

Victims

1924

RADIO WORLD

Title Reg. U. S. Pat. Off.

VOL. 5, No. 9

ILLUSTRATED

EVERY WEEK



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NEWS NUGGETS

RADIO waves travel not 186,000 miles an hour, but about 165,000 miles, said Capt. T. J. J. See, professor of mathematics and Government astronomer at Mare Island Navy Yard, Calif. He attributed this to the retardation caused by the pull of the ground, which the waves enter freely.

PLANS to broadcast the entire proceedings of the Republican National Convention, which opens in Cleveland, on June 10, have been approved by the full Republican National Committee and negotiations were opened with stations in several cities for broadcasting the convention proceedings to perhaps 20,000,000 people in all parts of the country by means of telephone service and radio. The stations are in Kansas City, Chicago, Pittsburgh, Buffalo, Providence, Atlanta, Dallas, St. Louis and Omaha. The broadcasting will take place from Cleveland, New York, Pittsburgh and Washington.

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1493 Broadway, New York City

RADIO WORLD

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How to Borrow Your Neighbor's AF

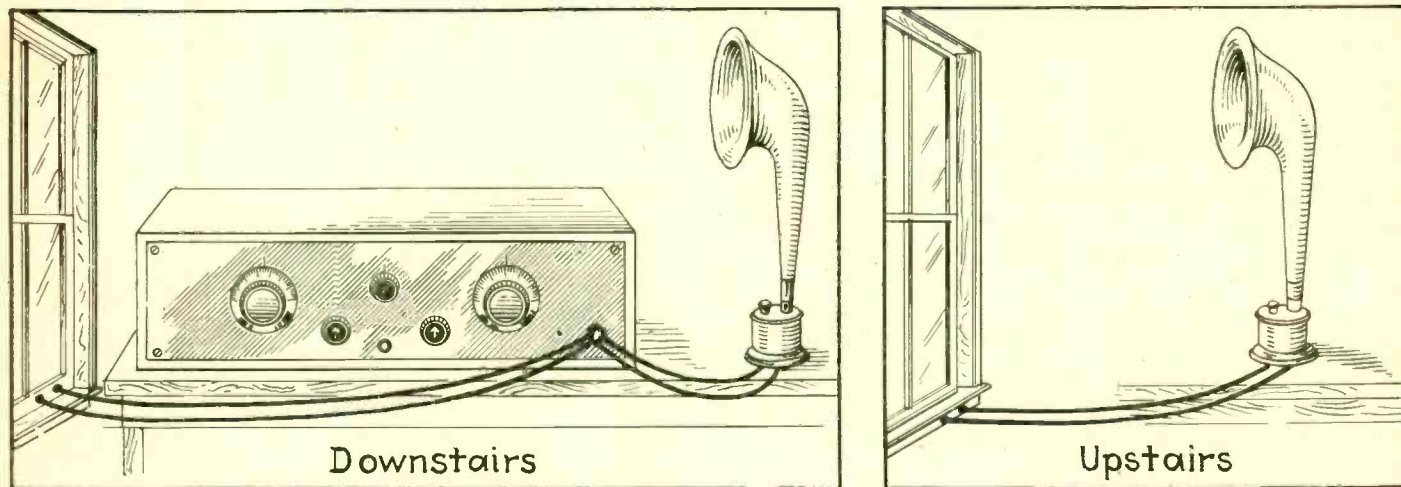


FIG. 3—At left, Mr. O'Brien's loud speaker, getting its AF from his own set. At right, Mr. Goodfellow's speaker, using input from downstairs.

By Robert Goodfellow

SHARING one's radio advantages is lots of fun, I've found. I live upstairs in a two-family house in Brooklyn, N. Y., and have about as good an aerial as exists in my neighborhood. Also, I concentrated on building the most selective receiver possible. It is a six-tube Super-Heterodyne, preceded by two stages of short wave radio-frequency amplification. Therefore I use eight tubes to get detection results only, and it so happens at this time that I have no audio-frequency amplification of my own. But my neighbor downstairs, John O'Brien, whom I call by his first name although he owns the house, has a little regenerative set, with two stages of AF for loud speaker operation and we team up in mutually advantageous fashion.

For instance, I can bring in the Pacific Coast under good conditions, and without causing even the tiniest bit of radiation. Obviously he can't even approach that DX record. When he gets Chicago on his squealer, using the loud speaker, he considers it an event and does some uncorking. If my arguments prevail, and it seems that ultimately they will, John isn't going to have a squealer, and still he's going to bring in far more distant stations than he does now. But that is another story. Let me tell you how we team up.

As I have a speaker, but no AF, I borrow his AF and, for a fair exchange, since I don't like to put myself unnecessarily under obligations to anybody, I lend him my detection. I'll say to him:

"John, there's going to be some tall DX hunting in my ranch upstairs to-night. How about borrowing your AF?"

"Sure," says John, for he has inherited the racial generosity from his fine ancestry, "and how about me borrowing some of your DT?"

John doesn't mean what DT usually stands for, but he has coined that contraction to signify detection, so that AF and RF won't be without that necessary com-

panionship of which the short-sighted dictionarians otherwise deprived them.

Very well, then. I get his AF added to my DT and he gets my DT added to his AF. And we both get the same thing. Nicer equality never was achieved anywhere.

To enable us to do this team work, of course, we had to do some wire-stringing. It was easy. The whole job was done and done well, in an hour and a half, including some splicing and soldering.

My receiver is right next to a back window, in the living-room. So's his. Through a porcelain tube two flexible telephone cord wires were run from the output of my detector set, under my window to the top of his window on the floor below, then again through a porcelain tube (for best insulation) through the top of his window. At both ends telephone tips were soldered on, and each of us fastens the tips to the plugs that goes into the jacks.

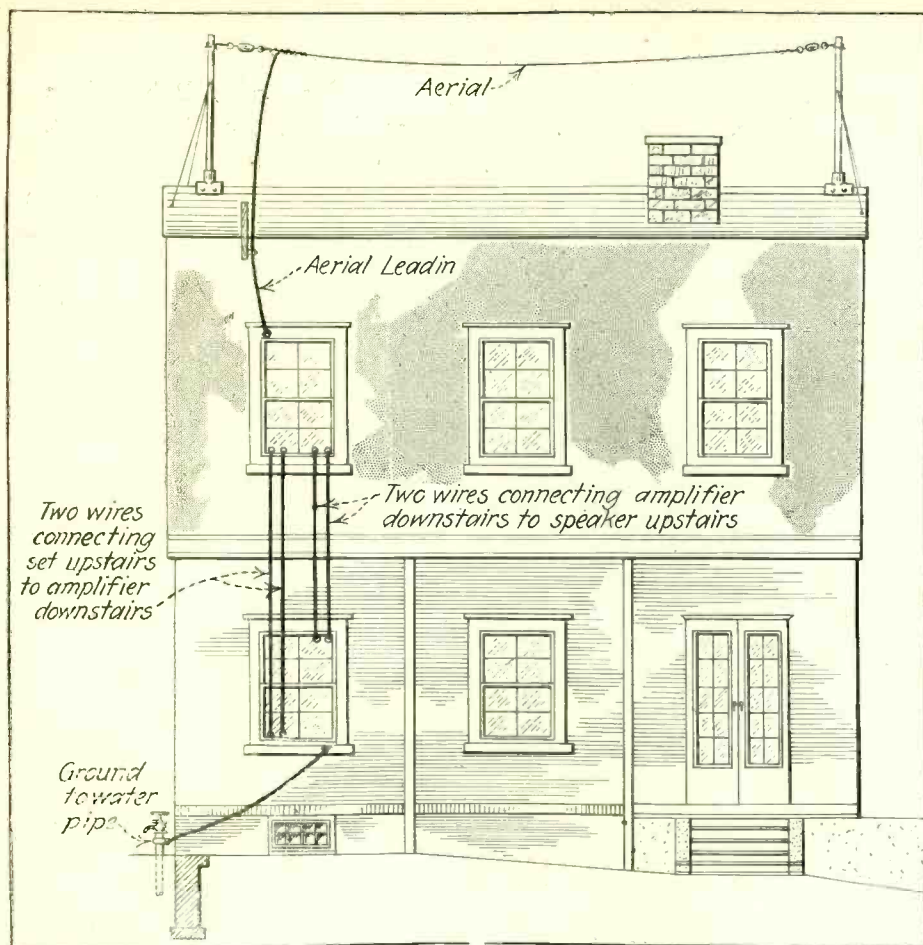
At this stage, if his audio-frequency frequency tubes are turned on, he had loud-speaker output of no mean quality and no meagre distance, for the detected signal with which I supply him is stepped up quite handsomely by the two-stage AF circuit that I built for him. But meanwhile, how do I get my hyped-up signal back?

Why, two more wires, similar to the telephone tinsel wire used before, bring back the signals to papa, only they come back, of course, fullgrown, for loud-speaker service, instead of in their soft infancy, too tender for the rigors of the horn.

Just as my detector plug has two sets of wires coming out, one for my own use when I, use earphone and the other for his own use when he uses earphones or loud speaker, so his AF jack has two sets of wires. One set goes to his own speaker and the other comes up to mine. Thus he has six wires entering his house at his window: aerial, ground (for he uses a sunk iron shaft); detector input from above, consisting of two wires and

(Concluded on next page)

You Keep the Signals, Yet Return Them



(Concluded from preceding page)

the audio-frequency output from his own place to mine, consisting of two more wires. I have only five wires coming from without, because I use the cold water pipe as a ground. Fig. 1 shows all these wires, excepting his aerial.

Our situation makes possible the following combinations:

1. My own exclusive use of my own detector set with headphones.
2. John's use of my detector set with headphones.
3. My use of John's detector set with headphones.
4. John's use of his detector set with headphones.
5. My use of John's three-tube set, consisting of his own DT and AF.
6. John's use of his own three-tube set, consisting of his own DT and AF.
7. My use of my detected signal, enveloped by his AF.
8. John's use of my detected signal, enveloped by his AF.

All this is lots of fun, as I said, and John figures he has the better of the bargain. The only difficulty is ordinarily both of us would have to be home at the same time, or the scheme couldn't be worked, and John (a bachelor) is an incarceration rebel.

I said the scheme "couldn't" be worked, did I? That language was a trifle too conclusive. John has

FIG. 1—How the wires are run, so that the family upstairs gets AF from the family downstairs and in return furnishes detection. Thus the signal detected in the sensitive receiver upstairs is mutually shared, in amplified form for loud speaker use, by the two families.

obliged me with a duplicate key to his apartment.

And I'll give him one to mine—as soon as I deposit that \$1,000 cash I collected on my endowment.

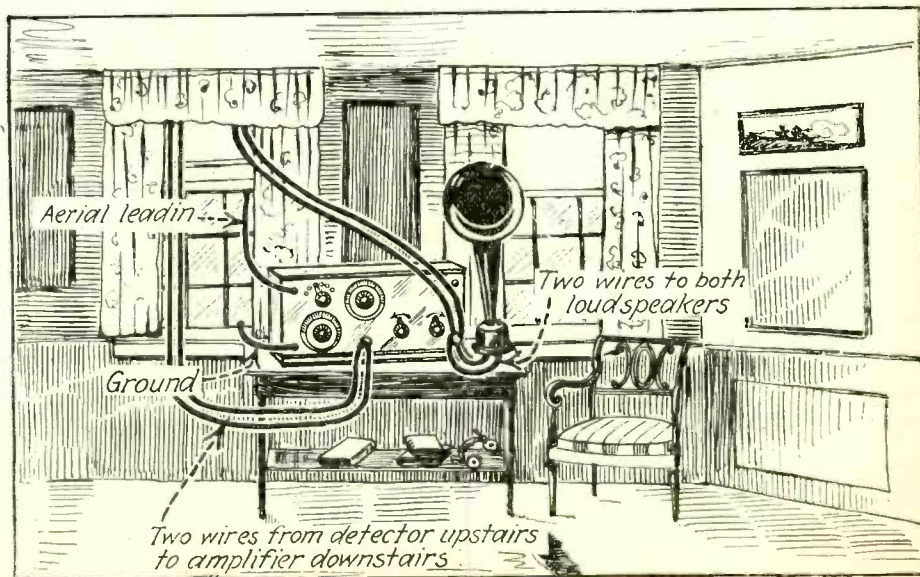


FIG. 2—Interior view of the set in the apartment downstairs, showing wire connections. The signal from the detector circuit upstairs is carried by two wires designated in the picture and constitute the input, which, after AF amplification in the set shown above, is returned to the family upstairs, yet kept downstairs at the same time!

Don't Let Your Tube Oscillate

By Richard Ross

THERE has been so much discussion of radiation and radiating receivers that the average radio fan has probably become confused as to just what types of receivers radiate and what types do not. Some writers will claim that a certain type of set radiates and some will claim that it does not radiate.

In general, it may be stated that any set in which a detector or a radio frequency amplifier tube oscillates will radiate, unless a stage of neutralized radio frequency amplification is placed between the oscillating tube and the antenna.

Some sets, of course, will radiate more energy than others and there are various means by which the radiation can be minimized, but not eliminated.

For instance, a three-circuit regenerative receiver with an untuned primary of about ten turns, will not radiate as energetically as the single circuit set, but it radiates enough energy to disturb nearby sets. A stage of potentiometer stabilized radio frequency amplification placed between the oscillating detector tube and the antenna will also cut down radiation, but will not eliminate it.

A safe rule to follow is "Never allow any tube to oscillate."

Radio Audience Is the Vastest of All

By C. M. Ripley

General Electric Company.

THE machinist, the electrical worker, the elevator boy, the janitor and the watchman are all listening on the wireless telephone together with the banker, the engineer, the merchant, the executive and the student. If there ever was a cosmopolitan audience in the history of the world, the invisible audience of radio is the last word.

All other audiences in the past have been members of a local community. The individuals had more or less similar tastes and experiences in life. They lived in the same climate, ate the same things; they were all brought up amid similar environment; they were subject to much the same mental, physical and moral influences, and seeking entertainment from the same kind of amusements.

But the radio audience is different. That is why it is a new factor.

There are workers in mills, mines and factories; in offices, upon the farms and in camps, in the outskirts of civilization. There are those who tend the lights, in lighthouses and lightships. There are bed-ridden at home and in hospitals, listening day and night and getting relief from their physical suffering. There are men and women who have traveled around the world—others who have never seen the ocean, or the great lakes or the gulf, or a large river. Other millions have never visited a metropolis or crossed over a great bridge. Thousands have never been inside of a large manufacturing plant or large church or a theater, or inspected an electric power station, and some have never seen an electric street car.

To millions the Woolworth building is only a picture; thousands have never seen a battleship or an Atlantic liner—much less set foot upon one, or explored the marvels below deck.

Other thousands who are "listening in" have never been in the country, and would not know a bullfrog's evening serenade from the lowing of cattle. Thousands have never seen snow or frost or natural ice, or a mountain; and thousands living on the prairies have never seen a hill.

To some the song of the nightingale is well known, to others that of the whip-poor-will. Some have hunted deer, but have never seen a coyote, and others have fished for cod and hunted whale in northern waters, but know nothing of the crocodile or alligator. Thousands among the vast radio audience have tramped the forest, and can tell the spruce, fir and balsam from the hemlock, pine and cedar, while others live 'mid the royal palms and the cactus plants.

At night, surrounded by snow, men in lumber camps are listening to radio, and construction workers, who by day were broiling in the hot sun on railroad tracks across the plains, or new road construction in the mountains, find evening recreation through radio. Men who are pouring concrete into huge dams to harness the mountain cataracts; those who live in fishing villages along the water's edge; sealers, mountaineers and trappers. Wireless operators on ships who keep their constant vigil through the long watches of the night, and other lonely men in watchtowers looking out for the forest fires, all are members of the radio fraternity.

The farmer boy, unlike Lincoln, does not have to go 10 miles to borrow a book in order to feed his mind today.

To the lonely man the radio program brings joy,

The Wide Appeal



(Wide World)

LEAVING FOR EUROPE on the Nieuw Amsterdam, William Mengelberg, conductor of the New York Philharmonic Orchestra, has a final "listen-in" from his set in New York City.



(Gilliams)

EDUCATIONAL value of the radio—just to give another instance of radio's wide appeal—is shown by this picture of pupils listening-in while a lesson is broadcast.

companionship and new lines of thought to feed the mind. To the person who is surfeited with the noise and crowds of a great metropolis, radio brings a feeling of secluded and intimate association with the speaker or singer, the artist or actor and the clergyman—undisturbed by an inconsiderate audience or the ill-timed applause of the over-enthusiastic. The music lover can hear music at its best—uninterrupted by the noises of an audience and auditorium.

Yet the person on the outposts of civilization feels brought in touch again with the wide, wide world. By radio he takes part in the bustle and busy activities of the cities he longs to see—that he has been separated from for perhaps months or years.

In addition to solitary listeners, there are strange groups of listeners in our invisible audience. There are intimate friends, sweethearts and complete family circles. There are indoor and outdoor listeners, merry-makers and students, and audiences in hamlets with a population of only a few hundred, gathered to hear speakers from centers of learning and culture.

Steamship passengers who visit the radio room above deck or who hear the concert and speeches multiplied in the saloon by a loud speaker; passengers on railway express trains, etc., all these are included in the vast invisible audience of radio.

The Radio Woman . . . *Her Activities at Work and at Play*



(Fotograms)

THE NEWEST improvement on the burdy-gurdy—a form of musical entertainment that lent itself admirably to improvement—is the radio-gurdy, engineered by a radio girly, in this case Laura Walters. The monkey is retained as an indispensable adjunct of the profession. Though Laura is only posing—that's work!



(Gilliams)

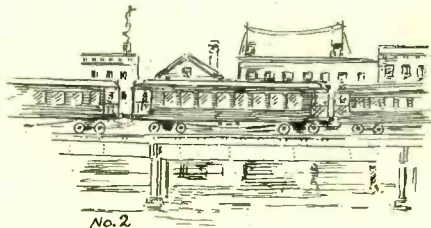
WHEN THAT feeling of lassitude overtakes Helen Lynch, she reclines easily in her downy bed and listens to the DX jazz artists, until ready to fall asleep. That's play! (Who turns off the radio?)

You Know

what this picture represents

*Let the Rebus Editor Know that You Know
and He Will Let the World Know*

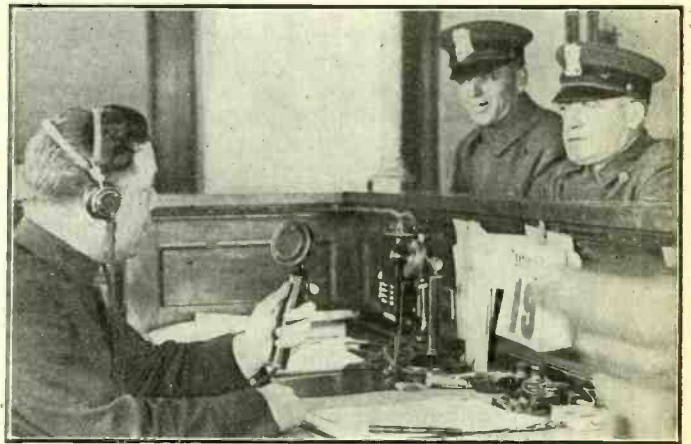
RADIO fans are known for their cleverness. RADIO WORLD knows how clever they are. The ingenious devices and adaptation contained in the mail sent to the editor by readers of RADIO WORLD leave no doubt



about it. Even if you can not read a diagram you should be able to read this rebus. Study the picture carefully and see if you cannot tell what piece of radio apparatus it represents.

After you have decided, send your answer to Rebus Editor, RADIO WORLD, 1493 Broadway, New York City. Mention Rebus No. 2. Be sure to give your full name and address. The names of all those sending in the correct answer will be published in RADIO WORLD.

More Police Use Radio



(Fotograms)

POLICE at Larchmont, N. Y., have their own station to catch crooks.

LARCHMONT, N. Y.

LARCHMONT is the third municipality in the United States to establish a radio broadcasting station in the village hall. The set, valued at \$2,500, is the gift of Frank E. Campbell of Bay Avenue. When its installation is completed it will have a sending radius of more than 600 miles. A receiving set also is being installed.

The Larchmont police expect to use the radio in sending out and receiving general alarms to and from police throughout the country.

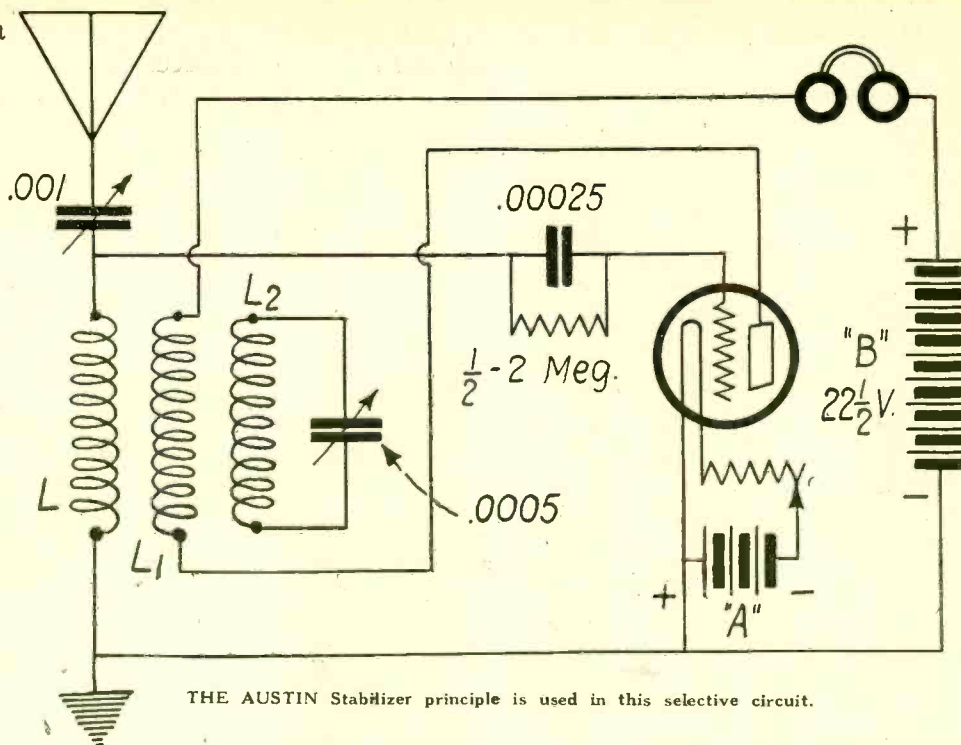
A Highly Selective One-Tube Set

Tuning is Similar to That of a Single Circuit Tuner, Only There is An Additional Control — Absorption Coil is Advantageous Feature

[A. P. Peck has been a contributor to RADIO WORLD under the pen name, Leroy Western. His first experimental work dates back to 1914. The set Mr. Peck describes is well suited for use on the water, the regular two-stage amplifying circuit being added for loud speaker operation. However, the set is equally attractive for home use, especially in congested districts, because of its splendid selectivity.]

