Piano Technicians
Journal

March 1985

Technicians are known by the parts they keep.

When technicians order genuine Steinway parts from Steinway & Sons, New York, they receive the same parts that go into a new Steinway piano. Which is exactly what their clients expect. In fact, technicians who mean business make a point of letting Steinway owners know that they only use the genuine article.

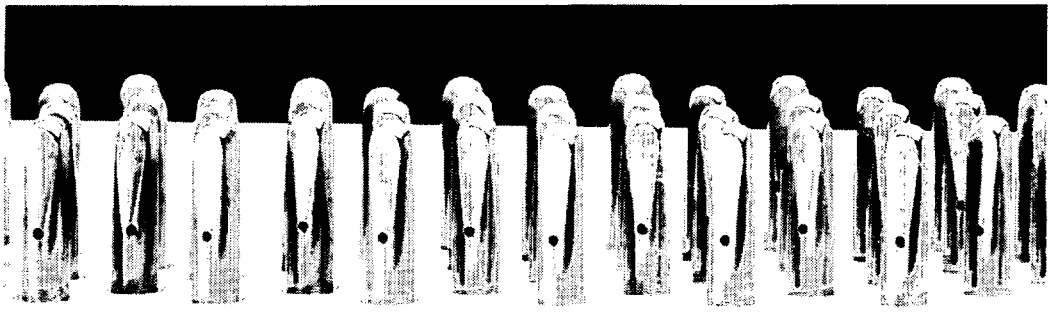
After all, if Steinway owners wanted Steinway-style and Steinway-like parts, they never would have bought a Steinway piano in the first place.

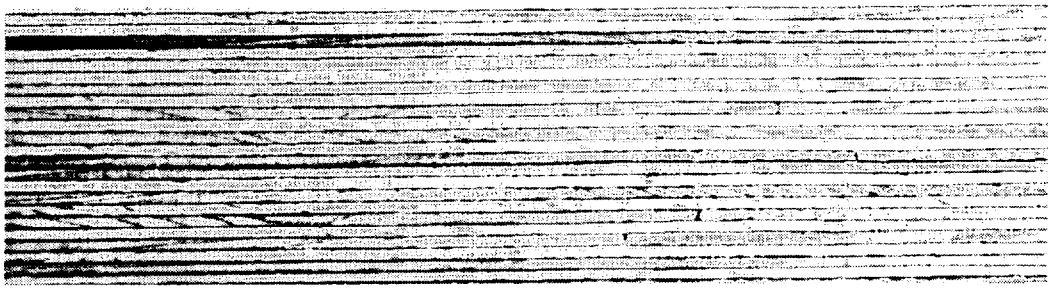
STEINWAY & SONS

Steinway Place, Long Island City, NY 11105 (718) 721-2600.

Delignit®

Multi-laminated beech pin block material





At long last Schaff has obtained a distributorship for the German made, multi-laminated beech pin block material called DELIGNIT®. For several years now this type of pin block has been imported into the United States and Canada. Now this particular DELIGNIT® grade, having the same characteristics of density as used by almost all European piano manufacturers, is available at Schaff.

As the above picture of a typical 1⅜" DELIGNIT® pin block shows, there are approximately 21 cross laminated plys of high quality beech veneers that are compressed together with a modified hot curing phenolic resin applied in a special dry-bonding process. A full panel pin block measures 48" wide x 59" long with a double block being 19" wide and a single block measuring 9½". All of the various width blocks come in either 1¼", 1⅜" or 1½" thickness.

Single and double blocks can be shipped UPS, but a full panel must ship via truck. Write or call for pricing information.

THE HOUSE DEDICATED TO SERVICE

Schaff PIANO SUPPLY COMPANY

451 OAKWOOD ROAD, LAKE ZURICH, IL 60047

(312) 438-4556

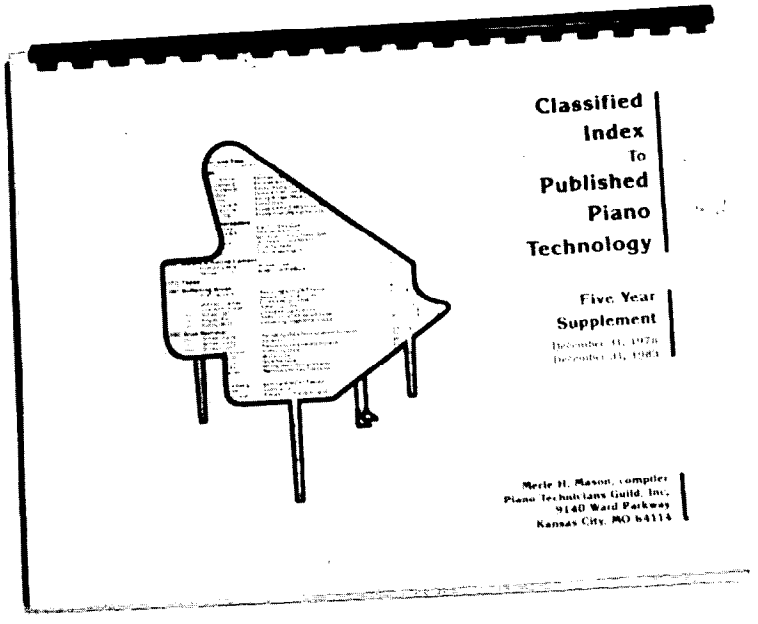
Piano Technicians Journal **March 1985**

Official Publication of The Piano Technicians Guild, Inc.
Volume 28, Number 3

On The Cover:
From Yamaha Grand.

Piano Technicians Journal (ISSN 0031 9562) is the official monthly publication of **The Piano Technicians Guild, Inc.** 9140 Ward Parkway, Kansas City, MO 64114. Second class postage paid at Kansas City, MO, US ISSN 0031 9562 foreign and domestic. POSTMASTER: send address changes to **Piano Technicians Journal** 9140 Ward Parkway, Kansas City, MO 64114. Annual subscription price: $85 (U.S.) for one year; $155 (U.S.) for two years; $7.50 per single copy. Piano Technicians Guild members receive the **Piano Technicians Journal** for $45 per year as part of their membership dues

Now Available—The Last Five Years!



Classified Index To Published Piano Technology Five-Year Supplement

(Covers articles published between January 1979 and December 1983)

Compiled By Merle H. Mason

Piano Technicians Guild Members—$12.50 ***Non-members—$15***

Please allow four to six weeks for delivery and add $1.50 for postage and handling.

TUNERS SUPPLY COMPANY 100th ANNIVERSARY CATALOG

Featuring a Complete Line of Hale Quality Tools & Supplies

Hale

The name you have trusted for over a century

Make it a Rule — Use a Hale Tool

Please send me the Tuners Supply 100th Anniversary Catalog.
Enclosed is $5.00 and my letterhead/business card.

