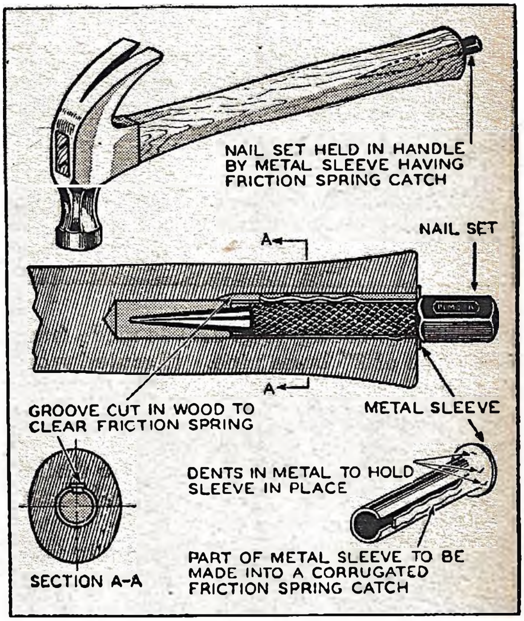
Chuck For Lathe

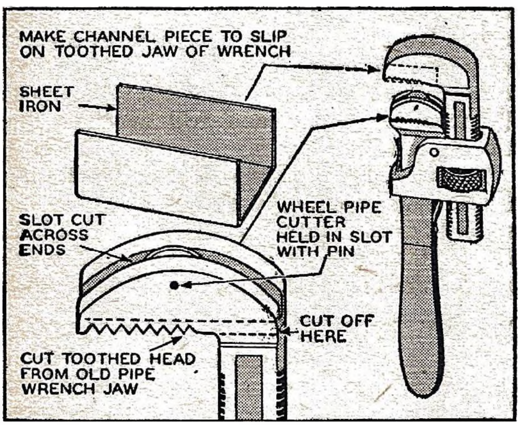


IF YOU need a chuck to hold small pieces in your lathe, pick one up in the local 5 & 10. It will have a four-sided, tapered shank to fit an ordinary brace. File this down, and also the shaft directly behind the knurled collar, so as to get a taper fit. With a chuck of this type the small cutters and grinders (meant for hand rotary tools) can be very useful in shaping and grinding and routing operations. Of course the action is reversed with this adaptation in the lathe. One moves the work about instead of the handgrinder.—*H. H. W.*

Nail Set In Hammer Handle

AS THE hammer and nail set are always used together they should, for convenience's sake be kept as close to each other as possible. The problem can be solved by drilling a pocket in the handle of the hammer to hold the nail set, as shown at right.



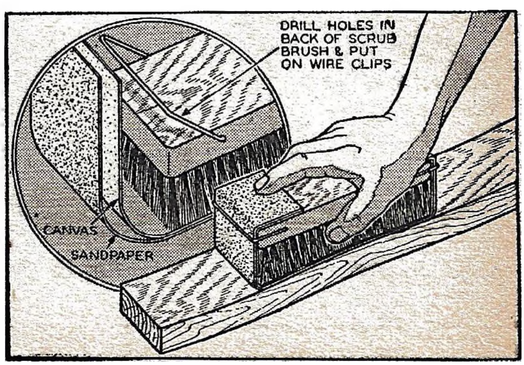


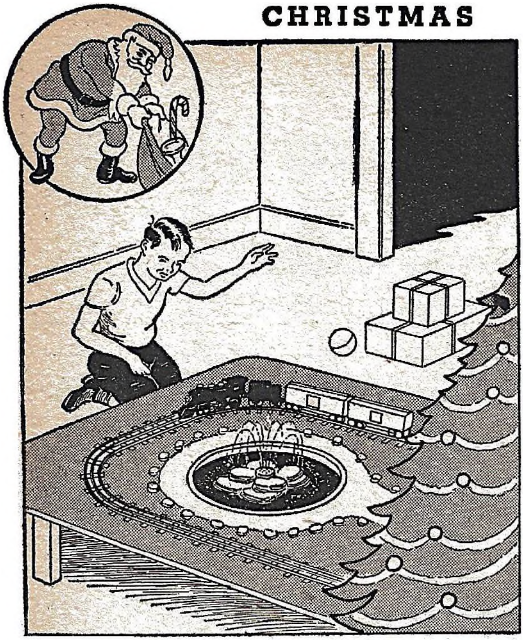
Cutting Pipes With Wrench

A PIPE cutting attachment for an ordinary Stillson wrench can be made as shown above. The toothed head from a worn out wrench is cut off and slotted to take a regular pipe-cutting wheel. To use place the cutting head, tooth down, on the lower jaw of the wrench, so teeth will mesh. Slip channel piece on and place wrench on pipe to be cut. Tighten jaws as on a nut and turn wrench.

Scrub Brush Holds Sandpaper

FOR sanding irregular or uneven surfaces an old scrub brush will be found very useful. Wrap the sandpaper around the brush and attach with clips as indicated below. The brush will follow the irregularities in the work and do a nice, clean job.





Toy Fountain For Christmas

Construct Your Own Pumping Station To Operate This 1 Quart Christmas Fountain. All Parts Easily Secured At Small Cost. Very Few Tools Needed.

by Uriah Hillegas

THE pump casing (Fig. 1A) is made from a piece of 2″ brass pipe. (Secured from local plumber.) Cut off a section about ⅜″ long and file down to ¼″, making both sides square and smooth.

File a throat inside deep enough to drill a ⅛″ hole on angle about 30° (to vertical center line of pump).

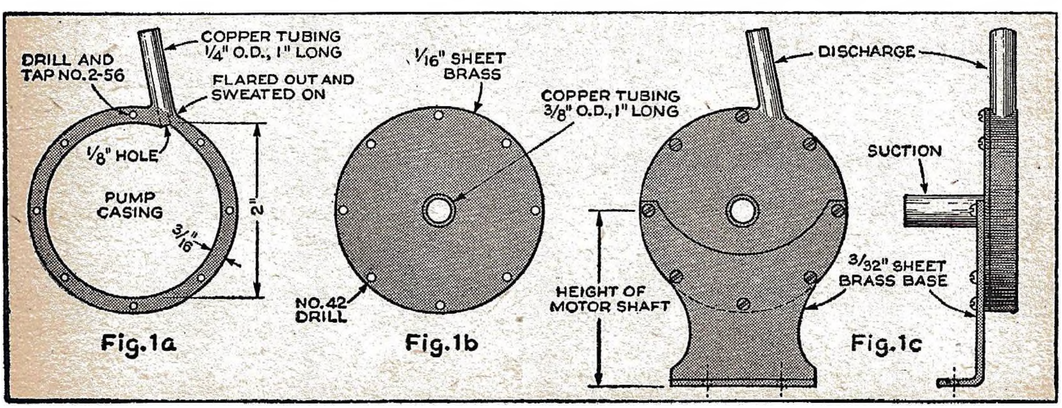
On the outside file a small shoulder to take the end of a 1″ piece of ¼″ O.D. (outside diameter) copper tubing. This is to be soldered on to the pump casing (Fig. 1A).

Drill and tap eight holes around the pump casing for 2/56 brass machine screws. (Tap drill No. 50 Body Drill No. 42.) All are equally spaced with the exception of one hole at the throat of the pump. This should be as near equal as possible without breaking through the pump casing outside or into throat of pump.

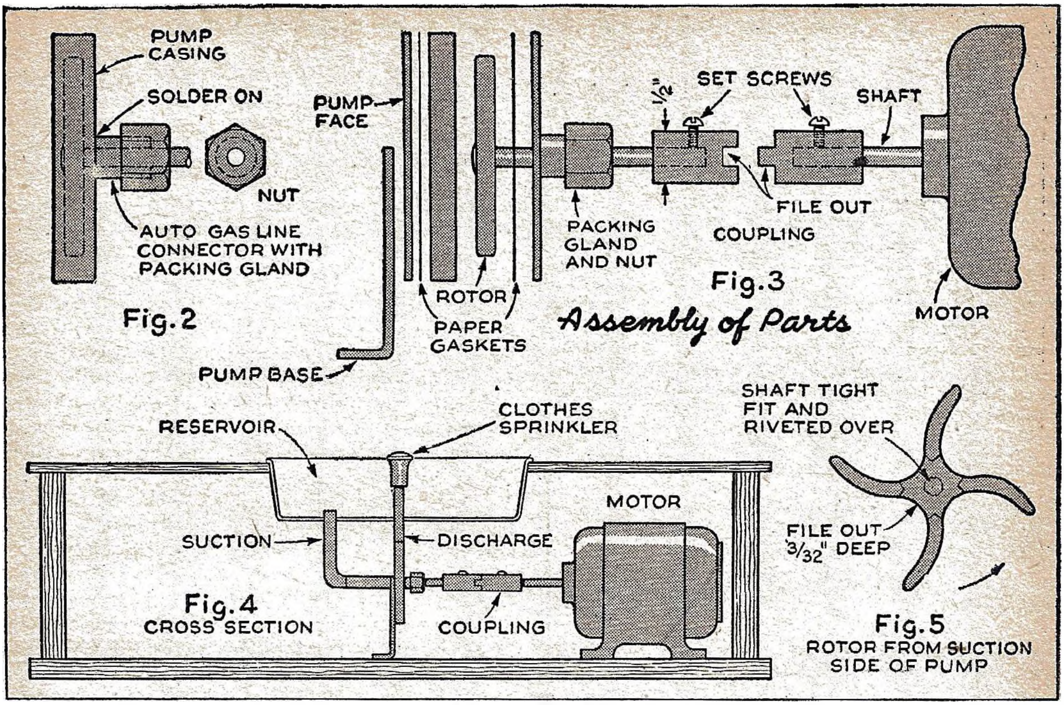
The face of the pump on the suction side is cut from $\frac{1}{16}$″ sheet brass with holes drilled with No. 42 drill. (Note that this face is not tapped.) After finding the center, drill a $\frac{1}{16}$″ hole. Solder on a 1″ piece of ⅜″ O.D. copper tubing about 1″ long. This is the suction pipe and will be connected to the reservoir with a piece of rubber hose (Fig. 1B).

The pump base (Fig. 1C) of $\frac{3}{32}$″ sheet brass is cut to shape and drilled, to be fastened with five of the bolts that hold the pump assembly. This base must be very rigid, otherwise it will be hard to align the pump properly. Do not make the base too high. Put a wooden block under the pump if it is necessary to raise it very high. Height will depend on motor used. After the base is cut out, bend it at right angles ½″ from the bottom and drill two holes for wood screws.

The back, or motor side of the pump (Fig. 2) is also made from $\frac{1}{16}$″ sheet brass drilled with a No. 42 drill. In the exact center drill a hole to take the shaft. The rotor shaft will be the size of the hole in the packing gland, which



Pump case assembly is shown above. Be sure to make the base very rigid so there can be no vibration or working of the shaft.



Reservoir should be made of tin (a kitchen pan will do) so pump tubes can be soldered in tightly. It can later be lacquered any desired color.

should be about ⅛", or a little larger if a packing gland of that size can not be secured. The packing gland used by the writer was secured from an auto supply store. The brass connector used to connect windshield wiper hose to a manifold is about the right size. The hole in the packing nut is too large but can be plugged with a piece of brass and drilled out to size. It is very important that the packing gland be a very accurate fit as this is the only bearing surface the rotor has. This packing gland must be kept very tight, otherwise water will leak out when the pump is stopped. Use a good graphite packing about $\frac{1}{16}$" diameter and wrap around the shaft. Automobile water pump packing is very good. When purchasing the packing gland be sure the packing nut is a right hand thread. Otherwise the nut will come off because of rotation of the rotor shaft.

The rotor (Fig. 5) is cut from a piece of ¼" brass plate. Cut out a 2" circle, then drill in the exact center to fit the shaft. Scribe out a rough design of the rotor and proceed to file down to rough size. Then file out the center of the rotor ¼" from the shaft hole on all sides and approximately $\frac{3}{32}$" deep. This allows water to pass from suction to the outside edge of rotor. After filing out the center, file the rotor down to exact size. Outside diameter of rotor should be approximately 1 15/16". Check carefully as you proceed for balance. To check for balance push a piece of shaft through the rotor about 1" on each side. Roll on two knife edges. Heaviest blade will always stop on bottom. Then file a little more and proceed until the balance is good. The balance of rotor is very important to a smooth running pump.

The coupling (Fig. 3) is made from ½" brass rod cut off ¾" long and drilled to the shaft size. Then file out a slot ¼" deep by $\frac{3}{16}$" wide. The other piece is filed down to leave a projection to fit the slotted half of the coupling. Drill to motor shaft size. Drill and tap holes for set screws of any size available.

When the pump is connected be sure the couplings are properly lined up. Plain couplings may be used and attached with pieces of rubber hose.

The reservoir is made from a tin pan about 14" diameter. Any sized pan may be used, but tin is the best material because it is easy to solder. In the center drill a hole to take ¼" O.D. copper tubing about 4" long. Let this extend up through pan approximately 2".

[*Continued on page* 154]

THE SCHOOL SHOP

Conducted by Frank Petraglia,
Shop Instructor, Samuel Gompers Industrial School
New York City

FLASHES FROM THE SCHOOL REPORTER

FIRST let us thank the many students who have volunteered their services as school shop reporters for this column of our department. The response was gratifying, and the amount of shop news which should be coming in will provide interesting sidelights on vocational school activities. However, an "A" rating goes to Bernard Berson, Manhattan High School of Aviation Trades, for being first to respond to the call. . . . In this connection, we deplore the lack of representation from the Western States. School reporters are wanted. Let us hear from you fellows of the Great West. . . . One of the newer schools in N. Y. C. is the Food Trades High School. Shops are equipped for instruction in baking, meat-cutting, cooking, and allied activities. Shop instructors report a high average of excellence in the cooking classes particularly, probably because students have to eat their completed jobs! . . . The same probably holds for the agricultural schools. . . . The El Paso Technical Institute, El Paso, Texas, won first place for the vocational school group in the national Scrapbook Contest. . . . "A" ratings for the following students who gave interesting reports of how student club activities are carried on in their areas before the Amer. Voc. Ed. Assn. Convention: Richard Krause, Johnstown, H. S., Johnstown, Pa., Lyle Shearer, Timken Vocational, Canton, O., Steve Elek, East Technical, Cleveland, O., Henry Dietrich, East H. S., Cleveland, O. Congratulations!

—SEESALL KNOWSALL

STUDENTS' PROBLEM BOX

1—Q. I wish to remove a thick layer of old paint from a large glass surface. How can this be done?

A. A 50% solution of acetic acid may be used for this purpose. Heat by adding hot water to the acid, and apply with a soft cloth until the paint comes off. This solution will not harm either hands or fabrics.

2—Q. Is it possible to mend a broken fountain-pen barrel?

A. Yes. Heat some dry shellac and apply to fractured part. Do not scrape off surplus shellac but shape it to conform with a heated iron.

3—Q. Chisel handles tend to split in time from repeated mallet or hammer blows. How can splitting be prevented?

A. An ingenious method for preventing splitting employs an ordinary metal bottle cap. Obtain a cap of necessary size and fit tightly to the handle.

4—Q. Is it posible to remove hammer imprints from wood?

A. Hammer imprints may be removed by the simple process of pouring a small amount of wood alcohol over the dent, lighting, and allowing to burn out. Heat expands the wood and raises it. Then plane and finish the surface.

5—Q. How may a brush which is hardened with dried shellac be cleaned?

A. Soak in borax and warm water and wash out as the shellac softens.

6—Q. Is there some method of applying oil automatically to a metal surface which is to be drilled to eliminate the need for stopping the drilling frequently while more oil is applied?

A. Place a thick metal washer over hole to be drilled and apply lubricating oil. The washer will act as a reservoir.

7—Q. Sometimes it is desirable to set a screw in concrete and remove it when necessary. How can this be done?

A. The screw must be set while the concrete is wet. The screw is first dipped in melted paraffin to prevent the concrete from adhering to the screw, then put in place. When the concrete has hardened the screw may be removed, leaving a permanent thread-hole.

8—Q. What chemical coloring is used to mark off boundary lines on ice for a game of hockey?

A. Use equal parts of salt and red ochre powder and sprinkle this mixture evenly in drawing the lines. The salt will melt the ochre into the ice, leaving a permanent impression.

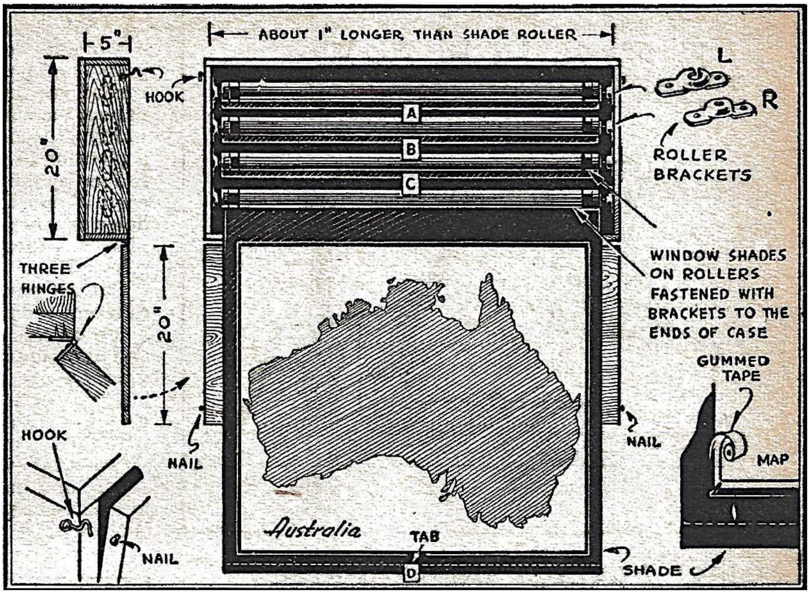
CIGAR BOX CONTEST!

For those of you who may have missed our Big Contest Announcement in last month's issue we will give a brief repeat. Eight cash prizes, ranging from $5 to $35, and totalling $100 will be paid for the most useful and original objects fashioned from ordinary cigar boxes! You can use other materials too, but the principal ingredient of your creation must be one or more cigar boxes. Pack your entry carefully and mail it to the Contest Editor, MECHANIX ILLUSTRATED, 1501 Broadway, New York, N. Y. Or you may send a clear photograph and description if you prefer. In either case be sure to include your name and address, *printed plainly*. Entries must be postmarked before midnight, November 30, 1941, to be eligible. Decisions of judges will be final and entries will not be returned. Collect those old cigar boxes and get started NOW!

THE SCHOOL SHOP NEEDS REPORTERS

If you would like to be a reporter for your shop group or school, just indicate this briefly on a postcard. Address MECHANIX ILLUSTRATED, 1501 B'way, New York, N. Y.

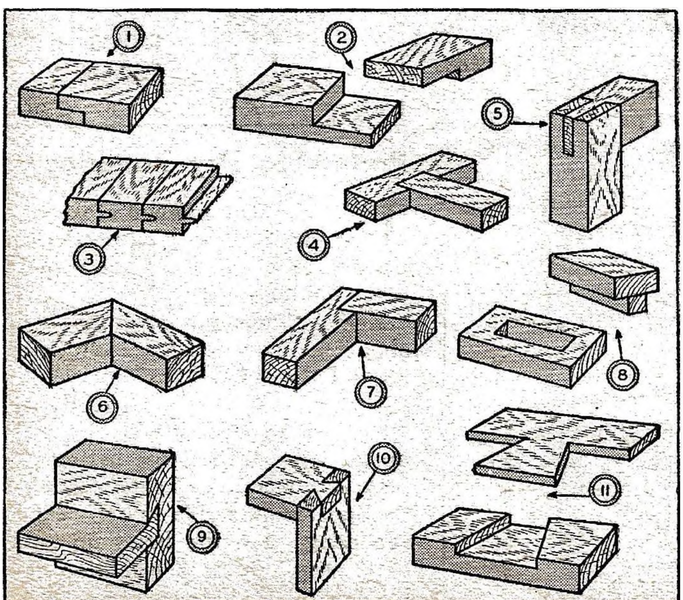
CLASSROOM MAP CASE



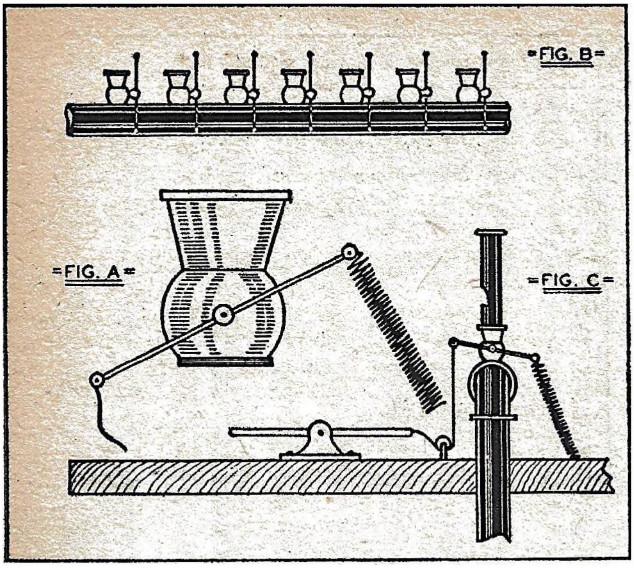
HAVE you ever read an interesting adventure story or news account of some far-off place and wished that you had a large-scale map so that you could find the names of the rivers, mountains and towns? Travel stories and books, especially, are easy to follow if you have a large map with many names and information not shown on smaller maps. Make this Map Case and hang it on the wall of your classroom, or at home, where you can pull down any map you wish in order to locate places all over the world. Map collecting and study is an interesting hobby if you like adventure and travel.

You will need from three to five old window shades on rollers for the map holders. The drawing shows a case holding four rollers. Use pine boards about ½" thick for the frame of the case; the ends are 19" long and 5" wide, while the top and bottom boards are 5" wide, their length depending upon the length of the window shade rollers. Place the slotted roller bracket (L) on the left, tacking it to the end board, and tack the bracket (R) on the inside of the opposite end board. Temporarily tack the top board to the ends, bringing the brackets to such a position that the roller fits snugly yet turns easily. Fasten the lower board in place. Attach the roller brackets to the end boards with short screws, spacing them an equal distance apart as shown in the end view. The frame can be nailed together once the rollers have been adjusted and tested. Saw out two boards from thin veneer or plywood about ¼" thick to cover front and back of the case. Tack the back in place. Hinge the front board to the lower edge of the case frame, attaching small brass hinges ¼" wide to the lower edge of the frame and upper edge of the front board (when the board is dropped down as shown in the End View). Use one hinge near each end of the case and one in the center. Attach small hooks to the ends of the case as shown, which will hook over nails or round-headed screws, fastened at each end of the front board, when the board is swung shut. Roll up the window shades snugly, patching torn or worn spots with transparent gummed tape such as Scotch tape. Roll out the lower end of the shade on a flat surface, smooth it, and "tack" the corners of your map in place with small pieces of tape. Then tape down the edge of the map all around, smoothing it as you do so, to keep out wrinkles. Key tags make good tabs. Fasten stout screw-eyes in the case so you can hang it on the wall.

HOW MANY OF THESE WOOD JOINTS CAN YOU IDENTIFY?



This is the second of a series of Craft Tests for shop students. Answers on page 111.



MUSIC WITH A STEAM CALLIOPE!

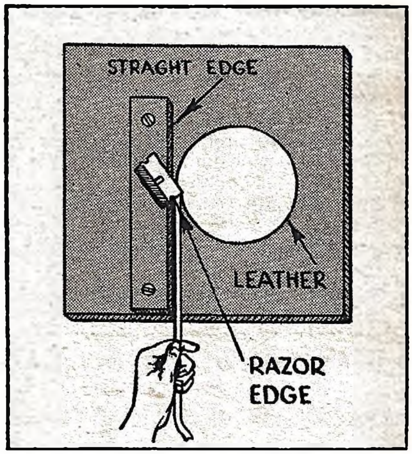
A SMALL steam calliope whose rich organ tones will not disturb all your neighbors can be built from discarded gas fixtures. Secure ten gas jet valves, the part of the gas fixture shown in Fig. A, and prepare to place them in a piece of 1" pipe about 12" long. This is done by tapping and drilling 10 holes, each 1" apart. Valves screwed into the holes appear in Fig. B. For the whistles pipe of a diameter to fit the valves is selected.

Cut ten pieces of this pipe, each of a different length; thread both ends, put a cap on the end intended for the top and fit a plug in the other end. The plug must have a small portion of its side filed out, and a notch cut in the side of the pipe with its horizontal edge level with the top of the plug. Pipes are then screwed into valves. Screw caps on one end of one inch pipe and attach other to steam. Fig. C shows key and valve operation.

Leather Lacings Easily Made

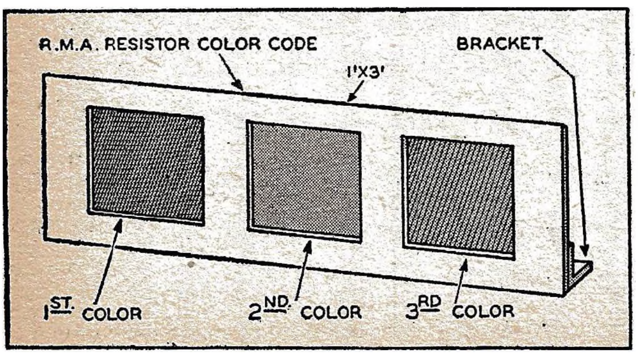
FROM a circle of leather you can make a long straight lacing. Salvage the leather from old shoes.

Use a piece of wood or your work bench for a base. Nail to it a narrow strip of wood with a lengthwise straight edge. Measure from the straight edge the width of the thong you want to cut. At that mark, firmly force the point of your *sharp* cutting tool into the base, the sharp edge away from you. Turn the circle of leather against the straight edge and to the cutting tool. A five inch circle of leather makes seven feet of lacing.



Aid For Teaching R.M.A. Color Code

THE teaching device below is useful for drilling radio mechanics students in the rapid calculation of resistor values. Small slabs, 8" square, painted to conform to the nine R.A.M. colors, are hung over a small nail or hook over each window of the demonstration panel whose overall size is approximately 1'x3'. This arrangement permits rapid interchange of the colors.—*John A. Painting, Instructor NYA Radio Comm. School, N.Y.C.*



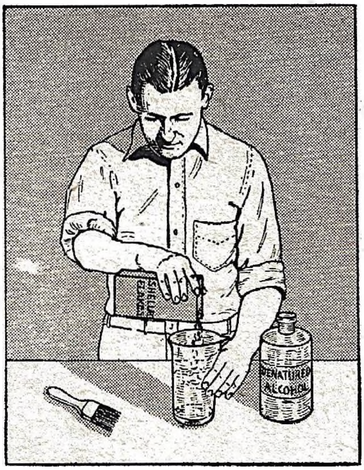
Renewing Dry Batteries

THE following method of renewing depleted dry batteries has proven its superiority over most other methods.