By A. P. Peck

Associate, Institute of Radio Engineers.



THE AUSTIN Stabilizer principle is used in this selective circuit.

MOST devices for preventing radiation operate on the principle of a "muffler" or "choke tube," in reality a single stage of radio-frequency amplification added in front of the detector and usually in front of the tuner as well. This tube prevents free oscillations in the detector circuit from reaching the antenna and thereby causing annoying squeals in neighbors' sets.

While this method of reducing radiation is quite effective and usually achieves the desired results, it requires an additional tube.

The circuit presented herewith, admirably adapted for use on a yacht, motor boat or other water craft, presents a means of controlling the oscillations in the receiver so that the set will not suddenly burst into oscillation and start to radiate. The principle used is that of the Austin stabilizer circuit.

There are several ways in which this method of controlling oscillation can be used. First, we will consider its use with three honeycomb coils. The coils in this case should be mounted in a standard three honeycomb coil mounting and connected as shown. Coil L1 should be in the usual primary position, L2 in the secondary position and L3, the absorption coil, in the detector position. The sizes should be about 50, 35 and 35 respectively. It will be noticed that coil L3 is connected only to a variable condenser and is not in the rest of the circuit in any manner, except by inductive coupling. Thus this coil and its attendant condenser act as a tuned absorption circuit which can be set at any particular value desired and which will prevent the receiving set from spilling over into oscillation when the operator does not desire it to do so. In this manner the loud signals which it is possible to obtain with a single circuit tuner may still be retained and the other characteristics of the single circuit tuner kept. The use of the absorption coil limits the worst feature of the single circuit tuner so that even in congested districts a set of the type illustrated herewith may be used without any annoying interference. Interference from oscillating receivers hinges upon the ability of the operator.

In case honeycomb coils and mounting are not on

hand, wind a specially designed coupler to be used in the circuit. A standard 3 1/2 inch ball rotor such as used in any vario-coupler may be employed. These rotors can usually be purchased already wound or if one is procured unwound, wind it full of No. 22 D.C.C. wire. This winding and all the other windings on the coupler should not be shellacked, but sufficient celluloid varnish may be placed on the windings to hold them in position. This celluloid varnish is sold under various trade names and is usually known merely as "radio cement."

The stator support should be a cardboard or bakelite tube 4 inches in diameter by 5 1/2 inches long. Provide holes for mounting the rotor or rig up other bearings. Then beginning about one-half inch from the end of the stator tube nearest to the rotor, wind 90 turns of No. 22 D. C. C. wire. This coil should be tapped every ten turns for its entire length. About one-eighth of an inch from the end of this latter winding, start the stabilizer winding. No. 22 D. C. C. wire may be used for this coil also. No taps are necessary and the winding itself should consist of 50 turns. The exact number of turns may best be determined by experiment and will depend to a certain extent upon various other factors which differ in various sets. This coil is to be tuned solely by the variable condenser shunted across it and the latter should be of the best type obtainable. It should have a maximum capacity of .00045 to .0005 mf.

A UV201A tube gave best results and this set, with the specially designed coupler, should give excellent service as a portable receiver with a UV199 tube. In actual use, the receiving set described was put in service with a 70-foot outdoor antenna and it gave surprising results as to volume, selectivity and freedom from squeals and howls. It was remarkably quiet in operation and when the stabilizing condenser was properly manipulated, it was impossible for a receiving set operating forty feet away to determine whether this improved single circuit tuner was in operation.

After the set is connected up, it is necessary to reverse the connections to coil L1 so as to determine the best operating position, as in a single circuit.

Installing a Radio in a Pleasure Boat

[Lieut. Peter V. O'Rourke, the author of this article, is a thoroughly experienced navigator, the sea and the radio being his twin hobbies. During the World War he rendered valiant service as a Lieutenant in the United States Merchant Marine, on duty in the submarine zone. He has navigated many pleasure boats in notable races. Now he is a Lieutenant of Police Reserves, Marine Division, New York City. His article is particularly timely, as May 30 is "going into commission day." Readers with individual radio installation problems in connection with their boats may address Lieut. O'Rourke, care of RADIO WORLD, 1493 Broadway, New York City.]

By Peter V. O'Rourke

MANY boat builders are providing suitable space in the plans for new boats for installing radio apparatus. In most instances the set is built-in and kept from sight, an aperture allowing for the output of the loud speaker.

Small boats as a rule have only enough stowage space to accommodate the necessary gear used for sailing, anchoring and their proper handling.

It becomes a real problem to make room for a receiving set which in itself requires a comparatively large area not to mention a choice spot. For this reason it may be suggested where possible to construct the set in as many units as practicable in order to fit them in places that may be utilized for this purpose.

Care should be taken to stow the radio apparatus where it will not shift due to the motion of the boat and the wiring should be properly run to prevent the set from getting wet, which causes short circuits.

Keep the batteries in a dry place and away from the galley, where an open flame or excessive heat may

prove disastrous, or from a closet which might become flooded. Rather than place the set in an inconvenient locker, make it portable.

In this case provide a watertight receptacle in which the cabinet and all are fitted fairly snug when not in use. The set may then be placed on the cabin floor or under a bunk but should be plainly marked Radio, so that it may not be mistaken for a chest or a mooring buoy or some other gadget.

When in use the set may be suspended from the cabin top directly over the cabin table or the center-board trunk, but should be held rigid.

It is quite natural that it should be kept away from the engine compartment where the vibration will jar the connections loose.

In a moderately large boat the installation may be made as shown in the accompanying diagrams (Figs. 1 and 2). Rigging an aerial depends entirely on the construction and general characteristics of the boat.

A cruiser equipped with a signal mast may use the conventional two or three parallel wires running from the masthead to the after flagstaff, taffrail or stanchion.

Where possible the wires may be extended from the masthead to the bow in addition to those running aft, but care should be taken to keep clear of the anchor gear and allow for the handling of lines when mooring or docking.

A sailing vessel can employ an antenna of the umbrella type suspended from the topmast and between the shrouds and if necessary an additional wire from the masthead to the bowsprit, insulated from the bobstay, which is grounded through contact with the water.

Insulated wire is preferable where slatting might cause the aerial to make contact with the standing wire rigging.

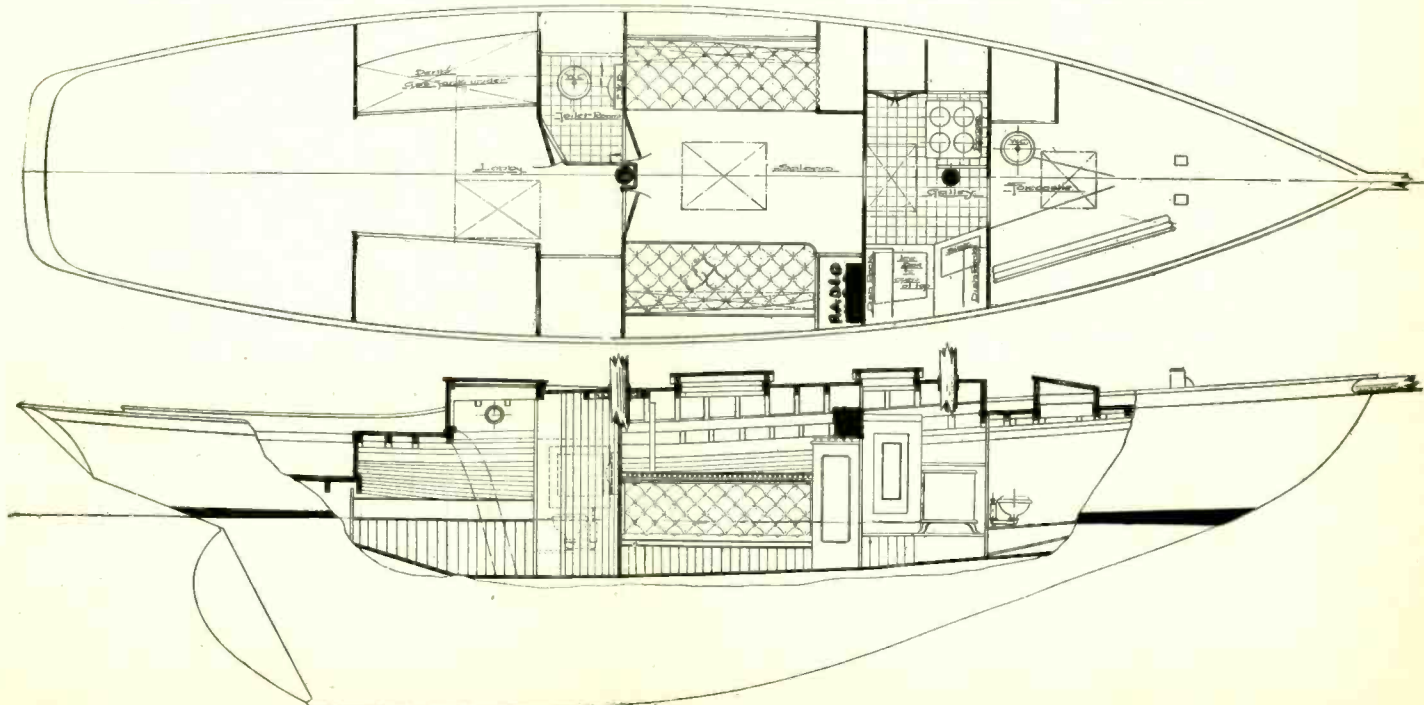
The rigging may be used as a counterpoise ground if the chain plates are submerged.

If lanyards are used to take up the shrouds, instead of turnbuckles, splice a wire connection to bridge the

(Concluded on next page)



LIEUT. PETER V. O'ROURKE,
Using a Sextant.



FIGS. 1 AND 2.—Top view of a schooner yacht, with radio set shown on top of sideboard in the cabin (upper diagram). The set is at starboard, amidships. Below is side view of the same craft, the set being designated by the black square.

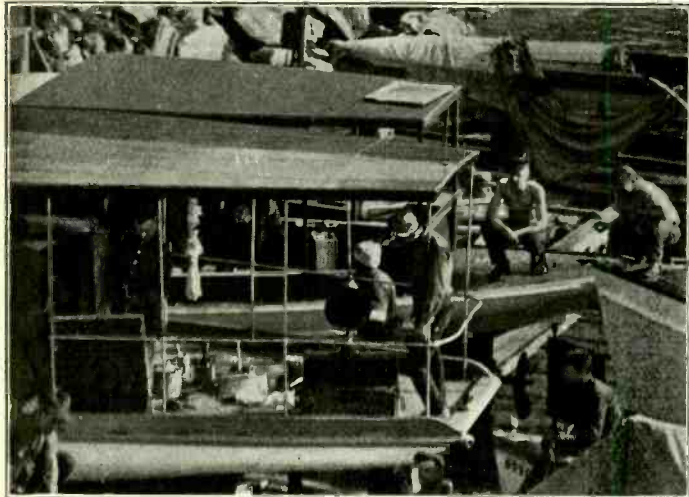
Solving Aerial Problems on the Water

(Concluded from preceding page)

gap. A ground connection can also be made to the engine of a motorboat or an auxiliary vessel.

The keel of a windjammer is an excellent ground. On a centerboard boat a wire weighted down may be dropped through the trunk or trailed overboard.

A wire fastened around the hull longitudinally makes a good counterpoise. Where there is sufficient free-



(Foto Topics)

INSTALLING A RADIO on a motorboat is a subject of ever-absorbing interest. The set in the above boat, in yard at Dyckman street, on the Hudson River, New York City, is at starboard, astern. Note the loud speaker. Most of the boats in the yard have provision for radio installation.

board to keep clear of the water this wire may be used as an aerial. The coaming may also be wrapped with wire but will not function as an aerial when the decks are awash.

A crystal set functions well on the water and requires very little space and no batteries.

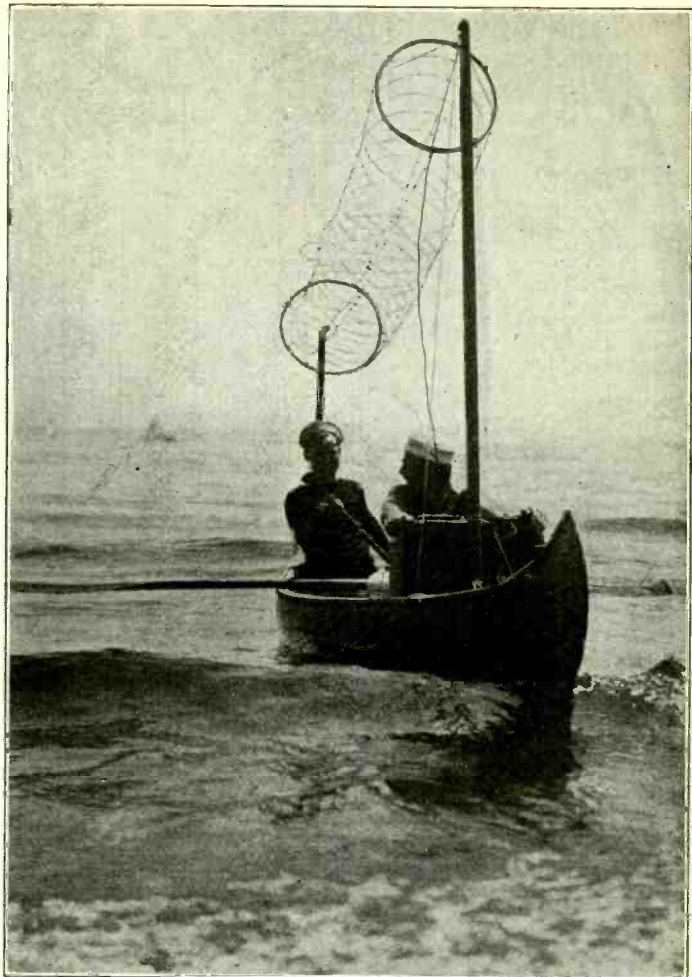
Complete outfits can be obtained including phones and all necessary equipment for as little as \$10. Those desiring a tube set may build the one described in this issue of RADIO WORLD by A. P. Peck, on page 7.

Right of Way Asked for White Bill

WASHINGTON.

SPECIAL consideration will be asked, to rush action on the White bill for regulating radio. The House Merchant and Marine Committee reported favorably on the bill. In so doing, however, it made changes. One provides for a court review of decisions of the Secretary of Commerce. Also, an amendment prohibits a radio company from owning or controlling a cable company and vice versa. Those familiar with modifications injected since the House hearings believe certain changes made and the broadening of the scope of the original bill will cause the Senate to demand a further hearing before acting on the bill.

Many proponents, including Secretary Hoover, believe failure to pass the bill would be an unfortunate occurrence. He needs aid in administering radio and is going to have it, bill or no bill. He is waiting, however, until the Congress adjourns, before announcing the date of his third radio conference here.



(Levick)

AERIALS on canoe and motorboat. The canoe has a cage antenna, the motorboat the L type.

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MAY 24, 1924

Radio Needs Hoover

SECRETARY Hoover's name has been suggested for the difficult task of administering the Dawes plan for payment of the German indemnity. It is a fine tribute to his genius for administration, but the American radio public and trade would regret to lose his services. Possessing a vision born of long experience with big problems, Secretary Hoover has been a boon friend to broadcasting and has won added respect and admiration by his fair-minded and thoughtful work as our Radio Chief. While the radio folk are generous, and appreciate the need for high talent and intelligence in the solution of world problems, probably if a vote were taken at most they would vote only to "lend" Secretary Hoover to the Committee of Experts. To give him up entirely would be too much to expect from an admiring public. Besides, there is a world aspect to the radio problems in America, the nation foremost in radio.

And Adam Listened In

THE first broadcasting set, you will remember, was made of a rib.—Palatka (Fla.) News.

AT Jamaica race track, New York City, Hilda Ferguson, actress, just for a lark, donned a jockey's habit and carried a radio set on horseback. The filly's name is Radio. Maybe the result charts henceforth will read, "Radio wore earphones, but no blinkers." Query: "Where is Hilda's aerial?" Also: "If the set is grounded to one of the horseshoes, what happens when that hoof is off the ground?" But why worry, if Hilda doesn't?



(Underwood & Underwood)

Broadcast Stations

In Canada, Cuba, Great Britain, Porto Rico and Mexico

[A complete list of broadcast stations in the United States was published in RADIO WORLD, issue of May 17. Another list of U. S. stations, revised up to moment of going to press, will be published soon.]

CANADA

Call	Owner	Location	M.	K.
CFAC	Herald	Calgary, Alta.	430	700
CFCA	Star Pub. & Ptg. Co.,	Toronto, Ont.	400	750
CFCE	Marconi Wireless Tel. Co.,	Montreal, Quebec	440	680
CFCH	Abitibi Pow. & Pap. Co., Ltd.,	Iroquois Falls, Ont.	400	750
CFCJ	La Cie de L'Evenement,	Quebec	410	730
CFCK	Radio Sup. Co., Ltd.,	Edmonton, Alta.	410	730
CFCL	Centennial Meth. Church,	Victoria, B. C.	400	750
CFCN	W. W. Grant Rad., Ltd.,	Calgary, Alta.	440	680
CFCO	Semmelhaack-Dickson, Ltd.,	Bellevue, Que.	450	670
CFCQ	Radio Spec., Ltd.,	Vancouver, B. C.	450	670
CFCR	Laurentide Air Serv.,	Sudbury, Ont.	410	730
CFCW	The Radio Shop,	London, Ont.	420	710
CFDC	Sparks Co.,	Nanaimo, B. C.	430	700
CFQC	Elec. Shop, Ltd.,	Saskatoon, Sask.	400	750
CFRC	Queen's Univ.,	Kingston, Ont.	450	670
CFUC	Univ. of Mont.,	Montreal, Que.	400	750
CFXC	Westminster Trust Co.,	New Westminster, B. C.	440	680
CHAC	Radio Eng., Ltd.,	Halifax, N. S.	400	750

Call	Owner	Location	M.	K.
CHBC	The Albertan Pub. Co.,	Calgary, Alta.	410	750
CHCB	Marconi Co.,	Toronto, Ont.	440	680
CHCC	Can. Westinghouse Co.,	Edmonton, Alta.	400	750
CHCD	Can. Wireless & Elec. Co.,	Quebec, Que.	410	730
CHCE	W. Can. Rad. Sup. Ltd.,	Victoria, B. C.	400	750
CHCL	Vancouver Merchants Exchange, Ltd.,	Vancouver, B. C.	440	680
CHCM	Riley & McCormack,	Calgary, Alta.	440	680
CHCS	Hamilton Spectator,	Hamilton, Ont.	410	730
CHYC	North Elec. Co., Ltd.,	Montreal, Que.	410	730
CJCA	The Edmonton Journal, Ltd.,	Edmonton, Alta.	450	670
CJCB	Phillipe Laundry,	Monti Joli, Que.	400	750
CJCC	London Free Press,	London, Ont.	430	700
CJCD	T. Eaton Co.,	Toronto, Ont.	410	730
CJCE	Sprott-Shaw Rad. Co.,	Vancouver B. C.	420	710
CJCI	Maritime Rad. Corp., Ltd.,	St. John, N. B.	400	750
CJCN	Simons, Agnew & Co., Ltd.,	Toronto, Ont.	410	730
CJCX	Percival Wesley Shackleton,	Olds, Alta.	400	750
CJSC	The Eve. Telegram,	Toronto, Ont.	430	700
CKAC	La Presse Pub. Co., Ltd.,	Montreal, Que.	430	700
CKCD	Vancouver Daily Province,	Vancouver, B. C.	410	730
CKCE	Can. Ind. Tel. Co.,	Toronto, Ont.	450	670
CKCH	Can. Natl. Rlys.,	Ottawa, Ont.	435	690
CKCK	Leader Pub. Co., Ltd.,	Regina, Sask.	420	710
CKCO	Ottawa Radio Assn.,	Ottawa, Ont.	400	750
CKCX	P. Burns Co.,	Calgary, Alta.	440	680
CKOC	Westworth Rad. Sup. Co.,	Hamilton, Ont.	410	730
CKY	Manitoba Tel. Sys.,	Winnipeg, Man.	450	670
OA	C. P. Edwards,	Ottawa, Que.		