Name _____

Address _____

City/State/Zip _____

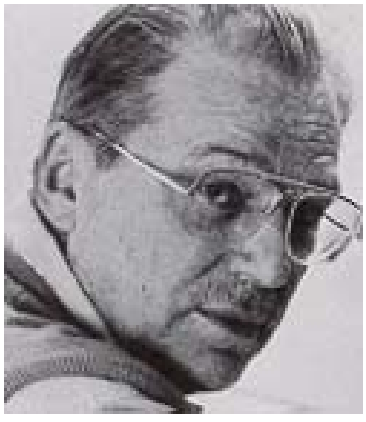
TUNERS SUPPLY COMPANY

Serving the Music Industry Since 1884

94 Wheatland Street, Somerville, MA 02145 (617) 666-4550

TOLL FREE: 1-800-247-0702 for orders only

The President's Perspective



Charles P. Huether
President

March Madness

"As mad as a March hare" is an old saying, for hares were supposed to act in strange ways at this time of year. They were courting, of course, and animals do have strange courting routines as we have been learning from the numerous television programs dealing with nature.

The madness of the hare led Louis Carroll to fashion the Mad Hatter in "Alice in Wonderland." Hatters were also considered mad because they developed certain occupational characteristics which made them seem mad in the eyes of the community. Working with mercury in the felting process, they developed various nervous disorders which made them seem strange. Such are the characteristics of humans that we fail to see the real person behind some strange physical and emotional actions of our fellow man.

Felt is a big part of our business, whether it is the felt used in hammers or the woven felt used and referred to as action cloth. From bushings to keybeds, from hammers to butts, wherever we look, there is felt in the piano. Fortunately, there has never been a connotation of madness connected with piano work. I am sure that in the olden days workmen in the factories suffered from numerous occupational hazards, but madness does not seem to have been one of them.

The "mad" image most often has been applied to the music maker rather than the instrument maker. Think of how many artists are reputed to have acted in strange ways, while we who build and maintain the instruments all are so placid, solid and down-to-earth.

The word "mad," when applied to people like us usually is related to the definition of "angry" and that is as often our own fault as that of others or our work.

Do you get "mad" when things become difficult? Do you become so angry that the problems compound? Attitude and acceptance are very important aspects of how well one is able to cope with and contain difficulties. Piano work is replete with difficulties. Did you ever consider how many decisions you make when tuning a piano? Calculate it this way: for each string, at least 10 decisions are made before you are satisfied with the pitch and the pin set. Multiply this by 230 strings and you reach the astounding figure of 2,300 decisions for one piano tuning. And this is under the best of circumstances.

There is no question but this is a strain. One thinks that the ulcer-causing decisions are all being made by the high-paid executives. Not so. Research has proved that the lower-level worker, making the mundane decisions of low-level occupations, is under greater strain than the executive and more prone to ulcers.

Take a lesson from this, relax and review the tension you may be generating while doing your work. The rewards of your work, where results are immediately visible, can be negated by doing it in such a way as to promote tension.

While March may be tagged as a "mad" month, don't let it get you down. Even as it is a time of low spirits because of the long winter just passed, it also is the harbinger of spring soon to be making itself visible with the seasonal change.

March used to be the time when we were all compelled to pay our income tax. There are not many of us around who remember that tax day used to be March 15! Now we have an extra month to relax and delay doing our returns. So while you are relaxing and avoiding making the necessary payment until the last moment, don't forget to send in your dues, if you have not done so already.

You can't run the car without gas. You can't run an organization without dues.

And after you have paid your dues, take advantage of one of your most important membership benefits and register for our Annual Convention and Institute to be held July 15-19 in Kansas City. If you have never been to our Annual Convention and Institute, you have a treat and a surprise in store for you. It defies description. This year we are taking on an extra dimension since we will be hosting the biannual meeting of the International Association of Piano Builders and Technicians. You will be able to rub elbows with some of the foremost technicians worldwide.

Come, be a part of the excitement. Send in your registration this month and prove that March can be a time for sensible decisions. Not everyone has to be "mad" in March.

Sohmer.
Concerned with the science of music as well as the art.

S O H M E R

Some piano makers feel that turning out pretty pianos year after year is their only responsibility. Fortunately, this is not the case at Sohmer.

For over 110 years, we have been working to make our pianos technically sound and acoustically perfect as well as beautiful to look at. Because we consider the science of piano technology and the innovations that develop from it to be fundamental in the perfection of the Sohmer piano.

We turn this belief into action by maintaining an ongoing dialogue with piano technicians all across the country.

Can we improve our selection of materials to insure better stability and tonal quality? How can we make it easier to clean, regulate and service our pianos? Your input helps us find the answers to these and other questions essential to the science of building pianos.

And vital to the art.

In turn, we provide facilities for meetings and piano demonstrations and study. And our representatives are available to speak on industry trends, styles and innovations.

We believe that together we can continue to create a beautiful instrument that is also a beautiful piece of furniture. A Sohmer. The perfect synthesis of science and art. We would like to hear from you. Call or write Harry Sohmer, Sohmer & Co., Ivoryton, Connecticut 06442 (203) 767-2675.

From The Executive Director

Barbara Parks
Executive Director

A Simple Task

A new year brings with it the promise of a clean slate, a chance to do better than we did in the past 12 months. We start the year renewed, having heard from old friends and family during the holidays. By March, we have hit our stride and, while our slate is not as fresh and clean as it was in January, we should be able to look back and count some accomplishments during the past two months.

There is one simple task I hope you've accomplished. I hope you renewed your membership in the Piano Technicians Guild. It's a simple task because it doesn't take long to put a check in an envelope and address it to the Home Office, but it's probably one of the most important career moves you can make. Take a look at some of the tangible and intangible benefits you receive from being a member.

Take the *Journal,* for example. What is it worth to you to have a monthly conversation with Technical Editor Jack Krefting or authors like Rick Baldassin, Chris Robinson, Jack Greenfield or any of our other excellent contributors? If you were not a member, it would cost you $85 per year to receive the *Journal.* That's a big chunk of your membership dues right there.

And what about the International Convention and Technical Institute coming up July 15-19 in Kansas City? Members receive a $60 discount on the non-member registration fee this year. Between the *Journal* and the Technical Institute, you've more than recovered your membership investment. And the benefits you will have gained are worth a lot more than that.

But there's more. Many regional and chapter seminars have discount rates for Guild members. Reference works like "Piano Parts And Their Functions" and the recently completed five-year *Journal* Index Supplement also are available to members at discount rates.

Each member receives a $1,000 life insurance policy, and supplemental life, hospitalization, disability and business coverage is available to members. Sure, you could set up your own insurance program if you had the time, but it would cost you more.