Remove the paper cover and drill about six one-quarter inch holes around the side of the zinc, about ½" from bottom. Then drill another row of holes about half way up the side and put the battery to soak in a solution of sal ammoniac for approximately 48 hours. Upon removing, plug the holes up with hard soap. In this condition the batteries will give nearly as strong current as when new.

Doing Better Shop Work

MANY homeshop workers, as well as mechanics of limited experience are being called into responsible jobs as a result of the defense program; but whether one is a craft student, or holds an important production job or merely operates his basement workshop for amusement, and extra profit, careful observance of certain practices which have become habit with the most skillful workmen, are sure to pay big dividends. Strangely enough, many of the most useful shop kinks appear to be unknown to the rank and file of mechanics. Those here described are in rather haphazard order just as they have occurred to the writer, and are deemed of sufficient value to be passed on.



FINISHING PATTERNS. Wood patterns are usually finished with black shellac on the main body, natural orange shellac on the core prints. For best results don't use ready prepared shellac. Buy only the best grade of flake orange shellac from a reliable paint manufacturer, and prepare it to the desired consistency by dissolving in purest denatured alcohol. Avoid patent solvents. A good rule is to dissolve all the flake shellac the alcohol will take up, then thin as desired with more alcohol, avoiding a heavy mixture. A consistency similar to that of whole milk is about right.

Avoid building up a heavy layer of shellac with a high gloss. The sand "lets go" of a pattern much better with only two or three thin coats, rubbed to dull velvety smoothness with fine sandpaper—rubbed so thin that the grain of the wood shows through. The rule of the skilled pattern maker is—the least shellac, and thinnest, which will rub down to velvety smoothness—and avoid building up an enamel-like coating which hides the grain. It should always be thin enough to dry within five minutes after application.

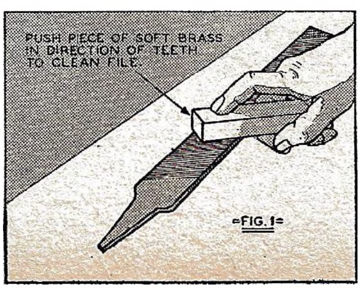
Never use lamp black, or any form of black oil colors for blackening shellac. Alcohol-soluble jet black Nigrosene is the ONE suitable material. About one level teaspoonful of this powder per pint is usually sufficient. Add it after the shellac is thoroughly dissolved.

Patterns rubbed with steel wool may stick in the sand. Use only common flint paper, No. 00, and use it dry. Oiling the sandpaper may cause the sand to stick; and for the same reason avoid handling the patterns unnecessarily after finishing.

LAYING OUT MACHINE TOOL WORK. The common practice is to coat iron or steel stock with copper sulphate ("blue vitriol") solution, forming a coating of copper through which a scribed line shows clearly. A better way is to use a dead-black coating, prepared from a small quantity of patternmaker's black shellac (very thin) with a small quantity of common starch added to "flatten" it. A heaping teaspoonful of starch per pint is usually sufficient. Apply with a single stroke of a fine brush or small wad of cloth—it dries ready for use much faster than the copper sulphate solution, while the scribed lines stand out vividly against the dead black surface in any kind of light. The work may be wiped bright instantly with a cloth moistened with denatured alcohol.

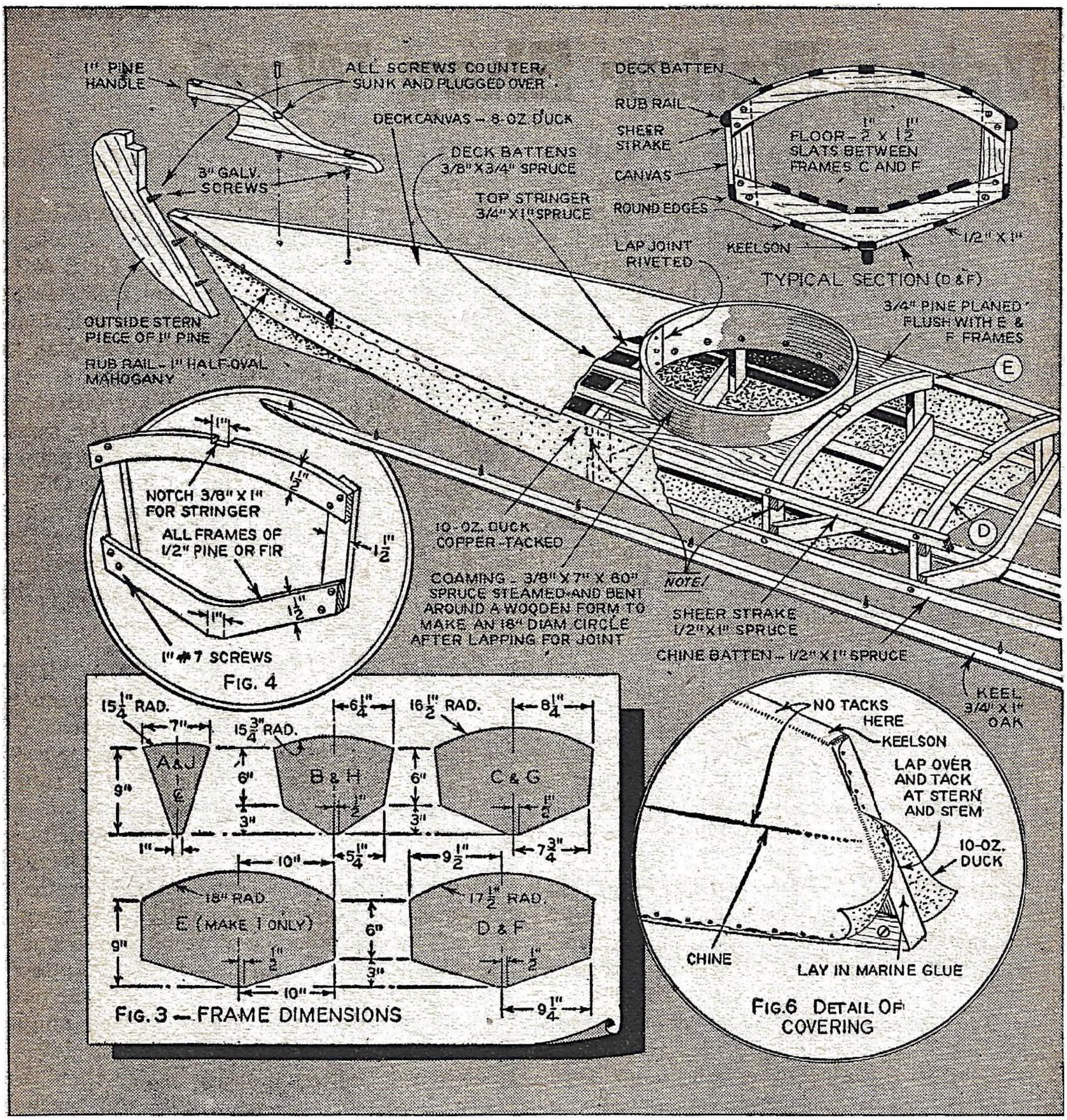
If copper sulphate solution is preferred,

[*Continued on page* 152]



Answers To Craft Test On Page 109

1. Half Lap Joint.
2. End Lap Joint.
3. Tongue and Groove.
4. Dado Joint.
5. Open Mortise Tenon
6. Mitre Joint.
7. Rabbet Joint.
8. Stub Mortise Tenon.
9. Dovetail Dado Joint.
10. Thru Single Dovetail Joint.
11. Lap Dovetail Joint.



Build "NOR' WESTER"—

ANYONE handy with ordinary carpenter tools should be able to build this light and sturdy Alaskan eskimo-type kayak. The ornamental piece at the stem represents the head of a seal and serves a practical purpose as a handle for carrying to and from the beach, and the stern assembly also has a handle. Overall dimensions are given in Fig. 1.

In construction, first make the stem proper and stern post, and screw them to the keelson. To facilitate building, the keelson should be temporarily screwed to the edge of a sturdy plank. The frames A, B, C, etc., are then secured to the keelson with long screws, counterbored from the top. Next install the sheer strake, or strip along the gunwale, as illustrated in Fig. 2. See that all frames are at right angles to the keelson, which is literally the backbone of the craft. After the sheer-batten, screw on the chine-batten, which is below and parallel to the former. Next comes the stringer along the middle of the deck, followed by the lighter deck-battens on each side. The frame is now stiff enough to be re-

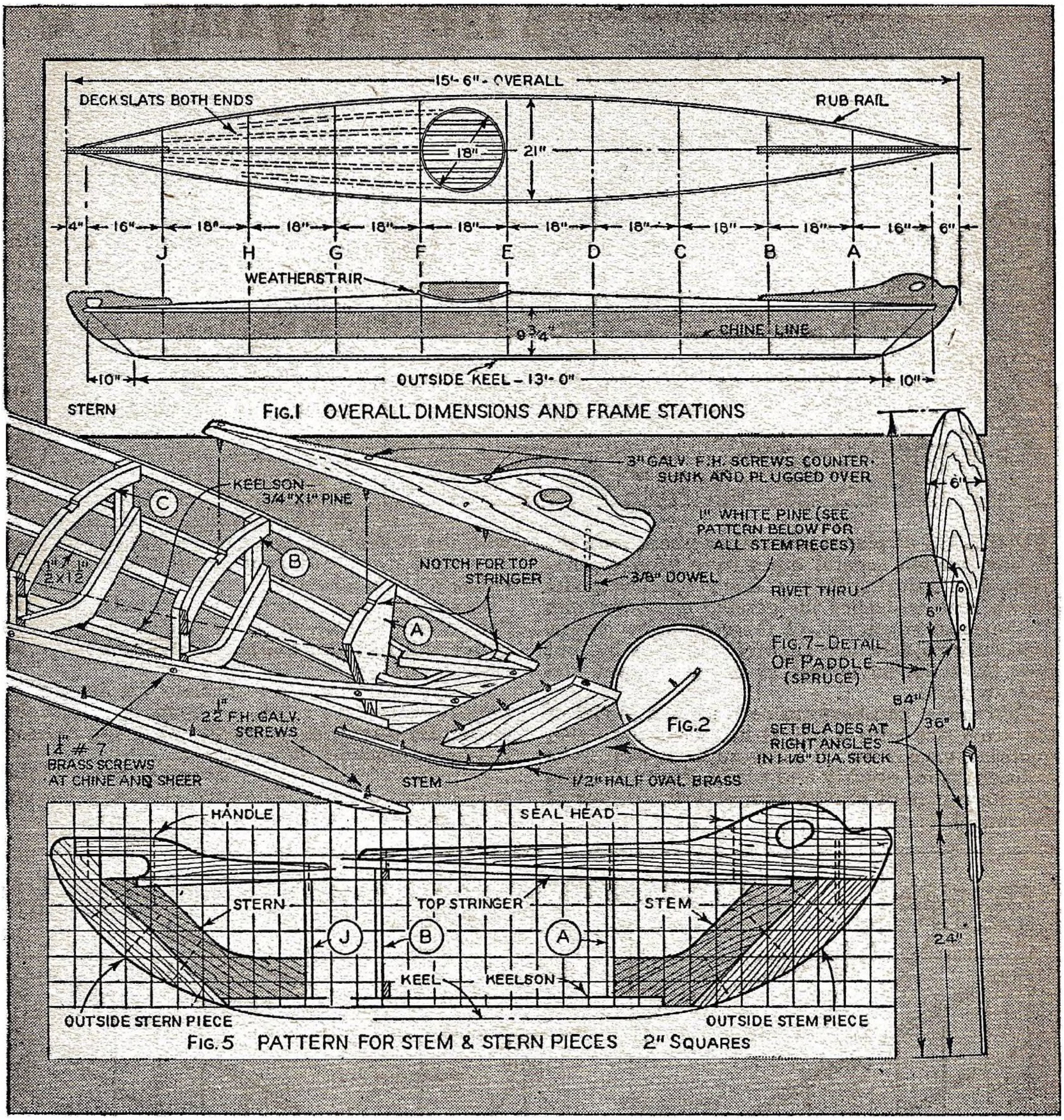


FIG.1 OVERALL DIMENSIONS AND FRAME STATIONS

FIG.5 PATTERN FOR STEM & STERN PIECES 2" SQUARES

Alaskan-type Kayak

by Hi Sibley

moved from the plank to which the keelson is screwed, and turned over to receive the light batten on each side of the keelson. Round the corners of all battens.

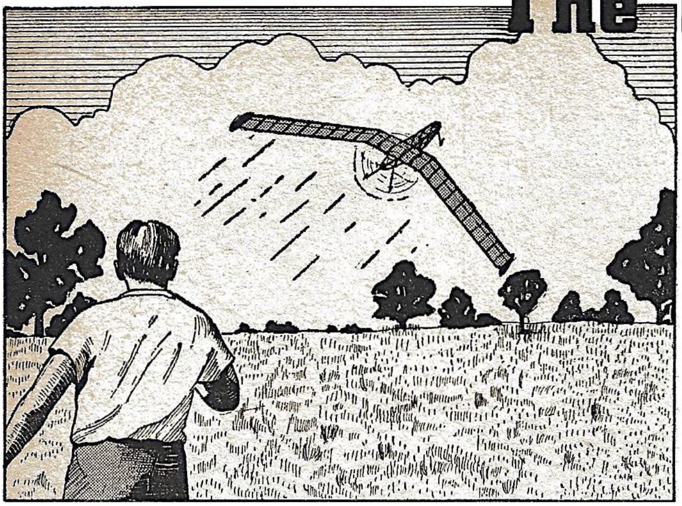
Now turn right-side up again and finish the cockpit. White pine pieces, cut to form an 18-in. dia. opening, are set in between frames E and F, and planed flush with them. A piece of spruce $\frac{3}{16}$-in. thick, 7-in. wide and 4 ft. 9-in. long is steamed or boiled and bent around a rough wooden form and bound with cord until it has set.

A form can be simply made by joining two wood disks or heads with sturdy slats, and bending the spruce around it. Use cord, not wire, in binding the piece in place. Steaming or boiling the wood half an hour should be sufficient. This can be done in a rough wooden box placed over a wash boiler, soaking in a water-trough or pool also softens the fibres enough to make a proper bend. The ends should be neatly lapped and riveted.

Outside dimensions of the frames are given

[Continued on page 150]

The Flying "V"



TAILLESS airplanes are rather uncommon today, though several types have been experimented with during the past few years. The model shown here embodies the general characteristics of the most successful of these. Tailless planes, especially models, are slightly tricky to fly, but they have the advantage of being compact and easy to build.

This model can perform as well as a model of the same size with a tail. It has the same flying qualities, except that it recovers from dangerous attitudes more quickly and easily, due to the fact that its center of gravity is nearer the center of the model.

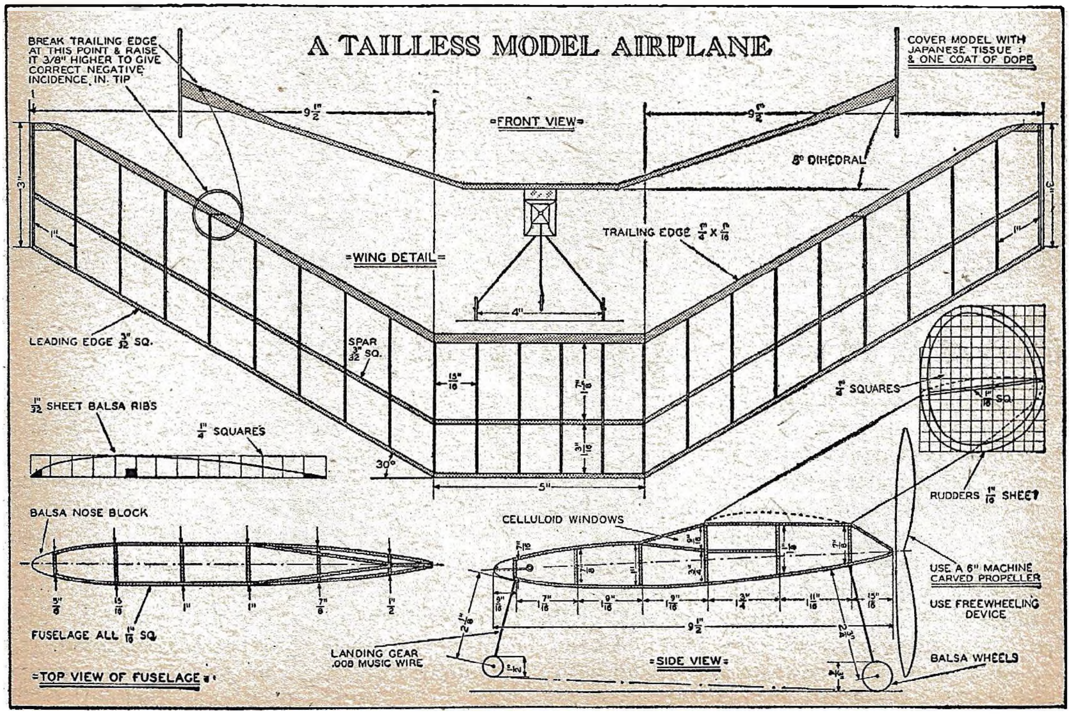
A new type of airfoil section is used in the wing and has proven well adaptable to tailless airplanes. It is flat on the bottom instead of curved, clear up to the leading edge, making construction simpler. The lift/drag ratio is just as high in proportion to the weight of the plane as an undercambered section.

To build the model, make a full size drawing of the wing, fuselage, and rudders. Construct them in the conventional way, using the wood sizes indicated on the drawing. Build the wing with care, exactly the way shown. It is very important that the trailing edge turn up to give negative incidence in the wing tips, which, combined with the sweepback, gives the model its stability. The wing may be attached to the fuselage with either a rubber band or cement.

Power the model with two strands of 3/16" flat rubber. A free-wheeling device on the propeller will increase the length of the glide considerably.

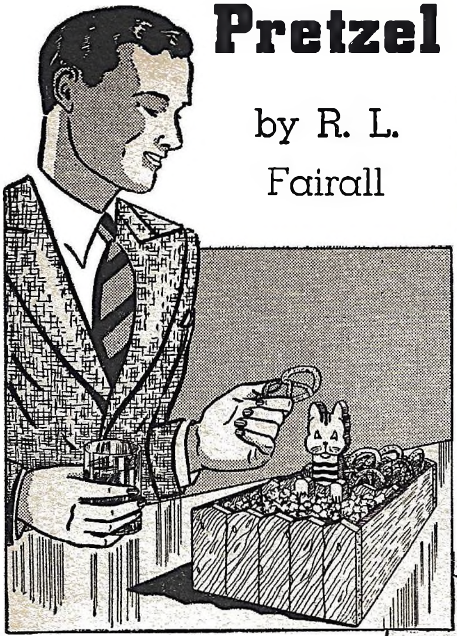
It may be necessary to change the amount of negative incidence in the wing tips to adjust the model. Do this by steaming the wing and holding it in position until it is dry.

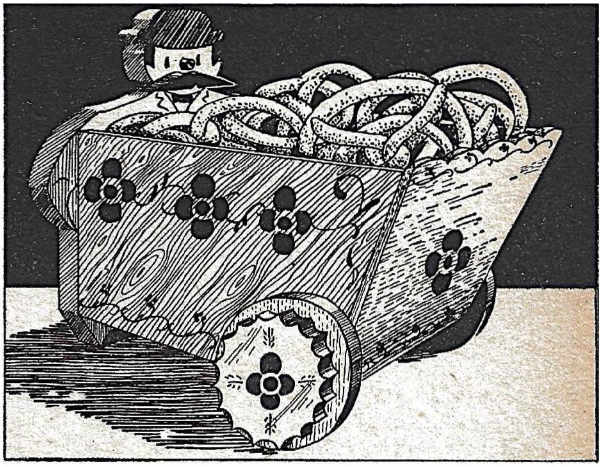
Adjust the model in the following way: If the model is nose-heavy, bend the trailing-edge up; if the model is tail-heavy, bend it down.



Pretzel And Popcorn Bins

by R. L. Fairall

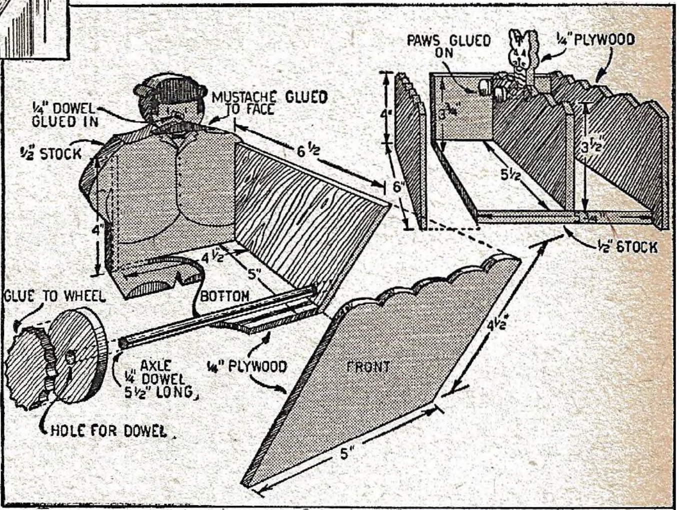


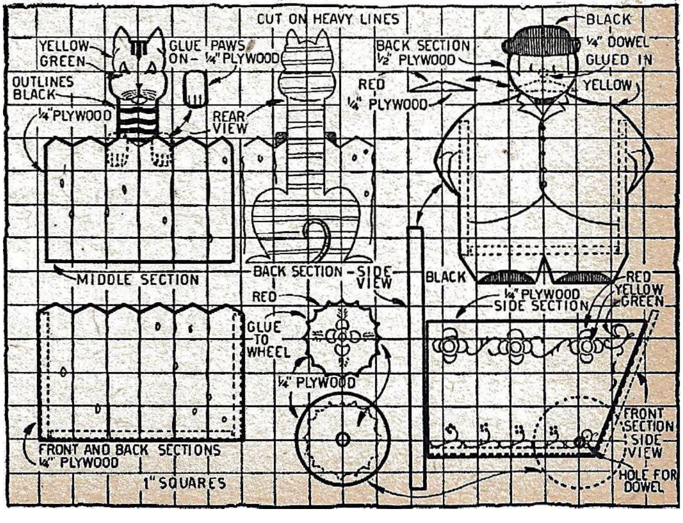


AMUSINGLY designed, these wooden bins or servers for popcorn and pretzels are made of ¼″ and ½″ plywood decorated in gay colors with shiny enamel.

To make the novelty designed as a cart being pushed by the little man with a large red mustache and nose, trace the figure, which is in reality the back of the cart, to ½″ plywood and cut him out with a jig saw; cut his mustache separately from ¼″ plywood and glue it to the face. For the nose, drill a hole and glue in a short section of ¼″ dowel. Next saw the sides, front and bottom sections and nail together with brads. Drill a ⅝″ hole in each side section ¾″ from the front just above the bottom, and slip the axle (¼″ dowel 5½″ long) through. Saw out the wheels (¼″ plywood 2¾″ in diameter with a ¼″ hole through the center), and glue them over each end of the axle; then cut out the scalloped hubs and glue these to the wheels. Paint the figure

[*Continued on page* 117]



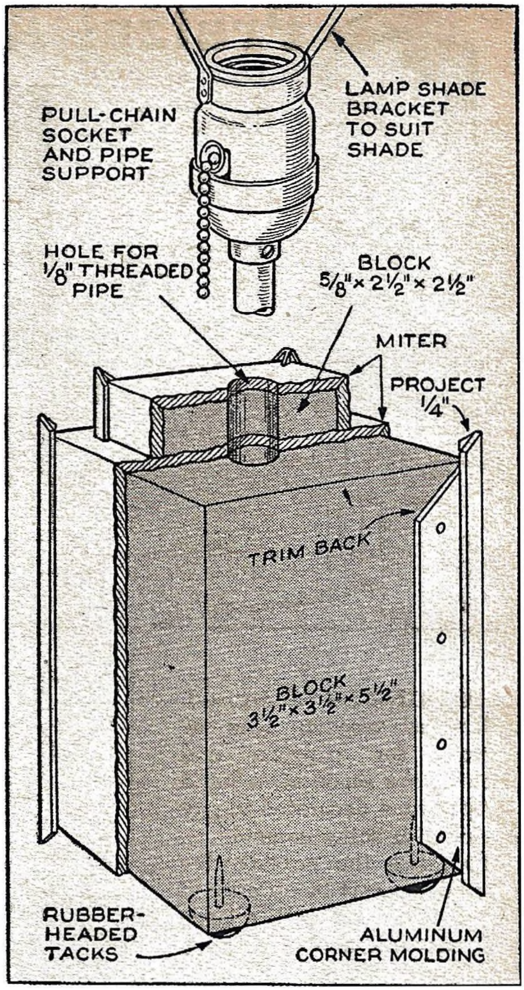


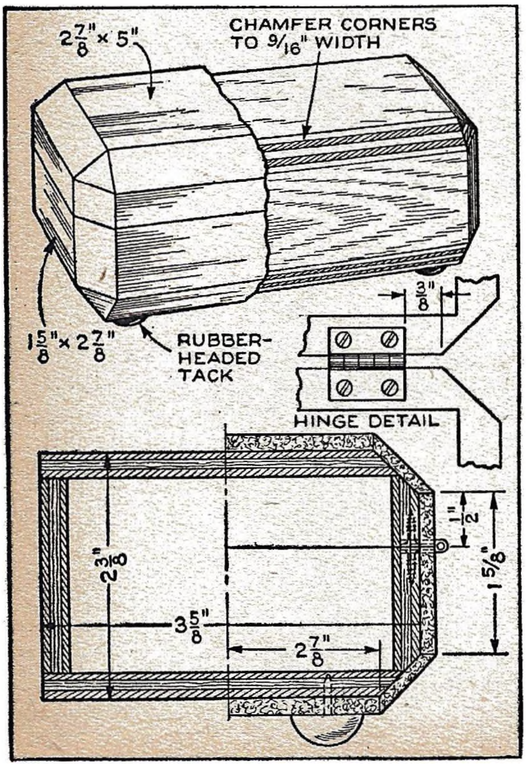
Formicraft In The Workshop

[Continued from page 93]

bottom, and frame it with a suitable molding of hardwood for stained or natural finish, or softwood for paint. The mold profile in the sketch can be worked on a power jointer or by hand, using a rabbet plane and sanding block. It is best made in a single 4′ length. If an iron miter box is not at hand, make a wooden one with guide cuts at 62½°. Fit a side molding, screw it in place, and proceed the same way around the tray. If a piece of waxed paper is laid over the bottom before attaching the mold, it will prevent smearing the bottom with paint, and can be removed by running a razor blade inside the molding. The writer used ivory board with chocolate trim.