CUBA

PWX	Cuban Tel. Co.,	Havana	400	750
2DW	Pedro Zayas,	Havana	300	1000
2AB	A. S. de Bustamante,	Havana	240	1250
2OK	M. G. Velez,	Havana	360	830
2BY	F. W. Borton,	Havana	260	1150
2CX	F. W. Borton,	Havana	320	940
2EV	Westinghouse Co.,	Havana	220	1360
2TW	R. E. Ramires,	Havana	230	1300
2HC	Heraldo,	Havana	275	1090
2LC	Luis Casas,	Havana	250	1200
2KD	E. S. de Puentes,	Havana	350	860
2MN	Fausto Simon,	Havana	270	1110
2MG	Manuel G. Sales,	Havana	280	1070
2JQ	Raul Perez Falcon,	Havana	150	1990
2KP	Alvira Daza,	Havana	200	1500
2HS	Julio Power,	Havana	180	1660
2OL	Oscar Collado,	Havana	290	1030
2WW	Amadeo Saenz,	Havana	210	1430
5EV	L. V. Figueroa,	Colon	360	830
6KW	F. H. Jones,	Tuinucu	340	880
6KJ	F. H. Jones,	Tuinucu	275	1090
6CX	A. T. Figueroa,	Cienfuegos	170	1760
6DW	Ed. Terry Cienfuegos		225	1330
6BY	Jose Ganduxe,	Cienfuegos	300	1000
6AZ	Valentin Ullivarri,	Cienfuegos	200	1500
6EV	Josefa Alvarez,	Caibarien	225	1330
7AZ	Pedro Nogueiras,	Camaguey	225	1330
7BY	Salvador Rionda,	Camaguey	350	860
8BY	Alberto Ravelo,	Stgo. de Cuba	240	1250
8AZ	Alfredo Brooks,	Stgo. de Cuba	250	1200
8FU	Andres Vinnat,	Stgo. de Cuba	225	1330
8DW	P. C. Anduz,	Stgo. de Cuba	275	1090
8EV	Eduardo Mateos,	Stgo. de Cuba	180	1660
8GT	Juan F. Chibas,	Stgo. de Cuba	260	1150

BRITISH

2LC	British Bdctg. Co.,	London	365	820
5IT	British Bdctg. Co.,	Birmingham	475	630
5WA	British Bdctg. Co.,	Cardiff	350	855
6BM	British Bdctg. Co.,	Bournemouth	385	780
2ZY	British Bdctg. Co.,	Manchester	375	800
5NO	British Bdctg. Co.,	Newcastle	400	750
5SC	British Bdctg. Co.,	Glasgow	420	710
2BD	British Bdctg. Co.,	Aberdeen	495	605
6SL	British Bdctg. Co.,	Sheffield	303	990

PORTO RICO

WKAQ	Radio Corp. of P. R.,	San Juan	360	830
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MEXICO

CYL	La Cast del Radio,	Mexico City, Mex.	500	600
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Intercollegiate Results to be Broadcast

AN Intercollegiate Radio League, composed of the principal colleges in the East, was formed at a conference of the College of the City of New York. Richard Carlisle, of the City College, was elected president. The purpose of the league is to disseminate college information such as results of chess, rifle and other intercollegiate matches by radio.

The 'Super-Het' That Got Scotland

By Frank P. Foley

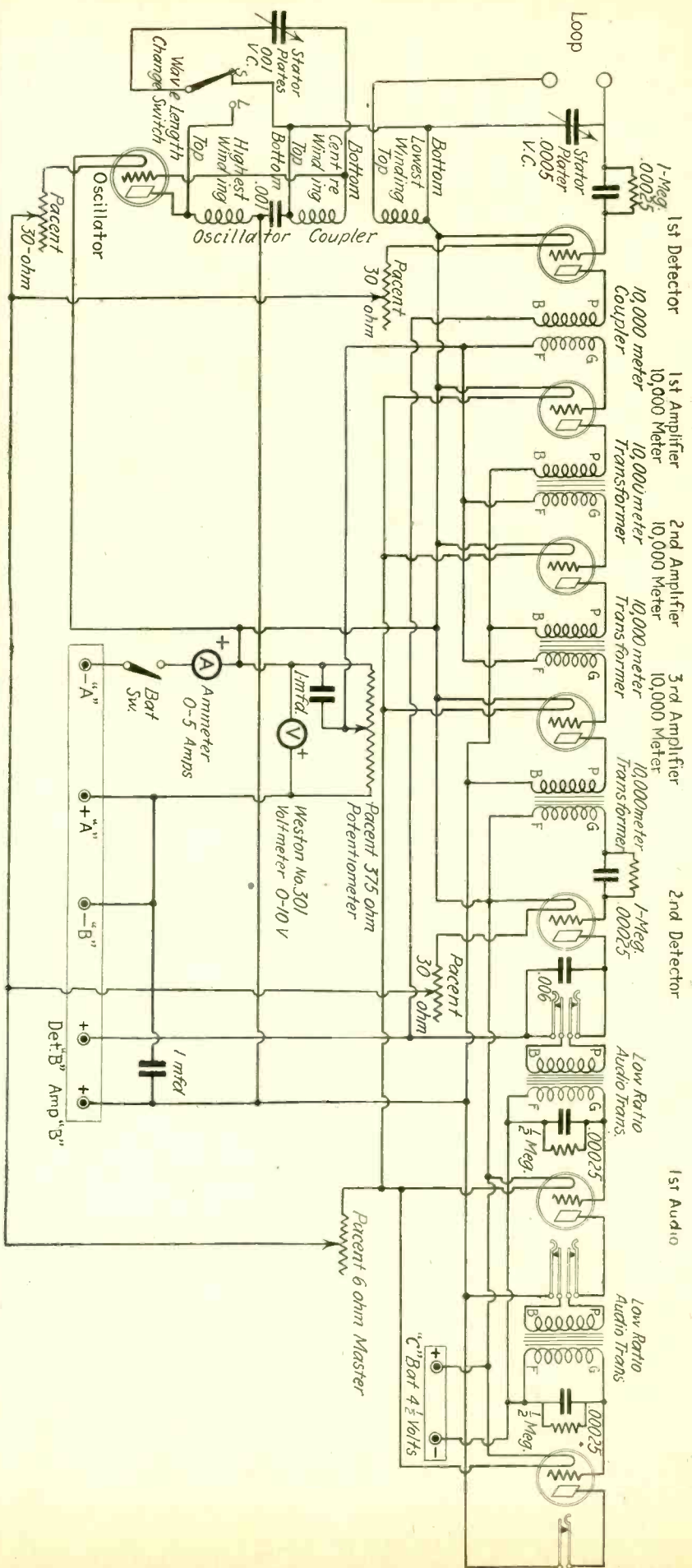
SO many letters of inquiry have been sent to me, because of the splendid results I got from my Super-Heterodyne, a photo of which appeared in RADIO WORLD, issue of April 26, that I decided the best way to answer the writers, and inform others, was to give the constructional data. This set got Scotland.

A panel, size 8 x 40 x 1/4", is desirable to provide ample room. The panel should be laid out as shown in Fig. 1 and all holes defined clearly with a center punch before drilling. The holes for mounting the rheostats, potentiometer and variable condensers should be counter-sunk so as to have the screws come flush with the face of the panel. After all the drilling is finished, two General Instrument Condensers are mounted on the panel. It is best at this time to measure the shaft and cut it so that 3/8" only projects from the panel. This is necessary as the Universal Dials require it. A cabinet 8 x 40 x 8" with a screw bottom is used. The base of this cabinet is removable and the instruments are mounted thereon. The panel is next fitted to the baseboard firmly with long wood screws. The screws attaching the baseboard to the top of the cabinet are next removed and the cover laid aside.

The Pacent rheostats are next mounted on the panel in the following order: A twenty-ohm rheostat is used on the oscillator and is mounted nearest to the tuning dials, as it plays a very important part in the operation of the set. The next rheostat is also twenty ohms and is used on the first detector tube. The next is six ohms and controls both the radio and audio-frequency amplifiers. The last 20-ohm rheostat controls the second detector tube. The 375-ohm Pacent potentiometer is placed directly between the two meters so as to preserve the panel symmetry. I strongly advise that the next move be to place lugs on the terminals of the rheostats, as you will find this difficult after the other equipment has been mounted. On the Pacent rheostats the center binding post and the one with the metal tab under it are used, the other binding being used only for table mounting. At this period the next thing will be to fasten down the sockets. Use the two wood screws provided for this purpose. I use the Na-Ald De Luxe socket as there is a minimum of metal in their construction and they do not melt. The bayonet prongs make excellent contact. They should be mounted as shown in the accompanying photo (Fig. 2), with the filament connections facing the panel. Weston meters are next mounted, the ammeter next to the battery binding posts and the voltmeter on the other side of the potentiometer. These are necessary instruments. The ammeter is very useful in determining exactly the proper filament current and it eliminates all guesswork with the rheostats. This is important also in that the dial settings will hold true only in so far as the oscillator tube is receiving the precise current.

The voltmeter is not so important, but it keeps tab at all times on the storage battery, and when it reads less than five and one-half volts, with all tubes lit, it is time to recharge the battery. It is worth several times its cost in the hydrometer fussing it saves. The next step will be to construct the 10,000-meter transformers. I use a fibre core. Bakelite tubing 2 3/4" O. D. and 2" long drilled for four binding posts is used to cover the windings and to protect them from dust and moisture. The primary windings consist of 3,000 turns and the secondary winding of 6,000 turns of No. 38 DCC, both wound in the same

COMPLETE WIRING DIAGRAM of Frank P. Foley's Super-Heterodyne (Fig. 3). All constants except those of the oscillator-coupler are given on the drawing. Low ratio audio-frequency transformers are advised. The C battery of 4 1/2 volts can be increased to 9 volts where more than 100 volts are used on the AF amplifier tubes. Although the use of the voltmeter and ammeter are not absolutely necessary, they are a great help in determining the correct adjustment of the rheostats and are a constant check on the condition of the storage battery. This is the diagram of the set on which Mr. Foley got Scotland and Cuba, from New York City, with the dial readings only a quarter of an inch apart. A photo of him at his set was published in RADIO WORLD, issue of April 26.



direction. The ends of the wire are solder to the binding posts mounted on the bakelite cover. Brass ends are then soldered with resin core
(Concluded on page 19)

The Radio University

A Question and Answer Department conducted by RADIO WORLD for its Subscribers by its Staff of Experts.

Address Letters to Radio University Department
RADIO WORLD, 1493 Broadway, New York City

A CIRCUIT you have published called "A Two-Tube Set of Great Power" holds special interest for me. The only drawback is the amount of money I would have to spend for B batteries. Couldn't the S tubes, sold by the Amrad people, be used to apply the high voltage direct to the plates of the power tubes? Could this be done, it would mean the saving of half the price of a B battery and the price of a battery charger.—Harvey Bailey, 1312 Rhode Island St., San Francisco.

You evidently don't take into consideration that the purchase of the S tubes is only part of the expense that goes with high voltage rectification of this sort. The additional cost of a high voltage transformer plus the cost of the heavy wiring and protective devices must be added to the price of the tubes. It seems that you could do better financially to purchase a storage B battery and a charger than to construct an S tube rectifier.

Please publish a diagram showing me how to connect a single stage of audio-frequency amplification. I have a double circuit jack in my detector set so I can take the output from there with an extra plug.—O. F. Slaviv, Chelsea, Mass. The diagram is published herewith (Fig. 11).

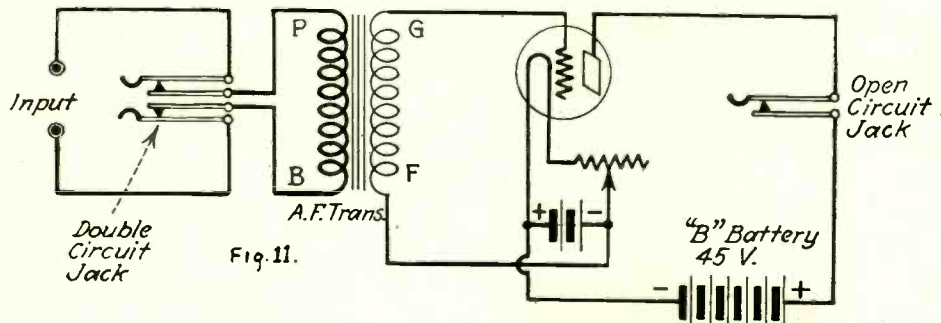


FIG. 11 shows the connections of a single stage audio frequency amplifier, used as a separate unit. The phone plug is placed in the detector jack when only one tube is to be used. When no plug is in detector circuit, AF unit is automatically connected. Asked for by O. F. Slaviv.

What four-tube set do you recommend as one being suitable for long distance clear reception, taking into consideration cheapness of price in getting the parts?—L. J. Durand, 90 West Street, New York City.

In the first place, do not recommend cheap parts. If you purchase parts of the first quality you can depend on good results. Suggest you build the four-tube superdyne.

My neutrodyne set works perfectly in my own house where it was built, but when in another location it oscillates continually. Can I have my A batteries in the cellar and run leads from there?—Geo. W. Blatchly, Jr., Freehold, N. J.

You will have to neutralize the set for the new location to prevent oscillation. It is not advisable to have long A battery leads.

1—In regard to the Transcontinental Reflex hook-up in RADIO WORLD, issue of May 3, all the couplers I have seen use seven or eight taps, and in your panel layout you show only five taps. Is there any way in which I could use my present coupler, which has eight taps, with this outfit? 2—How are the filaments of the first two tubes controlled?—Thomas J. Calligy, 721 Willow Ave., Hoboken, N. J.

1—The five taps shown on the panel are merely optional. If you care to use eight taps you can drill three additional holes in line with the five shown and connect the three other taps from your coupler to them. In case, however, you should want to use only five taps, you can omit the first, third and fifth tap on the coupler and connect the five others. 2—The filaments of the first two tubes are controlled by two rheostats, connected in exactly the same manner as the rheostat which controls the third tube.

I am figuring on building the Superdyne receiver. 1—In what direction should the coils be wound? 2—About what length should the stator and impedance tube be? 3—Are N. Y.

Coil Co. condensers all right for use in this circuit? 4—What ratio All-American transformers do you recommend in the audio-frequency amplifier stages of the Superdyne? 5—Will the White Radiation Killer described in RADIO WORLD, issue of February 23, work on an Autoplex circuit?—Charles Quesnel, Box 235, R.F.D. No. 9, Los Angeles.

1—The Superdyne coils are wound in the following manner. Primary clockwise, secondary clockwise, tickler clockwise and impedance counter-clockwise. A full description of the Superdyne set, how it is constructed, manner of winding the coils, etc., appear in RADIO WORLD for May 17 and in the present issue. The series of three articles will be concluded in the issue for May 31. 2—The lengths of the tubes is about 4 inches. 3—The condensers you mention can be used in the Superdyne circuit provided they are of the right capacity. That company makes all sizes of condensers. 4—It is advisable in the Superdyne, on account of the great volume obtainable, to use a 5-to-1 ratio transformer on the first stage and a 3-to-1 on the second stage. Little or no distortion is encountered when transformers of low ratio are used. 5—Yes, the White Radiation Killer can be used successfully with the Autoplex circuit, the

in this case. Just the first part of the rheostat should be used. The C301A tube uses six volts, therefore the entire three cells are used with the 30-ohm rheostat. All the above connections start from the negative lead on the storage battery.

Will you please advise me if I can get blue-print hook-up of the super-heterodyne set as shown on page 16 of March 15 issue of RADIO WORLD? Do you know about what it would cost to build such a set?—S. E. Gard, Amlin, Ohio.

Write to the Radio Corporation of America, sales office, 233 Broadway, New York City.

I have a double-slide tuning coil and wish to add a single tube to it instead of a crystal. Will you please publish a diagram showing all connections and values?—Winifred O'Rourke.

Fig. 10 gives the circuit you want. Fairly good selectivity can be had with this outfit. After you

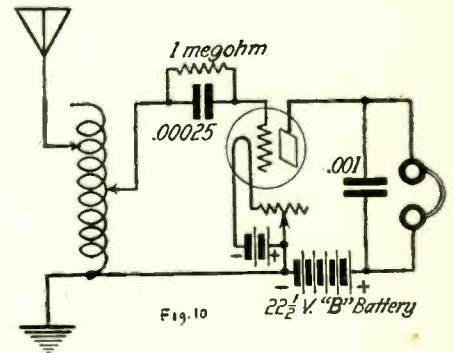


FIG. 10—Diagram for Winifred O'Rourke, showing how to wire a double-slide tuning coil with one vacuum tube.

have had a little experience with this set change it to a loose-coupled set.

I have built a set using Federal parts, one stage RF detector and two steps of AF, and wired it carefully, making sure that there were no long leads or parallel grid and plate wires, etc. Using Federal RF transformer, UV200 and 201A, Malone-Lemmon 7-plate condenser and a home-built coupler that has 8 seven-turn taps on the primary, wound on a 4-inch composition tube. Secondary has 80 turns No. 26 DSC wire wound on a 3/8 inch composition rotor. The primary is wound with No. 24 DSC wire. The center of the rotor is a half inch above the top of the primary winding. I have tried the rotor spaced as much as four inches from the primary without change, except weaker signals. I have also tried half a dozen different couplers with various results. The trouble I experience is that I am unable to tune in the stations I want and cut out all interference. All sizes of antennas, from 15 to 100 feet long, have been tried, but with no real improvement. Can you suggest any way by which I may improve the selectivity of my set?—B. P. Bishop, Lyons, N. Y.

The type of set you have, when used with an outdoor antenna and vario-coupler, always will tune rather broadly. One good method by which you can obtain great selectivity is to use a good sized loop antenna instead of the regular aerial and ground. In order to do this you will have to discard your present coupler, and instead connect the leads from the tuning condenser direct to the antenna and ground binding posts. The loop may be about 100 feet of wire wound on a frame 4 to 5 feet on the diagonal. Although the signals will not be as strong, you will find that great selectivity can be had. In addition, a great deal of static will be eliminated and usually better tone will be had. The loop gives fine quality.

In March 15 issue of RADIO WORLD I read about Major Armstrong's super-heterodyne receiver. Can UV201A tubes be used in this circuit? I would like to use them, as I have them on hand together with a storage battery. Also, can the Magnavox loud speaker be used instead of the built-in loud speaker? How many tubes has this set? Max H. Hopf, Harper, Texas.

UV201A tubes can be used successfully in this circuit. Eight tubes are used in the super-heterodyne. The Magnavox loud speaker will work fine with this outfit.

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And Get Full Question and Answer Service for the Coming 52 Weeks.
RADIO WORLD, 1493 Broadway, New York City:

Enclosed find \$6.00 for RADIO WORLD for one year (52 Nos.) and also consider this as an application to join RADIO WORLD'S University Club, which gives me free information in your Radio University Department for the coming year.

Name

Street

City and State

How to Make Core for Charger

By Walt S. Thompson, Jr.

FROM the letters which the writer has received concerning the "Construction of a Battery Charger," described in RADIO WORLD, issues of March 29 and April 5, 1924, it is apparent that the assembling of the transformer core has given readers some difficulty.

In the first part of the article in the issue of March 29 the material necessary for the transformer core was given as 150 pieces of silicon steel, 7" x 1 1/2" x .015" and 150 pieces of silicon steel 4 1/2" x 1 1/2" x .015". To conform to the present standard practice for assembling transformer cores, these sheets should be 5 1/2" x 1 1/2" x .015" and 3" x 1 1/2" x .015" as illustrated by Fig. 1 on this page.

After the steel has been cut into correct sizes and the coils have been wound and taped, the sheets should be built up inside the coils as indicated by Fig. 1. In this figure the assembly Y represents the arrangement of the sheets for the bottom layer and X represents the assembly for the next layer above. The third layer will be exactly as Y and the fourth as X and so forth until all the sheets have been used or until the space inside the coils has been filled. The various sheets of the same layer will touch those adjacent to it, the separation of the sheets in Fig. 1 being for the sake of clearness.

The assembled core as viewed from an end will appear as shown in Fig. 2. The sheets designated as A, B, C and D in this figure refer to sheets similarly designated in Fig. 1; and the sheets designated as A', B', C' and D' show the position of the sheets A, B, C and D if X and Y in Fig. 1 were the two top layers instead of the two bottom layers.

By carefully following the above explanation and that given in the RADIO WORLD of March 29 and by a careful examination of Figs. 1 and 2, the reader should have no trouble in assembling the transformer core.

The writer has also been requested to give sufficient data for constructing a five-ampere rather than a two-ampere battery charger. Such a change, of course, would necessitate the use of a five-ampere tube with its proper socket, as well as the following changes in the transformer windings:

Referring to Fig. 3 of the article in the April 5 issue, the transformer coils for a five-ampere charger should be wound as follows: The primary winding C should consist of 440 turns of No. 18 D.C.C. wire. The secondary D is divided into two parts, one for filament lighting, consisting of eight turns of two, No. 12 D.C.C. wires in parallel and the other consisting of 86 turns of No. 12 D.C.C. wire, for the charging winding.

Keeping the above factors in mind and also remembering that the fuses must have a higher current carrying capacity, the five-ampere charger may be as easily constructed as the two-ampere charger.

Big Radio Summer Is In Sight

THE coming summer, in the opinion of radio experts, will strikingly demonstrate that radio is not simply an indoor game, nor its use confined to the winter time.

On every hand—among manufacturers, among persons who already have sets, and among prospective buyers of sets—are indications that radio will be as popular in summer as in other months.

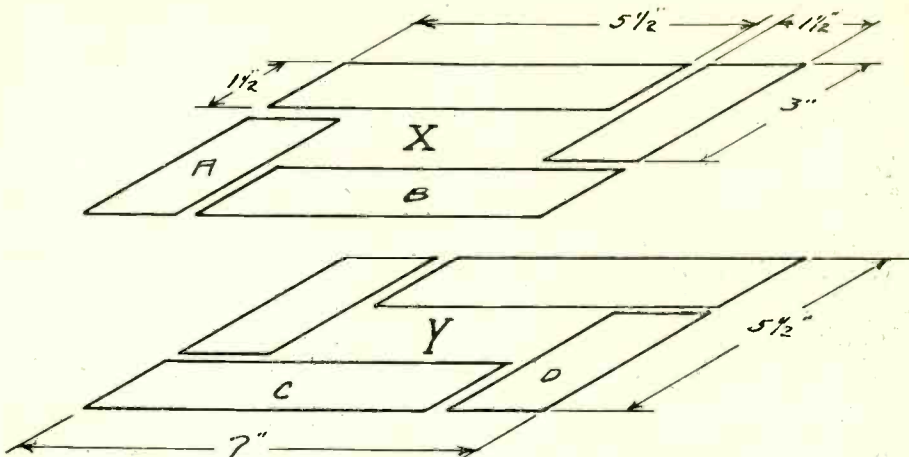


FIG. 1, showing how sheets should be built up inside the coils.