The Guild produces business aids that are available only to members. The list includes informative pamphlets, billing pads, appointment forms, service stickers and more. Most can be imprinted wth your name and phone number. They help you present a professional appearance.

Then there are the intangibles. If you are a registered craftsman member, do you use the initials "RTT" after your name? Those three letters mark you as a true professional, one who cared enough about his abilities to measure himself against a set of extremely high standards.

There's one more thing. It's impossible to capture it on paper, but you can see it on the faces of people at the convention, at regional seminars and at chapter meetings. The Guild is family. It's a closely knit organization of people who care about each other and about their profession. That feeling transcends geographic boundaries, individual personalities and even differences of opinion.

If you're a member, you know the feeling and you don't want to give it up. If you're not, here's an opportunity to be a part of something great.

1985 Technical Institute

Ernie Juhn
1985 Technical Institute Director

Mini-Technicals And More

What is a "Mini-Technical?" Let Bob Russell answer that one. He will be running the program this year.

"A Mini-Technical is a 1 1/2-hour class compressed into 25 minutes of pure knowlege! There will be three classes per period and, due to the popularity of last year's Mini-Technicals, we will enjoy more of them this year in Kansas City," Bob says. "The class schedule will be in your convention packet. So join the crowd, tighten your seatbelt and learn, while enjoying the fast-moving, no-nonsense variety of subjects presented in this year's Mini-Technicals."

Sharp tools are important to your work. It is a must for the fine technician to know how to sharpen them. Joel Rappaport, in his class "Be Sharp and Sharpen Your Tools," will cover the subject in a hands-on presentation. Everyone will have a chance to actually sharpen tools and learn all about the subject.

Restringing and Repinning—how to do it, why repin rather than restring and how to decide which. Both subjects, repinning using existing strings as well as restringing with new strings, will be covered by Marlyn Desens in his class "The Art of Restringing and Repinning."

Another new subject, "Keep It Level," will be covered by Cliff and Tony Geers. There is almost no end to what should be level or, for that matter, straight in pianos. We always want 88 level keys, 88 straight back checks, 88 hammers to check in a straight line, 88 keys to have even after touch and more. This is a class full of important knowledge presented by two pros.

"Practical Soundboard Work" is the title of a class that deals with cracked boards and how to fix them, lost crowns and how to restore them, rolling bridges and finishing soundboards. All this and more will be expertly covered by Brian Dockrill. Brian comes to us from Australia.

Many of us are sometimes confused by damper problems. "Troubleshooting Vertical and Grand Dampers" is the title of a class presented by Jack Krefting and Willard Sims. There is no tuner-technician who can afford to miss this presentation.

See you next month with more exciting news about the 1985 Technical Institute in Kansas City.

Dateline: Kansas City

Ernest S. Preuitt
Host Chapter Chairman

Look To The Future

Straight lines drawn from the extreme four corners of the 48 contiguous states cross some 100 miles west of Kansas City. But I'm telling you, the real heart of America *is* Kansas City.

There is Kansas City, Mo.; Kansas City, Kan.; and North Kansas City, Mo.—plus Overland Park, Kan.; Raytown, Mo.; Prairie Village, Kan.; Independence, Mo.; and many more municipalities and unincorporated areas— making up what we here call the Greater Kansas City Area, consisting of more than a million and a half people.

Over the next few months, you will read in the pages of the *Journal* about our annual convention next July 15-19. There will be the Institute, Council and Board meeting, and many people from different parts of the world attending the biannual meeting of the International Association of Piano Builders and Technicians. I shall let those responsible for the success of those functions elaborate on them. I'll confine my remarks to making you comfortable with our city and the Hyatt Regency, and keep you informed about what to expect in the way of extra and special activities.

My first convention was at midwinter in Wichita, Kan. It was so inspiring to me that the next July I bought a round-trip ticket on the Greyhound bus, borrowed 50 dollars and attended the 1963 convention in New York. Since that time, I have had no thought of missing one except when the doctor wanted to see what was inside me. I have always been attracted to the regular business at hand and attribute the Institute to whatever success I have had, but don't think for one minute that that is the only thing that has made me attend regularly. The extra activities have been a joyous vacation for Lu and me.

It would seem impossible for any place to be more exciting than the "Big Apple," but honestly, each year has been a new experience as bigger and better things happen every time.

So don't just "look to the future," for here in Kansas City there is a "'steak' in your future."

Economic Affairs

Robert Smit
Ecomomic Affairs Committee

Time Management

The nation that is adapting most rapidly to the revolutionary changes in technology and markets is the United States. The reduction in the American unemployment rate from 10.7 percent in November 1982 to 7.1 percent in June of 1984 is the envy of all its trading partners.

It is a story of entrepreneurship, a story of individuals in all walks of life "making things happen."

I got the above information out of a newsletter distributed by the Canadian Federation of Small Businesses. Individuals pulling together adapting themselves to an ever-changing world by effectively using the resources and technology available to them. This is the future road to economic stability.

Since most of us are part of the small-business community, we in the piano service business must also keep pace with changes in the marketplace. Just as the level of our technical expertise has improved, so should we look at ways to improve our business.

Time is our most precious commodity and there never seems to be enough of it. Often we find ourselves in a constant race with time and the reasons usually are due to lack of organization.

We should take time out to "get ready" to work. We should also find out how we are spending our time now. Don't trust guesswork. Let's try something just for fun. Make a list of how you think you are spending your time and then list how you actually are spending it. This will show you clearly the time that is wasted. Some of the things we might find that rob us of our time are:

Inefficiency—Work poorly done or not completed which necessitates retracing of one's steps or double work.

Indecision—Frequently the result of fear of failure. Not making decisions in time can result in wasted effort. Studies have shown that a less desirable decision made in a timely fashion and implemented decisively results in far more progress than the best decision which is late in coming. Prompt action often provides the added margin of time for correction.

Overconcern and preoccupation with efficiency—Efficiency that puts method ahead of results can be totally ineffective.

Procrastination—Decide on a definite time. Substitute action for explanation. Do not rationalize.

Regretting—Don't live in the past. We should learn from our mistakes. We shouldn't waste time regretting the knowledge we have gained through mistakes.

Of all the resources available to us in the world today, I'm sure we can all agree that time is irreplaceable and no matter how high the demand, you cannot get more of it.

The average person wastes up to 60 percent of his or her time through lack of organization. Little or no attempt is made to manage time.

How often do we use the excuse, "I didn't get enough time?" It has to be the most common excuse for lack of achievement. Or, "I'm too busy to get organized." It can be proven that every minute spent in planning will save several minutes in execution.

A true understanding of time is our most powerful asset. Whatever we wish to achieve will be more easily accomplished when we learn to organize our time.

Unlike money, we cannot earn time. We can only spend it and how we spend it will determine the degree of success we will achieve.