Wallboard and aluminum corner mold combine in the lamp base. Here a backing block is used, with the metal, mitered on both sides at the ends, nailed to the corners. Cut the side boards wide enough to require firm pressure when sliding them into the metal slots. Make them extra long, and fit the top miters against a mitered scrap pressed on the top of the block. When all sides are fitted

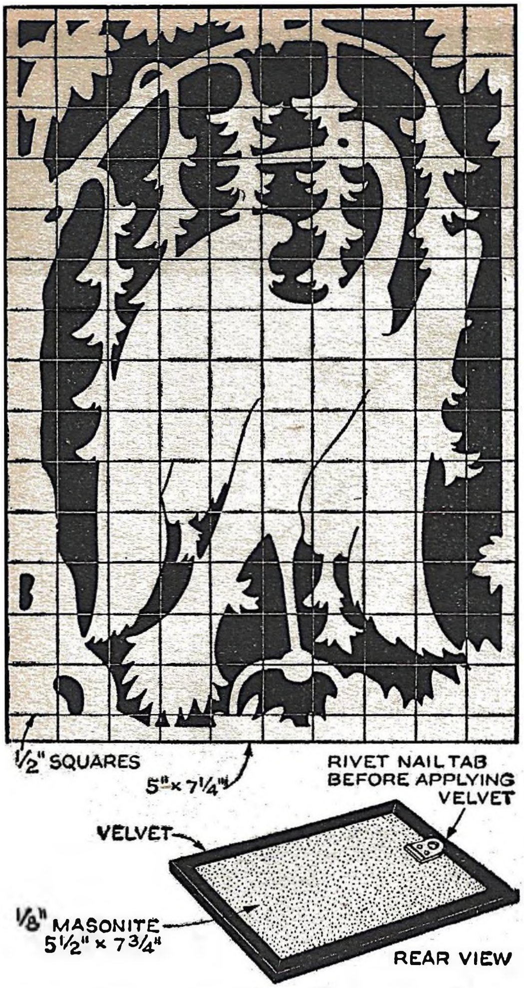




Above: A solid block of wood forms the core of the lamp base. Dealer who supplies the Formica or tileboard will also be able to get you the molding, if he hasn't it in stock. Left: Details of cigarette box. Note concealed hinge.

and cut to length, make the mitered top from actual measurements, paint the joining edges, and coat the underside with thick casein glue. Clamp lightly in place. The fitting of the top step is a repetition of this process. Bore the cord hole and attach a pull-chain socket with a pipe or suitable flanged fixture. The shade support is chosen to suit the shade.

The "marble mosaic" technic is illustrated in the box with chamfered corners. Here the core is a box built of ¼″ plywood chamfered as in the drawing. Make the top and bottom overlays with square edges and attach with casein glue, aligning them with straightedges held against the sides. Set the assembly where it will not be disturbed and lay a flat iron or other weight on top until it has set. Next add the side pieces, then the ends.



Above: Design of the plaque is laid out in half-inch squares for easy copying. Or you may wish to originate a picture yourself. Sketch it on thin paper, rub the back with black pencil and trace over it, for transferring to the board. Right: Dimensions and cross-section of tray.

Exact squaring of these pieces is much simplified by using "shooting boards." One is designed for paralleling the side edges, the other for squaring the ends, and the drawings are self-explanatory. In use, the slotted upper plywood is set on the lower for the exact width, a piece of tileboard is laid in place, and the edge is planed with a hand plane sliding on its side until stopped against the lower plywood. The action of the second jig is similar, but the piece is held by hand against the stop block.

The chamfer sides of the box have mitered edges, best made by clamping the pieces in a vise after squaring the ends on the shooting boards. Miter the edges with a plane, trying the piece often in its place on the box. When it fits, mark it for identification, and fit the other three long pieces. Paint the joints and glue in the pieces, clamping them by winding the box with strips of rubber. Then fit the end and side pieces. The triangular corners are best fitted with a file or a sanding disk.

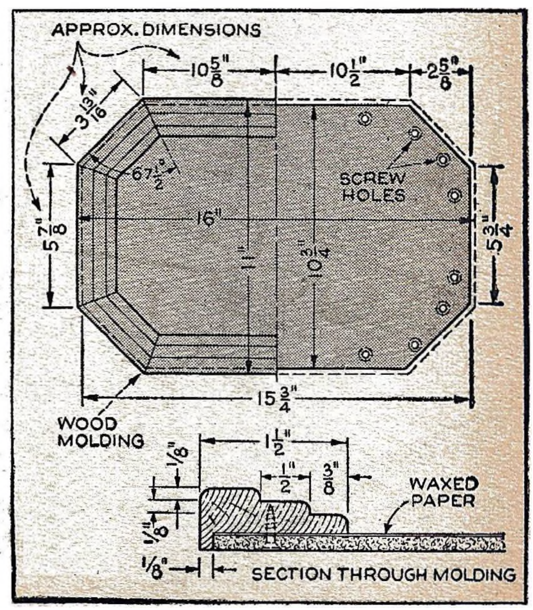
After removing the rubbers, touch up the corners with a fine file to remove wire edges, and saw off the lid. Smooth the raw edges by rubbing them on a sheet of sandpaper held flat on the bench top. After hinging the lid, paint the inside of the box, or line it with velvet or leather.

Pretzel And Popcorn Bins

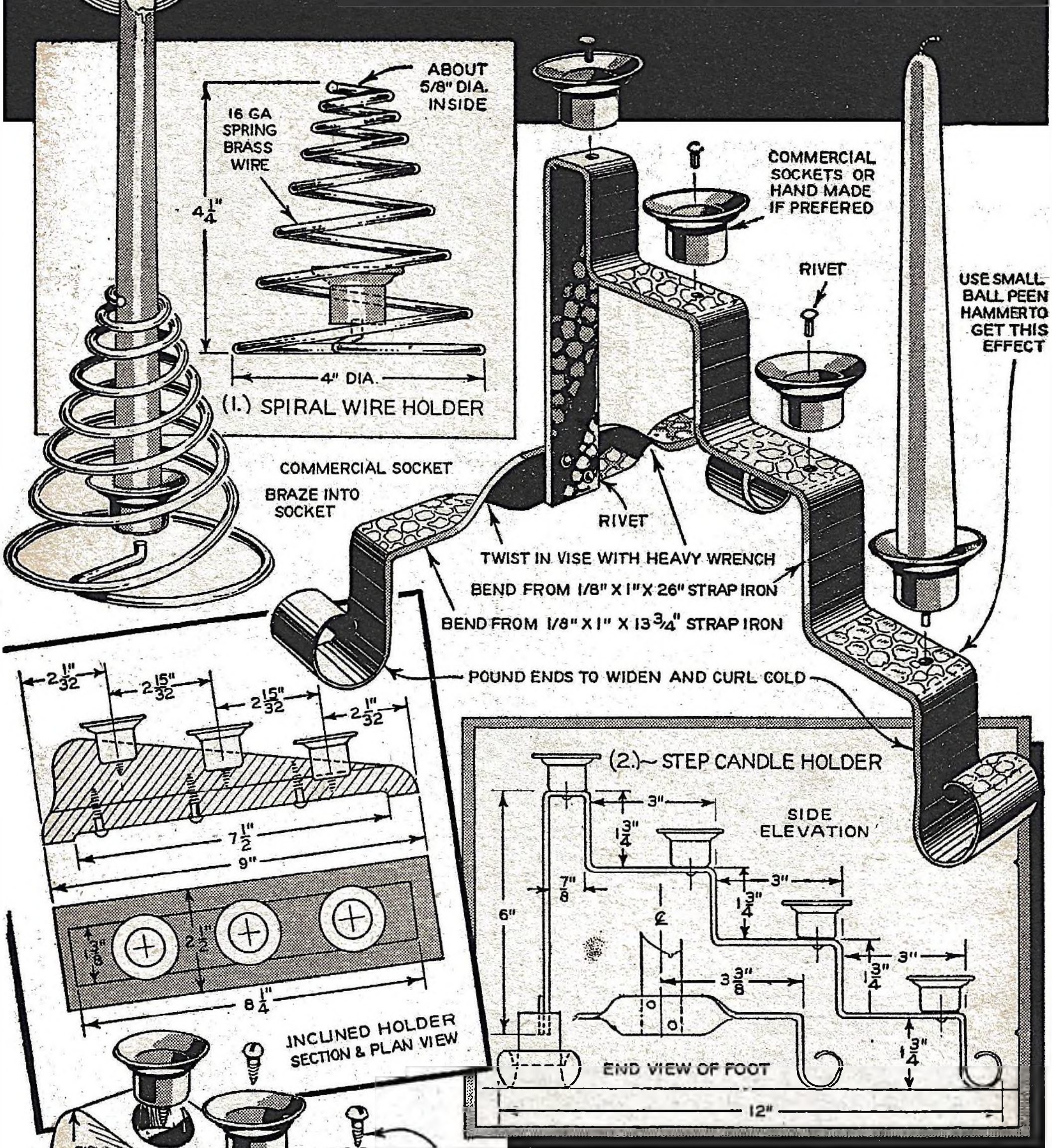
[*Continued from page* 115]

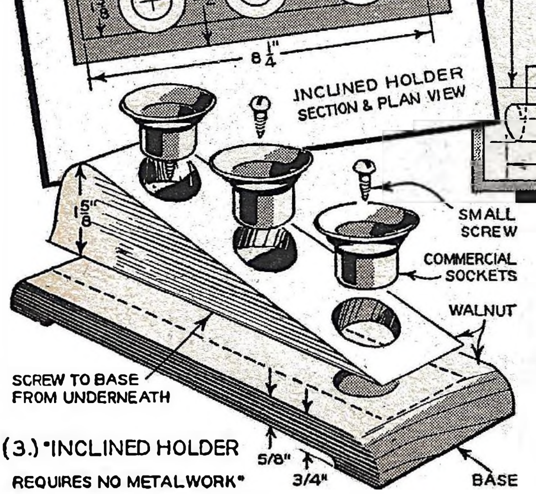
yellow; his hat, shoes, tie, and outlines black; hair, nose, and mustache red; and leave the face the natural color of the wood. Paint the designs on the cart red, yellow, and green. After these colors have dried, give the entire novelty two coats of shellac.

The second server is designed as a comic cat peering over a fence, both cat and fence being cut from one section of 1/4" plywood and acting as a handle and a division in the box. Cut the paws separately and glue them onto the fence. Paint the back of the cat on the back of the fence so it will look natural from any angle. Next saw out the front and back sections, 4"x6" from 1/4" plywood and the sides 3 3/4"x5 3/4" also of 1/4" plywood. Paint the cat yellow with black stripes and outlines; the eyes green. Indicate the boards and knotholes of the fence with black and leave the rest the natural color of the wood.



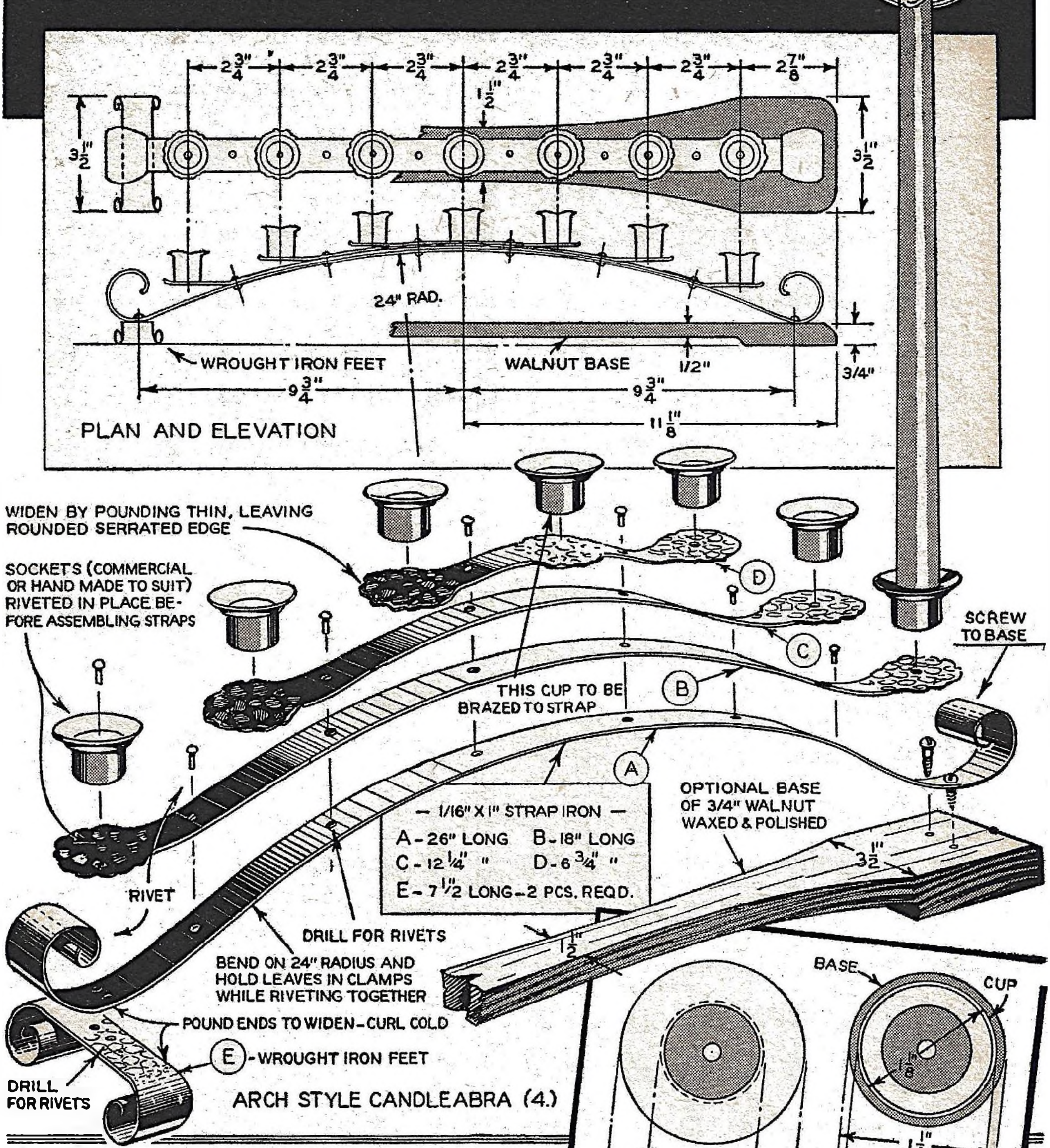
CHRISTMAS

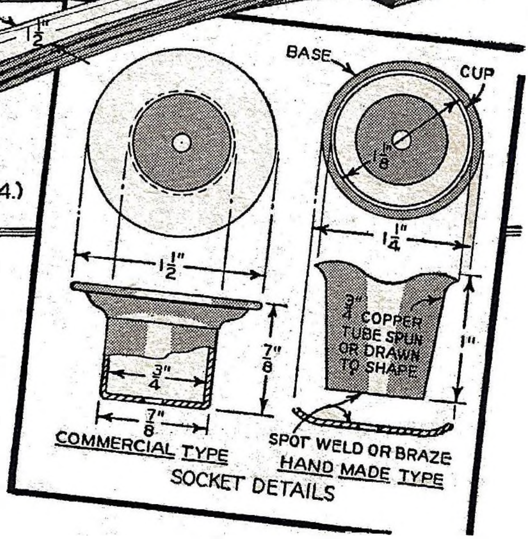




HAND made candle holders or candelabra add interest and distinction to the table, buffet, or mantel, particularly at Christmas time. The arch candelabra, No. 4, for seven candles is unusual and not difficult to make. The ends of the $\frac{1}{16}$"x1" strap iron are rounded and pounded thin, leaving a serrated edge. The ends are curled cold and the candle sockets riveted or brazed in place before the straps are riveted together. The arch holder

CANDLE HOLDERS





may have curled metal feet or a walnut base as illustrated. The candle sockets can be purchased, spun of thin sheet metal on a metal spinning lathe, or they can be made of brass or copper tubing with the lip flared over a tapered mandrel. The standard socket size is ¾".

The step candle holder, No. 2, is also made of strap iron bent cold. The twist in the foot

[*Continued on page* 152]

Model Submachine Gun

[*Continued from page* 97]

bradded and glued to the side plates. Punch pin holes through the full sized drawing of the side plates, at the exact location of these rippings so both plates are identical.

The barrel is made as shown in one of the photos, both sections being glued and bradded together. Avoid surplus glue that might foul the bore.

In the "tromboning" assembly, the box-shaped part immediately over the handle grip is made to slide freely over the barrel of the gun, plus a little extra clearance for the two coats of paint used in finishing. The mechanism is powered with two or three good weight office rubber-bands.

All in all construction is simple, as will be seen from a little study of the drawings and photographs. Should any trouble in operation be found, the cure will lie amongst the following.

Jamming In The Magazine

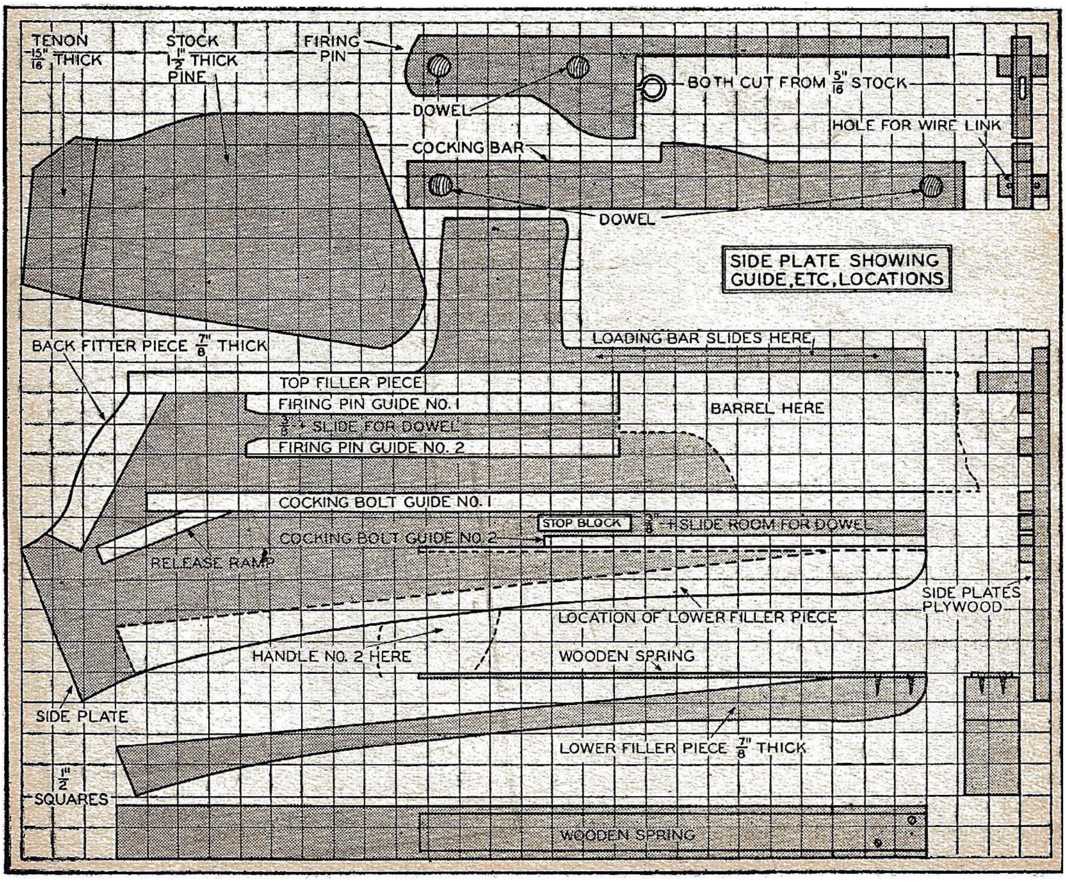
This will occur if the gun is shaken enough to cause the "bullets" to drop down vertically, instead of horizontally. *Cure*: Swing cover open and re-stack the bullets.

Jamming In The Firing Chamber

First be sure that sufficient room is allowed to permit the bullets to fall easily into place. If it is not cured by the above the trouble will probably be caused by the firing pin not being drawn back far enough to give the bullet time to drop completely into place. *Cure*: Shorten firing pin. If the barrel is made of soft wood the striking shoulder of the firing pin will bruise into the rear end of the barrel, having the effect of lengthening the firing pin. If such occurs it may be found necessary to provide something harder for the firing pin to strike on, such as a little piece of metal or hardwood block. However, if the barrel is made of hardwood trouble is unlikely. When the gun is used out-of-doors where excessive ammunition loss is likely, it is suggested that the "bullets" be not used, instead, peas or small stones should be used. This will necessitate single shot loading. Each individual shot should be placed directly into the firing chamber for single shot fire.

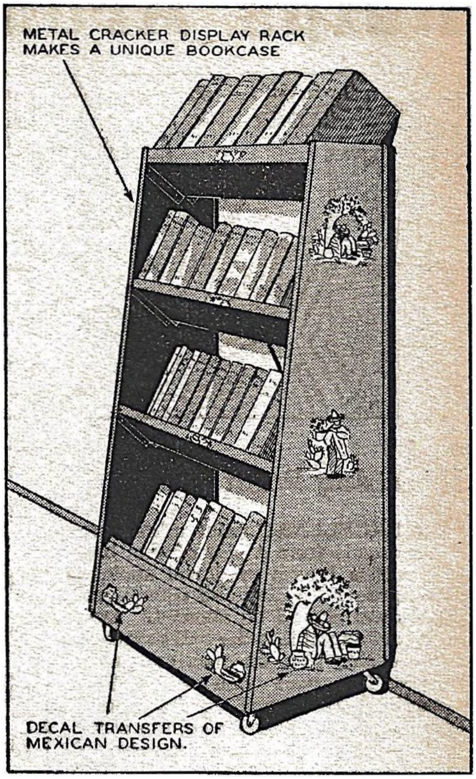
The simple but excellently working wooden mechanism will be a delight to the youngster who must see "why it works"—that is if Dad ever gets through playing with it.

Full sized patterns of the various parts can accurately be laid out in squares from the drawing below. Transfer patterns to wood and cut out.



CRACKER RACK BOOKCASE

AN OLD discarded metal cracker display rack, such as your grocer uses, can be conveniently transformed into a unique bookcase. After obtaining the rack wash it thoroughly, oil the rusted spots, if any, and sandpaper the entire case. Next give the rack two coats of enamel, inside and out. When dry, decal transfers of any desired design may be applied.—*J. C.*



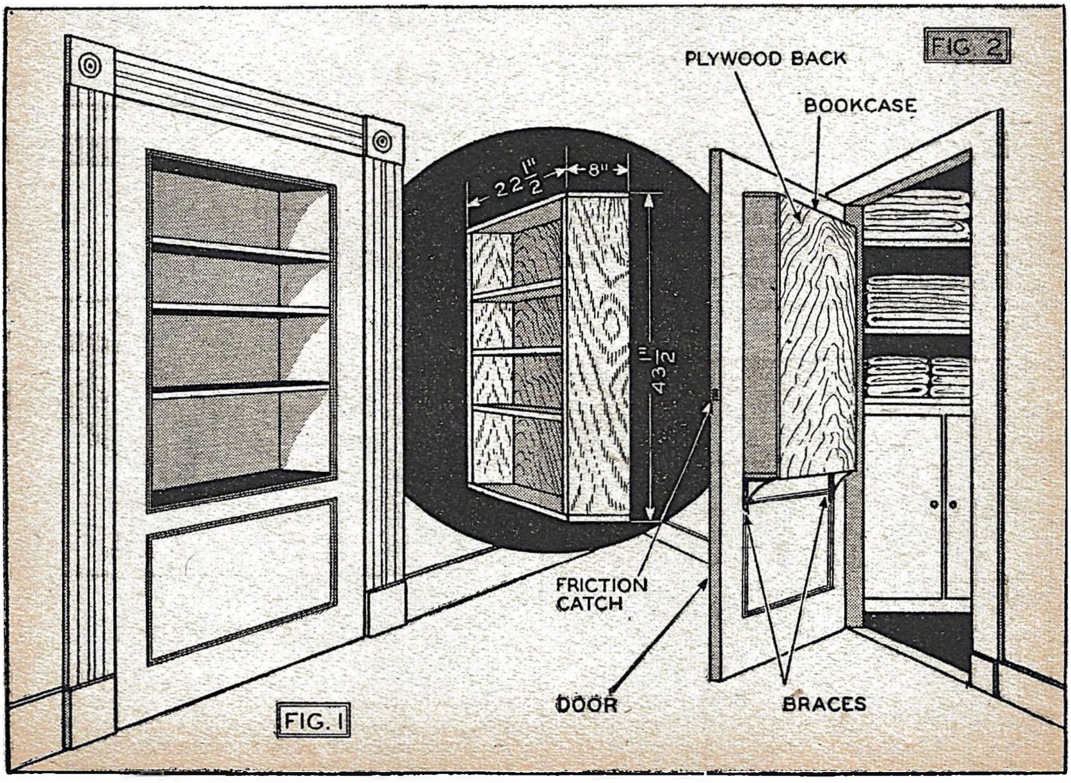
IN-A-DOOR BOOKCASE

WITH a few dollars and a little ingenuity, we turned the two storage closets which flanked our fireplace into a pair of charming built-in bookcases—and without sacrificing one inch of closet space! It was done with only two pieces of plywood for the backs, something over 16 ft. of lumber for sides and shelving, a dollar's worth of hardware, two pints of paint, and a generous amount of elbow grease!

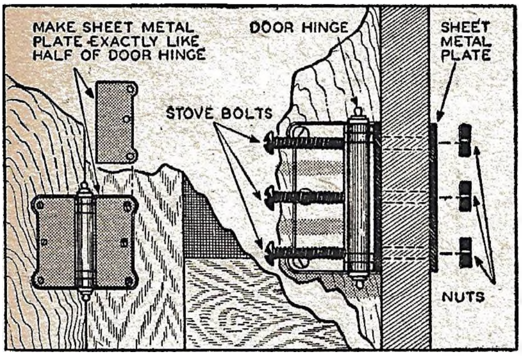
All in all the whole transformation cost $5.94, or less than $3 each, and required no more knowledge of carpentry than is necessary to read a measuring stick and pound a nail in straight.