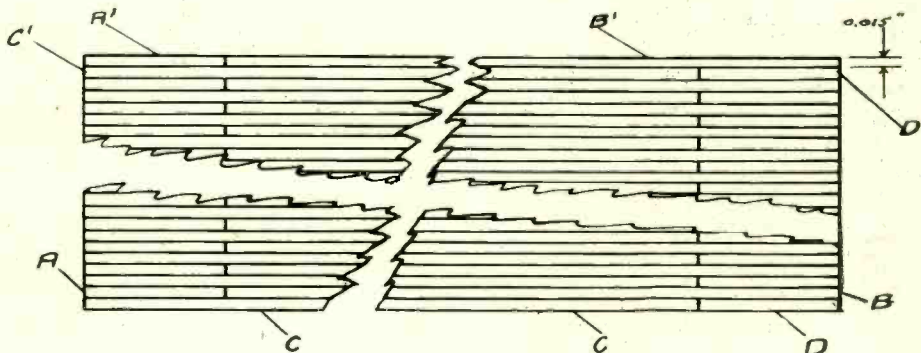
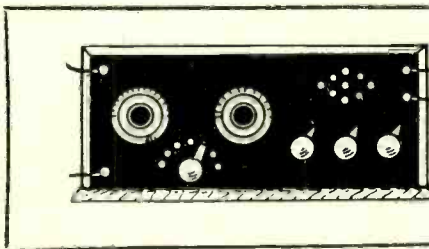


FIG. 2—The assembled core as seen from one end.



The RADIO PRIMER

Information and Instruction for the Beginner

A JACK is a convenient device for tapping the output of any circuit. A jack usually has four leaves, except in the final stage to be tapped, when it has only two. The theory on which a jack operates is that when the plug is inserted, the plug separates the top and bottom leaves from the middle ones, thereby opening the circuit.

The plug is often a source of mystery to many. At first they cannot figure out how it is that the shaft of the plug, consisting of a single conducting element, can deliver the current to both cords at the same time without causing a short circuit.

The explanation lies in a realization of the construction used in the plug.

Looking at a plug, it will be quickly noticed that it has a protruding knobbed tip. This is made of metal. A shaft leads from this tip inside the plug, and to this lead one of the phone tips is connected.

The protruding tip of the plug has a visible insulating collar and this insulation, most of it is hidden, is carried for the entire length of the shaft.

There is a second or outer shaft which leads inside the plug and to which the other phone tip is connected. Now, by looking at almost any jack, you will see that the upper leaf protrudes farther out than the

lower one. Imagine the plug inserted into the jack. The plug would now be facing in the opposite direction to the one diagrammed. The extreme tip of the plug connects with the lower leaf of the jack and the upper lead rests firmly on the visible metal shaft behind the plug tip. Therefore, instead of the same leads carrying the current to the two phone cords, the cleverly separated tip and shaft, well insulated from each other, carry the approach and return of the current.

"RADIO LEGION" THE NEW NAME

THE Radio Legion of America is the new name of an organization started in Chicago on a ten-cents-a-year membership basis. The word "Legion" was substituted for the original word "League," because it was discovered after formation that a "Radio League of America" had been chartered in New York City in 1915.

Paris Votes Radio School Fund

THE movement for the teaching of radio in French schools has become so strong that the city council of Paris has decided to open a credit of 20,000 francs on the 1924 budget for this work.

BROADCAST PROGRAMS FROM FAR AND NEAR

Wednesday, May 21

WHN, New York, 360m (830k), E. S. T.— 7:30 P. M., Ayla La Skere, double-voiced vocalist. 7:35 P. M., Hallett's Roseland dance orchestra. 8 P. M., Dr. Henry S. Moros, Union of Orthodox Jewish Cong. of America; soloist. 8:30 P. M., State Theatre overture. 8:40 P. M., broadcasting State Theatre vaudeville. 8:50 P. M., Victor Wilbur, baritone. 9 P. M., Gregory's orchestra. 9:30 P. M., M. Witmark Black and White program. 10 P. M., Henderson's orchestra.

WJZ, New York, 455m (660k), E. S. T.— 4:30 P. M., Hotel Commodore tea music. 5:30 P. M., State and Federal agricultural reports; farm and home reports; closing quotations N. Y. Stock Exchange; foreign exchange quotations; Evening Post News. 7 P. M., story for boys and girls. 7:20 P. M., "Financial Developments of the Day." 7:30 P. M., Selzer's orchestra. 8:35 P. M., talk, Edward T. O'Laughlin. 8:50 P. M., Marion F. Ledos, soprano. 9:05 P. M., "Reminiscences of a Reporter" by Win. H. Crawford. 9:25 P. M., "An Evening at Log Tavern." 10 P. M., "Race." 10:30 P. M., Coleman's T. orchestra.

WOR, Newark, N. J., 405m (740k), E. S. T.— 6:15 P. M., music while you dine. 6:55 P. M., day's sports. 8:15 P. M., Marie Rothman, coloratura soprano. 8:30 P. M., E. F. Goldman, bandmaster, "What Summer Concerts Mean." 8:45 P. M., Mr. Heathe-Gregory, bass-baritone. 9:30 P. M., J. A. Wales, "Norway." 10:00 P. M., James Caruso and his concert ensemble.

WRC, Washington, 469m (640k), E. S. T.— 3 P. M., Fashion Developments prepared by Women's Wear. 3:10 P. M., song recital. 3:25 P. M., report of National Conference Board. 3:30 P. M., song recital. 3:45 P. M., piano recital by Eleanor Glynn. 3:50 P. M., Current Topics, Editor The Outlook. 4:00 P. M., song recital. 5:15 P. M., instruction in International Code. 6:00 P. M., stories for children by Peggy Albion. 6:15 P. M., talk, auspices Smithsonian Institution.

KHJ, Los Angeles, 395m (760k), P. T.— 12:30 P. M., Altheda Oliver, mezzo-soprano, and Irene Hays, pianist. 2:30 P. M., matinee musicale. 6 P. M., Hickman's Orchestra. 6:30 P. M., Music Memory Contest conducted by Fitzgerald Music Co. 7 P. M., children's program. The Payne Children. Bedtime story by Uncle John. 8 P. M., program by Pomona College; Studebaker orchestra; Dr. Mars Baumgardt, lecturer. 10 P. M., Hickman's orchestra.

WCAE, Pittsburgh, 462m (650k), E. S. T.— 12:30 P. M., news; livestock quotations; weather reports. 3 P. M., piano recital by Fred Rosenfeld. 3:30 P. M., baseball scores. 4:30 P. M., stock market reports; Uncle "Kaybee." 6:30 P. M., dinner concert from William Penn Hotel. 7:30 P. M., The Sunshine Girl. 7:45 P. M., baseball scores; vocal selections by Joe Jacobson, character singer. 8:30 P. M., musical program by Yankee harmonizers.

WOO, Philadelphia, 509m (590k), E. S. T.— 11:30 A. M., weather forecast. 12 M., Tea Room orchestra. 12:55 P. M., time signals. 4:45 P. M., grand organ and trumpets. 7:30 P. M., police reports and sports results; dinner music by Havana Casino orchestra. 8:15 P. M., grand organ recital, Mary E. Vogt. 8:45 P. M., "Advantages of Career in Government Service," Robert C. Clothier. 9 P. M., W. O. O. orchestra; Arno Roder, baritone; Harriette G. Ridley, accompanist. 10 P. M., Walter Miller and his Ritz-Carlton dance orchestra.

WWJ, Detroit, 517m (580k), E. S. T.— 8 A. M., setting-up exercises. 9:30 A. M., "Tonight's dinner," special talk by Woman's Editor. 9:45 A. M., Public Health Service bulletins. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 12 M., dance music by Jean Goldkette's orchestra. 3 P. M., Detroit News orchestra. 3:30 P. M., weather forecast. 3:35 P. M., market reports and baseball scores. 5 P. M., baseball scores. 8:30 P. M., Detroit News orchestra.

KFAE, Pullman, Wash., 330m (910k), P. T.— 8:30 P. M., Forage Crops, Prof. O. E. Barbee; piano solos, Miss Margaret Rawson; "Phipps," a one-act play; Individuality in Dress, Miss Helen K. Robson; Weeds on the Farm, Prof. Leonard Hegnauer; soprano solos, Miss Muriel Holloway.

WOC, Davenport, Ia., 484m (620k), C. S. T.— 9 A. M., opening market quotations. 10 A. M., garden and household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., market quotations. 12 Noon, chimes concert. 1 P. M., closing stocks and markets. 3:30 P. M., educational program. 6:30 P. M., Sandman's visit. 6:50 P. M., sport news and weather forecast. 7 P. M., educational talk. 8 P. M., musical program.

WIP, Philadelphia, 509m (590k), E. S. T.— 1 P. M., luncheon music by Gimbel Tea Room orchestra. 1:30 P. M., weather forecast. 3 P. M., Hilda Reita, coloratura soprano; Laura T. Bast, contralto; Raymond Vetter, violinist; Emilie Loeben, pianist. 6 P. M., weather forecast; final baseball scores. 6:05 P. M., dinner music by St. James Hotel orchestra. 6:45 P. M., agriculture, livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for children.

KSD, St. Louis, 546m (550k), C. S. T.— 8 P. M., program by Advanced Music Department of St. Louis Public Schools, orchestra of 500.

WLAG, Minneapolis, 417m (720k), C. S. T.— 10:45 A. M., household hints. 11:35 A. M., surprise hour. 2:10 P. M., Woman's Club hour. 2:40 P. M., daylight concert—Agnes Thompson, reader; J. F. Vrenger, tenor; Bernice Darling and Gerald Osborn, cornet and piano players. 4 P. M.,

magazine reading. 5:30 P. M., children stories, Alpha Stalson. 6 P. M., sport hour—"Athletics at Macalester College," R. W. Phacker. 7:30 P. M., farm lectures. 9:15 P. M., business message. 10:45 P. M., Sam J. Heiman's Casino orchestra at St. Paul Hotel.

WBAP, Fort Worth, Tex., 476m (620k), C. S. T.— 7:30 P. M., concert, Sam S. Losh, baritone and pianist, and assisting artists. 9:30 P. M., concert, Dick Gaines' orchestra.

WNAC, Boston, 278m (1080k), E. S. T.— 10:30 A. M., WNAC Women's Club talk. 1 P. M., Shepard Colonial orchestra. 4 P. M., debate by Lowell H. S. pupils. 6 P. M., children's half-hour. 6:30 P. M., WNAC dinner dance; Checker Inn orchestra. 8 P. M., Harvard Freshman Glee Club and assisting artists. 9 P. M., program announced. 10 P. M., May dance.

WSB, Atlanta, Ga., 429m (700k), C. S. T.— 12 noon, entertainment. 3 P. M., play-by-play baseball broadcast. 5 P. M., Vick Myers' Melody orchestra; Miss Bonnie Barnhardt's songs and Burgess bedtime story. 10:45 P. M., City Hall Democrats entertainment.

WGI, Medford, Mass., 360m (830k), E. S. T.— 12:40 P. M., weather forecast. 12:45 P. M., closing report farmers' produce market. 6:30 P. M., closing stock market reports; world market survey, U. S. Dept. Foreign and Domestic Commerce; Boston police reports. 6:45 P. M., code practice. 7 P. M., meeting Amrad Big Brother Club. 7:30 P. M., evening program.

WDAR, Philadelphia, 395m (760k), E. S. T.— 11:45 A. M., daily almanac. 12:02 P. M., organ recital from Stanley Theatre; features from studio; Arcadia Concert orchestra; church services. 2 to 3 P. M., Arcadia concert orchestra; Mrs. Louis Love, "The Care of Children." 4:30 P. M., artist recital. 5:15 P. M., dance music. 5:45 P. M., baseball and sport results. 7:30 P. M., Dream Daddy with boys and girls. 8 P. M., Century Male Quartet and Hayden Club. 10 P. M., Marion Blankenship, harpist.

WLW, Cincinnati, 309m (970k), E. S. T.— 10:30 A. M., weather forecast and business reports. 12:45 P. M., language lesson. 1:30 P. M., business reports. 3 P. M., market reports. 4 P. M., concert for the "Shut-ins." 5:15 P. M., baseball results. 8 P. M., Instrumental Trio.

WGY, Schenectady, 380m (790k), E. S. T.— 11:30 A. M., stock market report. 10:40 A. M., produce market report. 11:45 A. M., weather report. 11:55 A. M., time signals. 5 P. M., produce and stock market quotations; news bulletins; baseball results. 5:30 P. M., adventure story.

WEAF, New York, 492m (610k), E. S. T.— 11 A. M., young mothers' program; health talks; market and weather reports. 4 P. M., Beatrice Godwin, soprano; Nathan Glantz orchestra. 7 to 11 P. M., synagogue services, United Synagogue of America; sport talk by Thornton Fisher; "Introductions to Psychology," by Gardner Murphy; Mary C. Hoffman and Sarah Alter, piano duets; annual meeting National Electric Light Assn. speeches by Hon. Arthur Capper, Senator; Martin J. Insull, Walter H. Johnson, Hon. Herbert Hoover; orchestral selections, announced.

KGW, Portland, Ore., 492m (610k), P. T.— 11:30 A. M., weather forecast. 12:30 P. M., concert by Darby's orchestra. 3:30 P. M., children's program. 7:30 P. M., baseball scores, weather forecast and market reports. 8 P. M., concert by B. P. O. E. Band. 9 P. M., Alexander Hamilton Institute business talk. 10 P. M., dance music by Olsen's Metropolitan orchestra; intermission numbers by Rosarian Quartet.

WFAA, Dallas, Tex., 476m (630k), C. S. T.— 12:30 P. M., musical program by Red-Head Girl of the Dallas Journal.

WDAF, Kansas City, Mo., 411m (730k), C. S. T.— 3:30, 4, 4:30, 5 and 6 P. M., baseball scores. 3:30 P. M., Geary's Missourians. 6 P. M., Market program, weather forecast, time signal and road report; weekly health talk; Tell-Me-a-Story Lady; Fritz Hanlein's Trio Ensemble. 8 P. M., program by Miss De Lore's Dobyns. 11:45 P. M. (Nighthawk Frolic), "Merry Old Chief" and Coon-Sanders orchestra.

KPO, San Francisco, 423m (710k), P. T.— 12 noon, time signals; reading of Scriptures. 1 P. M., Seiger's Fairmont Hotel orchestra. 2:30 P. M., Jack Fait's Entella Cafe orchestra. 4:30 P. M., Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories. 7 P. M., Seiger's Fairmont Hotel orchestra. 8 P. M., Max Bradfield's Versatile Band.

WHAS, Louisville, Ky., 400m (750k), C. S. T.— 4 P. M., Alamo Theatre orchestra; police bulletins; weather forecast; piano solos, Catherine Pilcher; Walnut Theatre orchestra; late news bulletins. 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., official time. 7:30 P. M., agricultural tabloid talk; concert, auspices Miss Bernice Lake; late news bulletins; baseball scores; official time.

WOS, Jefferson City, Mo., 441m (680k), C. S. T.— 8 P. M., "Raising Ton Litters of Pork," by Mr. J. W. Burch. 8:20 P. M., old time fiddling tunes presented by country fiddlers.

CKAC, Montreal, 430m (700k), E. S. T.— 1:45 P. M., Mount Royal Hotel classical program. 4 P. M., weather, news, stocks. 4:30 P. M., Mount Royal Hotel dance orchestra.

KFI, Los Angeles, 469m (640k), P. T.— 4:45 P. M., Evening Herald news. 5:15 P. M., Examiner news. 6:45 P. M., Nick Harris detective stories and concert. 8 P. M., Evening Herald concert. 9 P. M., Examiner concert. 10 P. M., Hollywood-Land Community orchestra. 11 P. M., Cocanut Grove orchestra.

KDKA, Pittsburgh, 326m (920k), E. S. T.— 2:15 P. M., baseball scores. 5 P. M., baseball

scores. 5:30 P. M., Pittsburgh Athletic Association orchestra. 6 P. M., baseball scores; dinner concert. 6:30 P. M., children's period. 6:45 P. M., news bulletins. 7 P. M., program by United Synagogue of America. 7:30 P. M., address, John Duss. 100th Anniversary Harmony Society. 7:40 P. M., Stockman and Farmer market reports. 8 P. M., concert by Black Cat orchestra. 9:55 P. M., time signals; weather forecast; baseball scores.

KYW, Chicago, 536m (560k), C. S. T.— 5 P. M., news, financial and final markets. 5:45 P. M., children's bedtime story. 6 P. M., dinner concert. 7 P. M., musical program. 8:05 P. M., "Good Roads" talk, Chicago Motor Club. 9 P. M., Midnight Revue.

WBZ, Springfield, Mass., 337m (890k), E. S. T.— 5 P. M., dinner concert, WBZ string orchestra. 6 P. M., baseball results. 6:30 P. M., bedtime story for kiddies. 6:40 P. M., WBZ string orchestra. 7:30 P. M., concert by Perry's "Ye Old New England Choir." 9:55 P. M., time signals. 10 P. M., day's events at General Conference of Methodist Episcopal Church. 10:30 P. M., midnight Boston dance concert.

Thursday, May 22

WHN, New York, 360m (830k), E. S. T.— 2:15 P. M., popular musical program, including State Theatre overture and vaudeville acts. 9:30 P. M., Judith Roth singing. 9:35 P. M., Oscar Taylor singing. 9:40 P. M., Wigwam Club orchestra. 10 P. M., classical program by All Nations' Ass'n. 10:30 P. M., Fletcher Henderson's Alabama Club orchestra. 11 P. M., Flo Williams, soprano. 11:15 P. M., Ross Fowler, baritone. 11:30 P. M., Al. Reiser's Dancing Carnival orchestra.

WJZ, New York, 455m (660k), E. S. T.— 4:45 P. M., "Harper's Bazaar" fashion talk. 5 P. M., Briggs Hubbell, baritone, banjoist. 5:15 P. M., Emma Ahlers, soprano. 5:30 P. M., State and Federal agricultural reports; farm and home reports; closing quotations N. Y. Stock Exchange; foreign exchange quotations; "Evening Post" news. 7 P. M., David Cory's Jack Rabbit stories. 7:20 P. M., "Financial Development of the Day." 7:30 P. M., Specht's Lido Venice orchestra. 8:30 P. M., Wanamaker organ recital. 9:15 P. M., debate, "Political Situation." 10:30 P. M., Hotel Majestic dance orchestra.

WJY, New York, 405m (740k), E. S. T.— 7:30 P. M., Doubleday Page, "Kipling." 8 P. M., "Golf," by Innis Brown. 8:15 P. M., West End Choral Club concert from Hotel Astor; chorus of 50 mixed voices; Esther Wilson, soprano; Wilfred Glenn, baritone. 10 P. M., "King Edward as I Knew Him," G. L. Chesterton.

WOR, Newark, N. J., 405m (740k), E. S. T.— 3:15 P. M., Around the Town in thirty minutes, with Gloria Foy, Harry Fox and Jay and Janet Vellie. 3:35 P. M., readings and monologues by John Healy. 3:45 P. M., soprano solos by Marie L. Andrews. 6:15 P. M., Albert E. Sonn, technical editor, "Radio for the Layman." 6:30 P. M., "Music While You Dine," Tom Cooper's Country Club orchestra. 7:20 P. M., resume of day's sports, courtesy Newark Morning Ledger.

WRC, Washington, 469m (640k), E. S. T.— 5:15 P. M., instruction in international code. 6 P. M., Children's Hour by Peggy Albion. 7:45 P. M., "The Question Box." 8 P. M., piano recital. 8:15 P. M., A Talk on Motoring, auspices A. A. A. 8:30 P. M., song recital by T. Edmund Boyer, tenor. 8:45 P. M., dance program by Pete Macias' L' Aiglon orchestra. 9:30 P. M., "The Political Situation in Washington Tonight," by Frederic W. Wile. 9:55 P. M., time signals and weather forecasts. 10 P. M., concert of mandolin, guitar and banjo music by Walter T. Holt studio.

WOAW, Omaha, Neb., 526m (570k), C. S. T.— 9 P. M., program courtesy of Woodmen Circle Federation: Pearl Wood Merry Makers; Woodmen Circle Federation Mixed Chorus; Dollye A. Morris, accompanist; reading, "Radio," by Edgar Guest; selection from "Bohemian Girl"; zither and harp guitar, selected; Wm. C. Kuehn and Sam T. Davis, The Old Timers; Central High School Quartet; Instrumental Trio.