Index Supplement Now Available

An index covering articles on piano technology printed between January 1979 and December 1983 has been published by the Piano Technicians Guild. The new 66-page index supplements an earlier 40-year classified index covering articles published prior to 1979.

The new work was compiled by Guild member Merle H. Mason, Ontario, Calif., who also prepared the earlier work. Mason also is the compiler of two other works published by the Guild, the "Piano Action Handbook" (1971) and "Piano Parts and Their Functions" (1981).

Copies may be ordered from the Guild's Home Office at 9140 Ward Parkway, Kansas City, MO 64114. Copies are $12.50 for Guild members and $15 for non-members.

The International Scene

Fred Odenheimer
Chairman, International Relations Committee

Happy Birthday, Mr. Sasso

Ascona, an artist colony and town situated by Lago Maggiore in southern Switzerland is a wonderful place to visit or, as far as this is concerned, to live, if you know the language, which is Italian. It has mountains, the lake and the mild climate prevalent south of the Alps. Whether you are walking through its narrow streets looking into small shops, art galleries or places to eat, or whether you go down to the lake past an old clock tower, you will experience a feeling of relaxation and harmony.

Going out on a narrow road leading to nearby Italy flanked by a steep incline towards the mountains to the right and a sharp drop-off to the left towards the lake, you will eventually reach Moscia #115, or at least the mailbox. The house is some 120 uneven steps down from the road. Entering it, with its Tessin interior on perhaps one of the cooler days, you will enjoy the warmth of its hearth but more so the warmth of its owner. From its windows you are overlooking the nearby lake and its two small islands of Iso La Bella and Iso La Madre. In summer, you can go to the lake for a swim, but you may prefer to fish.

Here lives Osvaldo Sasso, for many years president of Europiano, now honorary president but still one of the guiding forces of that association. No one coming in contact with Mr. Sasso will fail to be taken in by his sincerity, his helpfulness, his charm and his knowledge. He is a persuasive but gentle leader and friend to many who enjoy his immense hospitality and benefit from his vast professional experience and wisdom.

They will all come to Ascona in March for his 80th birthday, certainly to discuss piano design and construction as is natural among piano people, but mainly to celebrate with him that milestone in his life. In thoughts at least, I will be there to wish him all the best, health, happiness and many more birthdays to come. May I add to this the good wishes of the Piano Technicians Guild and those of his friends over here.

The Europiano Convention and Technical Institute will be held in Koenigslutter near Braunschweig, West Germany, May 15-19, 1985. There will be visits to the Gotrian and Schimmel factories.

THE
TECHNICAL
FORUM

Traveling Hammers, Wedging Soundboards, Tone In Square Piano, And The Multipurpose Tool Contest

Jack Krefting
Technical Editor

Traveling Hammers

The procedure we refer to as "traveling hammers" is about as aptly named as "boning a chicken." What we really want to do, of course, is *de-travel* them. Essentially, when traveling hammers we are tilting the flange until the axis of rotation is parallel to the flange rail, so that as each hammer rises to strike its strings, it does so without any side-to-side movement. Now, before we get into any protracted argument about whether the tenor and bass hammers move from side to side, let's just stipulate that there is a scooping motion which looks like traveling but isn't. To eliminate the confusion, let's concentrate on watching the shanks, not the hammers. There should never be any side motion when shanks rise, regardless of where they lie in the scale.

Some of the reasons that traveling is necessary would include slight or sometimes gross machining errors, subsequent twisting of the flange, and so on. Here is a partial list.