Our doors were of the usual two panel variety, and our first operation was to saw out the top panels, just inside the groove moulding. The doorknobs and locks were removed, and the holes filled with plastic wood and sanded.

[*Continued on page* 154]



Helps Around The House

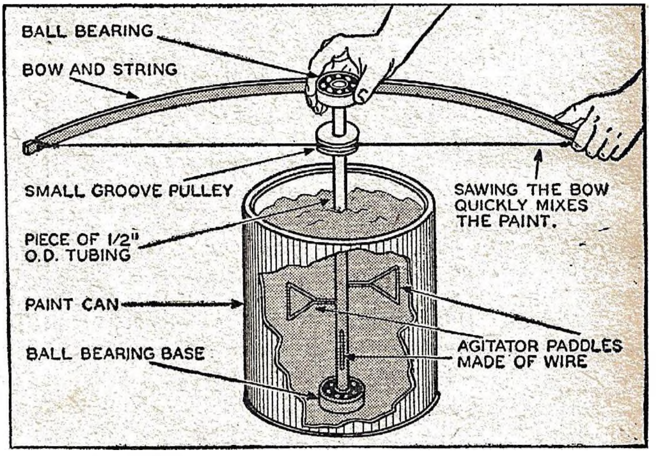


Fixing Screen Door Hinges

CONSTANT slamming of screen doors coupled with their light construction generally causes the hinge screws to work loose after a time. Tightening the screws is useless as they wear holes in the soft wood larger than their threads. A permanent remedy is illustrated at left. A pair of sheet metal plates, cut to exact shape of hinges, is placed directly behind the hinges on the inside. Holes are then drilled through the woodwork and stove bolts run through hinges, wood and plates, with nuts on inside. Tighten up the nuts and your screen door can never work loose again. The plates form a solid bearing surface for the nuts that will last as long as the door.

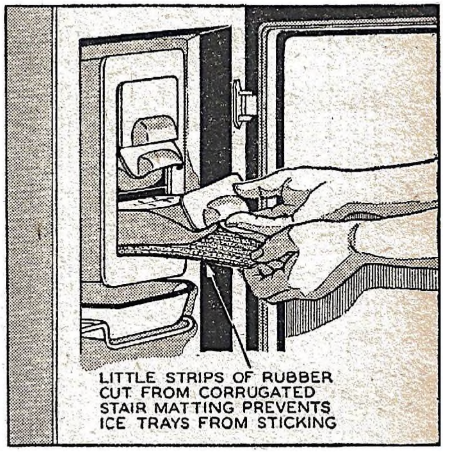
Bowstring Paint Mixer➔

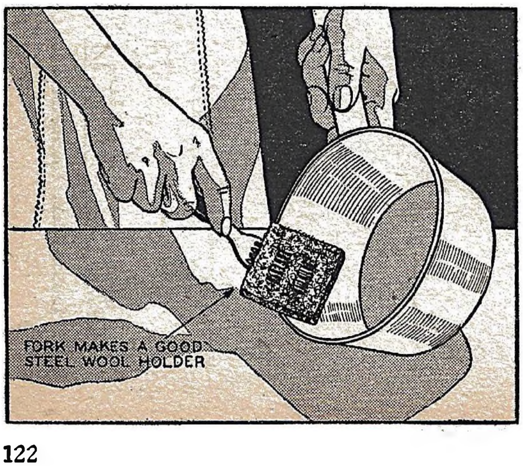
AN EXCELLENT paint mixer can be made from a pair of shot ball bearings, a length of dowel stick, a small grooved pulley and some wire. The dowel should be about 12" long and a driving fit into the ball bearings. One bearing goes on each end, with the pulley near one end. Wire "paddles" are shaped as shown and fastened to the dowel near the other end. Make the bow from a scrap of wood and a length of cord. Place the mixer in the paint can and run the bowstring back and forth over the pulley. Paint will be mixed fast and thoroughly.



Rubber Pads Under Ice Trays

THE worst thing in the world for an aluminum ice tray is to dig at it with a fork or knife to loosen it from the freezing compartment, where it is invariably stuck. Instead, place rubber mats cut from corrugated stair padding underneath the trays. This will prevent their freezing fast and will eliminate the necessity of poking them full of holes.



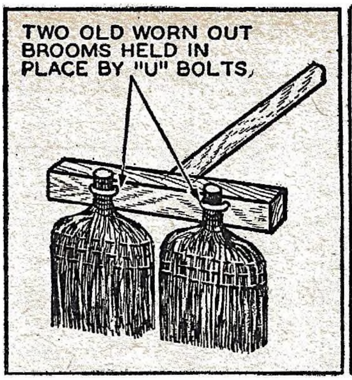


Fork Holds Steel Wool

AN ORDINARY table fork makes a good holder for the steel wool pads used for scouring pots and pans. Simply thread the pads on the forks pin fashion and scrub away without danger of taking the skin off your fingers.

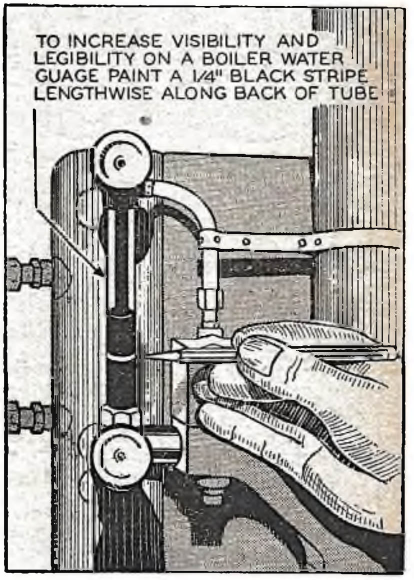
Inexpensive Yard Brooms

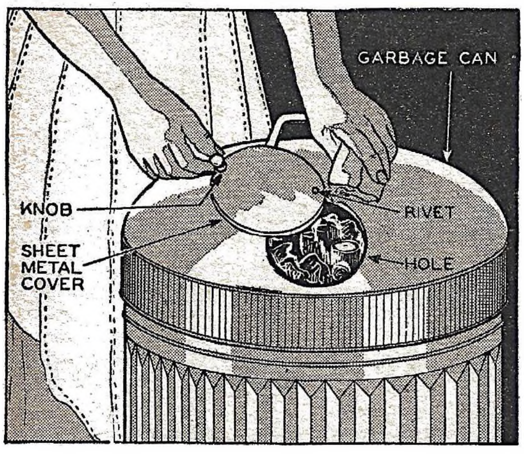
WORN out kitchen brooms are still of some use, as drawing at right shows. They can be converted into very efficient yard or porch brooms with very little effort. Cut the brooms off square across the bottoms just above where they are worn, and also cut them off at the top. Fasten two or three of them to a length of 2"x3" lumber by means of "U" bolts around the necks. Drill a hole in the 2x3 and insert a handle at a convenient angle and your broom is complete.



Readable Boiler Gauge

THE level in a boiler water gauge is hard to see and read, especially at a distance or in poor light, because there's little or no color contrast between the water and glass tube. To increase visibility and legibility just paint a narrow (1/4") black stripe lengthwise along the back of the tube. The stripe will appear normal size above water level but will be so magnified by the water below water level that the water itself will look like a column of black liquid. This catches the attendant's eye and attention more often, and he is thus less apt to let the boiler run dry or be flooded, with consequent regrettable results. If the stripe is broken or interrupted at the proper point (indicated in the drawing by pointing pencil), it will not only indicate where the water level *is*, but also where it *should* be.—A.V.



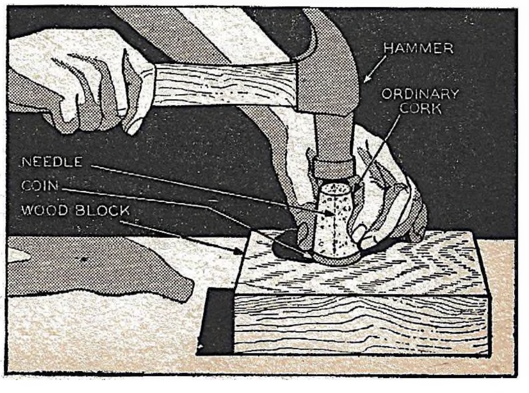


Small Lid On Garbage Can

THE bother of removing a tight-fitting garbage can lid two or three times a day to deposit small quantities of refuse can be avoided by cutting a small hole in the lid and covering it with a swinging metal plate.

Driving Thin Nails Through Hard Surfaces

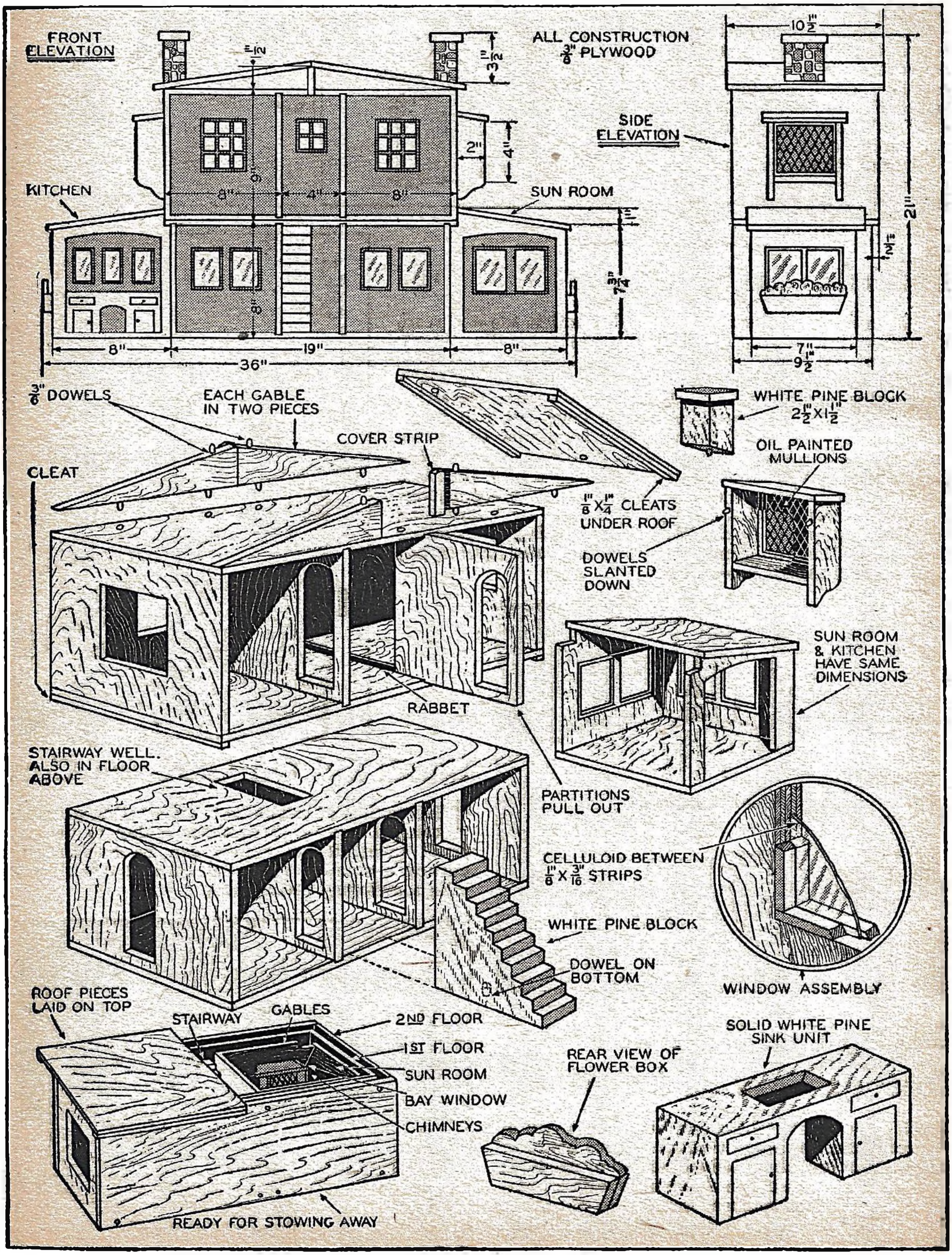
THE drawing at right shows how a thin nail or needle can be driven through a hard board or coin without breaking. Embed the nail or needle in a cork and strike a single sharp blow with a hammer. The cork compresses enough to allow the point to be driven forward, yet prevents the thin steel from buckling.—*W.F.S.*

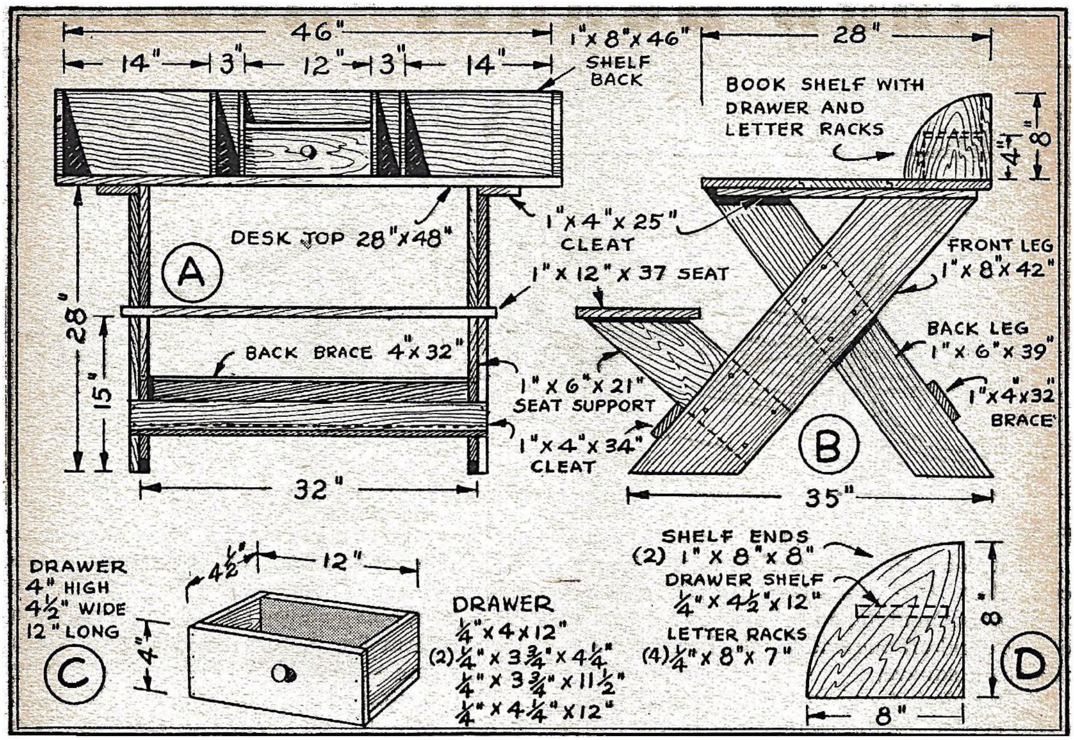


LARGE DOLL HOUSE Stows In Small Space

ALTHOUGH 3' long and 21" high this doll house, when taken apart, occupies a space only 9"x10½"x20". The several rooms and parts can be put in the upper story, and roof pieces laid on top. Five-ply ⅜" plywood is used throughout, with exception of the simneys, stairway and sink unit. First and second stories are simply telescoping boxes; gables, roof and wings separate units. Small dowels are used in

(Continued on page 154)

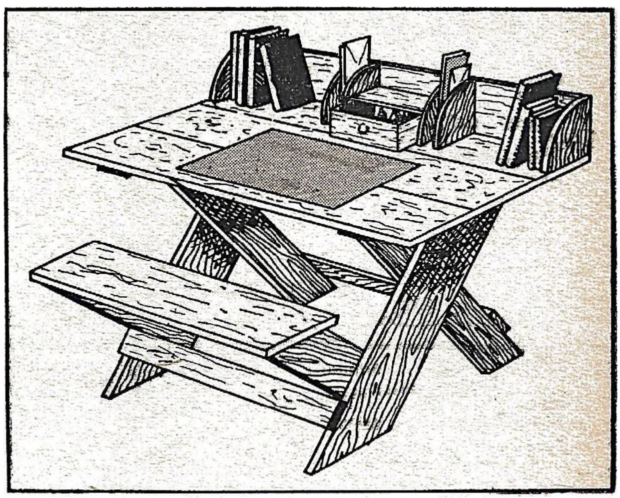




Pine Desk For Your Den

YOU can make this big, sturdy Captain's Desk out of pine boards and scraps. It has an attached bench, just the right height, a book shelf at the back with a drawer for pens and pencils and two racks for letters and papers. There is plenty of room on the desk top for tinkering, hobby work or study.

Find a large packing box if you can, removing the nails carefully to save the boards. Scraps of pine boards can be used also. You will need the following boards:



DESK TOP

2—1"x9"x48" (1" thick, 9" wide, 48" long)
1—1"x10"x48"
2—1"x4"x25" (cleats)

CROSS LEGS

2—1"x6"x39"
2—1"x8"x42"
1—1"x4"x32" (back brace)
1—1"x4"x34" (front cleat)

SEAT

1—1"x12"x37"
2—1"x6"x21" (seat supports)

DRAWER

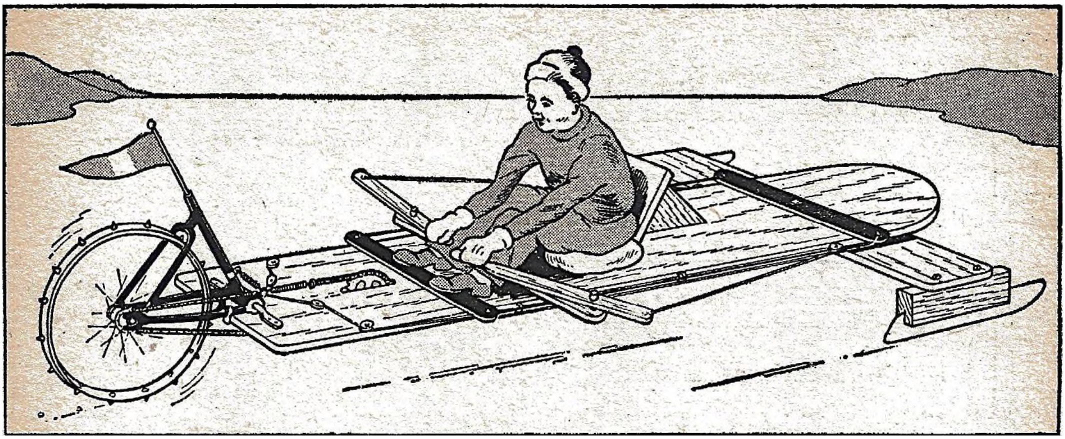
1—¼"x4"x12"
2—¼"x3¾"x4¼"
1—¼"x3¾"x11½"
1—¼"x4¼"x12"

SHELF

1—1"x8"x46" (back)
2—1"x8"x8" (ends)
4—¼"x8"x7" (letter racks)
1—¼"x4½"x12" (drawer shelf)

[Continued on page 156]

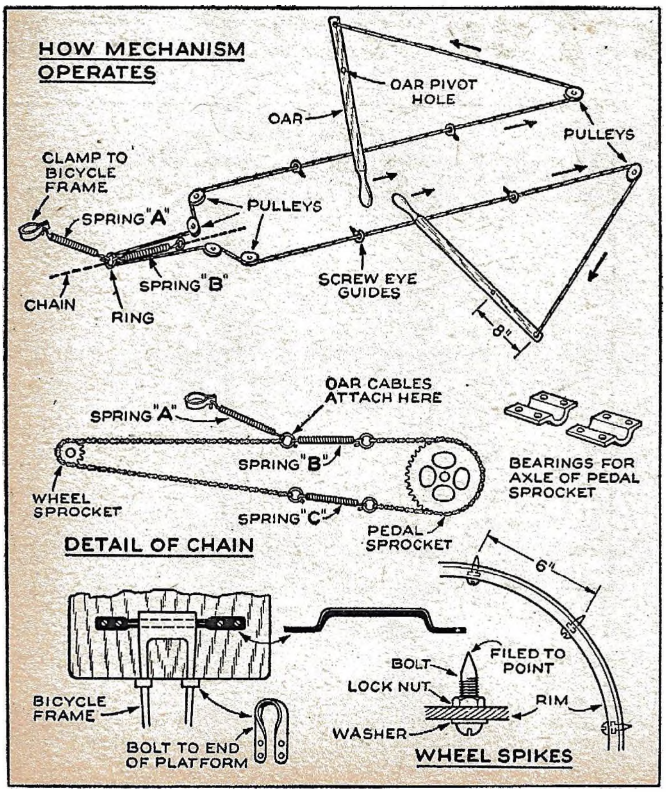
"Elbow Bender" Rowing



THE platform consists of a simple plank 9 ft. long, 18″ wide and 1″ thick. Or you can cleat two narrower boards together underneath, making due allowance for fittings, etc. Round off one end for the bow but leave the stern square.

A foot abaft the bow bore a 1″ hole in the exact center for the runner-bar pivot. Three feet back erect a slanting, wooden back-rest. A suitable seat cushion can be fastened to the platform just in front of it. Next, 18″ back of the rest, bolt a piece of 2″x3″ lumber across the platform for the oar pivot blocks. This bar is approximately 30″ long with a long bolt projecting up through each end. Its exact length will depend upon the skipper's size and leg length. The runner-bar is a piece of 2x8, 4 ft. long. Under each end bolt a 1 ft. block of 3x6 vertically and at right angles to the ends. Saw a slot in each block 2″ deep for the runners. Bolt a 1″ pipe flange to the center of the runner-bar and thread in a piece of 1″ pipe about a foot long. Heat and hammer the top end of the pipe square.

The runners are two pieces of heavy steel 4″ wide and 18″ long with three bolt holes drilled through near the top edge to bolt into the blocks. Grind and sharpen wedge shape as shown in cross section sketch. When assembled the result will be as shown in detail of runners. Push the pivot pipe up through the hole in the platform bow with sufficient washers above and below to raise the bow about 12″ off the ice.

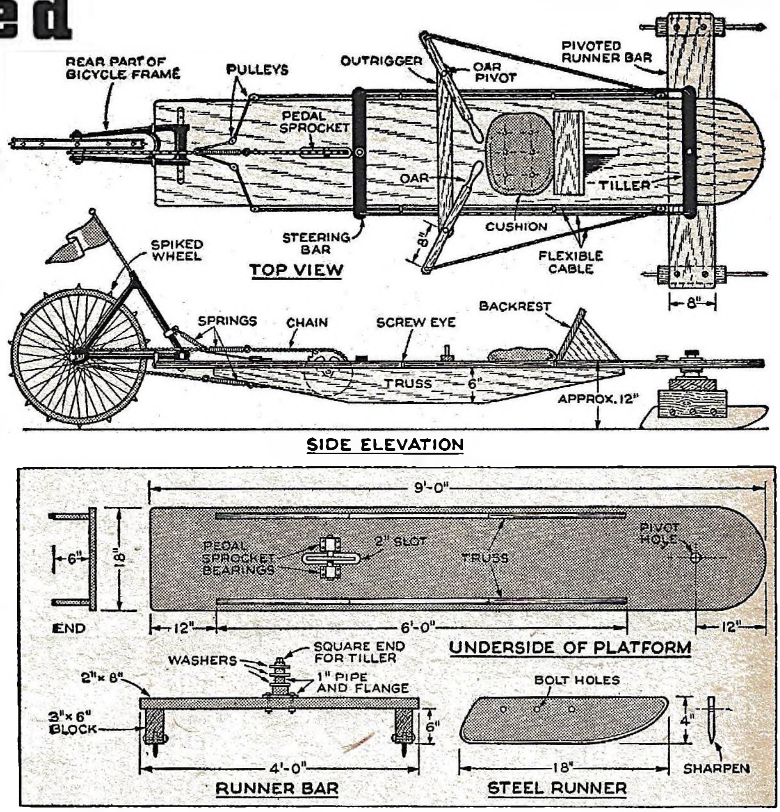


Mechanism is simple, as sketch at left indicates. Tension of spring "A" must be adjusted so it pulls chain back to the starting point after a stroke but does engage brake.

Ice Sled

When The Lake Blossoms Out This Winter With A Heavy Coat Of Ice, Slip Over The Surface In This Little "Rowsled" And You'll Have The Spectators Standing On Their Heads. It Is Easy To Build And Will Give Plenty Of Thrills For The Winter Months.

by
L. B. Robbins



The sled is propelled by rowing, exactly as in a boat. It will pick up speed gradually, and the mechanism operates in such a manner that the back stroke is the power stroke, while the sled is permitted to coast on the forward stroke.

The tiller is an iron bar about 24″ long with a hole in each end and a square hole in the center to fit down over the squared end of the pivot pipe. A cotter-pin secures it.

Use the bare rim of a rear bicycle wheel as the driver. Saw off the forward portion of the frame, using the triangular rear portion as a means of mounting. The wheel should be equipped with a good coaster-brake. The frame is then mounted as shown. Make a wide U iron to pivot through the pedal shaft bearing and bolt to the center of the platform.

Two feet ahead of the rear end of platform cut a slot in its center 2″ wide and somewhat longer than the diameter of the pedal sprocket to be used. Sprocket should be mounted on a solid axle after pedals have been removed. This axle is then run in two steel bearings like the type indicated. Bolt to the under side of the platform so the sprocket runs true in the slot. Just ahead, pivot bolt a steering-bar of hard wood across the platform. Drill a hole in each end.

Connect the two sockets with a bicycle chain made up of two or three lengths linked together. The top ends are connected to a spiral spring "B" and the bottom end to a spring "C." Make fastenings strong. The third spring "A" attaches to the ring at the rear end of spring "B." These should pull the chain at its usual tension over the sprockets. Then provide a clamp to fasten the free end of spring "A" to the upright of the bicycle frame.