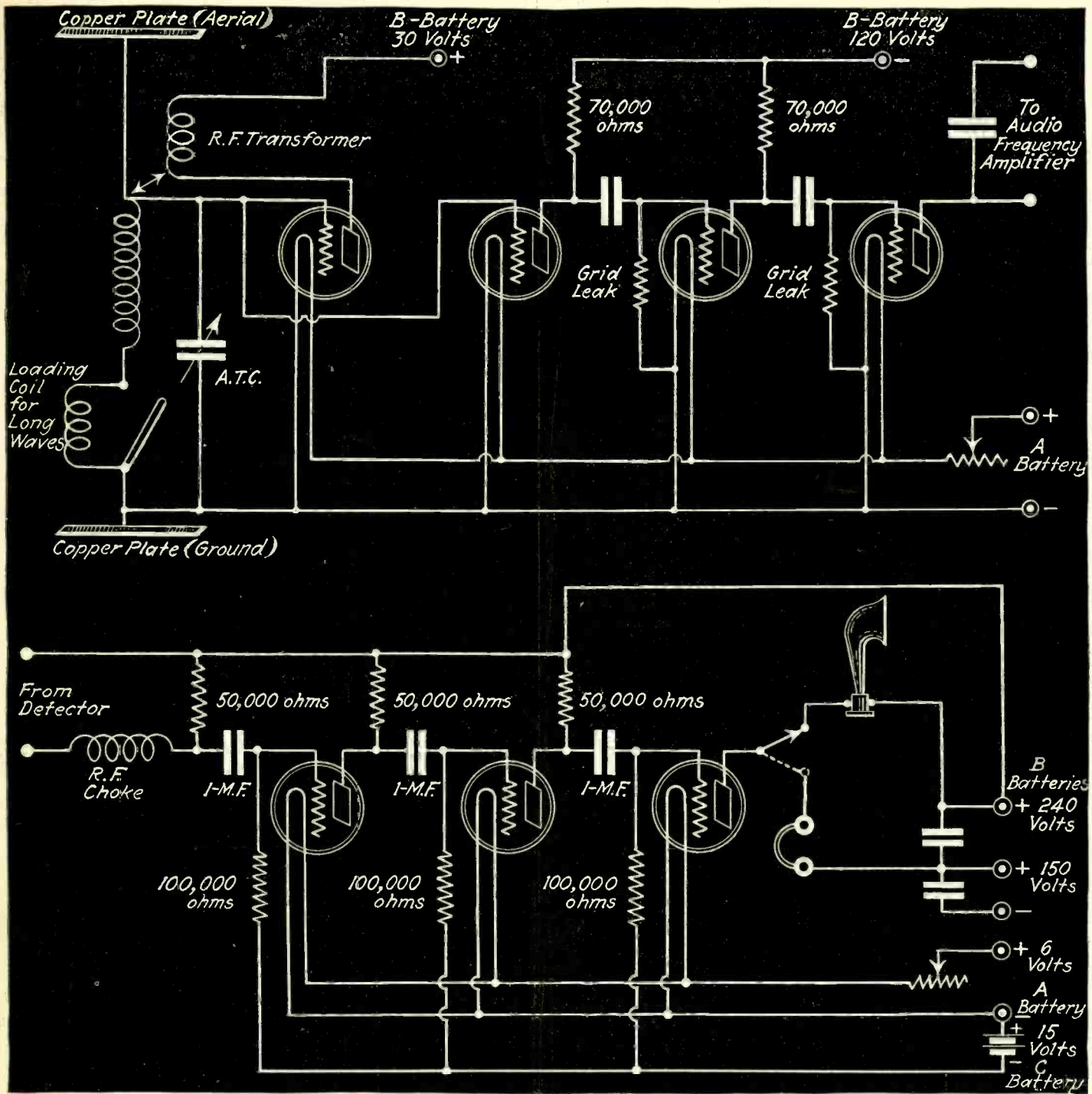
KHJ, Los Angeles, 395m (760k), P. T.— 12:30 P. M., Elizabeth M. Biehl, contralto; The Oakmont Country Club orchestra. 2:30 P. M., matinee musical; 6 P. M., Art Hickman's concert orchestra from Biltmore Hotel. 6:30 P. M., music memory contest, conducted by Fitzgerald Music Co. 7 P. M., children's program, bedtime story by Uncle John. 8 P. M., program courtesy Fitzgerald Music Co. 9 P. M., Jose Arias and his orchestra. 10 P. M., Art Hickman's dance orchestra.

WCAE, Pittsburgh, 462m (650k), E. S. T.— 12:30 P. M., news; weather reports. 3:30 P. M., baseball scores. 4:30 P. M., stock market reports; The Sunshine Girl. 6:30 P. M., dinner concert from William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores; vocal selections by Ben Fields. 8:30 P. M., W. E. Stevenson, tenor; Eugene Garmony, violinist; Miss Margaret Fisher, pianist; Miss Katherine Boggs, soprano; Raymond Grimm, accompanist. 11 P. M., late concert by Boyd's Cameo Six orchestra.

WOO, Philadelphia, 509m (590k), E. S. T.— 11 A. M., grand organ. 11:30 A. M., weather forecast. 12 Noon, luncheon music by Tea Room orchestra. 12:55 P. M., time signals. 4:45 P. M., grand organ and trumpets. 7:30 P. M., sports results and police reports. 10:55 P. M., time signals. 11:02 P. M., weather forecast.

WWJ, Detroit, 517m (580k), E. S. T.— 8 A. M., setting-up exercises. 9:30 A. M., "Tonight's Din-

Designed by A. G. D. West, the Expert Who Built It



HERE'S THE DIAGRAM OF A SET FIT FOR A KING—This seven-tube receiver converted King George, of Great Britain, into a radio fan. Copper plates are used in counterpoise fashion, instead of aerial and ground, when the set is in Buckingham Palace. But the King, when in residence at Windsor Castle, uses a small outdoor aerial.

Broadcasters Pay \$16,500 Music Royalties

ANOTHER battle of composers and broadcasters was staged before the House Committee on Patents, but no decision was announced. Although a compromise agreement is looked for, no legislation is expected this session.

Thirty-six radio broadcasting stations out of about 560 are paying the American Society of Composers, Authors and Publishers \$16,500 per year for the privilege of broadcasting songs copyrighted by members

of the Society, E. C. Mills, an official of the society, testified. Mr. Mills said that WEAf and WCAP are paying the society \$500 each. WOR, he said, is paying the society \$750 a year.

He explained that the Radio Corporation and the other three of the "big four" broadcasters are not paying anything, although the Radio Corporation had offered to enter into a five-year agreement with the society.

He intimated other contracts were expected.

Programs

Friday, May 23 (continued from page 15)

WDAR, Philadelphia, 395m (760k), E. S. T.—11:45 A. M., daily almanac. 12 noon, organ recital from Stanley Theatre; features from studio; Arcadia concert orchestra. 2 to 3 P. M., Arcadia concert orchestra; recital from studio. 4:30 P. M., dance music. 5:45 P. M., baseball and sport results. 7:30 P. M., Dream Daddy with boys and girls. 7:50 P. M., book review. 8 P. M., Spring Garden Quartet.

WLW, Cincinnati, 309m (970k), E. S. T.—10:30 A. M., weather forecast and business reports. 12:45 P. M., language lesson. 1:30 P. M., market reports. 3 P. M., stock quotations. 4 P. M., special program.

WGY, Schenectady, 380m (790k), E. S. T.—11:30 A. M., stock market report. 11:40 A. M., produce market report. 11:45 A. M., weather forecast. 11:55 A. M., time signals. 1 P. M., music and fashion talk. 5 P. M., children's program. 5:45 P. M., children's story. 7:35 P. M., health talk. 7:40 P. M., baseball results. 7:45 P. M., musical program. 10:30 P. M., radio drama, "Cosy Corners," by WGY Players; WGY orchestra.

WEAF, New York, 492m (610k), E. S. T.—11 A. M., musical program announced; market and weather reports. 4 P. M., talks and music for Women's Special Club program; Buddie Stevens, baritone; Charles Schwartz, violinist, accompanied by Samuel Fildes; Clare Miceli, lyric soprano. 7:30 to 10:30 P. M., sport talk by Thornton Fisher; Morris Goodman, violinist; Happiness Boys, Billy Jones and Ernest Hare; Viola Silva, contralto; B. Fischer's dance orchestra; Mendelssohn Quartet.

KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M., weather forecast. 12:30 P. M., Peck Holton's orchestra. 3:30 P. M., lecture by Jesse D. McComb, Oregon College. 7:30 P. M., baseball scores, weather forecast and market reports. 8 P. M., oratorical contest, auspices U. of O. 10:30 P. M., Hoot Owls.

WFAA, Dallas, Tex., 476m (630k), C. S. T.—12:30 P. M., address, Dr. Robert Stewart Hyer, on the Sunday school lesson. 8:30 P. M., W. B. Chenoweth and his Cornfield Symphony orchestra of old fiddlers.

WDAF, Kansas City, Mo., 411m (730k), C. S. T.—3:30, 4, 4:30, 5 and 6 P. M., baseball scores. 3:30 P. M., request program by Davis Radio orchestra. 6 P. M., marketgram, weather forecast, time signal and road report; Tell-Me-a-Story Lady; Fritz Henlein's Trianon Ensemble. 8 P. M., program by Barstow Glee Club. 11:45 P. M. (Nighthawk Frolic), "Merry Old Chief" and Coon-Sanders orchestra.

KPO, San Francisco, 423m (710k), P. T.—12 noon, time signals; reading Scripture. 1 P. M., Seiger's Fairmont Hotel orchestra. 2:30 P. M., organ recital by Theodore J. Irwin. 4:30 P. M., Seiger's Fairmont Hotel orchestra.

WHAS, Louisville, Ky., 400m (750k), C. S. T.—4 P. M., Alamo Theatre orchestra; police bulletins; weather forecast; Walnut Theatre orchestra; late news bulletins. 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 5 P. M., official time. 7:30 to 9 P. M., concert, direction Miss Helen I. Mitchell; late news bulletins; baseball scores.

WOS, Jefferson City, Mo., 411m (680k), C. S. T.—8 P. M., program by Jefferson City Assn. for the Blind; musical numbers by Morning Musical Club.

CKAC, Montreal, 430m (700k), E. S. T.—1:45 P. M., Rex Battle and his Mount Royal Hotel concert orchestra. 4 P. M., weather, news, stocks. 4:30 P. M., the dansant orchestra from Mount Royal Hotel.

KFI, Los Angeles, 469m (640k), P. T.—4:45 P. M., Evening Herald news. 5:15 P. M., Examiner news. 6:45 P. M., vocal concert. 8 P. M., Evening Herald concert. 9 P. M., Examiner concert. 10 P. M., pupils of Myra Belle Vickers. 11 P. M., Coconut Grove orchestra.

KDKA, Pittsburgh, 326m (920k), E. S. T.—3 P. M., baseball scores. 5:30 P. M., organ recital by Paul Fleeger. 6 P. M., baseball scores. 6:15 P. M., Sunday school lesson. 6:30 P. M., the children's period. 6:45 P. M., news bulletins. 7 P. M., baseball scores; Radio Boy Scout meeting. 7:15 P. M., feature. 7:40 P. M., Stockman and Farmer market reports. 8 P. M., concert by Carnegie Tech Glee Club. 9:55 P. M., time signals; weather forecast; baseball scores.

KYW, Chicago, 536m (560k), C. S. T.—5 P. M., news and talks. 5:33 P. M., Dun's review; Bradstreet's review. 5:45 P. M., children's bedtime story. 6 P. M., dinner concert from Congress Hotel. 7:20 P. M., talks under auspices American Farm Bureau Federation. 9 P. M. to 1:30 A. M., Midnight Revue.

WBZ, Springfield, Mass., 337m (890k), E. S. T.—5 P. M., dinner concert by WBZ orchestra. 6 P. M., baseball results; "Sand in the Gears," a dramatized story. 6:30 P. M., bedtime story for kiddies. 9 P. M., concert by Harrison Crawford, baritone and reader; Helex Broderick, cellist; J. Albert Baumgartner, accompanist. 9:55 P. M., time signals.

Saturday, May 24

WHN, New York, 360m (830k), E. S. T.—7:30 P. M., Broadway Jones and Royal Poncianna orchestra. 8 P. M., Jimmy Flynn, tenor. 8:15 P. M., Tom Bracken, popular songs. 8:30 P. M., Ted Newkirk's Harmonica orchestra. 9:15 P. M., Jos. C. Wolfe, baritone. 9:30 P. M., George Roberts and Jimmy Doyle, popular songs. 9:45 P. M., Fitzpatrick Brothers, old-time melodies. 10 P. M.,

musical program announced. 10:45 P. M., Jimmy Clarke and his entertainers. 11 P. M., musical program.

WJZ, New York, 455m (660k), E. S. T.—7:15 P. M., Waldorf-Astoria grill orchestra. 8:15 P. M., F. La Guardia, H. R. "Talk," 8:30 P. M., Anne B. Tundal, soprano. 8:45 P. M., "Radio Service, Its Several Varieties," by Dr. A. N. Goldsmith. 9:05 P. M., Anne B. Tyndal, soprano; Margaret Ludwig, contralto. 9:30 P. M., Helen Ruoss, harpist. 10 P. M., "Kipling," courtesy Doubleday-Page. 10:15 P. M., Mr. and Mrs. Vere Stiles Richards, tenor and soprano, accompanied by Keath McLeod. 10:45 P. M., Club Lido Venice orchestra.

WOR, Newark, N. J., 405m (740k), E. S. T.—3:30 P. M., Joint recital by Nellie Wing, soprano, and Lucy Case, contralto, Georgia Wing, piano. 6:15 P. M., "Music While You Dine," Ernie Krickett's Cinderella orchestra. 7:20 P. M., resume of day's sports, courtesy Newark Morning Ledger. 8 P. M., Gene Ingraham's bell record orchestra. 8:55 P. M., Gertrude Hale trio and assisting artists. 9:40 P. M., Englewood high school orchestra and boys' and girls' glee clubs. 10:20 P. M., program by Manhattan Serenaders.

WRC, Washington, 469m (640k), E. S. T.—5:15 P. M., instruction in International Code. 6 P. M., children's hour, by Peggy Albion. 7:45 P. M., bible talk, auspices Men's Organized Bible Class Assn. 8 P. M., song recital, Carolyn Manning, contralto. 8:15 P. M., talk on U. S. Coast Guard by Oliver M. Maxam. 8:30 P. M., song recital, Ruth Peter, soprano. 8:45 P. M., talk by Honorio Pueyrredon, Ambassador of Argentine. 9 P. M., concert by U. S. Marine Band. 9:55 P. M., time signals and weather forecasts. 10 P. M., concert by U. S. Marine Band.

WOAW, Omaha, Neb., 526m (570k), C. S. T.—6 P. M., dinner program, First Christian Church orchestra. 9 P. M., recital program: piano solos, "Minuet" and "Valse Lucille," Margaret Kolberg, aged 10; violin solo, "Hungarian Dance," Marie Rasmussen, Miss Blanche Burnette, accompanist; vocal solos, "Mother" and "Love's Garden of Roses," Miss Fern Shoup; piano solos, "Papillons," Miss Mildred Guggenmos, "Boating Song," and "Mammy Moon," Ayita Camp Fire Girls; piano solos, "Schnsucht" and "Gavotte," Miss Margaret Carmichael.

KHJ, Los Angeles, 395m (760k), P. T.—12:30 P. M., Mrs. A. R. Price, soprano, Vera Harlet White, pianist. 2:30 P. M., matinee musicale. 6 P. M., Art Hickman's concert orchestra. 6:30 P. M., Music Memory Contest, conducted by Fitzgerald Music Co. 7 P. M., children's program. 8 P. M., program, courtesy Beatrice Fenner, composer. 10 P. M., Art Hickman's dance orchestra from Biltmore Hotel.

WCAE, Pittsburgh, 462m (650k), E. S. T.—12:30 P. M., news; weather reports. 3 P. M., Billy Zoffer's music box cafe orchestra and assisting soloists and entertainers; baseball scores. 6:30 P. M., dinner concert from Wm. Penn hotel. 7:30 P. M., Uncle "Kaybee," 7:45 P. M., baseball scores; vocal selections by Lew Kennedy, Miss Irene Setzler, piano. 8:30 P. M., Mrs. George A. Macredie and Mrs. Roy Nol, piano duets; Miss Margaret Ulbegkin, soprano.

WOO, Philadelphia, 509m (590k), E. S. T.—11 A. M., grand organ. 11:30 A. M., weather forecast. 12 M., luncheon music by the Tea Room orchestra. 12:55 P. M., time signals. 4:45 P. M., grand organ and trumpets. 7:30 P. M., sports results and police reports. 10:55 P. M., time signals. 11:02 P. M., weather forecast.

WWJ, Detroit, 517m (580k), E. S. T.—8 A. M., setting-up exercises. 9:30 A. M., "Tonight's dinner" and a talk by Woman's Editor. 9:45 A. M., Public Health Service bulletins and talks of general interest. 10:25 A. M., weather forecast. 11:55 A. M., Arlington time. 3 P. M., Detroit News orchestra. 3:30 P. M., weather forecast. 3:35 P. M., market reports and baseball scores. 5 P. M., baseball scores.

WOC, Davenport, Ia., 484m (620k), C. S. T.—9 A. M., opening market quotations. 10 A. M., garden and household hints. 10:55 A. M., time signals. 11 A. M., weather and river forecast. 11:05 A. M., government bulletins. 11:15 A. M., closing market quotations. 12 M., chimes concert. 3:30 P. M., educational program, musical numbers pronounced. 5:45 P. M., chimes concert. 6:30 P. M., Sandman's visit. 6:50 P. M., sport news and weather forecast. 9 P. M., orchestra program.

WIP, Philadelphia, 509m (590k), E. S. T.—1 P. M., luncheon music, Gimmel tea room orchestra. 1:30 P. M., weather forecast. 3 P. M., artist students from Frank Oglesby studios. 4 P. M., Wong, Shanghai, China. 6 P. M., weather forecast; final baseball scores. 6:05 P. M., Jordan Lewis dance orchestra. 6:45 P. M., agricultural livestock and produce market reports. 7 P. M., Uncle Wip's bedtime stories and roll call for children.

KSD, St. Louis, 546m (550k), C. S. T.—8 P. M., Missouri theatre orchestra concert specialties broadcast from theatre.

WLAG, Minneapolis, 417m (720k), C. S. T.—8:30 A. M., announcements. 10:45 A. M., household hints. 11:35 P. M., Postcard Club. 7:30 P. M., business message. 9:15 P. M., Twin City Lines Trainsmen's Band. 10:30 P. M., Geo. Osborn's Golden Pheasant orchestra.

WBAP, Fort Worth, Tex., 476m (620k), C. S. T.—7 P. M., review of interdenominational Sunday school lesson and radio Bible class.

WNAC, Boston, 278m (1080k), E. S. T.—10:30 A. M.—WNAC Women's Club talks. 1 P. M., Shepard Colonial orchestra. 4 P. M., Dartmouth Jazz orchestra. 6:30 P. M., WNAC dinner dance; Shepard Colonial orchestra. 8:15 P. M., dance music State Ballroom orchestra. 9:15 P. M., dance music, Hotel Westminster orchestra. 10:15 P. M., dance music, Copley-Plaza orchestra; popular songs between dances.

WSB, Atlanta, Ga., 429m (700k), C. S. T.—12 noon, entertainment. 3 P. M., play-by-play baseball broadcast. 5 P. M., news, sports; Miss Bonnie Barnhardt's songs and Burgess bedtime story. 8 to 9 P. M., Clark Univ. Colored Glee Club. 10:45 P. M., Miss Mary Lansing's vocalists.

WGI, Medford, Mass., 360m (830k), E. S. T.—6:30 P. M., code practice; weather forecast; New England crop notes. 7 P. M., meeting Amrad Big Brother Club. 7:30 P. M., talk on current events. 8 P. M., talk on New England business; musicale.

WDAR, Philadelphia, 395m (760k), E. S. T.—11:45 A. M., daily almanac; organ recital from Stanley Theatre; features from studio; Arcadia concert orchestra. 2:30 P. M., Arcadia concert orchestra. 4:30 P. M., Bobbie Lee and his Cotton Pickers. 7:30 P. M., Dream Lady with boys and girls.

WLW, Cincinnati, 309m (970k), E. S. T.—10:30 A. M., weather forecast and business reports. 1:30 P. M., market reports.

WGY, Schenectady, 380m (790k), E. S. T.—11:30 A. M., stock market report. 11:40 A. M., produce market report. 11:55 A. M., U. S. time signals. 8:30 P. M., dance music by Blue Bird orchestra.

WEAF, New York, 492m (610k), E. S. T.—4 P. M., Carolinians orchestra; James J. Sheeran, leader; Daisey Soffer, soprano, accompanied by Billie Julie Sondant. 7:30 to 12 P. M., bedtime story; Louise Scanlon, soprano; health talk by Dr. W. E. Fitch; Wright Symons, baritone; Mrs. Antoinette Goldwalter, dramatic reader; Ruth Ryan, pianist; Redierne Hollinshead, tenor; Vincent Lopez and orchestra.

KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M., weather forecast. 3 P. M., children's program; story by Aunt Nell. 10 P. M., baseball scores, weather forecast and dance music by George Olsen's Metropolitan orchestra.

WFAA, Dallas, Tex., 476m (630k), C. S. T.—12:30 P. M., address, Hugo Swan, manager Dallas Better Business Bureau. 8:30 P. M., reader, pianist and singer from faculty of State Teachers' College. 11 P. M., Adolphus Hotel orchestra, dance music.

WDAF, Kansas City, Mo., 411m (730k), C. S. T.—3:30, 4, 4:30, 5 and 6 P. M., baseball scores. 3:30 P. M., Riley-Ehrhart orchestra. 6 P. M., marketgram, weather forecast, time signal and road report; Tell-Me-a-Story Lady; Fritz Henlein's Trianon Ensemble. 11:45 P. M. (Nighthawk Frolic), "Merry Old Chief" and Coon-Sanders orchestra.

KPO, San Francisco, 423m (710k), P. T.—12 noon, time signals. 1 P. M., Seiger's Fairmont Hotel orchestra. 2:30 P. M., program by members police department. 3:30 P. M., tea dansant; Bradfield's Versatile Band. 8 P. M., Art Weidner and his popular artists.

WHAS, Louisville, Ky., 400m (750k), C. S. T.—4 P. M., Walnut Theatre orchestra; police bulletins; weather forecast; contralto solos, Miss Caroline Gauld, accompanied by Miss Genevieve Schlosser; Alamo Theatre orchestra; late news bulletins. 4:50 P. M., local livestock, produce and grain market reports. 4:55 P. M., baseball scores. 7:30 to 9 P. M., concert, auspices Ben Alley Vocal Studio; an interesting historical episode; late news bulletins; baseball scores; official time.