1. Bent centerpin.
2. Crooked drilling of birdseye, or

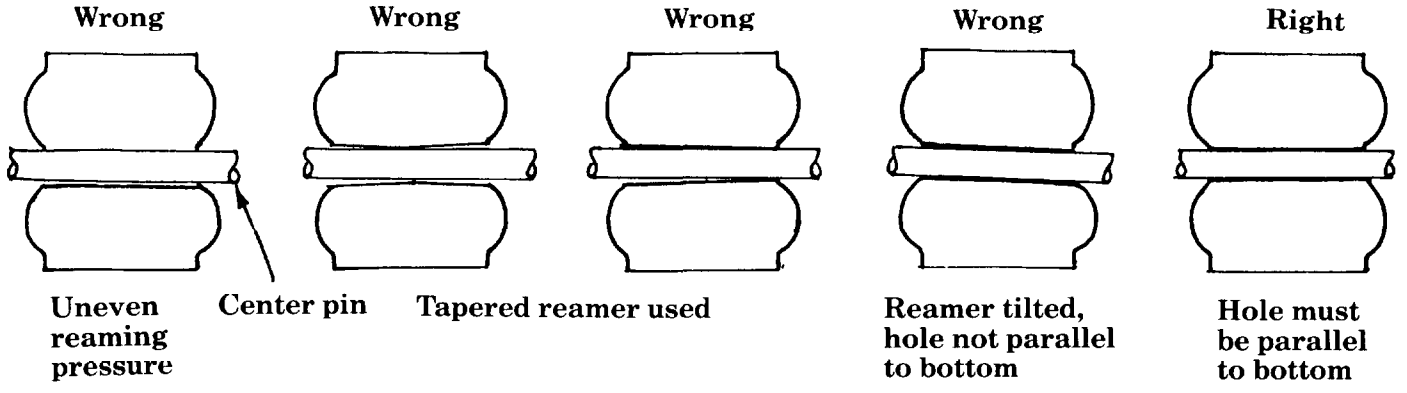


Figure 1

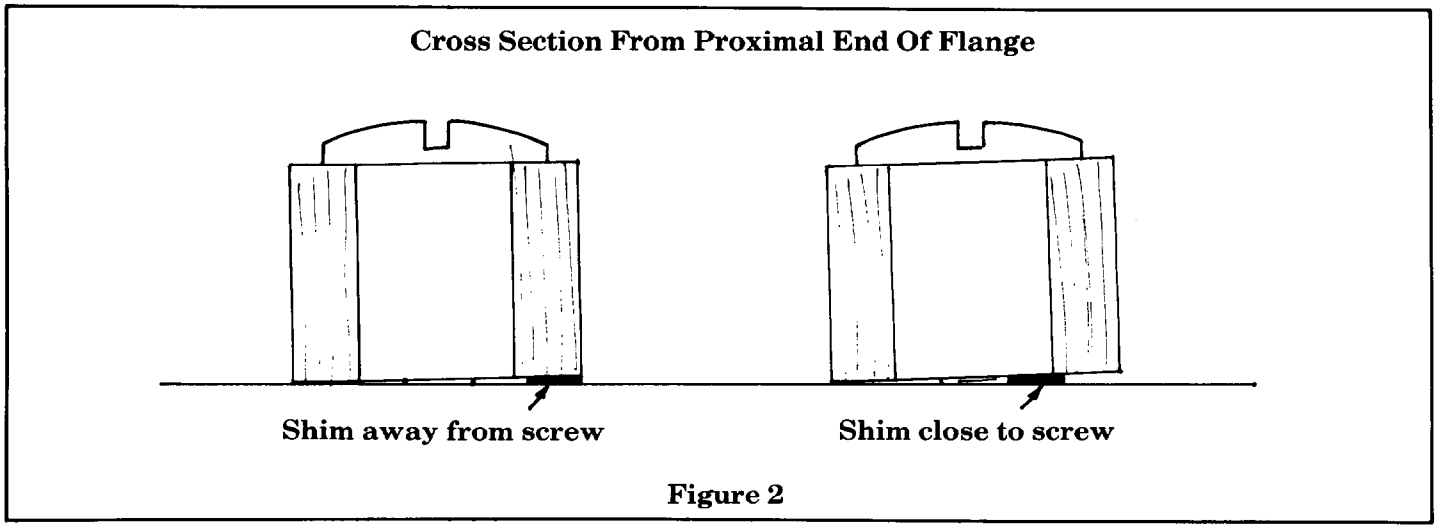


Figure 2

flange twisted after drilling.
3. Birdseye improperly reamed (see *Figure 1*).
4. Underside of flange not machined parallel with birdseye hole.
5. Someone blew the dust off the action with compressed air before tightening flange screws, so dirt got under some flanges.
6. Flange rail cloth or sandpaper is of uneven thickness.

This last can happen when old cloth is re-used, especially on a piano with a metal-faced rail. When replacing shanks, it is good practice to clean every bit of old covering from the rail, including glue if present, and to avoid using too much glue when putting on the new covering. On Steinway rails, some technicians including Willis Snyder use #240 Aluminum Oxide paper, grit side up, glued to the rail with contact cement. This provides a fine, stable, uniform surface on which the flanges may be mounted, while being thin and flexible enough that it can be wrapped around that scalloped rail. Wally Brooks prefers to use unglued stringing braid instead, on the theory that the cloth acts as a shock absorber or insulator to prevent action noise being transmitted through the action rails.

Some Baldwin grands built around 60 years ago had a steel-faced rail which was tapped to accept machine screws instead of the usual tapered wood screws threaded into a wooden rail. The steel was covered with oilcloth, which tends to stick alternately to the rail or to the flanges, so it is necessary to replace this material in almost every instance when replacing shanks.

Cliff Geers finds that garnet paper, stuck on with a thin layer of glue, works best in this application. In general, any metal-faced rail that was originally covered can be recovered with sandpaper, as can wooden rails. We suggest the standard (thin) weight, #100 or #120.

Interestingly enough, the list above did not include manufacturing flaws in the shank, only in the flange. That is because, regardless of how poorly drilled or bushed, the shank will always rotate around the axis of the centerpin. Even if the shank were tilted to a ridiculous angle of, say, 30 degrees to one side because the bushing holes were drilled crooked, if the bushings fit the pin the shank will not travel to one side.

When traveling shanks, we have three means of controlling the amount of tilt, the most obvious of which is the thickness of the shimming material. More about that later. The second means of control involves the lateral placement of the shim. As we see in *Figure 2*, the same thickness of shim material placed up against the screw shank will have a greater tilting effect than if it were placed near the edge. The third method of control involves the amount of penetration of the shim under the flange as shown in *Figure 3*. If the traveling problem is over-corrected by the travel paper, the latter may be partly pulled out to lessen the effect.

In order, then, the coarse adjustment is made by choosing the thickness of shim, since that seems to make a bigger difference than the other adjustments. The side-to-side adjustment is next, providing enough variation to take up the difference in thickness between one grade of paper and the next, assuming for the moment that we are using sandpaper for shimming. In other words, a piece of #120 right up against the screw would provide about the same angle as a piece of #100 at the edge, and so on. The most useful grades for traveling, in one technician's opinion, are #120 and #150, standard back, open coat garnet paper.

Probably the best reason to use sandpaper rather than tape is the ease with which the second and third adjustments can be made if the shimming material isn't sticky. Let's assume the shank is traveling slightly toward the bass, for example, compared to a shank that is known to be good. The technician loosens the flange screw and inserts a 3/32-inch wide strip of sandpaper, grit side up, far enough under to go at least a little beyond the screw, while touching it. The screw is then tightened and the travel is checked by raising groups of shanks with a screwdriver blade as usual. Now, assuming the problem was over-corrected, the shank will be traveling very slightly to the treble. The technician now loosens the screw a bit and pulls the paper outward and to the left, and then retightens it.

If we had been using tape and had miscalculated, even slightly, the screw would have to come all the way out each time an adjustment was required. In addition, some kinds of tape (masking, draft-

ing, etc.) are thought by some to contain too much moisture, and to cause loose flanges and traveling problems when the moisture evaporates. This may have validity, although we haven't proven that to our satisfaction. Those who prefer tape will counter that at least it will stay where it is put, and one would suppose that if a lot of reworking is planned, this might be an especially good idea. On the other hand, all of the repinning that may have been needed, whether the shanks are new or old, should have been done before we got to the traveling anyway. So presumably, there won't be many reasons to remove the flanges from the rail again in the foreseeable future, and in that case the argument about wanting the tape to stay put becomes much less compelling. Even plain paper will stay in place if the flange screws are kept tight.

We have said that traveling is a simple matter of comparison, to determine whether and in which direction any given shank may be traveling, when compared to its neighbors. But suppose, says the pessimist, that the entire set of flanges had been incorrectly machined—it could happen, because they're all made on the same machine, presumably—and that they were all traveling to one side or the other. In that case, the comparison test wouldn't work; as Murphy would have it, the only ones that would look bad were those few that happened to be all right for some reason, or those few that were grossly off to the same side as the majority. What then?

The result would be a swiping, scrubbing blow, which would reduce power, make voicing virtually impossible, and drastically shorten the life of the hammers. We have all seen the resultant abnormal hammer wear when there is a loose centerpin, and a traveling hammer will produce similar results, depending of course on the amount of travel. Because of the above symptoms, it is likely that the technician would be aware of such a situation if the instrument is in his clientele and receiving regular service. It is especially important to check the traveling when installing all new shanks and flanges, so the problem can be corrected before it develops.

One way to solve the problem is to arbitrarily designate guide shanks—the end shanks in each section, for example—and to travel them to some absolute standard rather than to other shanks. Place the action on a flat bench and prop a square up on the bench right behind the action. Compare the travel of the shank with the blade of the square, being careful to line up straight so as not to be confused by parallax. In fact, to avoid this problem, some technicians use a small square on adjacent hammer shanks directly over the shank cushions or rest rail, with the blade of the square about 1/32 inch from the shank to be checked.