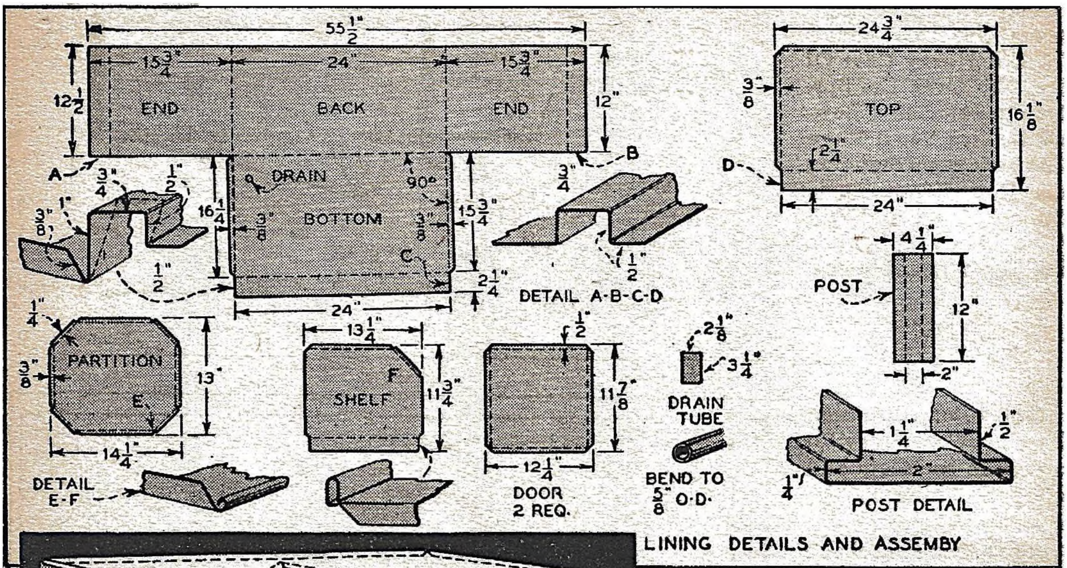
The driving mechanism is unique. Arrange four pulleys back of the pedal sprocket and two more at the bow, just back of the tiller. Using small diameter, galvanized steel braided wire cables; connect the ends of two lengths to the junction of the springs "A" and "B." Then run the wires through two rear pulleys, through leading screw-eyes in the platform edge, through one bow pulley to the ends of the "oars."

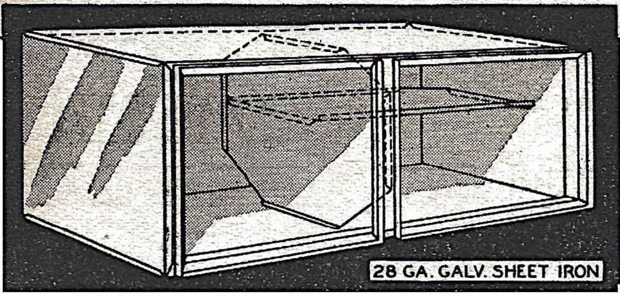
The oars can be shafts of real oars sawed off to suit. Usually 28″ to 30″ will be about the right length. Drill a hole in their ends for the wires and a second hole 8″ from the ends to fit fairly loosely over the oar pivot-bolts. Arrange the edges of the pulleys so the wires will remain in their tracks. Swivel mounted pulleys will effect this. Then run wires from each end of the tiller bar to the ends of the steering-bar.

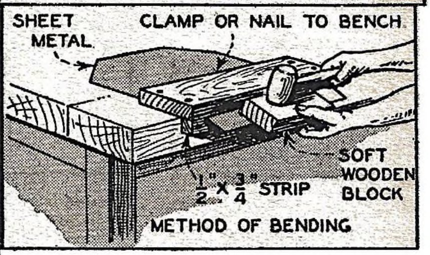
When all is assembled bolt a truss of stout wood under each edge of the platform to make

[Continued on page 160]

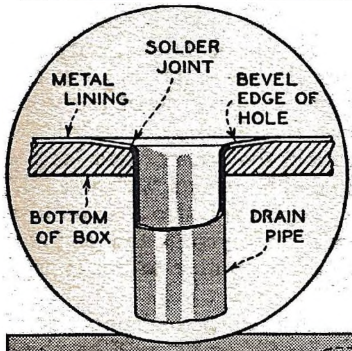
BOAT OR TRAILER





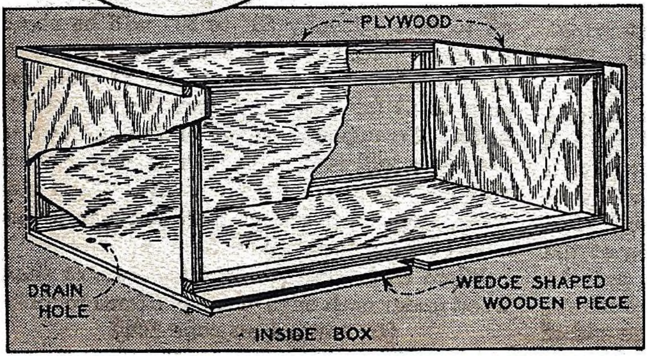


by T. W. Stites



DESIGNED and built for use in a house trailer or boat, this compact refrigerator will also be a valuable fixture in your summer cottage or camp, or tucked away in a corner of your tiny apartment. It is easily built, yet sturdy enough to stand the roughest kind of use, and requires a space only 15½"x17"x27".

Having an inch of cork or other insulating material all around, it uses only twenty-five pounds of ice every three days in ordinary summer weather, while in the hottest weather the twenty-five pounds of ice last two days. Ample internal circulation keeps the contents at an even temperature.



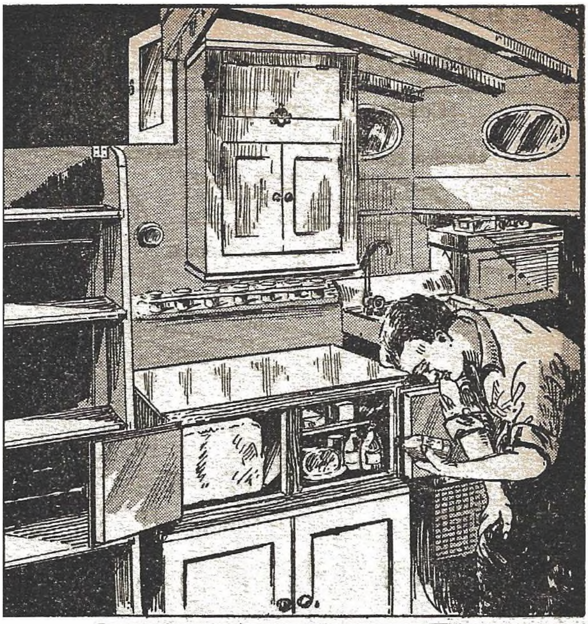
The refrigerator consists of a box within a box, with insulating material between them and a lining of galvanized sheet iron. The original was insulated with used cork as it can be obtained cheaply wherever old refrigerators have been wrecked. If you have

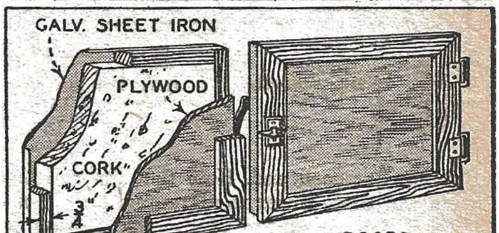
ICEBOX

difficulty getting the cork you can use thick Celotex, rock wool, or one of the insulating materials sold by the mail order houses.

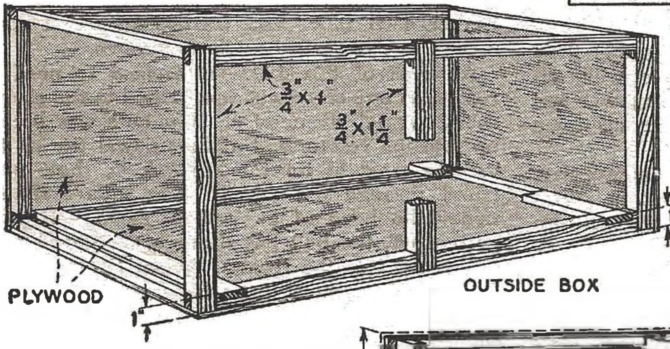
Few tools are required, a saw, hammer, square, screw driver, block plane, wood chisel, tin snips, pliers, soldering iron, brace and ⅝″ bit will do the job nicely. The dimensions given are easily altered to conform to available space. A slope of ½″ is allowed in the bottom for drainage.

The metal lining should be made first. From a sheet of 28 gauge galvanized iron, 30″x96″ cut the parts to the dimensions given in the drawing. Lay out the dotted lines to show where they are to be bent. The bending is simple and can be done by hand, using the edge of the work bench and a board. For bending the door stop channel, nail a strip of ½″x¾″ parting stop along the edge of the bench, even with the top. Lay the metal on the bench with the part to be bent extending over the edge. Clamp or nail a board on top of the metal to hold it down, then with a hammer and block of soft wood, bend the metal a little at a time being careful to make the bends smooth. The shapes in which to bend the metal are shown in the drawings.

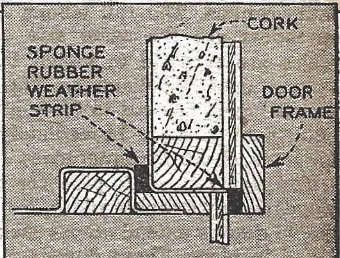




DOORS



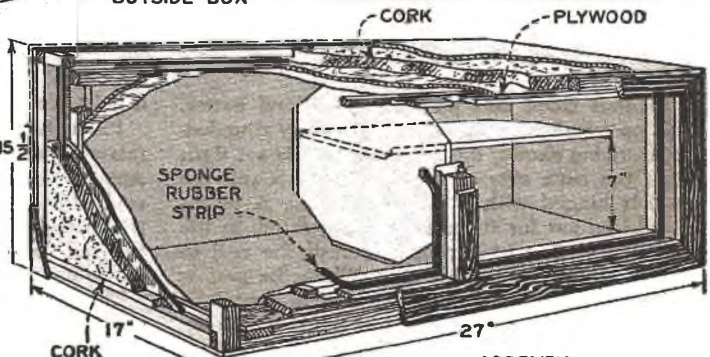
OUTSIDE BOX



DOOR DETAIL

After bending the door stop channel and turning up the ⅜″ allowance for seams, trim the ends of the channel to make a neat fit. Bend the back corners so the ends come into place, then solder all seams to make them water tight. It will be a

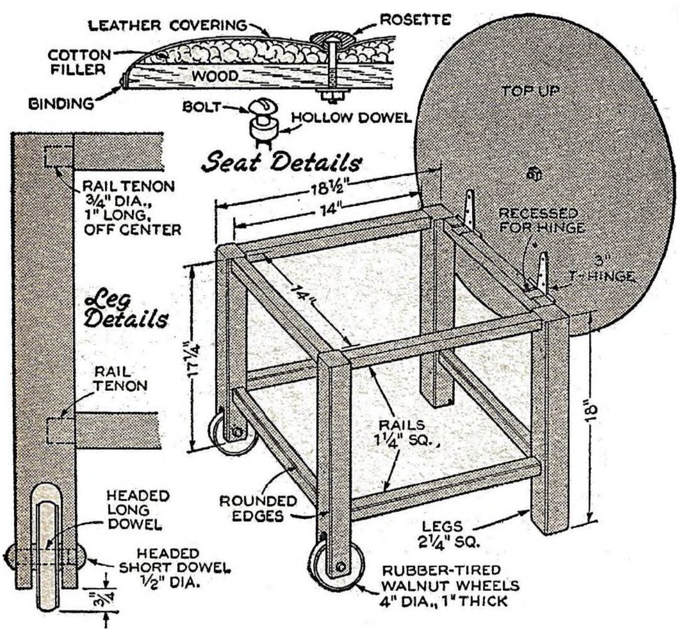
[*Continued on page* 158]



ASSEMBY
SHOWING CORK IN PLACE

Wheelbarrow Seat

[*Continued from page* 95]



1" tenons at each end. Note that the rail tenons are lower than center to allow more wood above their holes at the top of the legs. These were turned by off-centering the pieces between the lathe centers. The rail tenons are ¾" long. The spreaders are the same size except that their edges are rounded to match the legs and their tenons are 1" in diameter. The frame, when all pieces have been cut to fit, is glued together and held with clamps. Immediately after clamping however, check for squareness.

The top is of white pine (or other appropriate wood) in any suitable width, 1⅜" thick. Half-inch maple dowels extend across each joint 2" and are glued in place. These dowels give much greater lateral strength than is needed and hold the boards firmly together. When the glue has set, the circle 29½" (or whatever can be cut from the three 10" boards) is band sawed along a scribed line.

So that wood and padding will blend better, the top edge of the seat should be nicely rounded. As drawing shows, the top, back rail is set flush with the back side of the legs. To this rail the seat is hinged with T hinges 3" long. A recess should be cut for them after being fitted, in the top side of this back rail, to permit the seat to drop flat on all four leg tops. When the seat is tipped up, the protruding back edge now falls below the top and braces against the legs, holding it firmly. The top also tips a little past the vertical when in this position, making it quite stable. For those who desire it, locking arms such as are obtainable at the hardware store, can be attached to one or both sides to lock the seat in the "up" position.

Now for the upholstering. Solid leather in crinkled brown tone was chosen. Sheepskin will make a modern finish and is considerably cheaper. Many department stores carry packages of scrap leather for making jackets. Such pieces can also be obtained at shoe shops and if desired, some work at the family sewing machine will yield a large area of leather stitched together in crazy quilt fashion. Still another alternative is to cut a number of triangular segments which, when sewed together, will complete the circle, the seams running from the center out to the edge, pie fashion. Or you can use a single, solid piece as was done with the seat shown.

Two pounds of cotton batting were evenly arranged over the top of the seat and the leather laid on. A tack was driven part way home on one side. The leather was drawn squarely from this across the seat and another tack tapped in on the opposite side. Two other tacks, after stretching, quartered the circle. From then on it was just a matter of drawing out the slack and tacking, after which the waste was trimmed off flush with the lower edge and the binding tacked on. It will pay to go around the edge several times, stretching the leather each time. You will be surprised how much slack you will be able to remove.

An area of this diameter seemed to need a rosette so one of walnut was turned to the shape shown. A ⅝" diameter shallow hole was bored up into the rosette and a short dowel turned to make a snug fit for the hole. A ¼" hole was bored through the dowel. The square shank under the head of a ¼"x3½" stove bolt was ground off, the bolt put through the dowel and this glued into the rosette. When the glue was dry the bolt was put through the cotton and pine by first forcing a sharpened pencil through and following it with the bolt. This method took up additional slack from the leather and resulted in a tight, well rounded top.

Filler to which some walnut stain had been mixed, was rubbed over the framework and the surplus removed with a rag. When dry a good coat of clear lacquer was brushed on and when this had dried, rubbed down. The under side of the pine top was also stained to give it a tone consistent with the walnut.

This is a pleasing, practical project, applicable to many homes as well as the smart apartment. Taking less floor space than a large chair, it will, as above stated, take care of extra guests and fill a vacant corner too.

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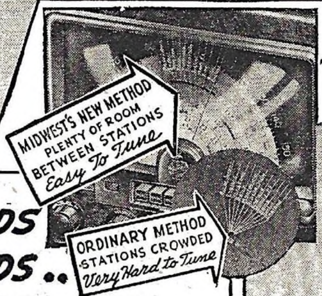

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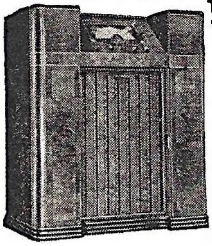

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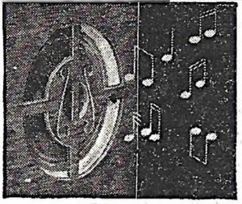

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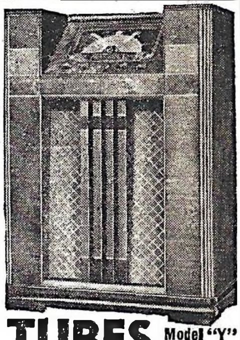

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A Sixth Sense For The Pilot

[*Continued from page* 47]

heading, the directional gyro will be at zero on the scale, moving to right or left as the pilot deviates from the course fixed by the directional gyro, which is in turn set by the compass.

Via the radio beam receiver, the position of the plane relative to the glide beam is indicated by a circle, and by keeping the circle exactly centered on the miniature plane, the pilot can make a perfect blind landing. The circle thus represents the pathway, and the pilot adjusts speed as he passes over the marker beacons on the approach to the field.

The Flightray is a return to the simplicity which marked the early days of flying, when a pilot used only his eyes and ears and flew "by the seat of his pants."

Sight-Seeing In Your Eyes

[*Continued from page* 53]

circle disappears you have found your eye's blind spot. It is called the "blind spot" because there are no nerve endings at the place where the optic nerve enters the retina, hence this part of the eye cannot see.

7. Your eye reads by jerks.

Print a sentence across a sheet of paper and in the middle of the sheet make a small hole to look through. Have a friend read the sentence while you hold the paper to your eye, and watch his eyes through the hole.

8. Black is red—how your eye is fooled when it gets tired.

Make a circular cardboard disk, marked in black as shown in the photograph. Mount it on the shaft of a small motor or grinder and whirl it rapidly, then let it come gradually to rest. As the speed decreases, you will suddenly notice the flickering image of the disk assume various colors. This strange illusion is due to the fatigue of the eye as it tries to follow the rapid movement of the whirling disk.

9. Seeing red in a white light.

If you read a book in brilliant sunlight, the black type may appear red, though sunlight is white. The reason for this is that the glare penetrates the skin and membranes surrounding the eye and takes on the color of the blood.

10. You really see everything upside-down.

Stick a pin into the end of a pencil and look at it through a pinhole in a card held an inch or two from the eye. Move the pinhead down across the hole and you will notice that it seems to move upward.

11. Your eye muscles move in sympathy.

Watch the pupil of a friend's eye at close range while you darken the other eye by holding a card in front of it. You will see the pupil enlarge in sympathy with the pupil of the darkened eye, which is trying to open wider and get more light.

(Correct Answers to Quiz on Page 74)

1. False. It's a line that reads the same both ways, as "Madam, I'm Adam."
2. True. The race is restricted to 3-year-olds.
3. False. The pesa is an African coin.
4. False. The Romans had this idea long ago.
5. False. It was from dodging Brooklyn's street cars.
6. False. To unteam means to open.
7. True.
8. True. You can use pine needles, sand, straw, etc.
9. True.
10. False. There's more aluminum.
11. True.
12. True. He's an artist.
13. False. The Russians thought of it first.
14. False. Minnows are said to be able to distinguish 20 colors.
15. True.
16. False. A cynget is a young swan.
17. True, too true.
18. True.
19. False. Silver birch is better.
20. False. They have a cork center.
21. True.
22. False.
23. False. Snapdragons are flowers.
24. True. They must be left white.
25. False. It was the Duke of Kent.

Attention, MI Readers!

We will pay $1 for each true-false statement which we find acceptable. Statements will not be acknowledged or returned. Address the Quiz Editor, MECHANIX ILLUSTRATED, 1501 Broadway, New York City.

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Make Portable Background

[*Continued from page* 86]

One 3-section, metal folding stand that can be raised to 9 or 10 feet.

One 6-foot length of tan or neutral colored monk's cloth, 50 inches wide.

One 6-foot length of black rep, 50 inches wide.

Four 56-inch lengths of 1½, or 2-inch half-round strips of white wood moulding (which can be purchased for about 30c).

Ten cents worth of stranded picture frame wire.

Some wire nails and a 10c bottle of Iron or LePage's glue.

[*Continued on page* 134]

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Make Portable Background

[*Continued from page* 132]

The stand is of the common variety used for aluminum reflectors. One can be purchased in the photo supply store for as little as $1.50.

To save initial cost, one shade of material can be used. However, by mounting two pieces of different colored materials back to back, more variety in background tones can be produced. Figure 2 shows the materials mounted back to back. The least-expensive grades of cloth are suitable and both can be purchased at the local department store for less than $2.00.

Other materials that can be used are: burlap, felt, velvet, velveteen, duvetyn or any rough-textured surface that will absorb light and not show wrinkles. A pure white background can be made of ordinary white muslin. Any wrinkles or folds that may occur with this or similar material must be pressed smooth with a hot flat iron.

Glue and nail the ends of the cloths together between the half-round mouldings. Wood screws can be used instead of nails and would make a more substantial job. The picture-frame wire is fastened to one end permitting the assembly to be hung from the top of the stand. A suitable hook must be provided for the stand. With the hollow type, a piece of wire bent S-shape, can be inserted in the top as shown in the diagram. With the solid type a piece of suitable flat hooked metal can be fastened to the top member of the stand. When not in use, this truly-professional equipment can be rolled up and folded into a compact unit, and tucked away out of sight. And it is so light and compact that you can take it anywhere the way the home-portrait specialists do.

"Crayon Drawing"

[*Continued from page* 85]

more intermediate tones so that the resulting print looks as if it has been drawn by hand in black and white, with charcoal or crayon. Use a non-glossy paper for the last step so you can apply spots or dabs of black here and there to simulate further the charcoal or crayon effects, whichever you prefer. Check for this with any reproductions of either process that are available to you.

The principle of this process is a fundamental of photography. Normal printing papers reproduce a shorter scale of tones (from black to white) than negative film, and the harder the paper the fewer the number of original tones it will be capable of reproducing. Since the drawing effect is extremely contrasty and lacks the middle tones characteristic of photographic reproduction, it is only necessary to drop the middle tones of the photograph to simulate drawing. If the original had not been as muddy as it was, it might have been possible to make the paper negative on normal paper and the final positive on hard.

Don't be alarmed by the granular effect produced on the paper negative.

Smoke The Pipe Of Peace

[*Continued from page* 41]

this "hardware" as soon as they buy the pipe. For one thing metal conducts heat so rapidly that the metallic taste mingles with the taste of the tobacco and stings the tongue. For another, most of the gadgets capture juices and then roll them in a flood down the stem when the pipe is tipped inadvertently.

In 1939 a famous aeronautical professor applied engineering ingenuity toward removing two objectionable features of the pipe—overheated smoke and acrid tobacco juices. His aluminum barrel in a fluted design increases the rate of heat dissipation in order to cool the smoke before it reaches the smoker's mouth. Condensing tars are retained by a small radiator device until the pipe is cleaned.

There are more fallacies in existence on the subject of breaking in a pipe than in almost any other field. For instance I have been told, with all the seriousness in the world, that the only way to break in a pipe is to light it and hold it out the window of a car that is being driven rapidly. Nothing could be farther off the track. The terrific draft set up by the wind burns the tobacco so swiftly and unevenly that only part of the bowl receives the heat. Your pipe will taste like something fresh out of a fire-gutted building. Moreover, the heat expansion may crack the bowl. It is uniform seasoning that is required.

When a less expensive pipe is used for the first time, many smokers scrape the inside of the bowl to remove the varnish and fuzz, then moisten the interior with a damp cloth. This is to prevent the fine dust and residue from contracting the pores and scorching the bowl. It also keeps this extraneous material from adding a sting to the first few pipe loads of tobacco.

Though scraping the bowl of the more expensive pipes is unnecessary, since they are put through special processes at the factory to remove the fuzz, dampening the bowl is important. The tobacco being moist next to the wood will not char it there, but will allow a sooty film to form instead.

Before the moisture evaporates, pack the bowl half full of tobacco with just a little "spring" to it—neither too tight nor too loose. Pick a brand that is free from artificial coloring or else the gummy substances which do not burn will collect at the bottom of the pipe and turn it sour. Use the same kind of tobacco until the pipe is fairly well seasoned. Switching tobaccos on a new pipe will make it either too strong or too flat.

Don't puff away at the thing as if your lungs were a pair of blacksmith's bellows. Overheating a new pipe prevents a "cake" from forming. The well-broken in pipe is sweet from top to heel, so remember to smoke the tobacco all the way down until there is nothing left to burn.

For the first few loads leave the ashes in the

[*Continued on page* 136]

Listening In On Hitler

[Continued from page 51]

by an analyst whose duty it is to read 35,000 words a day without missing a single significant word. So expert are these men that they were able to detect, hours in advance, Germany's intended invasion of Russia, and Japan's plan to occupy Indo-China.

Strongly backing up the FCC in aerial fishing expeditions for advance information on important events are the two high powered short wave listening posts maintained by the National Broadcasting Company in Hollywood and at Bellmore, Long Island. NBC's foreign language experts eavesdrop around the clock on European and Far Eastern broadcasts. Lines link them directly to the NBC News Room in New York, from which, thanks to the keen perceptions of the monitors, the network was able to flash a scoop on the Russian invasion.

A strangely variegated lot are the NBC monitors, including among their number White Russian refugees, and expatriates from every land in Europe and Asia. Jules Van Item, their Chief, is a Holland-born American who has lived in Germany, France, Roumania, Hungary, Spain, Portugal, Argentina, and Uruguay, and can order his cakes and coffee fluently in one dozen languages.

Playback devices play a big role in covering up for the fallibility of the human ear. One dogged NBC listener played a faint, blurred, barely audible recording of a speech from Bordeaux, France, over and over again. His reward, when he finally pieced it out, was a clean beat on the news of Marshall Petain's capitulation to Germany.

One of the neatest radio tricks of the current war, however, was not the work of the FCC or the NBC but was brought off instead by the G-men. Special Agents J. C. Ellsworth and M. H. Price spent long weeks glued to the controls of a little short-wave transmitter at Centerport, Long Island. During that time they were actually in direct touch with the Nazi Secret Service in Hamburg, Germany, which believed them to be secret agents of the Gestapo and freely traded valuable espionage instructions and data with them in return for certain worthless "information," trumped up by the FBI to make it seem real.

This led to the capture of Frederick Duquesne and the others of his dangerous spy ring, including Axel Wheeler-Hill, and thwarted what might have been a serious wave of sabotage.

Adding lecithin—a product from soybeans—to gasoline helps prevent corrosion in storage and discoloration from sunlight.

Smoke The Pipe Of Peace

[*Continued from page* 134]

pipe until it is absolutely cool—this gives the liquid residue a chance to soak into the pores of the fresh wood. Do not scrape the inner surface clear of the thin coating of carbon that has collected since it insulates the pipe against the heat and prevents the wood from cracking.

Too many smokers make mistakes in handling the carbon "cake" in their pipes. A thick "cake" never makes a pipe sweet, it only serves to overheat it, just as excessive carbon in a motor makes it sluggish and hot. A thin cake is cool and sweet, but it must be of uniform thickness in every part of the bowl.

Never use a sharp instrument to clean the pipe. Instead use a dull reamer to prevent cutting through the cake and chipping the wood. The little nicks will destroy much of the sweetness of a pipe that is otherwise perfectly seasoned.