CKAC, Montreal, 430m (700k), E. S. T.—7 P. M., kiddies stories in French and English. 7:30 P. M., Rex Battle's Mount Royal Hotel concert orchestra. 8:30 P. M., La Presse Studio entertainment. 10:30 P. M., Smith's Mount Royal Hotel dance orchestra.

KFI, Los Angeles, 469m (640k), P. T.—4:45 P. M., Evening Herald news. 5:15 P. M., Examiner news. 6:45 P. M., vocal concert. 8 P. M., Crosby Sisters and Sigma Pi Violin Trio. 9 P. M., Examiner concert. 10 P. M., popular song concert. 11 P. M., Coconut Grove orchestra.

KYW, Chicago, 536m (560k), C. S. T.—5:45 P. M., children's bedtime story. 6 P. M., dinner concert from Congress Hotel. 7 P. M., musical program courtesy Sherwood Music School. 8 P. M., talk by Vivette Gorman, home economics. 8:15 P. M., Youth's Companion stories, articles and humorous sketches. 8:15 P. M. to 12:30 A. M., late show.

WBZ, Springfield, Mass., 337m (890k), E. S. T.—11:55 A. M., time signals; weather reports; Boston market report. 5 P. M., dinner concert by Leo Reisman ensemble. 5:45 P. M., dinner dance music by Leo Reisman's orchestra. 6 P. M., baseball results. 6:05 P. M., Leo Reisman and his orchestra. 6:30 P. M., bedtime story for kiddies. 6:40 P. M., concert by Hotel Kimball Trio.

KDKA, Pittsburgh, 326m (920k), E. S. T.—5 P. M., baseball scores. 5:30 P. M., dinner concert by Westinghouse Band. 6 P. M., baseball scores. 6:30 P. M., children's period. 6:45 P. M., Last Minute Helps to Teachers. 7 P. M., baseball scores; sports review by James J. Long. 7:15 P. M., feature. 8 P. M., concert by Westinghouse Band.

Sunday, May 25

WOAW, Omaha, Neb., 526m (570k), C. S. T.—9 A. M., radio chapel service, by Rev. R. R. Brown, pastor, Omaha Gospel Tabernacle, minister Sunday Morning Radio Congregation, and associates. 2 P. M., matinee program, First Christian church orchestra, and soloists: "Marche Pontificale," "Moment Musical," "Intermezzo Russe," orchestra; piano solo: "Prelude in G. Minor," Marie Uhlig; "Eleanor," "Basket of Roses," "Valse Danseuse," orchestra; soprano solo, "How Beautiful Upon the Mountain," Mrs. T. R. Huston, Pearl Howard Melvin, accompanist; "La Czarine," mazurka, orchestra; piano solo: "Hungarian Rhapsody No. 5," Pearl Howard Melvin; "Barcarole," "Scari Dance," orchestra. 9 P. M., musical chapel service by Calvary Baptist

(Continued on next page)

Tells How He Built His "Super-Het"

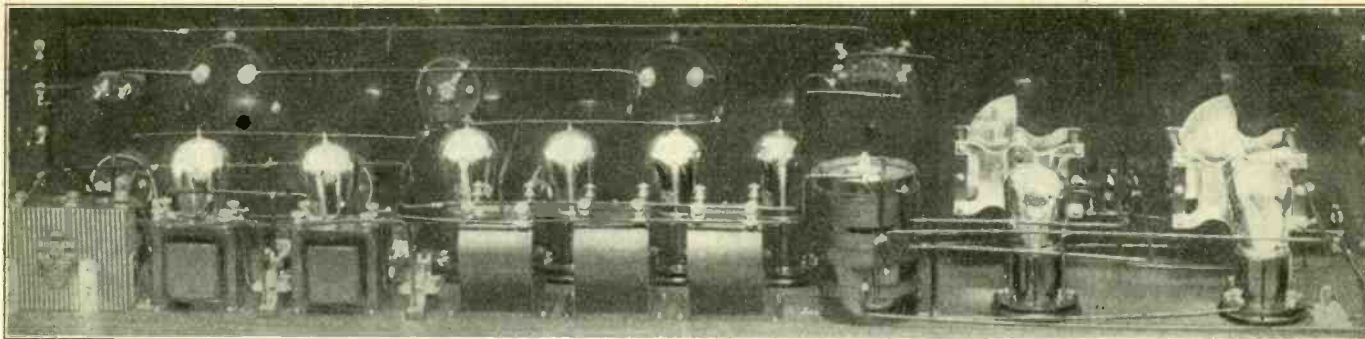


FIG. 2—How to mount the parts.

(Concluded from page 11)

fastened as securely as possible by means of the threaded rod which passes through the core and holds together the discs of which it consists. The filter coupler requires a brass rod similar to that used in the transformers, the discs being threaded on it as in the other. The windings consist of 6,000 turns in both primary and secondary and are spaced one inch apart. This loose coupling provides great selectivity and very little static interference passes through it to the radio-frequency amplifier. The oscillator coupler is wound on a bakelite tube two and three-quarter inches O. D. by four inches long. Starting one-eighth inch from the end, four small holes are drilled to fasten the beginning and end of the No. 18 DSC wire. Twenty turns are wound and then, starting back over the twenty, eighteen more are wound in the same direction. The next winding consists of twenty-two turns, is wound in the same direction as the bottom twenty of the first winding and is spaced one-eighth inch from the other. A space of three-quarters inch is left and eight more turns wound, the ends of which are fastened, by passing the wire through two small holes drilled $\frac{1}{4}$ " apart. This leaves about $\frac{1}{2}$ " of tubing and on this end fasten two small brackets for base mounting.

In the wiring diagram, we will consider this end the bottom of the oscillator coupler. If it is desired, collodion may be used to protect the windings, but it should be used sparingly.

The oscillator coupler and the radio transformers are next mounted on the baseboard, care being taken to place them so that the binding posts are nearest to

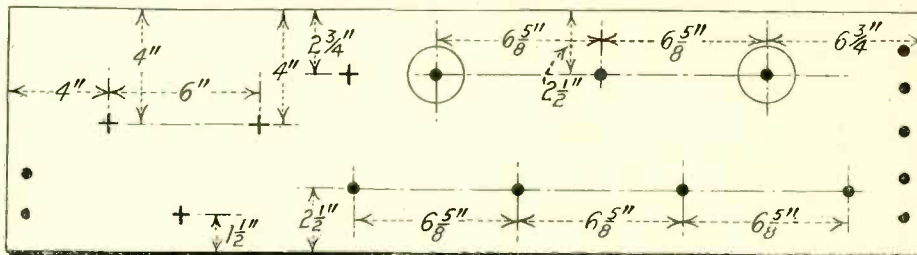


FIG. 1—Panel layout of Foley Super-Heterodyne.

the socket terminals they are to be fastened to. The audio transformers are next placed in position, and the other fixed condensers in the remaining space, care being taken to stick to the accompanying photo as closely as possible, so as to keep leads short. In wiring the set use a heavy bus bar, and if spaghetti is used, get the varnished cambric tubing. In the construction of this set you will find it cheaper to buy the finest equipment. It is important that very good audio transformers be used, and I have found Kellogg 3-1 ratio to be the best for this work. All fixed condensers should be of the mica variety and tested.

If you stick rigidly to my instructions you will have no trouble in successfully constructing this set. The Super-Heterodyne is no more difficult to construct than any regenerative set, except there is more detail work, and the chief reason some fail is they substitute and make changes. If you wish to experiment with the design, the best time is after you have had the set in operation. The parts needed:

- 1 panel 8" x 40" x $\frac{1}{4}$ " bakelite.
- 1 cabinet 8" x 40" x 8".
- 1 General Instrument .0005 mfd. variable condenser.

- 1 General Instrument .001 mfd. variable condenser.
- 1 6-ohm Pacent rheostat.
- 3 20-ohm Pacent rheostats.
- 1 375-ohm Pacent potentiometer.
- 8 Na-Ald De Luxe sockets.
- 1 Weston 0-5 ammeter.
- 1 Weston 0-10 voltmeter.
- 8 binding posts.
- 3 Resas intermediate frequency transformers or parts to build them.
- 1 Resas 10,000-meter coupler or parts to build it.
- 1 Resas oscillator coupler or parts to build it (described herewith).
- 2 Kellogg 3-1 audio transformers.
- 1 Cutler-Hammer battery switch.
- 2 1 mfd. fixed condensers.
- 4 .00025 mfd. Dubilier fixed condensers, type 601gt.
- 4 Daven resistances, one of 1 megohm, three of $\frac{1}{2}$ megohm.
- 3 good jacks (two double circuit and one single circuit).
- 2 Univernier dials.
- 1 Mydar switch lever.
- 1 .001 Dubilier fixed condenser.
- Lugs, bus bar, spaghetti and miscellaneous hardware.

(Continued from preceding page)

Church, Rev. Howard Clarkson Whitcomb, pastor. personnel quartet: Mrs. E. N. Carson, soprano; Carl F. Helgren, tenor; Miss Mabel Johnson, alto; Phil Helgren, bass.

WCAE, Pittsburgh, 462m (650k), E. S. T.—3 P. M., People's radio church services, conducted by a minister from International Bible Students' Association. 6:30 P. M., dinner concert from Wm. Penn hotel.

WOO, Philadelphia, 509m (590k), E. S. T.—10:30 A. M., morning services from Bethany Pres. church; organ recital from 10:30 to 10:45 by Miss Caroline Quigg; church services at 10:45 with sermon by Rev. A. Gordon MacLennan, pastor. 2:25 P. M., musical exercises of Bethany Sunday school. 3:15 P. M., old-time hymns and melodies, sacred chimes recital by Wanamaker grand organ.

WWJ, Detroit, 517m (580k), E. S. T.—11 A. M., services at St. Paul's Episcopal Cathedral. 2 P. M., Detroit News orchestra.

WIP, Philadelphia, 509m (590k), E. S. T.—4:30 P. M., services by Dr. B. G. Wilkinson broadcast from Germantown Theatre. 7:30 P. M., evening service from Holy Trinity Church. 9:30 P. M., symphonic concert, Ben Stad's WIP Little Symphony orchestra and Karl Bonawitz, organist.

WBAP, Fort Worth, Tex., 476m (620k), C. S. T.—11 A. M., complete services, First Presbyterian Church. 4 P. M., organ concert from Rialto Theatre; Miss M. A. White, organist. 5 P. M., concert by Sallie Belle Matthews' orchestra. 7 P. M., sport review. 11 P. M., popular program, Crockett's Texans orchestra.

WSB, Atlanta, Ga., 429m (700k), C. S. T.—11 A. M., First Pres. Church service. 5 P. M.,

Dallas, Ga., M. E. Church choir. 7:30 P. M., Wesley Memorial Church service.

WGI, Medford, Mass., 360m (830k), E. S. T.—4 P. M., twilight program; adventure hour; musicale. 8:30 P. M., evening program; talk, auspices Greater Boston Federation of Churches; musicale by Sagamore Quartet.

KGW, Portland, Ore., 492m (610k), P. T.—6 P. M., church services by Rev. A. B. Snider. Portland Council of Churches. 7 P. M., Olsen's concert orchestra dinner program; baseball scores.

WFFA, Dallas, Tex., 476m (630k), C. S. T.—6 P. M., Radio Bible Class; Bible study and Gospel song. 9 P. M., Netto Male Quartet, vocal recital. 10 P. M., City Temple orchestra.

WDAF, Kansas City, Mo., 411m (730k), C. S. T.—3:30, 4, 4:30, 5 and 6 P. M., baseball scores. 4 P. M., program by choir of Maywood Baptist Church.

KPO, San Francisco, 423m (710k), P. T.—11 A. M., undenominational and non-sectarian church services; soloist, Ruth May Friend, soprano. 8:30 P. M., Seiger's Fairmont Hotel orchestra.

WOS, Jefferson City, Mo., 441m (680k), C. S. T.—7:30 P. M., religious service of Central Evangelical Church, Rev. E. W. Berlekamp, pastor; Prof. F. J. Ziesberg, organist.

CKAC, Montreal, 430m (700k), E. S. T.—4:30 P. M., vocal and instrumental concert.

KYW, Chicago, 536m (560k), C. S. T.—10 A. M., Central Church service; musical program, direction Daniel Protheroe. 1:30 P. M., studio chapel service, direction Chicago Church Federation. 6 P. M., preliminary service, Chicago Sunday Evening Club. 7 P. M., regular meeting, Chicago Sunday Evening Club.

Monday, May 26

WOAW, Omaha, Neb., 526m (570k), C. S. T.—6 P. M., piano recital by pupils of Nettye S. Witt. 6:30 P. M., dinner program by Randall's Royal orchestra. 9 P. M., program featuring Omaha Elks' Band.

WCAE, Pittsburgh, 462m (650k), E. S. T.—2:30 P. M., news; weather reports. 3:30 P. M., baseball scores; library news. 4:30 P. M., stock market reports; The Sunshine Girl. 6:30 P. M., dinner concert from William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores. 8:30 P. M., Helen Coulter, soprano; Mrs. H. F. Logsdon, pianist; Miss Ruth Cunningham, accompanist. 11 P. M., late concert.

KFAE, Pullman, Wash., 330m (910k), P. T.—8:30 P. M., Violin solos, Raymond Howell; Chemistry Applied to Agriculture. Prof. J. L. St. John; flute solos, Percy Severance; Value of Cow Testing Tours, Don G. Magruder; soprano solos, Miss Vay Kerns; piano numbers, Ivor Melander.

WBAP, Fort Worth, Tex., 476m (620k), C. S. T.—7:30 P. M., concert by Carl Venth Club, Texas Woman's College. 9:30 P. M., concert by Roanoke Fiddle Band.

KGW, Portland, Ore., 492m (610k), P. T.—11:30 A. M., weather forecast. 3:30 P. M., literary program. 7:30 P. M., baseball scores, weather forecast and market reports. 8 P. M., Rose Festival Invitational program. 9:30 P. M., program by Gul Reazee Grotto.

WDAF, Kansas City, Mo., 411m (730k), C. S. T.—3:30, 4, 4:30, 5 and 6 P. M., baseball scores. 3:30 P. M., Milo Finley's dance and concert or-

(Concluded on page 30)

Here's What Broadcaster Must Sign

RADIOGRAMS

The March of Events

THE American Telephone and Telegraph Company, at the request of RADIO WORLD, has supplied for publication the form of contract granted by it to WHN, New York City. The license fee was \$2,000. WHN was sued by the A. T. & T. for infringement, but the case was settled by the signing of the contract.

W. E. Harkness, assistant vice-president of the A. T. & T., wrote:

AMERICAN TELEPHONE and TELEGRAPH CO.
Bell System
195 BROADWAY

New York, April 24, 1924.

EDITOR, RADIO WORLD:
This is in reply to your letter of April 14, 1924, addressed to Station WEAJ.

We are very glad to give you full information in regard to our practice in licensing, under our patents, infringing broadcasting stations. There are attached two copies each of license forms R-B-21 and RB-22.

In answer to your question, form RB-21 is the form of license agreement under which station WHN has been licensed and the right to broadcast for hire is included.

The license fees are based on the power in watts of the antenna circuit as determined by the government rating in the broadcasting license for the station issued by the Department of Commerce, and are Four Dollars (\$4.00) per watt with a minimum fee of Five Hundred Dollars (\$500.00) and a maximum fee of Three Thousand Dollars (\$3,000.00).

The license form RB-21 is offered to stations with a power of less than 750 watts, and in consideration of the smaller license fee paid the license is for a specified maximum power. The maximum license fee of Three Thousand Dollars (\$3,000.00) means that the station is licensed for any power and it is for this purpose that license form RB-22 has been prepared. Stations licensed for a specified power may at any time obtain a license for increased power upon payment of the difference between the license fee already paid and the license fee for higher power.

The license fee is not an annual or recurring charge, but is one payment covering the life of the various patents involved. The license fee may be paid in its entirety at the time the license agreement is executed or, if the licensee prefers, it may be distributed in any number of monthly payments up to twelve. We wish to have the total fee paid within a period of one year.

When a station is licensed the licensee is released from all claims for past infringement of our patents and is licensed to continue to use his present equipment for radio telephone broadcasting. While the licensee may purchase on the open market ordinary non-infringing apparatus for use in his station, the license does not give him the right to purchase additional infringing equipment for repair or replacement parts or for any other purpose, such as to increase the power of the station. Adequate arrangements have been made, however, for supplying the licensee with such requisite apparatus for future use.

Very truly yours,

W. E. HARKNESS,
Assistant Vice-President.

WHN signed the following:

LICENSE AGREEMENT. FORM No. RB21

AGREEMENT made this.....day of..... 192.., between the AMERICAN TELEPHONE AND TELEGRAPH COMPANY, a New York corporation, herein called the "Telephone Company," and WHN, herein called the "Licensee."

WHEREAS, the Telephone Company owns or controls certain inventions pertaining or applicable to radio telephone broadcast transmission, included among which are those set forth in the following letters patent of the United States:

879,532	Feb. 18, 1908	L. De Forest
1,129,942	Mar. 2, 1915	H. D. Arnold
1,129,943	Mar. 2, 1915	H. D. Arnold
1,137,315	Apr. 27, 1915	R. A. Heising
1,201,270	Oct. 17, 1916	L. DeForest
1,201,272	Oct. 17, 1916	L. DeForest
1,218,195	Mar. 6, 1917	C. V. Logwood
1,231,764	July 3, 1917	F. Lowenstein
Re. 14,380	Oct. 23, 1917	E. H. Colpitts
1,314,252	Aug. 26, 1919	L. DeForest
1,329,283	Jan. 27, 1920	H. D. Arnold
1,349,252	Aug. 10, 1920	H. D. Arnold
1,377,405	May 10, 1921	L. DeForest
1,442,146	Jan. 16, 1923	R. A. Heising
1,442,147	Jan. 16, 1923	R. A. Heising
1,452,032	Apr. 17, 1923	J. F. Farrington

and WHEREAS, the Licensee is operating a radio telephone broadcasting station at No..... Street, in the City of....., and is desirous of securing a license under the patents of the Telephone Company to continue to use said broadcasting station;

NOW, THEREFORE, in consideration of the premises and of the mutual agreements herein contained, it is agreed as follows:

1. The Telephone Company hereby releases the Licensee from all claims for past infringement of

NATIONAL HEADQUARTERS of the American Legion has opened an official Legion radio broadcasting station in Chicago. From it, formal announcements intended for the general public as well as for three quarters of a million Legionnaires will be broadcast at least twice a week. Sunday afternoons and Tuesday evenings will be the official Legion "nights on the air." On those days, brief addresses will be made by prominent speakers. The remainder of each program will be devoted to musical numbers and other forms of popular entertainment. The Legion Station is known as W T A S -286 meters wave length. It is owned by Charles E. Erbstein, a Chicago attorney.

IRVING BERLIN, song-writer, who is also owner of the music publishing business known as Irving Berlin, Inc., denounced the music publishing firm of Waterson, Berlin & Snyder, with which he was connected some years ago, for using his name in connection with the radio broadcasting question. Waterson, Berlin and Snyder are attempting to restrain the American Society of Authors and Composers from broadcasting music published by them but composed by members of the society. The music publishing firm claims that a contract with the society to transfer the performing rights of the works of its members does not include the right to lease the song to broadcasters.

THE RECEIVING STATION of the British Broadcasting Company, London, picked up a puzzling clicking sound the other day, which later proved to be more heart beats broadcast from KDKA, East Pittsburgh. The sound at first defied detection.

A THEATRICAL WEEKLY publishes a "house ad" asking performers to buy space in its department, "Radio Entertainers." It is for musicians, singers, readers, speakers, elocutionists and "patterers" to pay for ads offering their services free. Stations do not pay artists for appearing before the microphone.

WGN has succeeded in broadcasting phonograph records which were recorded in New York City from the broadcast program.

When WGN went on the air with its inaugural program, March 29, Frank Hoyt, inventor of a method of recording broadcast reception, tuned in at his laboratories in New York and recorded his reception of the program on aluminum disks. He succeeded in recording virtually all of the program, which continued from six p. m. Saturday evening to six a. m. Sunday morning. A part of these records were brought to

its patents arising out of the Licensee's use prior hereto of said broadcasting station.

2. The Telephone Company hereby grants to said Licensee, subject to the terms and conditions hereinafter stated, a personal, non-transferable license to continue to use said station, but only for radio telephone broadcasting (including broadcasting for toll or hire), under the patents above recited and under all other patents covering said broadcasting station as now constituted, which are now, or which may hereafter be, owned by the Telephone Company or under which it has control of like rights for radio telephone broadcasting.

3. The Licensee hereby agrees to pay to the Telephone Company for the license herein granted to it the sum of Dollars, payable in monthly installments of Dollars each, on or before the 10th day of each month following the date of this agreement; the receipt of the first of said payments being hereby acknowledged by the Telephone Company.

4. It is understood and agreed that the license fee above stated is based upon the operation of said station with a maximum power of

Chicago by him and under his supervision broadcast April 10 to Donald B. McMillan. The experimental call letters 9XN were used by WGN.

A NEW musical organization was introduced over the other waves when the Capitol Theatre Broadcasting Orchestra gave its first performance as a unit on the program broadcast by S. L. Rothafel last week. Mr. Rothafel announces that the new organization will be a regular part of the weekly radio concerts from the Capitol.

BROADCASTING direct from the Montauk Club in Brooklyn, station WJZ transmitted in full the address by Chauncey M. Depew at the banquet tendered him in honor of his 90th birthday by that club.

A REMARKABLE demonstration of the possibilities of short wave amateur radio communication was given recently when a message was transmitted by private amateur radio stations from Bristol, England, to Vancouver, British Columbia, a distance of more than 6,000 miles, in a little more than an hour.