It will now be easy, assuming of course that the rest rail is level with the action and not high at some point, to determine whether that 1/32-inch gap remains constant. If it does, that shank may be used as a guide. If it doesn't, paper its flange until it does.

Another method is to sight the travel against a background of vertical lines. Particularly if hammers are already installed, it is best to use a black background with white lines, as the black contrasts well with the hammer felt. A piece of black posterboard works well, and the white lines may be spaced at any convenient interval, so long as they are perpendicular to the bottom surface of the posterboard.

Do not be confused by the fact that the sides of the hammers won't be exactly parallel with the lines. That's because the tails are usually tapered. Just pick a spot on the side of the hammer, such as the top corner, and move your head until that spot is lined up with a white line. It will be easier to do with one eye closed, incidentally, although it is not impossible with both open. In any case, raise and lower the hammer while keeping an eye on that spot to determine whether or not the hammer deviates from that line, and then proceed as with the second method above.

When all shanks have been traveled and double-checked, the excess paper protruding from under the flanges may be torn away. We will cover the topic of hammer spacing in a subsequent issue, and want to emphasize that, except for the Steinway, of course, it is neither necessary nor desirable to loosen the flange screws when spacing; so even though the travel paper has not been glued to the flanges, there is no need to fear that it will be lost.

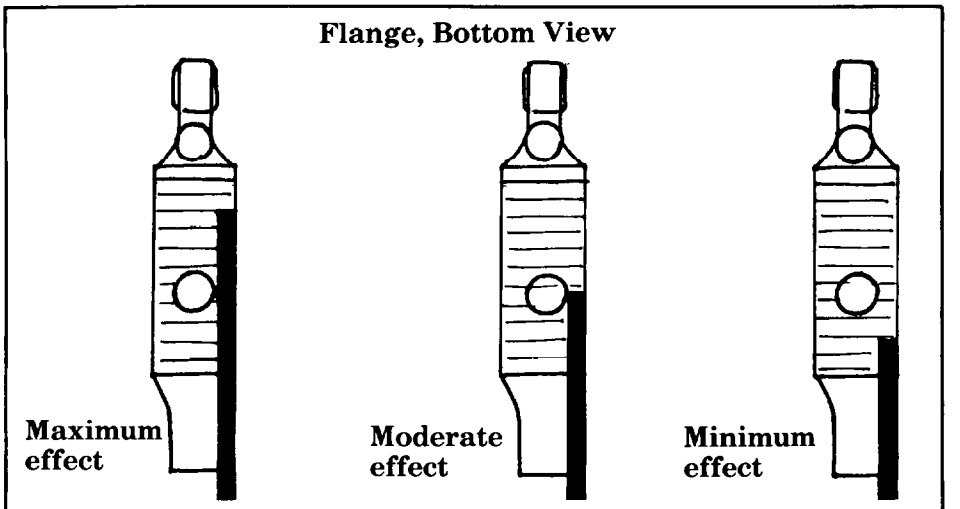


Figure 3

Wedging Soundboards

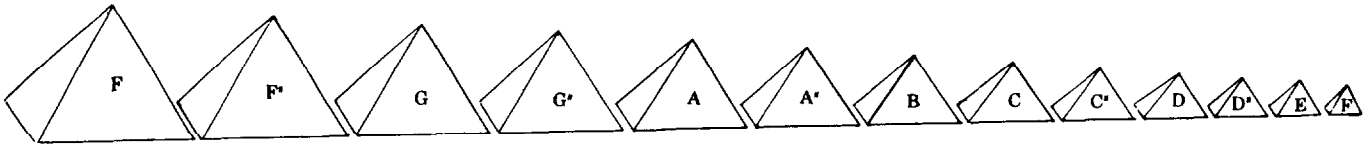
Q: *How far should the soundboard be wedged when shimming? For a reference point, perhaps the sound of wood could be included. Creaking, splitting or whatever.*

A: I am assuming that this refers to the practice of placing wedges between the ribs and the beams while shimming, in the expectation that the cracks would be widened and that therefore the wider shim would cause an increase in crown or a better-fitting shim. If an increase in crown is desired, this won't work, because the idea is

Multipurpose Tool Contest

When we received this month's entry, our suspicions that this contest is not being taken entirely seriously were heightened a bit; nonetheless, we did promise to publish every entry, so here is Ed Solenberger's contribution.

The Pyra-Intonator



The power of the ancients harnessed!
- Corrects improper temperaments.
- Restores brilliance of tone.
- Eliminates poor touch and sluggish dampers.
- Mummifies pin blocks for more permanent tunings.
- Great conversation pieces—assorted decorator colors.
- Can be used for other purposes—sharpen razor blades, improve taste of cheap wines—hundreds of experiments.

Mrs. R. of Alton writes "...delighted! Tone becoming more brilliant the more I play!" Leonard Bernstein's assistant conductor's identical twin brother (my first cousin) writes, "...Ed, sometimes you amaze me!..."

Priced reasonably—send order and we will get at yours right away—*Hurry!* Orders pouring in each day. Please state color preferences—give alternate. *Solcraft, 1551 Lynn Ct., Santa Rosa, CA.*

based on the faulty premise that a greater amount of soundboard wood on the same length of rib will automatically increase the crown. That would only be theoretically feasible if all ribs were removed and refastened to the newly dried and shrunken board. What we are considering here, on the contrary, is the simple addition of a very small amount of wood in one or a few places, which has no effect whatever on the majority of the rib gluing surface, wherever it remains intact.

The other possibility has more to recommend it, though only slightly more when it is realized that this practice actually bends the board upward for a theoretically tighter shim when the wedges are removed. The problem there is that, while the top would be pressed tighter, the bottom would be pulled apart, the net result being less than great. Worse yet, those creaking sounds could signify cracking ribs, a condition that weakens the board's resistance to downbearing and impairs its ability to distribute sound, all at once.

The recommendation from here is not to drive wedges, period. If rib support is needed during shimming, simply place the wedges while the board is starting to bake down. They will get tight enough as the crown lessens with the loss of moisture anyway, and we don't want to overdo it. My test as to whether wedges are too tight is to listen for them when the heat is removed. If they were loose enough not to cause any damage, they should fall to the floor within an hour or so without having been touched. Granted, that's a little like locking the proverbial barn door after the horses have escaped—by the time one realizes the results, it's too late to do anything about the damage—so it's probably just as well to avoid the wedges altogether. It's doubtful that they do any good, and if driven in with any force at all, they can create serious problems.

Tone In Square Piano

Q: *Why is the tone of square grand pianos seemingly more ethereal than the modern grand?*

A: One of the reasons technicians commonly give for not wanting to tune squares is that the tuning pins are hard to locate because they aren't lined up with the key or the hammer. Another reason is the backbreaking long reach to the pins (in the "American-style" squares devised by Englishman John Broadwood, where the pins are to the left and in back) and the fact that the pins are oblong, making tuning hammer technique problematical at best. Still another common complaint is that these instruments always seem to need extra work, and that work is troublesome because of the unavailability of parts.