If your pipe tastes like a million dollars, don't work a good thing to death. A pipe should never be in continuous use for more than a couple of weeks. Clean it out, run a pipe cleaner through it, and hang it bowl down so that it can rest. This will dry out any excess fluid that has collected. Some smokers recommend leaving it where the sun can play on it. Another good idea is to pack the bottom with powdered chalk before placing it aside.

One pipe isn't enough for the man who smokes continuously. Puffing on the same pipe all day long makes it hot, strong, and evil smelling. Have several pipes in your collection and keep rotating them. Each will be cool and dry when its turn comes for the next smoke.

When a pipe goes strong, the place to look is in the shank. Here, rather than in the stem or bowl, the acrid juices and stale smoke accumulate. A foul shank will spoil the best tobacco, so run a thick pipe cleaner through it after every few pipefuls. If you have a metal guard in the pipe, use pipe cleaners frequently and clean it out with hot running water at intervals.

When pipe cleaners do not prevent a strong acrid taste, the pipe needs more than an ordinary cleaning. The best thing to do is blow steam through it. First remove the stem and hold the mouth of the pipe over a kettle of boiling water. You might as well throw the pipe away if you have cleaned it with soap and hot water since the taste of stale tobacco is preferable to the result of a soap and water bath.

If you have a cork that will fit into the bowl of your pipe, here is another good treatment. Cut a hole into the cork just the size of the nozzle of a seltzer bottle, then place the mouthpiece of the pipe into a pan. Squirt a small amount of the soda water from the siphon through the pipe. It works like a charm.

Alligators renew their teeth as needed, when they wear out.

Walking On Air

[*Continued from page* 57]

of air around your body rushes into the folds, and your descent is abruptly checked.

Even though you are a novice at jumping, it is not difficult to jockey the 'chute to practically any spot you like. If the ground underneath is clear of buildings, trees, or other obstructions, you might as well let nature take its course; but if there is a possibility of landing on a dangerous object, such as a high tension wire, you can do some artful dodging by "slipping" the 'chute.

Slipping requires a fair amount of ability in judging height, distance, and the rate of drift. The shroud lines should be pulled down at least six feet on the side toward which you wish to travel. They should be held there for several seconds since it takes time for the slipping to begin. Horizontal force is created by the parachute's folding in and spilling out air on the depressed side. This pushes you in one given direction while you sail downward at the same time. You can easily move ten feet horizontally for every one hundred vertically.

Once a parachute takes a new direction it will tend to keep moving that way; therefore, you should retain control by hanging onto the depressed shroud lines until you are reasonably close to the place at which you wish to halt the slipping movement. It is well to remember that if you pull the lines past a certain point, you lose altitude more rapidly instead of traveling sidewards, thus defeating your main purpose.

You can overcome a tendency to oscillate or swing during descent by pulling hard on the shroud lines at the high side of the canopy as your body swings up in that direction. Then at the moment you start the return swing reach for the lines on the opposite side and pull them down. The principle behind this is the same as that used by youngsters when they "let the cat die down" on a playground swing—it levels out the pendulating action.

Windy days offer a problem because the force of the wind tends to "drift" the parachute as it descends, creating a velocity too swift for comfortable landing. To reduce this speed you must "buck" the wind. This is done by pulling down on the lines at the side from which the wind is blowing.

Suppose that as you approach the ground you find a row of oak trees directly in your path. You are too low to spill the wind and drift past the trees. Remembering that you were previously warned against pulling too hard on the shroud lines since it would cause to lose altitude too swiftly, you do so now. This spills most of the air out of the canopy and drops you short of the barrier.

A mistake that many jumpers make in this situation is forgetting to release the lines as they come to earth. As a result, they land with a bad jar. Once you have started falling short of the barrier you can avoid this shock by releasing the

Walking On Air

lines, thus returning the 'chute to its previous rate of descent.

In landing it is best to minimize the shock of contact by completely relaxing the legs and body. The legs should always be held together with the knees slightly bent. Don't fight to stay erect; let the body swing sideways and roll until the 'chute has spilled out its air.

If the wind is too strong, the parachute will not deflate itself and you may be dragged along the ground for quite a distance. As soon as possible, therefore, pull in the lower shroud lines and spill out the air. This difficulty can be avoided by pulling down hard on the shroud lines when you are a foot or so from the ground. By the time you have made contact the canopy will be lifeless and you can unbuckle it without trouble.

The hazards of landing in a body of water are not as great as is popularly supposed. As you approach the water, slide backward in the harness until the strain on the leg and breast straps is so loosened that they may be unbuckled immediately. At about fifty feet from the water unsnap the buckles, but remember to hold firmly to the harness so as to avoid being pitched out. Hit the water in the ordinary manner, release the harness immediately, and start swimming. The wind in the canopy will drag the harness off your back.

Something-Out-Of-Nothing

[*Continued from page* 38]

made it all the tougher, longer-wearing planking for wharves. The super gave Barter a twenty-thousand-dollar initial order for Deer Isle Spruce.

So began the Barter Lumber Company. It also was the beginning of the Barter Coal Company, which almost ended the Barter Lumber Company and Ralph Barter too.

You'll see wharves jutting into the harbor waters all along the coast of Maine; shabby, graying fingers reaching out for the rich bounty of the sea. A wharf can be a mighty profitable investment or a veritable old man of the sea, a fatal burden of taxes and repairs. The latter is what Ralph Barter blithely bought in the exuberance of the moment. Then, when he realized that the expense of maintaining such a large wharf would just about sink the so auspiciously launched lumber company, he tried to sell the wharf or to swap it for a smaller one. But this time Ralph Barter really did have something no one else wanted, and it began to look as if he was stuck with it.

The only way out that Barter could see was to add some business that would help pay wharf expenses. It was a fine location for buying lobsters. Barter knew lobsters, believed that he could make money as a dealer. But the memory

[*Continued on page* 138]

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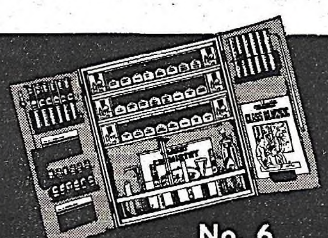

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ALFRED HAMILTON, Editor

They Keep On Earning Money by Easy Electroplating

THE MAN who dreams of earning extra money, as much as $50 or $60 per week, need not dream in vain. Brush electroplating offers that opportunity. Here's what Jasper Brown of Chicago says: "I bought my electroplater to experiment with during my spare time. In a few evenings I earned the cost of the machine by plating jewelry, silverware, headlight reflectors, etc., for friends and neighbors. Now I have all I can do. I recommend this machine to all who want a profitable business."

Jasper Brown is headed for a business of his own, apparently. Restaurants, music stores, doctors, dentists and garages are only a few of the many sources of business for the electroplater who wants to hear more cash jingling in his pocket.

J. J. Wilson, Slidell, La., writes: "After I received my electroplater I practiced for about an hour. I made up four samples and went out after business. One of the large chain restaurants now has me do all their silverware."

Max Hemmert, Idaho Falls, Idaho, states: "I am now spending all my time in plating work. I purchased a brush plater last summer and have worked up a very promising business."

Frank Welde, Philadelphia, goes after garage business. He writes: "I electroplated a few brass strips for samples. I then showed these strips to different people and that's how I got plenty of jobs. I have all the work from a big garage. The owner gets 10% of what is charged his customers, and the rest goes to me for my work."

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FREE SAMPLE and BOOKLET EXPLAINS ALL

WARNER ELECTRIC COMPANY
225 N. Wabash Ave., Chicago, Ill., Dpt 134

Something-Out-Of-Nothing

[*Continued from page* 137]

of the old days was still an unhealed wound. If he couldn't fish for lobsters, he'd be-damned if he'd handle 'em at all.

Take coal, on the other hand. Coal is a nice bulky merchandise with which to utilize waste space. Not many on the island used coal for house heating because, Barter believed, the price was too high. He studied the situation, learned that he could lower the price by four dollars a ton if he bought coal direct from the mines and had it come to his wharf in chartered barges. He put a cautious ad in the Deer Isle Messenger, secured sufficient advance orders to warrant the venture, and wired for his first barge of coal.

It was a big event, the arrival of the first ocean-going vessel to make Deer Isle harbor in many a moon. At flood tide the waterfront was crowded with islanders come to welcome the shipment that was to bring them winter warmth and comfort many had never known before. A shout went up as the sea-going tug rounded into view. Slowly, majestically the tow entered the reach between the headlands, the long voyage almost over, danger past. If Ralph Barter had known where there was a good brass band no one wanted he would have hired it. He ordered the unloading crew out upon the wharf.

"What's she stopping out in the reach for?"

Dense smoke belched from the tug's rakish funnel. White water boiled at her counter. The barge was stuck fast in the channel mud two miles from Barter's wharf! And Ralph Barter's hopes of saving the Barter Lumber Company with cheap coal were stuck out there with it.

Ralph Barter forgot a lot and he learned a lot that first hard winter. He forgot the pride which had prevented him from buying lobsters; and he put in a tank to sell gasoline to the fishermen from whom he bought lobsters, which gave him dealer's price on fuel for his sawmill, coal and lumber trucks. He worked so hard at pulling himself out of the ditch that first shipment had put him in, making something out of nothing, justifying the confidence of the townspeople, that he forgot he was a cripple. And when he did that he learned to laugh again.

Today Barter is the largest independent buyer of lobsters on the Maine Coast, and that's not all. He owns the only coal company on the island, still operates the lumber company, is a gas and oil distributor, a ship chandler, a cannery owner. He does a half million dollar a year business from a town of 1,400 population, but you'd never know it by his attitude or by the appearance of his present headquarters.

Only in a Maine island fishing village can you find a store like the one on Barter's Wharf, Town of Stonington, on Deer Isle, in Penobscot Bay. Odoriferous with tarred rope, oilskins, tobacco smoke and fishermen, it's partitioned into one corner of a tired old barn-like building that was once painted red. The store looks small because so much sea-going merchandise is packed around the walls, in front of the counter, and suspended from the walls and ceiling.

Many among the frugal islanders seem to resent Barter's ability to recognize opportunities they've missed for years. Some call him a "hard man to do bizness with." But the fifty or more men who work for him at one season or another don't seem to find him hard. Half the "customers" occupying the deacon seat in Barter's store are on his payroll. Not one jumps up to feign activity when the boss comes in. "I'd fire a man in a minute if I see him do that," Barter says. "When there's no work for a man to do I want him to sit down and rest his face and hands. It's dishonest in a man to try and make me think he's workin' when we both know damn well he isn't."

The Ralph K. Barter Company uses 5,000 barrels a year to ship its lobsters, clams and scallops to a clientele that extends beyond the Mississippi. It would appear that he effects a tidy saving by having his own men assemble the containers. "I figgered it out once," Ralph Barter says, "and it costs me just ten percent more than it would to have the barrels shipped from the main, all built. But it helps keep my crew together—gives 'em work during the slack season."

Barter expects a lot of his men, and usually gets it. "If a man's taking my wages I expect him to use his head for me as well's his muscle," is the way he puts it. "When one of my truck drivers is out collecting clams I expect him to notice whether the clam digger needs a new hoe or mebby a new pair o' rubber boots, and to remind the man that I sell these things."

The office of all the Barter companies is a large pine sheathed room, painted brown and white, in the loft of the tired old building on Barter's Stonington wharf. The view includes a glimpse of Ralph Barter's latest acquisition, the property which got him into competition with Japan.

Just as it was the Eastern Steamship Company and its wharves which enabled him to launch the Barter Lumber Company, so it was the Eastern and a wharf which precipitated Ralph Barter into a business which heretofore had been considered the sole province of the Nipponese. The steamship company had abandoned its Stonington run years before but the steamer wharf, with its 40x100-foot waitingroom and freightshed, still remained. It was in excellent repair; a nice big white elephant, eating its head off in taxes. It cost $28,000 to build. Barter offered $300 for it, cash—and got it!

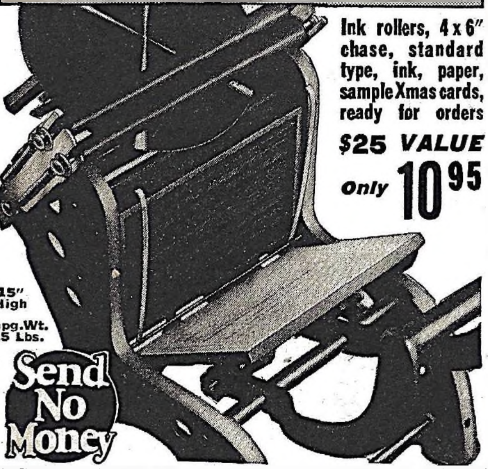
Before he made the offer Barter knew where he could dispose of the material comprising the wharf for a neat little profit of $5,000, and furnish a winter's work for a dismantling crew, to boot. But it was such a nice big wharf, such a gorgeous white elephant, it seemed too bad to take it down.

[Continued on page 140]

ANNOUNCING

The Sensational New

PECK POSTCARD PRINTER



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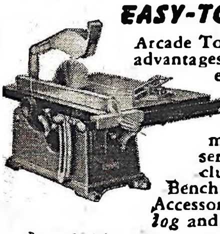

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Something-Out-Of-Nothing

[*Continued from page* 139]

Barter did a little figuring. He looked up the owner of an abandoned sardine factory on the main. Then he ambled over to the Stonington Town House.

"What this town needs," Barter opined, "is a public wharf. One that any craft, from a vessel to a peapod, can tie up to. Something each and ev'ryone can use—free."

The First Selectman fixed him with a wary eye. "Voters wouldn't stand for it. Cost too much money."

"Well, mebbyso. But what if the town could get the use of a wharf like that without it costing the voters a cent? Be a big feather in the selectmen's cap, wouldn't it?"

The FS removed his feet from the visitors' chair and motioned for Barter to "set." Before Barter left the chair the First Selectman had promised to lower to $108 the $800 annual town tax on the $28,000 property Ralph Barter had bought for $300—in return for Barter's promise of free wharf privileges for the town. A week later Barter had engaged sixty diggers and operators, installed a boiler and retorts from the abandoned sardine factory; and the Deer Isle Canning Company was born, in, of all places, the Eastern Steamship Company's erstwhile waiting room.

The opening of a clam-canning plant on the wharf that was too good to be worth anything because the taxes were too high has worked out pretty well for everyone, including Ralph Barter himself. But it wasn't until they sent him to the State of Maine Legislature for the second time that he actually got into competition with Japan.

This came about because there is nothing the Down East fishermen detest more than crabs. Even dogfish or sand fleas are preferable to the thieving crustaceans which get into the lobster-pots, steal the bait and otherwise make life burdensome to lobstermen.

Imagine the surprise of Ralph Barter when an act regulating the taking of crabs was consigned to the Legislative Committee on Sea and Shore Fisheries, of which he was a member. And imagine his chagrin when he learned that the astute Portland fishermen had worked up for themselves a right profitable little business in the crustaceans which his own Down Easters threw away in disgust. As soon as the legislature adjourned, the solon from the Penobscot Archipelago hied himself to Casco Bay to learn what, if any, were the reasons *his* constituents couldn't make money out of crabs, too.

Right away he found reasons.

To begin with, the Penobscot Bay area was too far from the big city markets to deal in fresh crabmeat, as the Casco Bay fishermen did. Furthermore, the meat of Maine crabs could not be canned except by a registered formula the use of which entailed a prohibitive royalty. And even if you could can Maine crabmeat you couldn't sell it on account of low-price competition from

Something-Out-Of-Nothing

Japan. In other words, Down East crabs were as big a nuisance as everyone had always said they were, and more too. They were a pestilential abomination, to put it mildly, and anyone who even thought of doing anything with them commercially was crazier than a coot. Which was just the kind of talk Ralph Barter liked to hear.

This Barter man can't get tired in an ordinary twelve-hour day, so he reads in bed from midnight till two and three in the morning—has done it for years. His mind grips facts like a lobster hangs onto breakfast. For weeks he read books on chemistry and canning at night and experimented in the canning shop by day. Out of this "messing around," as he calls it, came an original Barter formula for the canning of crabmeat.

So now the Penobscot Bay Islanders no longer curse the once-pestiferous crab. They set for him special traps, designed and built by Ralph Barter, and they cash in on the former pest. Yes, Ralph Barter is canning the crabs no one wanted.

It is doubtful whether the Down East fishermen will ever put the Japanese completely out of the canned crabmeat business, but already Ralph Barter's canning company is moving to larger quarters. No one seemed to want the big brick building in Stonington which was abandoned by a sardine packing company years ago. So, of course, Barter bought it.

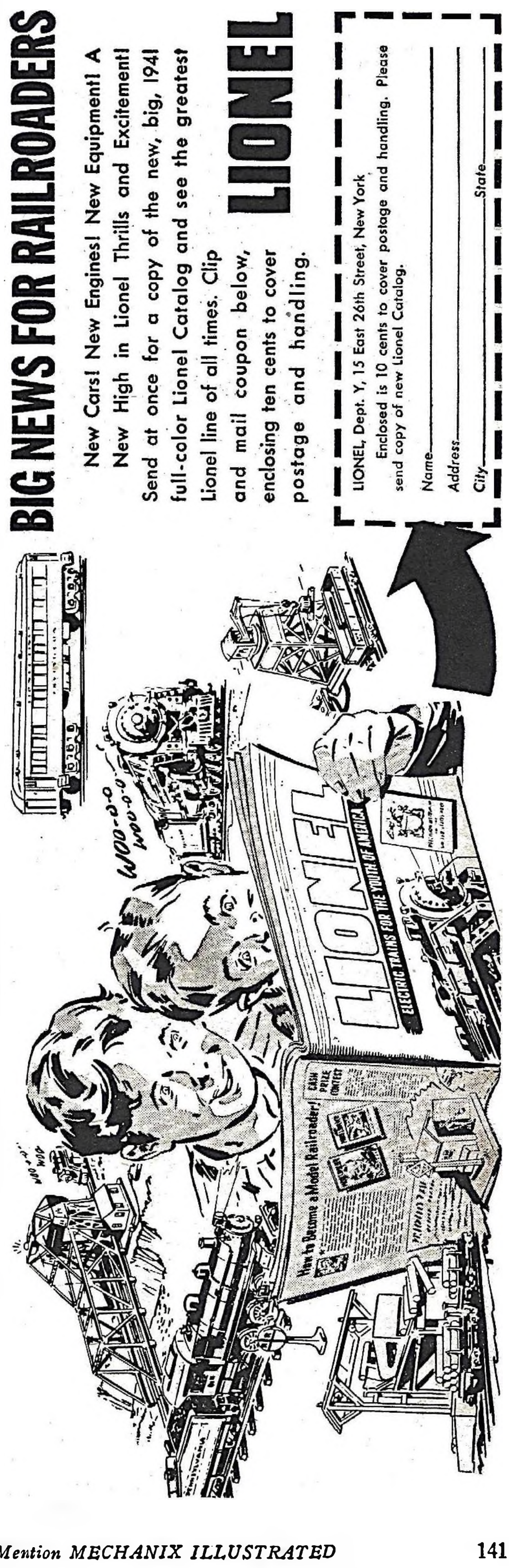
While the new canning machinery is being installed Ralph Barter is "messing around" with a brand new product. Sea urchin is the common name. The fishermen's name is unprintable. The sea urchin is a little marine animal a-kin to the starfish. It looks like a big thistle, somewhat flattened, but it's twice as ornery as any thistle that ever saw the land, with hundreds of dark-green-blending-into-purple spines that are sharp as needles. They find 'em in Down East waters by the millions and a more useless article you never saw in all your born days. That's why Ralph Barter's so crazy over 'em.

Sea-going Italians sometimes eat sea urchins fresh but no one else ever thought of doing anything except avoid them whenever possible—until the something-from-nothing-man cooked some, broke open the brittle shells and concocted of the roe-like meat a canape spread that rivals the spawn of the Russian sturgeon. He's experimenting now with the canning of this "American caviar."

"It's nothing—nothing at all," Barter says.

Which, if true, ought to net him at least another half-million.

In selecting an airplane bomb target range on the Texas coast, the War Department conferred with the National Audubon Society to see that water bird sanctuaries are disturbed as little as possible.



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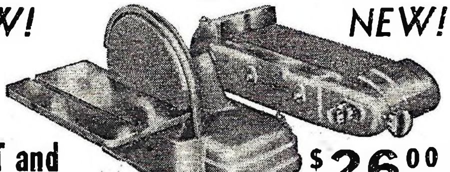

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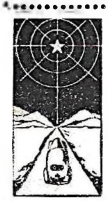

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Test Textiles With Microscope

[*Continued from page* 91]

by numerous fine lines running lengthwise. Wool is made of animal hair, and like most hairs shows characteristic scales on the surface.

In itself wool can be made an interesting subject of microscopic investigation. Besides sheep wool, there are several other kinds of animal hairs used in making cloth and felt: hairs from the rabbit, angora goat (mohair), sheep, llama, alpaca, etc. Since no two animals produce hair exactly alike, a microscopist can learn to identify each kind of wool at a glance. Thus he can tell when "angora mohair" is really a mixture of cotton and sheep wool.

The technique of examining textile fibers is not difficult. First of all, take a look at the weave of the cloth at low magnifications, say 10 to 25 diameters. If your microscope doesn't go that low in power, use a hand magnifier of the "linen tester" type. You can see readily whether the cloth is woven evenly of uniform-diameter thread, or is cheap stuff with irregular threads made of short fibers. Examine the thread to see whether it is twisted, braided, or merely made of parallel fibers. You can tell much about the dye if any was used—whether it has penetrated well or is merely on the surface, etc.

For studying individual fibers, switch to higher magnifications of 100 diameters and greater. Clip off a short bit of thread, and with a needle tease it apart so the fibers are separated. Place these on a clean 1″ x 3″ glass slide, and over them lay a thin cover glass. Such "dry mounting" is sufficient for a considerable portion of textile observation, and usually is the best of the simple methods for preparing wool for examination.

Fibers have a different appearance when wet with water, and often new details can be seen. Simply place two or three drops of water on the specimen after it is on the slide, and over it lay a cover glass. Instead of water you can use xylol, liquid petrolatum, glycerine, or clove oil. For permanent mounts, moisten the fibers slightly with xylol and then add two or three drops of Canada balsam, followed by the cover glass. Often greater detail can be brought out if a black paper is inserted under the microscope stage and the fibers illuminated strongly from a point above and at one side of the stage. Another stunt often employed is to use darkfield illumination. When the microscope is not equipped with a darkfield condenser or special light stop, a similar effect can be produced by inserting the finger or a ½″ cardboard strip tapered at one end, into the light beam between the substage mirror and object. Move the finger or cardboard about until the fibers appear well illuminated against a dark background.

Government scientists are making a nationwide survey of the number of migratory waterfowl in North America.

Captain Marvel Troops

[Continued from page 45]

carrier in the Gulf of Alaska. We have reason to believe an attempt will be made to land perhaps a hundred men on the beaches somewhere in the region of the Columbia Estuary. Their purpose will be to infiltrate; to cripple the Bremerton Navy Yards, the Boeing plane factory and the important power lines.

"These invaders are to be eliminated."

The major spun on his heel and walked toward a tall stand of fir that rose beyond the rocks skirting the beach. Three troopers went with him. The others shouldered packs and ran swiftly, two-by-two, spreading north and south from the major's chosen point of command.

Sixty men had a job to do! Sixty men were to protect a coast-line of 20 miles!

But the major had supreme confidence in them. He knew what their training had been. He knew their super-capabilities. He knew the story behind the training of these Captain Marvel troops.

Do these Super Troops sound fantastic to you? Do they sound like something out of the fertile imagination of a comic book artist? Well, listen to what Colonel Albert P. Clark, head of the Fort Lewis, Wash., Base Hospital, said recently in a dispatch quoted by the Associated Press:

"Let me personally select 5,000 men and feed them a specially prepared diet for sixth months and I can produce a small army of unbeatable men—men who will still fight with their bare fists after all their weapons are gone!"

Colonel Clark knows whereof he speaks. For the army is doing just exactly what he proposed, at this very minute—is producing actual "super troops" with the idea of forming divisions of shock troops who could turn Hitler's "panzers" into "pansies" in no time!

How is it being done? Let's take a look at a little building down in the Tennessee Mountains, where the government started research several years ago on the subject of the relationship between food and the personality and abilities of mankind.

The results of this research in the Tennessee Mountains have only recently been made public. The findings of scientists of the U. S. Health Service here undoubtedly are going to alter the lives of every one of us and of our children in the very near future.

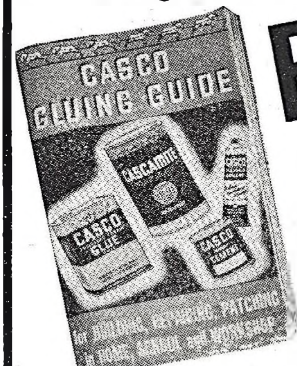
The Health Service combed the hill country and got together a group of underfed and under-nourished "hill billies"—people who had lived most of their lives on salt pork and corn bread. They were as shiftless, lazy, lackadaisical a bunch of folks as you could find.

We cannot expect here to detail all of the many experimental plans which the Health Service applied, all of the disappointments they met, nor all of the technical details of their research.

We can, however, tell you this: After several years of experimenting with diet, the Health

[Continued on page 144]

The book that takes the guesswork out of gluing



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Captain Marvel Troops

[*Continued from page* 143]

Service turned these character-less hill people into strong, healthy, ambitious, thriving, energy-filled citizens, all of them a credit to the community!

It was all done by scientific feeding of diets containing the proper vitamins, proteins and minerals.

But here is the amazing ending of this experiment: After having accomplished this miracle of scientific feeding, after having turned the hill-billies into "go-getters," the researchers then put them back on their old diet of salt pork and corn bread—and, in a few short weeks, turned their subjects back into shiftless hill-billies again!

The researchers recite the case of one woman in particular of this group. When she arrived at the health center, her nature was so vicious that she frequently became embroiled in fights with her friends and with the scientists. She refused to do any work whatsoever. But after a few months of proper diet, fortified with vitamin "shots," she became a perfect lady, co-operative, lovable, willing to work and level-tempered! Deprived of her vitamin-full diet, she once more relapsed to her former snarling, shiftless self.

Then, to complete the cycle of wizardy, the health experts once more changed the hill-billies into "go-getters" by means of diet and vitamin shots.

Now getting closer to our American shock troops, consider the RAF pilot they call "Carrots." His photograph has been carried in all the newspapers. It was not his red hair that won him his nickname, but his habit of munching on carrots. "Carrots" has the reputation of being the best night fighter in the RAF. Why? Because he can see better in the dark than most of his pals. Why can he see better? Scientists will tell you it is because carrots are a particularly rich source of Vitamin A. And Vitamin A is a preventative of "night blindness." Heavy shots of it will increase the ability of anyone to see in the dark!