"THE AIR will be the 'battleground' of the next presidential campaign, and radio will play an unprecedented role in the coming election," declared David Sarnoff, Vice President and General Manager of the Radio Corporation of America, in an address before a distinguished gathering of Chicago business men at the Chicago Association of Commerce. "For the first time in the history of an American presidential election, rival presidential candidates will appeal through the forum of the air, to the American electorate."

WJZ, broadcasting station of the R. C. A., from 7:20 to 7:30 p. m. daily, except Saturday and Sunday, now broadcasts "The Day's Financial Developments." Thus the business man, though far from any ticker, can tell to a penny each night how far he is ahead of the game in the merry whirl of Wall Street.

A \$20,000 THEFT having been committed in New York, the police broadcast a general alarm for Henry F. Niemeyer, formerly head bookkeeper for the Eastern States Refrigerating Company, the victim. A policeman in Tucson, Ariz., heard the description. Arresting a young man for speeding in a luxurious sedan with his bride, the policeman noticed the description tallied with the appearance of the speeder. So Niemeyer was taken to New York and lodged in the Tombs.

watts delivered to the antenna, and no present license is granted for the operation of said station with greater power. The Telephone Company agrees that it will at any time upon request of the Licensee grant to him a license under its patents for the operation of said station for radio telephone broadcasting with a greater power, upon terms commensurate with the license fee herein.

This license is subject to revocation by the Telephone Company upon violation by the Licensee of any of its foregoing provisions including failure of the Licensee to pay, when due, the above mentioned license payments.

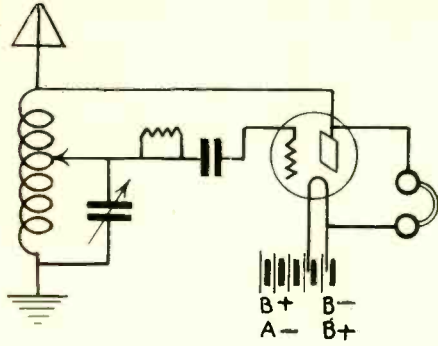
IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed the day and year first above written.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY,
By.....
Vice-President.

By.....
The other form is substantially the same as the above, except as explained in Mr. Harkness' letter.

WHAT IS WRONG HERE?

THE wiring in the accompanying diagram is wrong. If you find what you think is the error, write to Wrong Diagram Editor, RADIO WORLD, 1493 Broadway, New York City. The names and addresses of those sending in the right answer will be published.



Wrong Diagram No. 3

gram Editor, RADIO WORLD, 1493 Broadway, New York City. The names and addresses of those sending in the right answer will be published.

The following sent in the correct answers to Wrong Diagram No. 1, published May 17:

- L. M. Church, Aid Office, War Dept., Washington, D. C.
- Fred Hoffman, Jr., 1963 61st Street, Brooklyn, N. Y.
- Fred Himmelsbach, Jr., (age 14), 1012 88th St., Woodhaven, N. Y.
- H. W. Coblentz, 1542 N. Capitol Street, Washington, D. C.
- Ralph B. Hall, Y. M. C. A., Warren, Pa.
- Wm. Hummler, 79 171st Street, Jamaica, N. Y.
- Robert T. Searing, Box 979, Hamilton, N. Y.
- Bernard S. Shay, 3016 Holmes St., South Minneapolis, Minn.
- A. F. Santoleri, 339 N. 64th Street, Philadelphia, Pa.
- Lyna R. Harris, 73 Waverly Street, Roxbury, Mass.
- Clifford Braithwait, 18 Grove Street, Hempstead, L. I.
- Roy Clough, 12 State St., Marblehead, Mass.
- Christopher Albach, 469 E. 136th St., New York City.
- Harold Flanders, 717 W. South St., Salina, Kan.
- Watson K. Phillips, 213 S. Fifth Street, Philadelphia, Pa.
- George J. Boehm, 25 Russell Street, Brooklyn, N. Y.
- Joseph Samek, 2543 Church Avenue, Brooklyn, N. Y.
- Robert Burkhan, Kent School, Kent, Conn.
- C. Struppmann, 1 Shippen Street, Weehawken, N. J.
- H. B. Watkins, 274 Franklin Street, Springfield, Mass.
- A. Karp, 105 E. 104th Street, New York City.
- Wm. Filler, 1741 Washington Avenue, New York City.
- Alfred E. Ritter, 250 Crocus Avenue, Floral Park, N. Y.
- Dr. A. W. Hinchman, Burch Bldg., Breckenridge, Tex.
- E. S. Ledbeller, Carrollton, Tex.
- Reuben H. Durney, 418 Main Street, Camden, N. J.
- Byron Clark, Temple, Tex.
- Leslie Cartwright, Wilcox, Pa.
- Clifford J. Fritch, 2007 Third Avenue, Detroit.

- Thomas Bulger, 365 Cathedral Parkway, New York City.
- F. C. Arnold, 104 No. West St., Waukegan, Ill.
- John L. Parent, 263 Riverdale Avenue, Yonkers, N. Y.
- Coates S. Mowbray, Y. M. C. A., Warren, Pa.
- H. S. Miller, 1335 Fifteenth Street, N. W., Washington, D. C.
- Rollin Jenny, 414 Jackson Avenue, Endicott, N. Y.
- Edw. Plevka, 426 East 77th Street, New York City.
- J. G. Dozier, P. O. Box 438, Harrisville, R. I.
- Mortimer F. Drudy, 8825 76th Street, Woodhaven, N. Y.
- G. M. Yacum, Jr., 135 So. Arkansas Avenue, Atlantic City, N. J.
- Benjamin M. Martin, 216 61st Street, Brooklyn, N. Y.
- Chas. Root, 357 Myrtle Avenue, Albany, N. Y.
- Thos. H. Lucking, 23 Birch Street, Derry, N. H.
- Jos. M. Ridout, Jr., Mt. Ida, Alexandria, Va.
- Adrian Marshall, Brookline, N. H.
- Norman D. Mattison, 118 Union Street, Montclair, N. J.
- Russell Baker, care of Mrs. M. E. Adams, Fryeburg, Me.
- Robt. S. Skull, 136 E. Queen Street, Chambersburg, Pa.
- Edw. Hill, Shelton, Conn.
- Ray Love, 328 E. 12th Street, New Albany, Ind.
- Richard J. Aubin, 25 Jefferson Street, Schenectady, N. Y.
- La Verne Auchue, 37 N. Sibley Street, Fond du Lac, Wis.
- Edward Turner, 932 1/2 Florida Avenue, N. W., Washington, D. C.

(To Be Continued)

LITERATURE WANTED

THE names and addresses published below are those of readers of RADIO WORLD who desire manufacturers of and dealers in radio sets, parts and supplies, to send literature on their products.]

- The Wonder, 5-10-25 cent store, 582 Main Street, Springfield, Mass.
- Edw. Turner, 932 1/2 Florida Avenue, N. W., Washington, D. C.
- R. U. Gladwin, Indrio, Fla.
- Daniel Wallace Kane, 49 Park Place, Princeton, N. J.
- Herald Radio Co., 366 Cathedral Parkway, New York City.

Dry Battery Conference Asks Standardization

WASHINGTON. REPRESENTATIVES of nine dry battery manufacturers, four electric companies, two telephone companies, a railroad, the American Railway Association and nine government departments met at the Bureau of Standards at a preliminary conference on dry cell standardization. Standard performance tests for radio filament and plate batteries were adopted at the conference. Standardization of B battery sizes, at least of the unit cells, was proposed. A special sub-committee will be appointed by Dr. G. W. Vinal, of the Bureau of Standards. The committee decided not to require a "noise" test of batteries since they were not believed responsible for sufficient noises to make these tests worth while. The committee also was instructed to recommend standard designations for all dry cells.

Safe Transport of Troops Due to Radio

WASHINGTON.

COMMANDER D. C. Bingham, U. S. N. in a recent speech here, said that the direction finder was largely responsible for the ineffectiveness of the German U-boats in preventing the movement of American troops to France.

The U-boats had radio and they talked. Allied shore stations equipped with direction finders could thus locate them and would follow them throughout their journeys. The approximate location of the U-boats being thus known, the troop ships were routed around them.

There are four factors to be considered in a naval force, the Commander said. They are: 1, communications; 2, mobility; 3, armament; 4, protection. Victory, he

said, might well go to the side that has the best communication, as that side could dispose of its force more effectively.

Stations Now Are Using Trained Reporters

TRAINED reporters are now employed by several broadcasting stations and are supplying the listeners with material prepared on the same basis as is found in newspapers.

The impresario of Station WRC has arranged with Mrs. W. A. Du Puy, reporter and lecturer on national and international affairs, to speak each Monday afternoon, giving a weekly review of women's affairs.

MAGNAVOX Radio Products



M1—\$35.00

Magnavox Reproducer for dry battery receiving sets

THIS new semi-dynamic Magnavox Reproducer is particularly recommended for dry battery receiving sets where low voltage and low current consumption tubes are used. The M1 is supreme in its class.

Magnavox Reproducers

- R2 with 18-inch curvex horn \$50.00
- R3 with 14-inch curvex horn \$35.00
- M1 with 14-in. curvex horn. Requires no battery for the field . \$35.00

Magnavox Combination Sets

- A1-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 1 stage of amplification \$59.00
- A2-R consisting of electro-dynamic Reproducer with 14-inch curvex horn and 2 stages of amplification \$85.00

Magnavox Power Amplifiers

- A1—new 1-stage Power Amplifier \$27.50
- AC-2-C—2-stage Power Amplifier \$50.00
- AC-3-C—3-stage Power Amplifier \$60.00

Magnavox products can be had at Registered Magnavox Dealers everywhere. Write for new 32-page catalogue.

The Magnavox Company Oakland, California

New York Office: 350 West 31st Street
Canadian Distributors: Perkins Electric Limited, Montreal

WHAT IS AN INVENTION?
 How to obtain a patent and other valuable information is supplied in our FREE Booklet. Write for a copy today.
MANUFACTURERS PATENT CO., Inc.
 70 WALL STREET, NEW YORK

Workman Radio Service
 "THE ACCENT IS ON SERVICE"
 16 Vesey St. New York

VARIOCOUPERS

\$3.50	Workrite 180° Silk Wound	\$2.95
3.50	Fisher, Large, 90°	2.75
2.75	Fisher, 150°	2.25
4.25	Special Bank Wound Coupler for Haynes Circuit (with diagram)	3.25
7.00	Ambassador Coil (with diagram)	5.50

VARIOMETERS

\$3.50	Workrite	\$2.95
5.00	Pathé Moulded	2.25
3.50	Fisher, Large	2.85

CONDENSERS

\$2.00	R. C. 11 plate	\$1.05
2.35	R. C. 23 plate	1.35
2.75	R. C. 43 plate	1.65

VERNIER CONDENSERS

\$4.00	R. C. 23 plate	\$2.25
5.00	R. C. 43 plate	2.95

PHONES

\$18.00	DR. SEIBT IMPORTED "SUPER HEADSET"	\$5.90
\$12.00	N. & K., Imported	\$5.90

The above items are just a few of our numerous attractive priced articles, which are contained in our BULLETIN OF RADIO PARTS. Gladly sent to you upon request.

Army's Battle Set Improved; Now a 2-Man Transmitter

THE most difficult problem of the Army Signal Corps has always been to keep headquarters in close contact with the troops advancing in the field of battle, and during the World War this means of radio communication was found inadequate, according to officers of the army. Recently signal experts have developed a satisfactory portable field radio set for infantry battalions, with the result that presently an improved set will be placed in operation.

The radio-telegraph transmitting set for infantry field use, known as S. C. 77, has been modified and improved in several features, giving it an increased range and better stability. The set complete now weighs only 75 pounds, and is a "two-man" set; that is, one man can carry the batteries and another the set itself. A new method of operation and improvements, so that any VT-1 tube will operate satisfactorily in the oscillator socket, have been achieved. The set box, known as BC-9 A, has been redesigned for carrying the apparatus in the field.

The sending key is arranged to short a large resistance in series with the plate circuit.

When the sending key is depressed, the set operates at full power, with full plate voltage. When it is released, the large plate resistance, thereby inserted, causes a large reduction in the effective plate voltage so that the set oscillates weakly. When receiving, therefore, it causes but slight interference to a nearby set, receiving on the same tuner (wavelength) setting. It is then possible for all the stations in a net to use a common tuner setting. The

other tuner settings may be assigned to adjacent nets, which may then be operated at one time.

SUPERDYNE

THE WONDER CIRCUIT

Tremendous Volume!

D. X. Without an Aerial

Original Globe Coils

With Complete Wiring Instructions and Diagram.

\$6.25 Postpaid **\$6.25**

Globe Radio Equipment Co.
 217 WEST 125th STREET NEW YORK

CAUGHT

with worn-out dry cell "B" batteries? Purchase the economy way. Build a rechargeable "Hawley" knockdown "B" storage battery consisting of large-size Edison elements, special molded extra heavy flat bottom glass vials, (not ordinary thin test tubes), special nickel wire, 200 hole hard rubber perforated separators, rubber stoppers, chemical electrolyte; in fact, everything for the actual making of battery, including, free, an 8-page illustrated folder showing the simple putting together, making of a charger, and charging. 4 volt, \$6.25; 90 volt, \$9.90; 100 volt, \$10.50; 150 volt, \$14.25; 200 volt, \$17.00. Unconditional guarantee or money refunded. 30 day trial. Pioneer dealer. B. W. Smith, 31 Washington Ave., Danbury, Ct.

Supremacy Proven by Every Test

FILKO-STAT
 THE SCIENTIFICALLY CORRECT RADIO RHEOSTAT

TOWER'S

TOWER'S Scientific
 WEIGHS ONLY 80Z
 Perfect Tone Mates
\$2.95
 Plus a few cents postage



OUR \$200,000.00 COMPANY STANDS SQUARELY BACK OF EVERY HEADSET

WORLD'S GREATEST HEADSET VALUE

Formerly \$6.00, now \$2.95, with Notable Improvements

Longer Cord (full 5 feet), Stronger Magnets, Higher Resistance, Increase of Sensitivity, Perfect Tone Mates

EVERY SET TESTED BY LICENSED RADIO OPERATORS

Send no money - Order on a Post-Card

THE TOWER MFG. CO., Dept. D. 98 BROOKLINE AVENUE, BOSTON, MASS.

Scientific

How Radio Compares to Other Industries

By PEARCE W. MACK
Vice-President, Acme Apparatus Co.

THE growth of radio from an educational and social standpoint has been so rapid that it has somewhat obscured its importance and significance as an industry.

Even yet it is not generally realized that radio within a few short years, has become one of the major industries of the country. Some idea of its magnitude may be realized from the fact that annual sales of radio at present amount to more than those of sporting goods and cameras, are one-fourth as large as furniture sales, three-fourths as great as jewelry, and the same for musical instruments.

In actual figures, sporting goods, cameras, etc., show an annual value of about \$185,000,000. Sales of radio equipment aggregate almost twice as much as all kinds of sporting goods. Likewise the annual value of radio business is nearly twice as great as that of the carpet and rug business.

Roger W. Babson, statistician and business authority, recently forecast that on a basis of figures for the year 1923, it is probable that the American people will spend approximately \$350,000,000 for radio equipment during the present year. He estimated the annual business in vacuum tubes alone at about \$50,000,000.

Brisbane Broadcasts

ARTHUR BRISBANE spoke over WEAf. He said:

"I would like to say to you ladies and gentlemen, that to my mind radio as a circulator is without a peer.

"We of the newspapers have thought for years that we commanded the great medium of information to the world at large.

"But it must be confessed that of all the mediums, none today compares with the radio; it goes beyond the range and reaches a vastness the newspaper can not cope with."



CHALFONTE-HADDON HALL ATLANTIC CITY

Hospitable, homelike. In the very center of things.
On the Beach and the Boardwalk.

For more than fifty years, these two delightful hotels have been the natural choice of cultivated, interesting people—bent on happy, health-giving days by the sea.

American Plan Only. Always Open.
Illustrated folder and rates on request.

LEEDS and LIPPINCOTT COMPANY





Actual Size

2500 Miles with One Myers Tube!

Remarkable radio reception is an every-day result with MYERS TUBES. Mr. W. E. Gerard, 73 Pine Avenue, St. Lambert, Montreal, Canada, using only one MYERS TUBE, hears KDZB, Bakersfield, California.

Get distance with clarity. MYERS are the only tubes correctly designed for radio without bunched leads. Two types—for dry or storage battery. Insist on MYERS at your dealer's—otherwise send purchase price and be supplied post-paid. Write for free circuit diagrams.

\$5

EACH, complete with mounting clips ready to mount on your set; no sockets or extra equipment required.

F. B. Myers Co. Ltd.
Radio Vacuum Tubes
240 CRAIG STREET, W.
MONTREAL, CANADA

FILL OUT AND MAIL NOW

SUBSCRIPTION BLANK

RADIO WORLD

RADIO WORLD

1493 Broadway, New York City

Please send me RADIO WORLD for.....months, for which

please find enclosed \$.....

SUBSCRIPTION RATES:

Single Copy	\$.15
Three Months	1.50
Six Months	3.00
One Year, 12 Issues.....	6.00
Add \$1.00 a Year to Foreign Postage; 50c for Canadian Postage.	

S-U-P-E-R-D-Y-N-E

The Circuit Featured by RADIO WORLD

The most satisfactory radio circuit yet developed. Any locality, all conditions. Equal in all respects to five tube Neutrodyne, but more simple to tune and no critical adjustments.

Local and Long Distance With or Without Ground
With or Without Aerial Maximum Volume
Perfect Reproduction

Our engineers have developed the coils for this circuit to its highest perfection. Coils for Superdyne (complete with diagram)..... **\$6.50**

Kits consisting of two Flewelling Condensers and complete set of coils (with diagram)..... **\$19.50**

Complete parts assembled on engraved Radion Panel, and base panel with necessary bus bar ready to wire (diagram and plan furnished) at **\$65.00**

Contrary to usual practice, all parts included in this kit are the very best quality on the market, and workmanship first class.

RESULTS GUARANTEED

Flewelling Condensers in stock. Mail orders solicited.

WALLACE RADIO COMPANY, Inc.

135 LIBERTY STREET,

NEW YORK

COSMOPOLITAN PHUSIFORMER

The Missing Link in Radio

15-17 WEST 18th ST.

NEW YORK



ULTRADYNE

the Improved Super-Heterodyne. Send 50c for book giving complete details of drilling, assembling, wiring and tuning 6 and 8 tube ULTRADYNE Receivers.

50c
Phenix Radio Corp., 5-9 Beekman St., N. Y. C.

BROOKLYN RADIO SERVICE CO.

Mail Order Dept.

577 Myrtle Avenue

BROOKLYN, N. Y.

TUBES		SOCKETS		TRANSFORMERS RADIO	
Genuine R. C. A. Tubes (all types)	\$3.92	Fada	.79	Coto Coll.	\$.69
PHONES		Tillman	.35	Acme R-2, 3, 4	3.25
Western Elect.	\$9.45	De Forest	.50	Acme 30K Super-Heterodyne	4.20
Federal	4.50	Bell	.69	Atwater Kent	3.80
Dictagraph	4.60	Hoosick Falls	.60	Tri Coll A.	1.90
Brandes	3.95	Pacent, 199	.40	Erla Reflex	3.25
Baldwin Type C.	7.29	Federal	.79	Rasia RT6	3.00
Ambassador	3.98	General Radio	.89	Rasia CR	3.25
N. & K.	6.50	Workrite, 199	.60	Ovi	1.65
Frest	3.25	PLUGS		UV 1714	3.60
LOUD SPEAKERS		Federal	\$.69	RR 1716	6.75
Magnavox, M-1	\$21.95	Pacent	.45	TRANSFORMERS PUSH PULL	
Dictagraph	17.50	Weston	.89	Como Duplex	\$9.90
Pathe	11.98	Red R. I.	.89	All American	9.50
Manhattan	15.00	Pilot	.50	Modern	10.00
Music Master	21.95	DIALS		VOLT METERS	
Magnavox, R-3	24.50	Amsco, 2"	\$.30	Jewel, 0-50 Volts	\$2.25
Plugs Included.		Amsco, 3"	.50	Jewel, 0-12-120 Volts	9.85
STORAGE "A" BATTERIES		Amsco, 4"	.79	Sterling, 0-50 Volts	1.73
60 Amp.	\$9.95	De Forest, 3"	.35	Sterling, 0-35 Amp.	.89
90 Amp. Yale	12.45	De Forest, 4"	.40	Sterling, 0-35 Amp., 0-50 Volts	3.00
120 Amp.	15.75	Pathe, 2"	.30	PANEL MTGS.	
Guaranteed 18 months.		Pathe, 3"	.40	Sterling, 0-10 Amp.	\$3.50
CHARGERS		Pathe, 4"	.55	Sterling, 0-5 Amp.	3.50
Rectigon, 2 Amp.	\$14.40	Federal, 3"	.50	Sterling, 0-100 Volts	4.00
Rectigon, 5 Amp.	22.40	Federal, 4"	1.15	German Meters, 0-50 Volts	1.25
Tungar, 2 Amp.	14.40	TRANSFORMERS AUDIO		SETS	
Tungar, 5 Amp.	22.40	Star, 3 to 1	\$2.60	AK 5 Tube	\$78.50
Acme A, 2 Amp.	9.75	Star, 6 to 1	2.95	Grebe CR 12	112.00
Acme A & B, 2 Amp.	11.20	U. V. 712	5.20	Grebe CR 9	65.00
Ward Leonard, D.C.	8.75	Modern, 4 to 1	3.95	Grebe CR 14	77.00
RHEOSTATS		Modern, 10 to 1	4.40	Collin B. Kennedy	65.00
Filkostat	\$1.59	Acme	3.25	Fada, 160	78.00
Fada	.60	All American	3.35	Fada 5 Tube	65.00
Amsco (all styles)	.95	Federal No. 65	4.90	CROSLY XJ	40.00
C. Hammer, 6 Ohm	.79	Thordarsen, 3 1/2 to 1	2.80		
Bradlevstat	1.49	Thordarsen, 6 to 1	3.20		
Pacent	.79	Jefferson No. 41	3.20		
Klossner	.59	Amertran	4.55		
Federal No. 18	.79	Erla, 3 to 1	3.75		
		Erla, 6 to 1	3.95		
		Federal No. 226	3.25		

Allow us to quote on any parts or standard sets.