These are all valid reasons, but I believe there is another which may be as much a factor as any but is rarely verbalized. That is the preponderance of false beats in the middle and lower middle sections of the piano, making fine tuning virtually impossible on many squares. The tension is low, which not only affects inharmonicity, but also precludes solid termination; the result is false beating, which sounds like a faint vibrato.

Characteristically, squares that are overstrung tend to sound best

in the bass—those that aren't overstrung don't even have that to offer—and, yes, "ethereal" in the middle and dead in the treble. They all seem to have gorgeous cabinetry and, because of their historical significance, make fascinating conversation pieces.

Please send all technical articles, tips, questions and comments for publication to me at this address:
Jack Krefting, Tech Ed
Piano Technicians Journal
c/o Baldwin
1801 Gilbert Ave.
Cincinnati, OH 45202

It's The Little Things That Count!

Tightening Plate Bolts

Gerald F. Foye
San Diego Chapter

The famous philosopher, Ping Pong, contended that "He who does not tighten plate does not do good job!" Unfortunately, his philosophy failed and he was beheaded for breaking 3,000 of the finest china plates before concluding those plates could not be tightened.

Fortunately, in our business, we are dealing with metal piano plates that certainly do require tightening, although I am certain it is a neglected practice. If you make it a part of your routine you will find it to be a quick, simple task and you will also be amazed at how many of those plate screws (new or old pianos) are loose. It may mean the difference between a good or mediocre tuning. One of the main reasons is stability.

How much to tighten them is a matter of judgment. Obviously they must be seated snugly but not over-tightened to the point of stripping metal threads. Remember the screws go through the metal plate but are threaded into wood. Get all the screws that are conveniently accessible. You may even have to loosen some strings to get at some. Obviously you can't be expected to get at those that were well hidden by piano design and construction. Simply do the best you can, which is certainly better than not tightening any.

My preference is a 3/8-inch drive breaker bar (handle) to fit the following 3/8-inch drive tools: 5/8- and 3/4-inch and 14- and 17-mm. sockets. Also a 3/8-inch drive phillips and a T-40 Torx.

The latter will likely have a 1/4-inch drive and therefore will require a 1/4- to 3/8-inch adapter. And, last, is a flat (spade) bladed screw driver bit as would be used in a brace or hand boring tool such as the Craftsman DD-9-41002. This is used in conjunction with the tuning lever and standard tip. Sometimes a little grinding to modify the drive shank will make the tool fit the tuning tips more snugly.

Of course, there are always a few odd sizes other than mentioned and should you run across enough to make it worthwhile, then obtain the correct tool for those sizes.

Place the tools in a kit form such as a cloth or plastic pouch so they are accessible to simplify the job.

A bit off the topic, but for you rebuilders a simple method of seating the plate on the bearing points is to place a ball of clay at each point. Should it tend to stick, then place a small piece of waxed paper between clay and sticking surface. When the plate is lifted, the clay will distinctly indicate where the gaps are and can be measured as to what amount for correction.

A word of caution: as Ping Pong's cousin, King Kong said, "He who fool around with nose bolt looking for big trouble!" And, if you don't know what the nose bolt is, you had better latch onto someone who does and have them explain the situation.

THE
ECLECTIC'S
NOTEBOOK

A Moving Experience

Christopher S. Robinson
Connecticut Chapter

It is possible that someone somewhere has given a good technical on how to move a grand piano; or that perhaps such an article may have appeared within recent memory in the *Journal*, but this writer is having some difficulty in recalling it. In any event, since so many different methods of approaching the problem seem to exist, and since so many of us are obligated to do a substantial amount of our own piano cartage, it does not seem unreasonable to have a look at a few representative techniques used in preparing a grand piano for a "local" transferral.

The very first thing to do is tie down everything that is liable to move, wobble, flap or slap. In *Picture 1*, we can see that the lidstick and the music desk have been strapped with felt material so that they will not bang against the lid during shipping. Similarly, in *Picture 2* it is clear that the fallboard has been wedged closed with a fold of bushing cloth. The felt should be placed at both ends of the fallboard so that the opposite cheek of the piano will not be damaged.

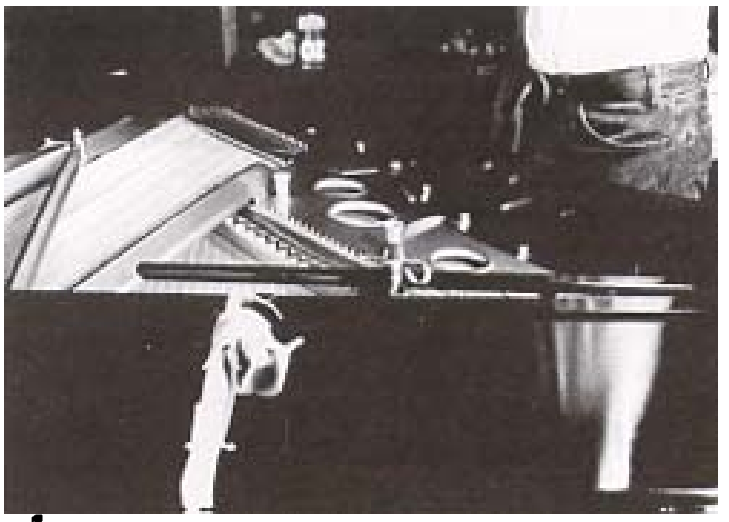
Some movers prefer to remove the lid prior to wrapping the piano, presumably for fear of damaging the lid hinges because of the overhang difference between the side of the case and the outside periphery of the lid itself. It is my opinion that there is more potential for damage in the remove-and-reinstall lid operation, plus the exposure of the belly and damper system of the piano during handling, than there is to the lid or hinges with the piano assembly complete. But this argument brings us very quickly to *Picture 3*.

"The very first thing to do is tie down everything that is liable to move, wobble, flap or slap."

The use of a fitted, lined, and spine-padded canvas moving cover is *mandatory* for the professional-quality removal of a precious musical instrument. (The spine of a grand piano is the long, straight side at the left-handed, or bass end of the case.) With this cover and a minimum of care, there is very little chance of damaging the lid or lid hinges, to say nothing of the rest of the piano.