What happened to the Tennessee mountaineers to change their personalities completely? Principally, Vitamin B-1 and its complexes. In the army, they call the Vitamin B complexes the "Morale Vitamin." The Morale Vitamin promotes fearlessness, willingness to battle for a cause, endurance, unusual strength. It also heightens intelligence and perceptibility.

In conjunction with feeding of the Morale Vitamin, a forced feeding of calcium is also used. In the health service tests, from two to four times the amount of calcium that an average person ordinarily eats was fed. Calcium accelerates the rate of development and maintains a higher level of adult vitality, it was found.

Scientists have discovered that measured administrations of the male sex hormone also adds to the combativeness of the soldier.

Should our shock troops also be protected

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against wounds? They are being fed heavy dosages of Vitamin K, the anti-hemorrhage vitamin. The K element cuts down excessive bleeding in wounds and enables the blood to coagulate more quickly.

There seems to be no end to the magic of modern administrations. For instance, scientists have just recently discovered that they can restore your gray hair to its normal color—with vitamins! One of the B complexes, known as para-aminobenzoic acid, will do it.

Hitler, as usual, was the first to recognize the value in war of diet and vitamin concentrates. As a matter of fact, Hitler is using diet as a two-edged weapon. The rations of the German army are built on the lines of a simple peasant diet—whole meal, vegetables, potatoes, cheese, skimmed milk and dried fruit. These foods are vitamin-rich, mineral- and protein-rich, and contain elements which America's white flour and highly refined foods, until recently, have lacked. Germans have also developed the famous Bratling Concentrate of foods—soy beans, meat and vegetables—which will not lose its value even though kept in cans. The Panzer troops also get highly concentrated vegetable and fruit juices and vitamin derivatives.

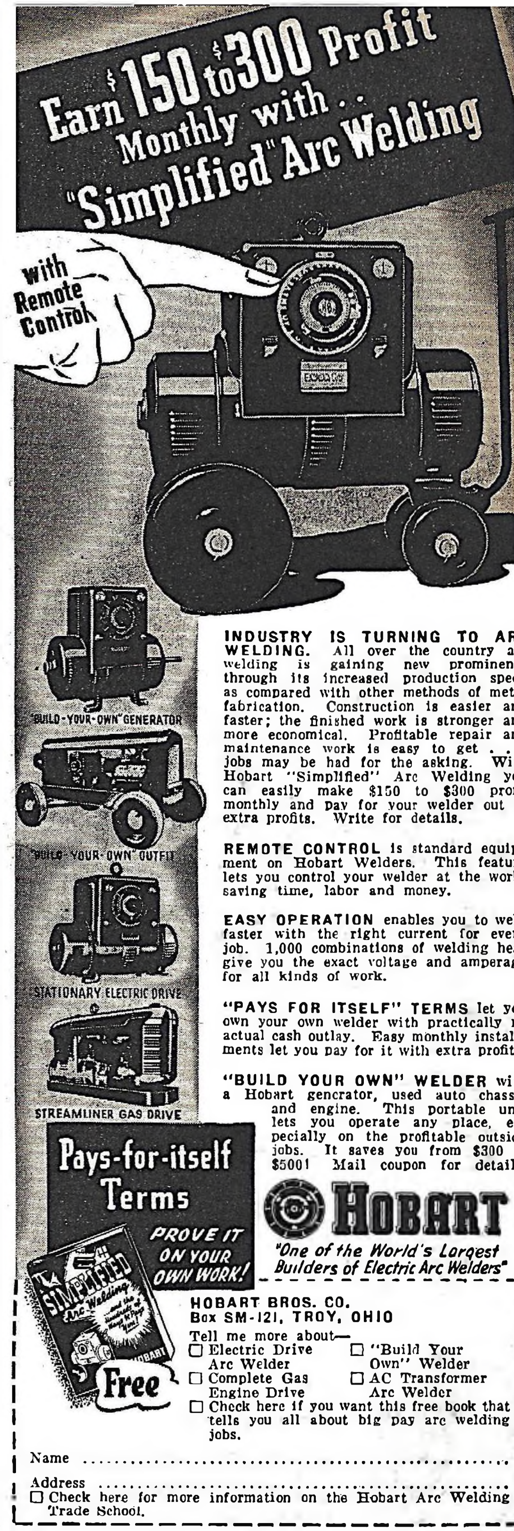
That is one edge of Hitler's two-edged diet sword. The other is more terrifying. By depriving his conquered people of foods containing the Morale Vitamin, B-1, he is deliberately attempting to demoralize whole races of people and deprive them of their "will to victory."

Dr. Thomas Parran, Surgeon General of the United States, and Paul V. McNutt, federal health and welfare coordinator, along with the Department of Agriculture's economists and nutritionists, already have started a nation-wide campaign to make our entire populace conscious of these amazing forward strides in the knowledge of the importance of diet. Dr. Parran and Mr. McNutt have set a definite goal in this campaign. The government's goal is to induce Americans to eat 70 to 100 per cent more fresh fruits and vegetables, 35 per cent more eggs, 20 per cent more milk and 10 per cent more butter. Great retail food chains, such as the A. & P. Tea Company, have been enlisted in this campaign. The A. & P., in particular, has conducted an eight-months' educational drive and reported recently that American housewives in this time have stepped up their buying of foods containing the essential A, B and C vitamin foods by an average of 18 per cent.

By the end of this year, every grocer in America will be supplied with sample menus, sample diets for persons in every walk of life.

Out at Fort Snelling, in Minnesota, a platoon of soldiers have been on experimental diet for several months now. The same things are being done to them that were done to our Tennessee mountaineers—only with further refinements of tech-

[*Continued on page 146*]



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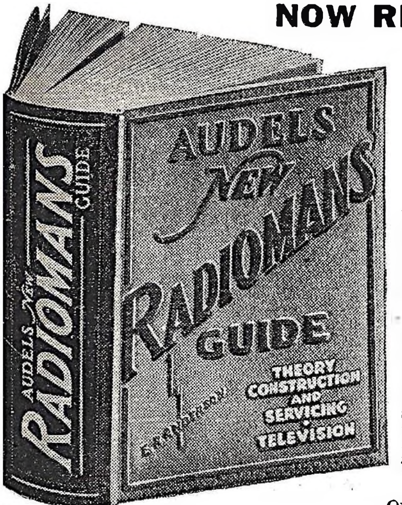

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Captain Marvel Troops

[*Continued from page* 145]

nique. Preliminary reports—which haven't been too freely publicized by our cagey military men—indicate amazing results from these tests. These experimental "shock troops," it has been found, have overcome the fear connected with parachute jumping, have increased their vitality and combativeness as well as their endurance and perceptibility.

Recently, a special detail of the U. S. Marine Corps was formed. Known as the "Amphibious Detail," this is a detachment of especially selected strong men who will be used to storm enemy positions in landing parties—on assignments which are too tough even for the ordinarily tough Marine Corps. The "Amphibious Detail" is being fed the same scientifically designed super-diet that is being tested on the experimental platoon at Fort Snelling. The "Captain Marvel troops" are on their way—rapidly!

So now let us go back to our fictional "Captain Marvel men," who are guarding the Pacific Coast against invasion, and watch them in action!

What were those mysterious cestas with which eight of our super troops were equipped? Not long ago, the War Department had official observers at the Jai Alai courts in Brooklyn, N. Y. These observers watched the super-handball game played by the Basques and Spaniards with great interest. The cesta—the elongated, curved basket—is strapped to the player's wrist. Catching the hard, goat-skin Jai Alai ball in the cesta, the players hurl the ball back with a force that is almost unbelievable. The ball is thrown with such force that frequently a player, hit by it, is killed outright!

The War Department observers made no bets on the Jai Alai game. What they were actually watching with such interest was the manner in which the cesta was used.

Think of what a strong man, equipped with a cesta, could do with a hand grenade!

Imagine the power with which a Captain Marvel Trooper could throw a super-grenade, so equipped!

Our Captain Marvel troopers ran easily through the brush and within an hour were stationed at their assigned posts. The major and his three men faded into the terrain like stalking cats and soon had their listening post established.

Midnight. One a. m.

"Planes, sir," said the trooper at the "ears." "Sounds like three, probably two-motored transport—150 miles."

Minutes passed. The listener began to grin. "They are holding their course. They will be here in a few minutes."

From the treetop came "Jim's" voice.

"Three planes—flying boats, sir. About three miles out. Flying low . . . Ooops! There's a landing flare."

[*Continued on page* 149]

The MI Three Bander

[*Continued from page* 101]

Speakers having a field resistance of less than 1200 ohms should not be used with this receiver. If a permanent magnet speaker is employed. no changes will be necessary in the circuit as given.

In aligning, adjust the i-f transformers first, feeding a 455-kc modulated signal from a test oscillator to the grid of the 6K7 and adjusting first the secondary, then the primary trimmer for maximum response, as indicated on an output meter (or by ear, if no output meter is available). Then align the short-wave band, trimming the oscillator at around 15 mc. Two points will be found which will produce high output—the proper point is the one which the least trimmer capacity, obtained when the trimmer screw is loosened beyond the first resonance point until the second peak is reached. Then adjust the antenna coil trimmer (top trimmer) for maximum response. The latter will not be critical in adjustment. No padding of the short-wave band is necessary, the padder being fixed.

For the broadcast band, trim at 1500 kc, using a weak signal. The trimmers are the center ones on the side of each transformer can, for this band. Then pad at 600 kc, feeding a modulated signal and adjusting C7 for maximum response while rocking the gang condenser back and forth around the 600-kc point. After padding recheck the 1500-kc point.

For the long-wave band, trim at 400-kc (bottom trimmers on each transformer) in the same manner and pad at 200-kc. The band extends beyond these ranges, but the most desired services are at the points given.

If no calibrated test oscillator is at hand, the long-wave band may be aligned with the aid of a broadcast receiver. The oscillator on this band operates at a frequency 455 kc higher than that of the incoming signal to which the antenna coil is tuned. Thus the range will be 200 plus 455, or 655 kc to 400 plus 455, or 855 kc. If a broadcast receiver is tuned to 855 kc, when the oscillator is adjusted to 855 kc a thump should be heard in the speaker. Similarly, proper adjustment of the padder will produce a thump in the broadcast receiver speaker when the broadcast set is tuned to 655 kc. The antenna trimmers may then be adjusted on a received station.

If the set is used in crowded metropolitan area where there are a great many powerful broadcast stations, some of the more powerful stations on the broadcast band may be heard when the set is operated on the long wave band. This is due to the extreme sensitivity of the set and the relative weak signals on the long wave band, which do not permit the avc to act and reduce the sensitivity. However, it will be found that the aircraft stations will pound through nevertheless.

Military uses of wood in national defense include charcoal for gas masks, rosin for shrapnel filling, timber for pontoons and other construction.

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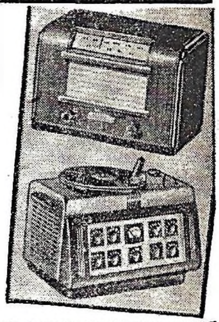

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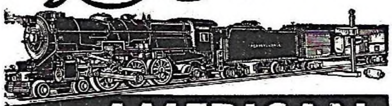

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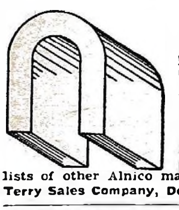

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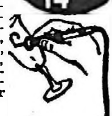

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Mechanic's Tool

[*Continued from page* 104]

points, as shown in the accompanying sketch. For removing eye-holed wrist-pin locks (B) the scissors are simply closed after the points are inserted in the holes; while tailed circular locks (D) are removed by gripping the two tails in the small notches cut in the scissor points.

For the purpose of holding or replacing valve-stem spring locks a semicircular groove (E) is cut in each scissor blade, with approximately the same radius as each of the two halves of the lock. A little heavy grease in each recess will hold the lock-halves (F) in place while they are being replaced on the valve stem.—*I. J. S.*

Tool Fits Tang-Screw Bushing

[*Continued from page* 104]

hour, and which will do the job in a minute or so. The counterbore "A" is turned up from a piece of steel tubing, the teeth filed to shape, and cyanide hardened. Outside diameter should be exactly that of the bushing to be fitted; inside diameter should be a smooth push-fit for the tang-screw.

Make the false guide-screw "B," Figure 2, of drill rod, same size as the rifle's tang-screw, and headless. Harden at cherry red, and temper in oil at brown to purple. Don't use a die, but cut the thread in lathe, so that it will enter the tang accurately, at exactly the same angle as the original screw.

When making stock, drill hole for tang-screw slightly oversize for the regular tang-screw, then fit this headless guide-screw (which should be about 1" longer) tightly into tang; clamp the rifle action into stock, or hold the assembly firmly in vise; slip cutter over projecting end of guide-screw, and turn it by means of a screwdriver bit held in brace. Remove cutter and guide-screw, and insert bushing, which should fit the wood snugly, and accept the tang-screw easily, without strain.

Plankton—Blue Plate Special

[*Continued from page* 66]

certain groups originated in given localities of the ocean. Curiously, though devoid of means of locomotion, plankton are discovered to be great globe-trotters. Sub-tropical natives of South Atlantic waters hop aboard the Gulf Stream and are carried gaily into the chilly North Atlantic, even seeming to thrive on the change in environment.

Some of the richest existing swarms of plankton life are far to the north. If the present experimental collecting should develop into mass-collecting for human consumption, both the North Atlantic and North Pacific would furnish abundant hauls. The Nazis will find slim pickings in the Baltic sea—now a Nazi lake—however, experts say.

Captain Marvel Troops

[*Continued from page* 146]

"Considerate of them. Sure they are hostile ships, Jim?"

"They're hostile craft all right. I know the cut of their wings. Seem to be landing about two miles out. Coming down now, sir."

"Right. Tell the boys"—this to the radio operator—"they must make contact within one hour. Let them land before we attack. Two cestamen to each plane. These planes must be destroyed.

Just beyond the heaving wave line that marked the shoals, not 200 yards from shore, the big water bird stopped. Little figures began popping out of a hatch. In the still night air the major heard the soft plop of the rubber boats as they hit the water.

Behind him he heard the quiet tread of his three men.

Jim dropped a round pellet into the pod of the cesta. His arm swung. The ball-like bomb left the basket with a swish and creak of the rattan. The terrific snap of the throw tripped a firing device inside as the super bomb hurtled toward the flying boat beyond the breakers.

The first bomb touched off the fireworks. It blasted a wingtip off the invader.

"Yi-i-i-pee-e-e-e-e-e!"

The major's battle cry froze the landing party into a huddle. Four machine rifles raked them—two from each flank, crossing their fire.

Thirty men were in the invading party. Ten troopers faced them. The troopers accounted for eight in the first onslaught. Then the invaders dropped to the ground—a dozen of them gained the shelter of the rocks, whipped out wicked automatics and began a counter fire. Two leaped into the sea and started to swim toward the plane.

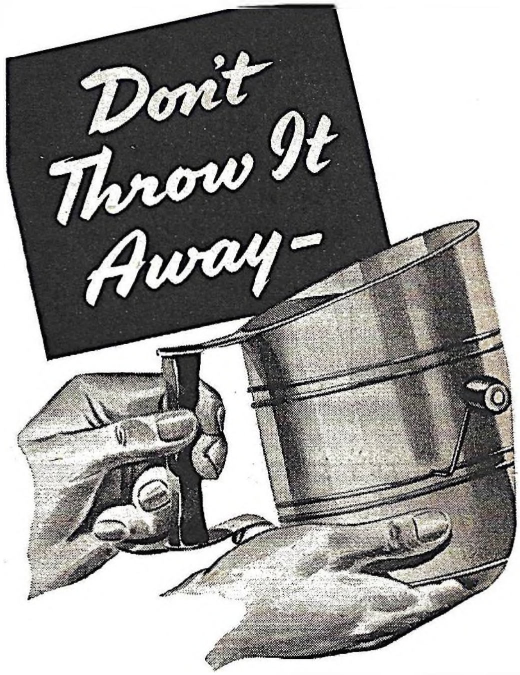
A flare went up from the plane, lighting the shore and the scattered Marvel men. The plane's forward gunner let loose.

A trooper, fourth in the major's crew, stepped out from behind a rock, set up a tall, limber tripod on the apex of which was swiveled a short barreled one-pounder. A cartridge the size of a corncob was in the breech as he pressed the trigger. The plane's gut turret dissolved in splinters. Three more blasts and the hull caved in. The plane began to settle.

Four troopers raced for the rock that sheltered the invaders. They leaped on top as one man, fired twice below them and then plunged straight into the struggling mass. Thuds, screams, two pistol cracks and then silence. The last trooper out of the melee packed the leader, trussed like a pig, over his shoulder.

Southward rifle fire crackled over the less frequent of explosions of the super bombs. Flames lit the sky to the north.

To the south sounded four sharp explosions—then a devastating roar. Then the night was quiet again. The invader had been "eliminated."



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FOR KNIFE NO. 1
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Build "Nor' Wester"

[*Continued from page* 113]

in Fig. 3. Note that there are duplicates at each end; that is, A and J are identical, as are B and H, etc. Only the center frame, E, is single. In Fig. 4 is shown frame assembly, the four pieces being joined at the ends after an application of casein waterproof glue and secured with 1-in. No. 7 brass screws. Under no circumstances use any iron nails, screws or hardware on this job.

A sectional view of the completed job is illustrated at Frame D, which is typical. Battens, keelson, keel, false-bottom, molding and canvas are given in their final assembly.

Arrangement of the various stem and stern members are shown in the squared profiles, Fig. 5. If the builder wishes to make an extra-light kayak for racing purposes he can dispense with the seal's head and the handle at the stern. This will in no way affect the strength of the canoe. Dotted lines indicate locations of the long screws, which in most cases are counterbored well into the wood and plugged over with dowels.

Turn the frame upside down to put on the canvas, drawing it taut and tacking along the gunwales only. Lap the ends over the stem and stern after applying marine glue (not casein) and tack as shown in Fig. 6. Use copper tacks; iron will rust and rot the fabric. To make the canvas drum-tight, give one application of airplane wing dope. Next apply white lead and zinc paste with enough oil to brush it on. A smooth finish can be achieved by applying several coats, allowing each to dry before sandpapering smooth. Give the final color-coat and finish the rub-rail and coaming with mahogany oil-stain and spar varnish. Seal's head and stem should be painted same color as the canvas. A double-bladed paddle is made as in Fig. 7.

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Frames—1 piece, ¾"x7"x18" (Nos. A and J), pine or fir
Frames—21 feet, ¾"x5" (B, C, D, E, F, G, H) pine or fir
Battens—2 pieces, ½"x1"x16', spruce (sheer)
Battens—4 pieces, ½"x1"x14' (chine, bottom stringer)
Battens—5 pieces ½"x1"x13', deck—spruce
Keelson—1 piece, ¾"x1"x13', pine
Deck stringer—1 piece, ¾"x1"x13', spruce
Keel—1 piece, ¾"x1"x13', oak
Rub rail—2 pieces, 1" half oval, mahogany
Coaming—1 piece, ¾"x7"x5', spruce
Canvas—1 piece, 30"x15'—10-oz. duck (deck)
Canvas—1 piece 24"x15'—8-oz. duck (deck)
Brass molding—1 piece—½" round x 4'
Screws—1 gross, No. 7—1¼" brass flat head, frames
Screws—½" gross, No. 7—1" brass flat head, battens
Screws—14 gross, No 12—3" galvanized flat head, stem, stern, etc.
Screws—12 gross, No. 9—2½" galvanized flat head, keel
Hardware—Copper tacks, marine glue, airplane wing dope, white lead and zinc paste, sandpaper, paint, varnish, etc.

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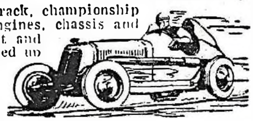

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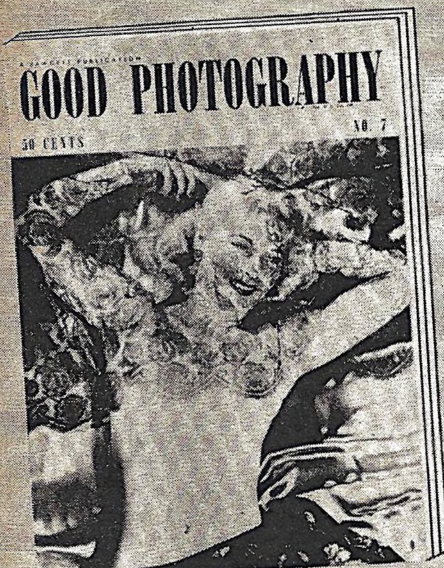

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Doing Better Shop Work

[*Continued from page* 111]

prepare it by dissolving all the "blue vitriol" a quantity of water will take up. A few drops of nitric or hydrochloric acid added will make it "take hold" better on the work.

FILING. Bench and lathe filing is improved and speeded up by rubbing the files frequently with a lump of common chalk, which prevents the files "pinning" with bits of steel. *Every minute spent using the file card or brush, means three minutes gained on the job—in addition to better quality work.*

Light, steady strokes at an even speed will give quicker and better results than heavy pressure and hard work, which serve only to clog the file and delay things, besides developing a tendency to "rock" the file, causing a rounded or unequal surface.

ALWAYS consult file manufacturers' catalogs, and use the type of file recommended for the metal being worked. The highest priced files obtainable are always the most economical—though occasionally some good "seconds" with only slight imperfections are available at the "five and ten"—*IF you know your files.* Never buy files which have been thrown together in a counter bin; and if the salesgirl starts to wrap your selections together without a layer of paper between—walk out of the store! Test every file before purchasing on the thumb nail, and buy only if it "takes hold" instantly without any tendency to slide over the flat surface of the nail.

Many die-makers and other experienced filers prefer using a piece of soft brass to "clear" a file, as shown in Figure 1, instead of a file card or brush. It saves the file and prolongs its working life. Have recourse to the pick only when necessary, and keep a very hard, very sharp scriber for this purpose. A phonograph needle honed very sharp, and set into a piece of steel rod for a handle, makes an excellent file pick. Using the points of your toolmaker's dividers for a file pick, as I have seen some do, is not recommended!

For best results on aluminum, use the files recommended by the makers whenever possible, and dip them frequently into a tall can of kerosene, or distillate, or 4 parts kerosene with 1 part turpentine.—*Clyde Baker.*

Christmas Candle Holders

[*Continued from page* 119]

is easily made with a heavy wrench and metal vise. The dimensions of the steps can be changed somewhat as desired; for instance, the tread can be changed to 2½", and the rise to 1½" instead of 3" and 1¾". The construction of the inclined walnut holder, No. 3, and the wire holder, No. 1 are clearly shown on the plans and need no further explanation.

The iron on all the holders should be painted with a dull black metal paint.—*A. M. Y.*

The Lowdown On 1942 Cars

[*Continued from page* 73]

revolutions per mile. It will surprise many motorists to learn that Packard is still using aluminium pistons. In fact, the company assures purchasers that pistons of this metal will be used throughout the 1942 model year for the Super-Eight engine. All of the Packard power plants have been stepped up 5 h.p. through an increase to compression ratio of 6.85 to 1. When it becomes necessary Packard engineers will swing over to special cast-iron pistons. Only other change in Packard engines is adoption of heavy-duty, thin alloy bearings.

An improvement in the Willys Americar is re-design of the heat control mechanism on the manifold. This permits what is called "all-speed, all-temperature" peak power. An added advantage is opportunity for more efficient adjustment for summer and winter fuel mixtures. Willys pistons are of molybdenum iron alloy, oval ground for elasticity and plated with tin.

Oldsmobile is offered in Sixes and Eights with, as in the case of Pontiac, only a small differential in price between engines. This year Hydra-matic Drive is being featured more than ever because it has been found to contribute much to engine efficiency.

Pontiac's Torpedo is on a 119-inch wheelbase with choice of the 90 h.p. Six or the 103 h.p. Eight engine. Streamliner and Streamliner-Chieftain models are on a wheelbase of 122 inches with same choice of engines. After sixteen years of continuous use the electro-plated iron alloy pistons seem quite at home. Continued is the Scotch-mist manifold. Starting has been simplified by making the initial idling speed faster for cold starting. An ingenious feature is the use of a link between the float valve pin and the float valve lever of the carburetor so that the pin won't stick when the float lowers. The link simply pulls the pin down. Pontiac's engineers have also increased timing chain life by changing the pressure angle of the teeth from 17 to 22 degrees.

Special interest is shown in the Nash Ambassador "600" engine because it is designed to give from 25 to 30 miles to the gallon. Its Flying Scot engine develops 75 h.p., has fewer parts than conventional motors since the inlet manifolding is sealed within the engine block. Nash continues to have two larger cars in its 1942 line. Both the Six and the Eight are built on the same wheelbase, and powered by engines of valve-in-head design. These motors also have sealed-in manifolds. The Six develops 105 h.p., while the Eight develops 115 h.p. Steel strut aluminium pistons are used.

A feature of the Nash Ambassador "600," like Oldsmobile and Buick, is use of coil springs for all four wheels. Nash continues with its air conditioning system controlled by a "Weather Eye."

[*Continued on page* 155]

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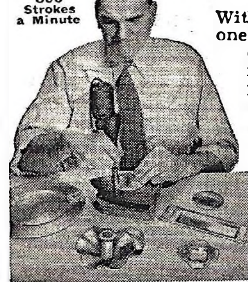

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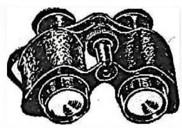

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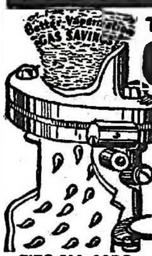

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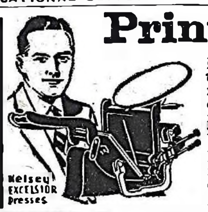

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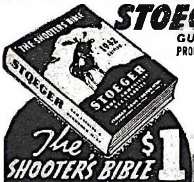

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Toy Fountain For Christmas

[*Continued from page* 107]

Then solder in place. This is to be connected to discharge of pump (Fig. 4).

Over from center about 4", drill a hole to take a piece of 3/8" O. D. copper tubing. This piece is 3" long, pushed up through the pan 1/4", and soldered in place. This will stop any dirt from entering the pump. This will then be connected to the suction of the pump.

The nozzle of the fountain is made from the type of clothes sprinkler that fits in a bottle. This will fit tight down over the discharge pipe from pump. If pump discharges too much water for the size of the pan, outside row of holes can be soldered shut.