Send 5c. in stamps for catalogue.

Join the A. B. C.

THE American Broadcast Club, formed under the auspices of RADIO WORLD, has for its object the promotion of the welfare of the broadcast listeners of the United States and Canada.

Membership is open to all interested in radio in any way, either as broadcast listener, dealer, manufacturer, wholesaler or jobber.

A novel feature of the A. B. C. is that membership entails no duties or obligations whatever. There are no dues. All you have to do is enroll. That will signify your interest in radio and make you one of the thousands unselfishly united in a common interest.

All you have to do to join is to send in your name and address on a postcard or in a letter.

Address, A. B. C. Editor, RADIO WORLD, 1493 Broadway, New York City.

Some New Members

- Harold Flanders, 717 W. South Street, Salina, Kan.
- H. C. Austin, New Hope, Pa.
- Edgar F. Morris, 542 Dean Street, Brooklyn, N. Y.
- John B. Keene, 1162 Ingersoll Street, Winnipeg, Can.
- Bernard M. Shay, 3016 Holmes Avenue, South Minneapolis, Minn.
- Roger M. Smith, Stockton, Ill.
- T. C. Ashley, 1913 Elm Avenue, Portsmouth, Va.
- Edw. Plevka, 426 E. 77th Street, New York City.
- F. Howard Bain, 141 W. Seventh Avenue, Tarantum, Pa.
- A. E. Baldwin, District Wire Chief, Chenango & Unadilla Tel. Corp., Norwich, N. Y.
- R. A. Garrett, 1625 Omohundro Avenue, Norfolk, Va.
- Basil C. King, 55 Moutray Street, Toronto, Can.
- Roy T. Roedelbroun, 451 Gregory Avenue, Weehawken, N. J.
- Angelo Sterchele, Box 122, Elmer Road, Vine-land, N. J.
- Mark W. Dunnigan, 3701 Lonna Vista Avenue, Oakland, Cal.
- Fred M. Bullock, Evansville, Wis.

(To be Continued)

RECEIVER BARGAINS

- Radiola Super-Heterodyne, portable type. \$180.00
- Radiola Super VIII 335.00
- Knockdown Complete 5 tube Neutrodyne 28.95
- \$350. Radiola Grand with 4 tubes and batteries 153.00
- Super-Heterodyne, Parts for 7 tube set. 82.95
- New 201A Tubes, in lots of three (ea.) 2.50

Order direct or write for full description. Cut prices on Standard Radio Supplies. Send stamp for list.
THOMAS RADIO SUPPLY CO.
111 W. S. Dix St. Muncie, Ind.
Live Proposition to Dealers.

RADIO WORLD'S VACATION NUMBER

JUNE SEVENTH

75,000 radio buyers look to this Vacation Number each year to see what they will buy in radio for their summer home, or take with them on their vacation.

Heretofore the radio business has sagged in Summer. Extra sales effort is needed; when one is motoring up hill we step on the gas, and over the hill we go. Advertising is the gas of radio merchandising.

There will be extra reader interest in RADIO WORLD'S Vacation Number, increased circulation, and many new radio vacation ideas, so this issue will be treasured, kept and bring advertisers orders weeks, even months, afterwards.

RADIO WORLD offers a weekly advertising service at a lower rate than any national radio publication, approaching 75,000 readers.

RADIO WORLD'S SPECIAL VACATION ISSUE JUNE 7TH

Closing Dates, first form (best positions), May 27th. Last form, May 29th.

FLAT ADVERTISING RATE:

\$5 an Inch, \$50 a Column (11 inches) \$150 Page (7 1/4 x 11 inches)

RADIO WORLD, 1493 Broadway, New York

Telephones: Lackawanna 6976-2063

Burnt-Out Tubes Replaced for \$2.50



ROYALTRON TUBES

- Types (.06 Amp.)
- 199
- 1/4 Amp.)
- WD12
- 1/4 Amp.)
- 200
- 1/4 Amp.)
- 201A

A Wonderful Tube for Your Superdyne.

The Only Tube with a Replacement Guarantee Against Breakage or Blowout.

Burnt-out, Defective or Broken Tubes of any brand or make whatsoever will be replaced by a brand new (not refilled) Royaltron Tube, at a cost of only \$2.50. Take this advertisement with your old tubes to any ROYALTRON dealer, or send them direct to us with \$2.50.

It is with the Object of Advertising the MERITS of ROYALTRON Tubes, that we make the above unusual offer.

Every ROYALTRON Tube is accompanied by a money-back guarantee. The only 200 on the market that draws 1/4 Amp. PRICE, WITHOUT BURNT-OUT TUBE \$4.00

Approved by the Radio News and World Laboratories

Royal Manufacturing Co.
206 BROADWAY NEW YORK
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Shorthand Contest by Radio, May 24

STATION WJZ, New York City, in cooperation with the Gregg Shorthand School, will broadcast the Second Annual Radio Shorthand Contest at 3 P. M., Eastern Daylight Saving Time (2 P. M. Eastern Standard Time) on Saturday, May 24. The contest is open to any shorthand-writing radio fan who is able to receive the dictation broadcast. A specially installed set in the Hotel Pennsylvania will receive the dictation for the teachers and pupils attending the meeting of the Shorthand Teachers Association, while all other contestants throughout the country will receive the dictation by radio.

Contestants will attach their transcription to their shorthand notes and mail them to station WJZ, New York City, before midnight of May 24. Address WJZ, Aeolian Building, New York City.

Six gold medals will be awarded as follows: For the best transcript received from a teacher at the meeting in the hotel; for the best transcript received from a student at the meeting; for the best transcript received from a teacher at any other point; for the best transcript received from a student at any other point; for the best transcript received from a stenographer at any point; for the best transcript received from any writer—student, teacher, or stenographer—from the most distant point.

The dictation will be given by Charles L. Swem, winner of the World Shorthand Championship in 1923.

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New Patents

Radio Receiving Apparatus

No. 1,473,417: Patented Nov. 6, 1923. Patentee: Frank G. Beetem, Philadelphia, Pa.

THIS invention relates to radio receiving systems employing audions or vacuum tubes.

One of the objects of my invention is to provide a suitable regulating device for the filament circuit of an audion or vacuum tube, so arranged with adjustable hand-operated resistances that any given setting for the filament excitation may be obtained and afterward the filament current and voltage will remain substantially constant, irrespective of normal changes in the voltage of the battery or other source supplying this filament circuit.

It is a well known fact that the voltage of primary or secondary batteries varies throughout the discharge of the battery. Starting at a given point the tendency is for the voltage to decrease more or less steadily with time during the period when current is being drawn from the battery. With some forms or types of batteries this voltage regulation is very poor and so in the case of the filament circuit of audion or vacuum tubes, compensation for the decrease of voltage of the battery exciting the filament is made from time to time with adjustable resistances in series with the filament in the battery circuit, the amount of resistance included in the filament circuit being varied by manual adjustment to maintain constant current.

In some types of radio receiving apparatus, and especially with batteries having poor voltage characteristics, the necessity for constant adjustment is exceedingly objectionable and frequently results in the loss of signals or portions thereof, which under the conditions of a constant filament current would not occur.

A particular object of my invention is to render it possible to use any type of battery, at least for a considerable period, without the necessity for constant adjustment. To accomplish this, I propose to include in the filament circuit a device which will, within the limits of its particular design, automatically maintain a constant filament-current and consequently a constant filament temperature.

Further, the invention has for an object the provision of suitable means for simplifying the control of audions or vacuum tubes in the reception of oscillations of definite radio frequency by providing automatic means for maintaining constant current in the filament circuit of the audion in combination with manual means for making the initial adjustment whereby the automatic means is operated at its point of maximum effectiveness and at the same time the current in the filament is adjusted to the desired value, and is thereafter maintained at said value automatically and without further manual adjustment, notwithstanding variations in the voltage of the source of current.

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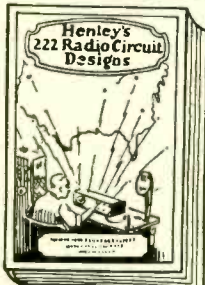
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SECRETARY of Commerce Hoover has
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position of a new radio language.

The writer says he has discovered, not
invented, this universal tongue, which he
claims is as old as time and space. He
pointed out that it needs no dictionary nor
encyclopedia, the words being built up on
a logical basis as they are needed. They
are readily deciphered by the same process
by the one who receives them visually,
audibly or electrically, he explains. There
are only three basic verbs, and yet it has
none of the narrow limitations of any of
the national languages. "It is not an artifi-
cial language as Volapuk, Idom, Neutral,
Esperanto, Ido or other attempts to solve
the question," he adds. The suggested
scheme is based upon an underlying prin-
ciple of nature; viz, "the sounds of nature
are a perfect cosmometric hieroglyph," and
as such are a perfect container of all
phenomena, the writer asserts; explaining
that the newly discovered speech can be
written and spoken by those who have
knowledge and know how to use that knowl-
edge scientifically and in accordance with
logical principles, but the ignorant or the
half intelligent cannot do so.

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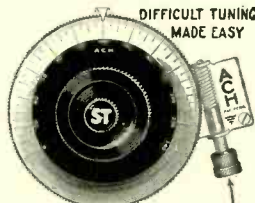
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Programs

Monday, May 26 (concluded from page 19)

chestra. 6 P. M., marketgram, weather forecast, time signal and road report; "Request Story Night," by the Tell-Me-a-Story Lady. Fritz Hanlein's Trianon Ensemble. 8 P. M., Fritz Hanlein's Trianon Ensemble and the Plantation Players. 11:45 P. M. (Nighthawk Frolic), "Merry Old Chief" and the Plantation Players.
 WHAZ, Troy, N. Y., 380m (760k), E. S. T.—9 P. M., popular dance music by Campus Serenaders, Rensselaer Polytech. Inst. students' or-

chestra, and assisting artists; education talk on chemical engineering.
 KPO, San Francisco, 423m (710k), P. T.—12 noon, time signals; reading Scripture. 1 P. M., Seiger's Fairmont Hotel orchestra. 2:30 P. M., Miss Audrey Farncroft, soprano, accompanied by Harriet Murton; Harland McCoy, basso; Robert Terrill, trombone; Henry Halstrom, accompanist. 4:30 P. M., Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories. 7 P. M., Seiger's Fairmont Hotel orchestra. 8 P. M., organ recital by Theodore J. Irwin. 9 P. M., violin music, pupils of Sigmund Anker. 10 P. M., Bradfield's Versatile Band.
 WOS, Jefferson City, Mo., 441m (680k), C. S. T.—8 P. M., program of novelty numbers by Frank G. Robertson, one-man band artist.
 CKAC, Montreal, 430m (700k), E. S. T.—1:45 P. M., Mount Royal Hotel luncheon concert. 4 P. M., weather, news, stocks. 4:30 P. M., Mount Royal Hotel dansant orchestra.

Tuesday, May 27

WOAW, Omaha, Neb., 526m (570k), C. S. T.—6 P. M., speaker's half-hour. 6:30 P. M., dinner program, Pat's Melody Boys. 9 P. M., program, courtesy Midland College, Fremont, Neb., songs, "Dance of the Romaika," "My Sunshine."
 WCAE, Pittsburgh, 426m (650k), E. S. T.—12:30 P. M., news; weather reports. 3:30 P. M., baseball scores. 4:30 P. M., stock market reports; the Sunshine Girl. 6:30 P. M., dinner concert from William Penn Hotel. 7:30 P. M., Uncle Kaybee. 7:45 P. M., baseball scores; Charles Mundy, tenor; Miss Olga Mundy, accompanist. 8:30 P. M., Jack Morgan, tenor soloist, and assisting artists. 11 P. M., late concert by artists from Loew's Aldine Theatre.
 WBAP, Fort Worth, Tex., 476m (620k), C. S. T.—7:30 P. M., concert by band of Josephine, Tex. 9:30 P. M., concert by Carl Venth and E. T. Croft.
 KGW, Portland, Ore., 492m (610k), P. T.—11:15 A. M., market basket. 11:30 A. M., weather forecast. 12:30 P. M., Civic Music Club of Portland. 3:30 P. M., talk by Jeanette P. Cramer, home economics. 7:30 P. M., baseball scores; weather forecast and market reports. 7:45 P. M., talk for farmers.
 WDAF, Kansas City, Mo., 411m (730k), C. S. T.—Baseball scores at 3:30, 4, 4:30, 5 and 6 P. M. 3:30 P. M., Joseph Black's Sexton cafe concert orchestra. 6 P. M., marketgram; weather forecast; time signal and road report; the Tell-Me-a-Story Lady; Fritz Hanlein's Trianon Ensemble. 11:45 P. M., Nighthawk Frolic, the "Merry Old Chief" and Plantation Players.
 KPO, San Francisco, 423m (710k), P. T.—12 noon, time signals. 1 P. M., Seiger's Fairmont Hotel orchestra. 2:30 P. M., organ recital by Theodore J. Irwin; 4:30 P. M., Seiger's Fairmont Hotel orchestra. 5:30 P. M., children's hour stories. 6:30 P. M., Cleveland Six orchestra. 7 P. M., Seiger's Fairmont Hotel orchestra. 8 P. M., Stanford University band and Glee Club. 10 P. M., Bradfield's Versatile band.
 CKAC, Montreal, 430m (700k), E. S. T.—4 P. M., weather; news; stocks; music. 7 P. M., kiddies' stories in French and English. 7:30 P. M., Rex Battle's Mount Royal Hotel dinner concert orchestra. 8:30 P. M., Liner "Canada" orchestra; talks. 10:30 P. M., J. C. Smith's orchestra.

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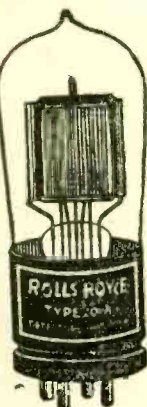
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If it isn't just right and you used GOOD parts, you can use same panel, same layout and, in a few hours' easy work, turn it into a Kladag Coast-to-Coast On Loud Speaker Receiver that takes its hat off to nothing. Scores have done this. We'll send you complete, simple instructions, hook-up, extra part and enuf real gold sheathed bus wire, prepaid, for \$5.00. Descriptive sheet only—10c. Radio list for stamp. We accept U. S. stamps same as cash. KLADAG RADIO LABORATORIES, KENT, OHIO

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Winding Coils for Superdyne

(Concluded from page 23)

CLOCKWISE. No insulation, other than that on the wire itself, is used to separate the two windings. FOUR turns of wire may be used instead of six on the primary winding where the receiving set is close by several broadcasting stations. Coil LF-1 is the tickler coil and is wound on a wooden or moulded bakelite standard rotor 3/8-inch maximum diameter. It consists of 36 turns of No. 22 DSC wire, 18 turns on each side of the rotor, wound CLOCKWISE. Thus far, coils L, L-1 and LF-1 are wound in a CLOCKWISE direction.

Now comes the catch, the pitfall, that has baffled countless builders of the Superdyne. As explained in Part I, the regeneration in the Superdyne circuit is controlled by the reverse feedback principle, which enables the radio-frequency tube and the detector to be tuned to resonance without allowing the circuit to spill over.

Here is how we obtain this reverse feedback:

Coil L-2, which has 46 turns of No. 22 DSC wire, with a tap taken from the 25th turn, as shown in the diagram published May 17, is wound COUNTER-CLOCKWISE. In other words, holding the form with its ends to your left and right, and starting from the left-hand side of the tube, with the right hand on top of the form, wind from RIGHT to LEFT, or TOWARD you. This is exactly opposite to the way in which the first three coils were wound.

When the tickler or rotor is fastened at the top of the stator (Fig. 2), the top of the bottom winding on the stator should be approximately on a level with the top winding on the stator. A slight variation in this is permissible. Care should be taken, however, that the rotor be centered, as shown in Fig. 3. The wires from all these coils can be left long, or brought to small lugs fastened onto the winding tube.

The panel should be tackled next. With a try-square, rule a line 3 1/2 inches from the top, right across the panel, from one side to the other. That is the guide for laying out the condensers. The dimensions, location and size of the holes are given in the accompanying panel layout (Fig. 4). Drill each hole slowly, starting from the back of the panel. As the drill

is just about to break through, turn the front side. This is to prevent the drill from breaking through and marring the surface. The holes for the bezels may present a difficulty to the average experimenter, and if he cannot make them, any machine shop will do the job inexpensively.

The schematic diagrams (Figs. 2 and 3) show the location of the various parts.

[The third and final installment will be published next week, May 31 issue.]

Have You a Neutrodyne?



Does it howl? Is it hard to control? Do you wish to eliminate neutralizing condensers and double the efficiency of your receiver? TECHNIFORMERS are so extremely efficient that the sensitiveness of a receiver incorporating them is unsurpassed. There is no inductive coupling between them, and as a result, neutralizing condensers and potentiometers are not required to stop oscillation.

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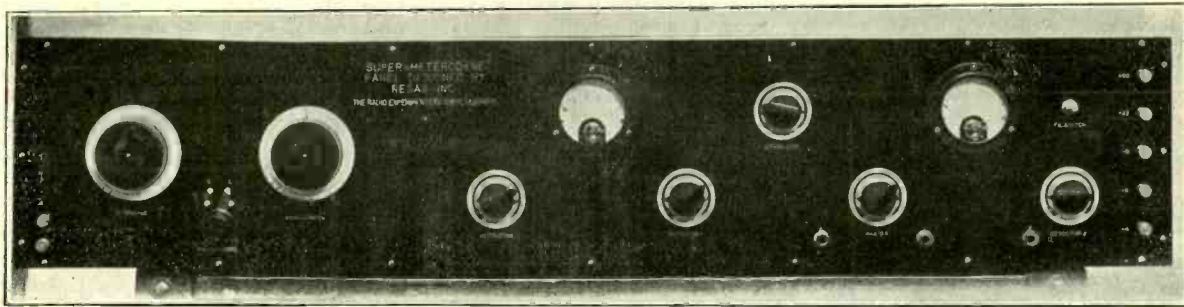
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8 TUBE SUPER-HETERODYNE



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Construct for yourself, using genuine Resas parts, an exact duplicate of the set on which Frank P. Foley received 5SC, Glasgow, Scotland, on March 17, 1924, at 5.19 P. M. (See picture in April 26th issue, Radio World.) For the first time all the improvements incorporated in the super-heterodyne by Frank P. Foley are given to the radio public.

8 Tube Super-Heterodyne Kit Complete Unassembled \$140.00

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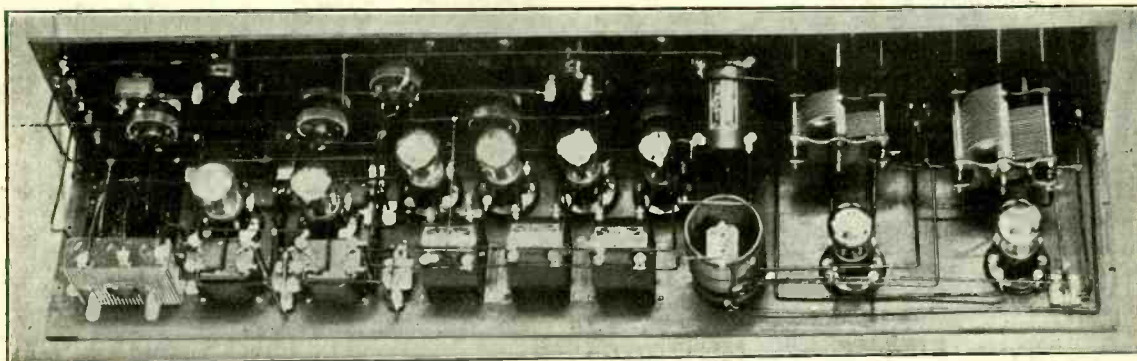
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| <ul style="list-style-type: none"> 1 Bakelite Panel, 8x40x$\frac{1}{4}$", drilled, buffed and engraved. 1 Mahogany Cabinet, 8x40x8, Removable Base. 1 Specially Constructed Grounded Rotor Condenser, capacity .001 M.F.D. 1 Specially Constructed Grounded Rotor Condenser, capacity .0005 M.F.D. 3 Resas Super-Heterodyne Transformers, the finest obtainable for intermediate frequency amplification, | <ul style="list-style-type: none"> 1 Resas 10,000 Meter Coupler, whose unique design affords unequalled selectivity. 1 Resas Oscillator Coupler, permitting smooth, even control of oscillations. 8 Na-Aid De Luxe Sockets (bayonet contacts). 2 Kellogg 3-1 Audio Frequency Transformers. 4 Dubilier .00025 mfd. Fixed Condensers. 4 Special Resistences. 1 Dubilier .001 mfd. Fixed Condenser. | <ul style="list-style-type: none"> 1 Weston Model 301 Voltmeter, 0-10 Volts. 1 Weston Model 301 Ammeter, 0-5 Amps. 4 Pacent Rheostats. 1 Pacent 375 ohm Potentiometer. 7 Binding Posts, nickeled. 1 Cutler-Hammer Battery Switch. 2 1-Microfarad Fixed Condensers. 3 Jacks (Phosphor Bronze Contacts). 1 Mydar Wave Change Switch. 1 Grid Bias Battery. 2 Univernier Dials, Geared. |
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All necessary hardware for above

Complete detailed constructional data with each kit giving full constructional information and photographs which makes wiring so simple that a boy can build this set.

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