On the bottom of the pan solder three brass angle brackets made from scrap. These are used to fasten the pump base to reservoir. Straps are bolted to these brackets and fastened to pump base.

Cut hole in platform of Christmas display and set complete unit in.

Any small motor will do; fan, sewing machine or erector set motor.

Rubber tubing is used to connect the pump to the reservoir, to cut down rate of flow. If necessary, a clamp can be put on discharge tube to regulate rate of flow.

In-A-Door Bookcase

[*Continued from page* 121]

Then the actual construction began. We had the wood cut and planned at the lumberyard to save time; all we had to do was nail it together. We first made two open faced boxes, 8", to fit the openings made by the removal of the door panels. Three shelves were fitted into each at varying distances. Then the finished cases were fastened to the back sides of the door frames, covering the openings. We attached steel braces to the lower corners of the cases to prevent strain or sagging.

Both doors and cases were given an undercoat of pale blue (1 pint), and finished off with delft blue enamel (1 pint), the color of our woodwork. Then the doors were hung to the jamb by extra strong concealed hinges. The problem of a catch was solved by two five-cent friction catches which opened and shut without jar or effort.—*N. S. K.*

Doll House In Small Space

(*Continued from page 124*)

assembling the completed members, as shown. These dowels should be tapered slightly, and those in the bay windows should be slanted down somewhat.

In building this project, use brads and casein glue, and make the rabbets for the partitions wide enough so that the latter will slide in easily. Window sash consists simply of a sheet of celluloid glued between strips, as shown in the circle. Where mullions are indicated, paint in white with oils.

Paint the roof Chinese red, outside walls cream and interiors in pale tints, a different color for each room. Flower boxes are painted to resemble red and yellow blooms. Kitchen should be in white with oilcloth glued on the floor. Other floors stained to resemble dark oak.—*Hi Sibley.*

The Lowdown On 1942 Cars

[*Continued from page* 153]

This brings into the picture the marked trend toward elimination of the cowl ventilator. In Cadillac and Buick this is supplanted by a new system of ventilation which is built into all models. In Pontiac the underseat heater picks up fresh air blown to it by a sirocco blower placed just below the left headlamp and back of the radiator grille. Absence of the cowl ventilator results in a longer sweep of the hood.

Back to engines again we find that the 1942 Buicks are built on six chassis varying in wheelbase from 118 inches to 139 inches. Two valve-in-head straight eight engines power the Buick line, power ranging from 110 to 165 h.p. The wide variation is due not merely to the two sizes in engines but to the use of compound carburetion as standard on all but the lowest rated engine. Pistons are of iron alloy with cam ground turbulator top providing high compression pressures without pinging. Main changes in the engine concern increased bearing life due to use of new materials, the new shot blast connecting rods and the oil-cushioned finish of the crank pin journals.

The eleven models in the Dodge line are powered by a new 105 h.p. engine, a rise from 91 h.p. of last year's power plant. The extra power is obtained without increase in its r.p.m. speed. Torque has been increased from 170 foot pounds to 185 so that the increased performance is noticed through the normal driving range rather than at high speed.

Chrysler's line consists of six models and a total of 31 body styles. First there is the Royal of 121½-inch wheelbase. Then the Windsor of same wheelbase but with different trim and equipment, plus a six-passenger convertible club coupe. Third is the Saratoga on a 127½-inch wheelbase. Fourth the New Yorker of same wheelbase as the Saratoga but with different equipment. Finally the Crown Imperial of 145½-inch wheelbase and the Town and County (a new name for station wagon) which is on the Windsor chassis with Fluid Drive and Vacamatic transmission standard. The Royal and Windsor models carry a still more powerful six-cylinder engine developing 120 h.p. with torque of 200 foot pounds. Horsepower of the eight is 140 with a compression ratio of 6.8 to 1. An important change in the Chrysler engine is use of larger exhaust piping and improved mufflers.

Buick is introducing the much-discussed wide base rims. One of the advantages of this type of rim is the greater stability of the tire and the car when rounding a curve. There is naturally less bulge to the tire.

Noteworthy is Plymouth's convenience offered by having the car flooring flush with the running boards which, of course, are of the concealed type. There is nothing to trip over in getting into or

[*Continued on page* 157]

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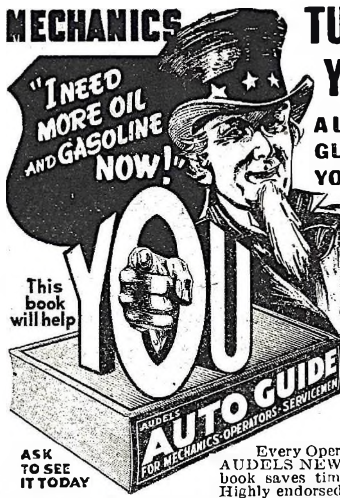

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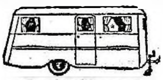

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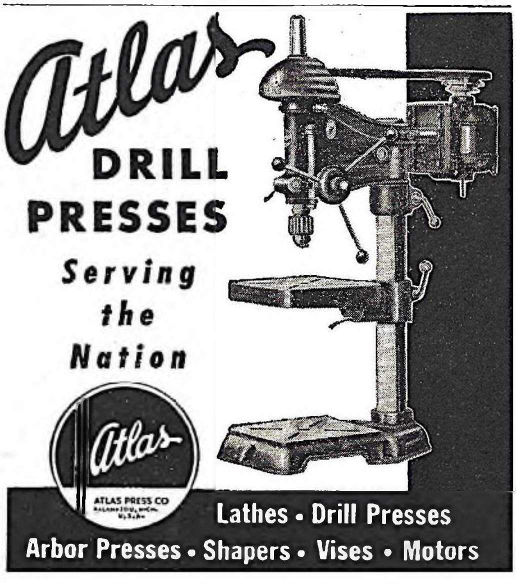

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Pine Desk For Your Den

[*Continued from page* 125]

After you have sawed out the boards to size shown, you are then ready to assemble them. If you have a plane, smooth down the edges and rough saw cuts. Boards ¾" thick can be used instead of 1" thick. (A) shows the front view of the finished desk. Start with the desk top first, laying the three boards together and securing them with the two 1"x4" cleats on the underside, placing the cleats 4" from each end of the top. Use matched boards for the top, if possible, for a snug fit, although you can use narrower boards if the 9" and 10" widths are not available. Now fasten the two pairs of cross-legs together as shown. Note that the front leg is on the outside, and the back leg is on the inside. Adjust the legs so that the distance between the extreme tips of the lower ends is 35", and the distance between the upper ends 26". Now saw off the corners of the upper and lower ends so that the legs rest flat on the floor, and the table top flat on the upper ends. The upper end of the back leg is 1" higher than the front leg, for it rests against the desk top. The upper end of the front leg is nailed to the cleat. You can see this by studying A and B. Fasten the seat support boards to the lower end of the front legs at the angle shown so that when the upper corners of the supports are cut off level, the seat is about 15" above the floor. Fasten the supports temporarily to find the right height for the seat. You may like it higher or lower. Nail the cleat to the lower ends of the front legs, just under the seat supports. Then nail the seat in place. Attach the back brace to the lower ends of the back legs. The ends of the shelf are quarter-circle blocks cut from two boards 8" square and 1" thick. Tie a string to a pencil, hold the string at one corner and the pencil at the other and describe the arc. The four letter rack pieces are cut out in the same manner (only they are ¼" thick and 7" long), to fit against the back board. Nail two rack boards at the center, placing them 12" apart for the drawer. Between them nail the drawer shelf, slightly more than 4" above the desk top. Now fasten the other two rack boards in place, 3" from the drawer compartment, thus forming two letter or paper racks. Assemble the drawer pieces as shown, using small brads or glue. Whittle out a drawer knob, fastening it to the front from the inside, with a screw. If possible use wood screws in assembling the desk, to make it stronger. However, nails can be used instead (finishing nails). Punch the nail heads below the surface and fill the holes with putty. When the desk is assembled, give it a walnut or oak stain, wiping away the stain quickly with a rag to give it a light tone. Stain only the front of the drawer. C shows the drawer construction and separate pieces, and D the shelf ends and position of the drawer shelf.—*G. E. Van Horn*

In Australia's great sheep raising bush country, fenced pastures sometimes contain 20 square miles.

The Lowdown On 1942 Cars

[*Continued from page* 155]

out of the car, and it gives the car an added trim.

It must be apparent that the reason General Motors cars are making full use of fenders continued through the doors is to provide for wider concealed running boards.

Chevrolet is using hard alloy cast-iron pistons for the 1942 engines. Important changes have been made in Chevrolet bearings to take care of the switch from aluminium alloy to cast iron.

Cadillac's 150 h.p. V-8 engine will run cooler this year because of a 10 per cent increase in the car's frontal ventilation area. Functional design again to the fore! These cars are wider than they are high, measurements being 81 and 63 inches respectively.

In its lowest priced field Hudson offers a 116-inch wheelbase job with a 92 h.p. six-cylinder engine. There is also a still lower priced model known as the Hudson Six but with same power and wheelbase. Then comes the Super-Six with 121-inch wheelbase and a 102 h.p. motor. Then there are the Commodore Six and Eight models with 102 and 128 h.p. engines on 121-inch wheelbase, plus a Custom Eight on a wheelbase of 128 inches. Hudson continues to accent its feature of a mechanical braking system to back the hydraulic system, and its patented Auto-Poise front wheel control which helps keep the car to a straight course even in a heavy side wind.

Studebaker's line starts with the Champion, a Six with 80 h.p. engine. Hill holder is available at slight extra cost. The car weighs around 2,500 pounds and has an overall length of 193 inches. It is also prepared at the factory for installation of Studebaker's "Thermo-Control" Climatizer, an unusually complete car heating and ventilating system.

Commanders and Presidents complete the Studebaker offerings for 1942. Engine for the former deliver 94 h.p., while the motor for the latter is a 117 h.p. power plant. A new development is the use of light-weight Parco Lubrized iron alloy pistons. These do not scuff or score because of the thin protective coating.

Outstanding in 1942 car developments is the use of rear quarter windows for convertible coupes. This eliminates the blind spots which have been an objection to this type of car ever since the rumble seat was put inside under cover.

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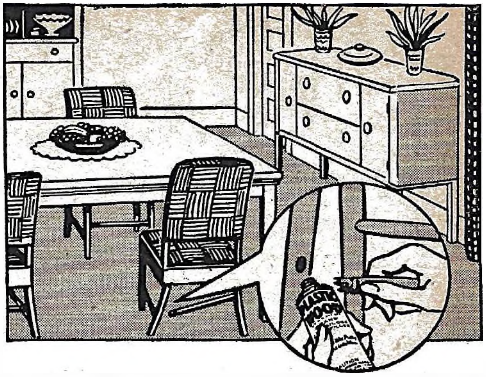

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Boat Or Trailer Icebox

[*Continued from page* 129]

little easier to put in the partition and the shelf before putting on the top. Solder these in place, leaving 5" above the shelf. A few rivets will make them stronger, but may be left out if a good job of soldering is done. The center post is the last piece to be put on. Care should be taken to get the door stop on the post even with the door stop at the top and bottom.

When this is done the dimensions should be 24" long, 12" high at one end and 12½" at the other, and 14¼" from the front of the door stop channel to the back. If your dimensions differ from these, allowance can be made on the rest of the work.

Make the inside box of ¼" plywood. The top is 16"25½", the ends 13¾"x16" and 12¾"x16", the back 24"x12½" at one end and 12" at the other, and the bottom is 16"x24". Use ½"x¾" parting stop for framework as shown in the drawing, attaching the plywood with ¾" No. 6 screws. Parting stop is also used to fill the door stop channel and held in place with screws. A wedge of pine 1¾" wide and 24" long, ½" thick at one end and tapered to an edge at the other, is used to square up the door openings. This piece is easily ripped from a piece of 1¾" stock with a power saw, or can be ripped by hand. In assembling, the top is left off until most of the work is done.

Two pieces of ½"x1½" pine 16½" long serve to brace the lower corners and support the back of the inner box. These are fitted to the front and rear frame pieces as shown. The front piece is of ¾" pine 26½" long, 1½" wide at one end and tapered to 1" at the other. Into this are notched the upright pieces, also of ¾" pine, the end pieces are 1" wide and the center piece 1¼". The top front piece is ¾"x1", the lower back piece is ½"x1" and the rest are ½"x¾" partin stop. Cover the outside with ¼" plywood, the top is 17"x27", ends 16¾"x15¼", back 15¼"x26½", and the bottom 16½"x26½".

With cork and some other insulators, fitting is necessary, and can be done on the job. When the bottom, ends and back are assembled, bore a ⅝" hole for the drain tube, 4½" from the back and 3" from the end. Bevel the inside edge about ¼" back all around the hole. Cut a hole in the metal lining to correspond. Slip the lining into place, tap the metal down around the hole, insert the drain tube, flare the edges a little and solder it in place. A piece of garden hose slipped over the drain tube will carry off the water.

Nail down the edges of the metal lining with small flat head brads, then fit strips of plywood around the door opening (excepting on the center post), between the door stop and the plywood trim on the front of the refrigerator. Attach the trim with finishing brads.

To make the doors, use ¼" plywood 10⅞"x11¼", to this attach a frame of ¾"x1" pine. Fill with insulating material and cover with galvanized

[*Continued on page* 160]

Safe Safe-Lighting

[*Continued from page* 89]

are sometimes slightly sensitive to green. This would seem to invalidate the rule previously stated, but actually *there is no safelight* for panchromatic films. A dark green light is used only because at low intensity levels the human eye is most sensitive to this color. The eye is so highly sensitive (when adapted) to green light that vision is possible at intensities too weak to fog many panchromatic films. For the very fast pan films even a dark green light is inadvisable.

The color of the safelight is only one of the factors that determines how safe the light will be. Any so-called safelight will cause fog if too strong a lamp is used in the housing, if the light is placed too close to the sensitive material, or if the period of exposure to the light is excessive.

It is best to install an indirect safelight for general illumination which permits the second safelight, used close to the scene of actual development, to be less intense. An indirect safelight can be installed either against the ceiling or about twelve inches from and facing a light colored wall. The illumination reflected from the surface brightens the room in each case.

A distance of about eighteen inches should be the minimum for the direct safelight. At this distance the light is spread out, and therefore not particularly intense at any given point. Nevertheless, ample light is provided for developing prints, and in the case of films, a closer distance would involve too much danger of fogging.

The wattage of the lamp is also important. For papers, 25-watt lamps are satisfactory providing the safelight is suitable for the sensitive material. For films, 10- to 15-watt lamps are the maximum that should be used, except for the indirect safelights in which case 25-watt lamps are safe.

The question constantly arises as to the necessity of having to purchase manufactured safelight filters. Naturally, this is the best recommendation, but by no means is it the only one. Dyed sheets of various materials, colored cellophane, colored liquids, etc., have been employed successfully by many amateurs. The crux of the whole matter is: "Does it give a *safe* light?" A simple test will determine this.

To test the safeness of darkroom illumination, a sheet of film or paper of the fastest variety that is to be used under the light is placed about eighteen inches from the safelight, and after thirty seconds exposure, a section about ½ inch wide is covered with a piece of black paper. At thirty second intervals, the piece of black paper is pushed up ½ inch at a time. After a total exposure of 4 or 5 minutes the safelight is turned off and the sheet of film or paper is put in the developer for the normal period and then is fixed and washed briefly.

No evidence of appreciable fog should be observable on the test strip after performing this

[*Continued on page* 161]

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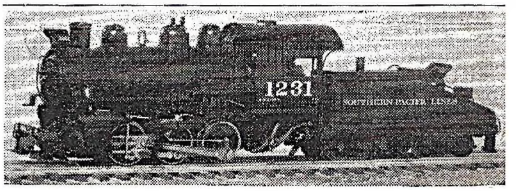

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Every letter used in a cryptic problem represents a number. There is a different letter for each of the ten digits, counting from 0 to 9, or from 1 to 0 (10). When these ten different values are discovered the key will appear as a ten-letter word or phrase, starting with the letter signifying either 0 or 1, as the case may be.

These equivalents, when discovered should be written in *immediately* all through the problem, and in the key order. That is, if you determine that a letter, say A, stands for number 4, you must immediately write 4 under every A in the problem, and write A under number 4 in the key row, to spell out the key word or phrase.

CRYPTORITHM No. 3 Subtraction.

A Subtracrypt. Key:

```
          1 2   3 4 5 6 7   8 9 0

    C  A  C, K  L  E, L  A  Y.
    A  H  E, N  Y  H, N  E  B.
    --------------------------
       C  K, K  Y  M, B  A  E.
```

HINTS: Col. 2: A—E=A. E *must* be either 0 or 9. If E is 9, the top A (the Minuend) has "lent 1" to col. 1, thus making a total of 10 subtracted. And either 0 or 10 subtracted from A will leave A in the Remainder.

Col. 1: Y—B=E. Here we find that E is *not* 0, because B and Y represent two different numbers. So we know E is 9! We can figure incidentally that B is just 1 more than Y, to give a Remainder of 9. So that indicates that B will follow just after Y in our key phrase.

CRYPTORITHM No. 4 Division.

A Divicrypt. Key:

```
          1 2 3 4 5 6   7 8 9 0

G U N S ) H I D S K Y ( G G
          H Y D U S
          ---------
            H D I K Y
            H Y D U S
            ---------
              U D R Y
```

HINTS: Explanations for most of the following steps have been given in the Subtracrypt, No. 3.

1st subtraction, 1st col.: K—S=K. S is clearly 0!

1st subtraction, 3rd col.: D—D=D. As D *must* be 0 or 9, it *is* 9!

2nd subtraction, 3rd col.: I—D (9)=D (9). I is 8 (18).

1st subtraction, 2nd col.: S—U=I. (10—U=8.) U is 2.

2nd subtraction, 4th col.: D—Y=U. (9—Y=2.) Y looks like 7, but we can figure that this D (9) lent 1 to col. 3, so Y is only 6.

1st subtraction, 4th col.: I—Y=H. (8—6=H.) As I lent 1 to col. 3, this is 7—6=H. So H is 1.

Now, let us try multiplication.

1st multiplication: G×GUNS=HYDUS; 4th and 5th cols.: HY. We know HY stands for 16. So G times G is 16, with or without a possible "carry" from G times U. As 3×3 is too small, we *know* G is 4, and there was no "carry."

Correct solutions will be published in January issue of MECHANIX ILLUSTRATED. Address answers to NINE-HEX, care of MECHANIX ILLUSTRATED, 1501 Broadway, New York City.

Key answers to November Cryptorithms: No. 1: "WHITE FLAGS"; No. 2: "CAT WHISKERS."

Boat Or Trailer Icebox

[*Continued from page* 158]

iron, bend down the edges all around and nail them. The trim on the front of the door is made of 5/16"x1⅜" lattice strip. Allow this to extend 5/16" beyond the edge of the door all around. Use ⅜" offset hinges. These and the catches can be obtained at any hardware or ten cent store. Sponge rubber weather strip about ⅛" thick on the door stop and under the trim on the door will make an air tight seal.

Make an ice tray of 20 gauge corrugated galvanized iron, 10¼"x13", with the corrugations running the short way. This is supported by three strips of parting stop 13" long attached to it with screws.

The refrigerator will look well enameled white inside, and the outside stained and varnished, or painted to match the surroundings.

"Elbow Bender"—Ice Sled

[*Continued from page* 127]

it rigid under the load. Trusses are 6 ft. long by 6" at their widest points, and straight grained.

The driving wheel should then be provided with spikes. These are steel bolts projecting through the wheel rim at least ½" beyond the edge of the rim. Space them about 6" apart and grind them to sharp points for sure traction.

Some adjustments of the springs will probably be found necessary to provide proper chain tension and also so the chain will be drawn back properly by spring "A."

At rest, the oars should remain almost directly across the platform. Now, seated, pull them sharply toward you. This will engage the coaster-brake and rotate the wheel. Its spikes dig into the ice and push the boat forward. Ease up the stroke and return the oar handles to a position away from you. Spring "A" should be so adjusted that it will pull the chain back but not too far so the coaster-brake locks. The wheel will drift along until the next stroke is taken. This will accelerate the speed. In this manner you propel the sled just as if rowing a boat. Adjust the wire lengths, spring tensions and the rowing stroke for maximum results.

Steering is done with the feet on the steering-bar. Make only wide turns as short turns will cramp the runner-bar. Braking can be done by pushing a foot on the top of the sprocket so the coaster-brake takes hold and drags the traction wheel.

Keep the runners sharp, the chain well oiled as well as the wheel mechanism. Then there is no doubt but what "Elbow Bender" will be the center of attraction at the next ice meet.

There is no truth in the ancient belief that blue-eyed people are more susceptible to tuberculosis, says a doctor who recorded eye color of patients at one sanatorium for 20 years.

Safe Safe-Lighting

[*Continued from page* 159]

test. Any light that holds up under the test can be considered satisfactory. The test exposure is made in steps because of the greater ease it affords in detecting any fog caused by the light itself. Slight chemical fog will cover the entire film or paper, and any safelight fog will be recognized as a difference in density between this chemical fog and the density of the step where the accumulated light from the safelight fogged the film further.

Tests as outlined above are useful for several reasons:

1. One can periodically check the safety of his darkroom illumination. After all, safelight filters fade or decolorize with time. Small pinholes sometimes develop too, and go by unobserved.
2. It is sometimes true that amateurs use *less* light than is permissible and this is a handicap to efficient work. A safelight test might indicate that more light can be used.
3. Unknown types of colored materials can be tested for safety. It is a bad practice to wrap a piece of yellow cellophane around a 15-watt lamp and use this for making prints without first testing to see if more than one thickness is required or perhaps to see if the material is unsuitable regardless of the number of thicknesses.
4. Newly introduced films and papers for which no color-sensitivity information is available can be tested under your particular safelight.

Still another and novel way to provide general illumination in a printing room is to use red fluorescent lamps as ceiling lights. These lamps provide uniformly-distributed illumination and require no special filters.

For developing highly sensitive orthochromatic or panchromatic films in a bright safelight, one can resort to the use of desensitizers. For most of the high speed films, pinakryptol yellow dissolved in the recommended quantity of water is preferred. However, there are two exceptions at least, for the instructions with Agfa's Triple S Ortho film and Superpan Press film both call for pinakryptol green. These are used as forebaths and after two minutes immersion in the desensitizing solution and two minutes in the developer, a bright yellow-green safelight, such as used for bromide papers, can be turned on for 10 to 15 seconds inspection periods every minute or two.

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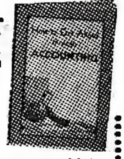

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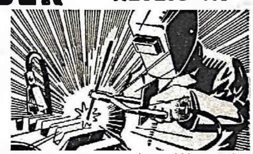

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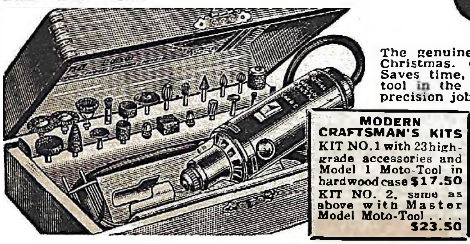

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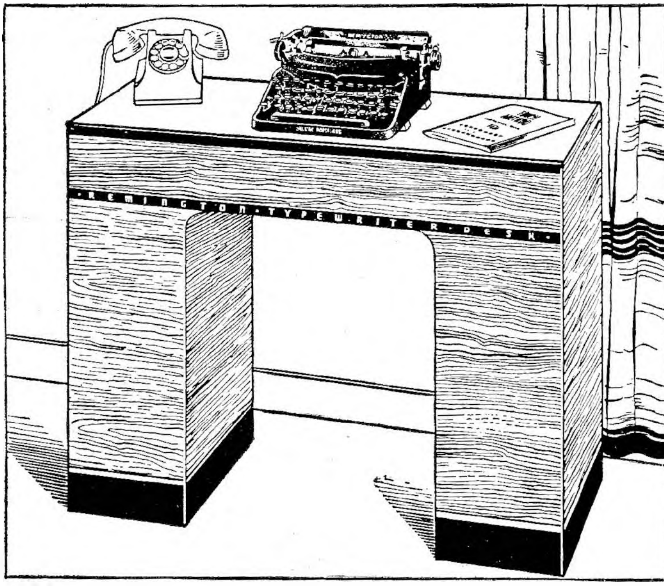

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The Remington Deluxe Noiseless Portable Typewriter is sold on a trial basis with a money back guarantee. If, after ten days trial, you do not wish to keep the typewriter, we will take it back, paying all shipping charges. You risk nothing in buying a Remington Portable Typewriter on terms as low as 10c a day.

THESE TWO EXTRAS FOR YOU

LEARN TYPING FREE

To help you even further, you get free with this special offer a 44-page booklet, prepared by experts, to teach you quickly how to typewrite by the touch method. When you buy a Noiseless you get this free Remington Rand gift that increases the pleasure of using your Remington Deluxe Noiseless Portable. Remember, the touch typing book is sent free while this offer holds.

SPECIAL CARRYING CASE

The Remington Deluxe Noiseless Portable is light in weight, easily carried about. With this offer Remington supplies a sturdy, beautiful carrying case which rivals in beauty and utility the most attractive luggage you can buy.

SPECIFICATIONS

ALL ESSENTIAL FEATURES of large standard office machines appear in the Noiseless Portable—standard 4-row keyboard; back spacer; margin stops and margin release; double shift key and shift lock; two color ribbon and automatic ribbon reverse; tabulator variable line spacer; paper fingers; makes as many as seven carbons; takes paper 9.5″ wide; writes lines 8.2″ wide. There are also extra features like the card writing attachment, black key cards and white letters, touch regulator, rubber cushioned feet. These make typing on a Remington Deluxe Noiseless Portable a distinct pleasure. Thousands of families now using the Remington Deluxe Noiseless Portable know from experience how wonderful it is!

MAIL COUPON NOW!

Remington Rand Inc., Dept. 141-12
Buffalo, N. Y.

Tell me, without obligation, how to get a free Trial of a new Remington Deluxe Noiseless Portable, including Carrying Case and Free 44-page Touch Method Instruction Book. Also about your 10c a day plan. Send Catalogue.

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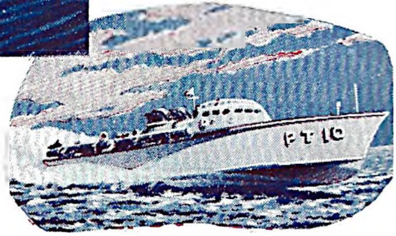

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