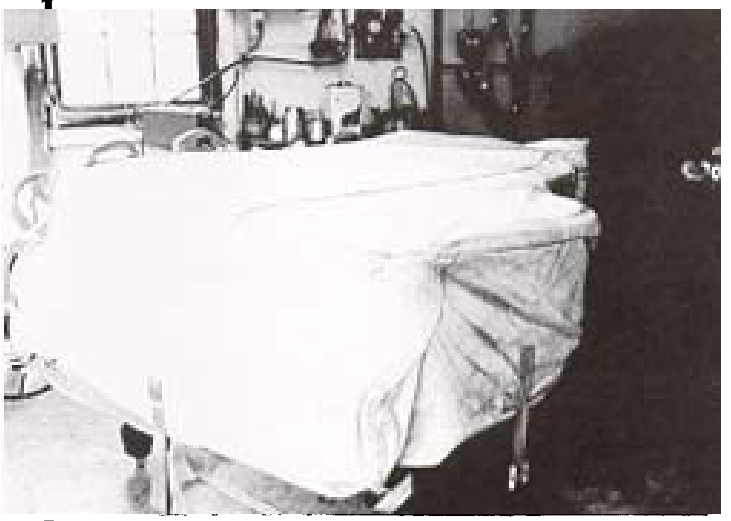
My problem right here is that it is not possible to advise the reader where to find such an item. The cover that is seen in the photograph was obtained at a wholesale professional movers and truckers supply company. Shortly after this cover was purchased, they discontinued stocking them.

It is suggested that the technician who does piano moving look under "canvas goods" in the yellow pages of any large city, and then contract with one of the suppliers to make a "universal" grand piano moving cover. By universal, we mean that the cover is open at the

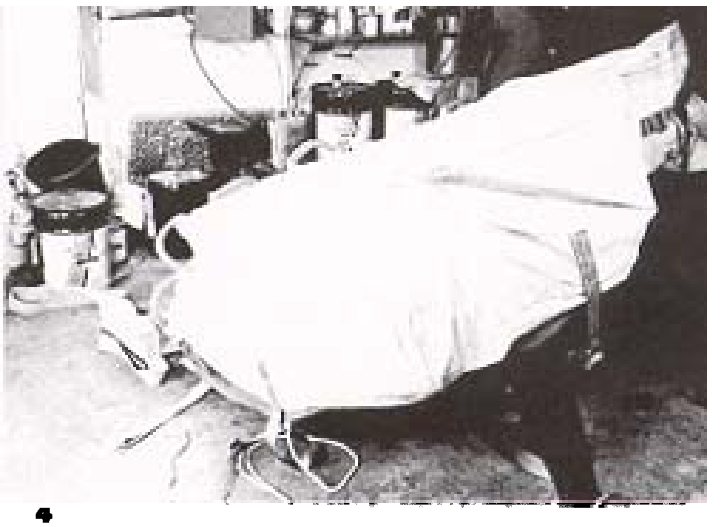


1

2



3



4

tail end so that differences in length can be allowed for. Perhaps if one of the readers of this column know where one of these can be purchased, they will write to Jack Krefting at the *Journal* and share their knowledge with the balance of the readership.

In *Picture 4,* the spine, or bass leg of the piano has been removed, allowing the piano to be "dropped" onto the skid board. Please note that the pedal lyre was previously removed so as to avoid damaging the pedal housing, lyre spindles and keybed of the instrument, which were never intended to accept the weight of the instrument that they service. If you need that kind of assistance to de-leg the grand in question, take a hint from a fellow technician who uses a "T" construction made of two-by-fours to hold up the bass end of the piano while the spine leg is being removed.

Those of us who have performed this operation before know that there is very little pressure on the treble leg. However, as the instrument turns over, there may be quite a bit of weight placed upon the tail leg. Therefore, it is very important to turn the caster toward the right, or treble, so that it will not unexpectedly swivel under pressure, delivering the equivalent of a hammer-blow to the spindle of the tail leg. (The spindle is the vertical part of the leg assembly, the beam is the horizontal component.)

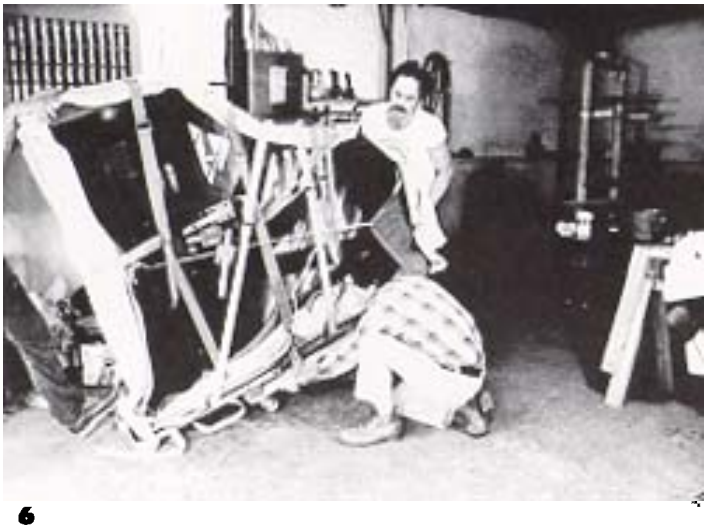
In *Picture 5,* The piano is turned over at 90 degrees, and is resting securely on its spine. At this point, the remainder of the cover straps are tied and tightened, and the skid-board straps are securely cross-fastened over the flugel of the piano. (The flugel is the bent portion of the case along the right side of the piano which follows the curve of the treble bridge.) Many have found in their experience that cross-fastening is superior to straight front-and-back tying because it more effectively prevents movement of the piano on the skid board during moving, which may again relate to the lid and lid-hinge controversy.

> "The use of a fitted, lined, and spine-padded canvas moving cover is mandatory for the professional-quality removal of a precious musical instrument."

In *Picture 6* the man who is placing the dolly under the piano has just *balanced* the piano while the fellow with the mustache lifted its tail end. You will note that the dolly is being tilted so as to best achieve the location of center of gravity under the instrument being moved.

Look a little closer at the fellow doing the lifting! He is not *bent over!* The weight of the piano is in his biceps and forearms. During the lifting of the piano from its position at rest, he used his thighs, but-

5



6

> "There is nothing more dangerous than trying to lift a heavy object with your back! Even a hernia is repairable, but oftentimes a back problem is not."

7

tocks and shoulder muscles to raise the piano so that the dolly could be placed under it. *There is nothing more dangerous than trying to lift a heavy object with your back!* Even a hernia is repairable, but oftentimes a back problem is not. If the reader will now focus attention on the last picture *(7),* he or she will see something that is a little novel. The man at the end of the skidboard is holding onto a *sling.* You will note that the sling has two loop ends which are wrapped around the wrists of the subject. Also, the sling threads through the back of the skidboard behind the standard handle.

The beauty of this sling is that it does not obligate the mover to bend completely over in the process of lifting the piano. The mover can adjust the sling to his or her height so that the body can make best use of its power, and most securely protect its spine and back muscles in the process of dead-pressing 700 or so pounds from one end.

While it is very hard to tell from this picture, the lift of the board has been accomplished almost entirely with the legs and shoulders of this man. His back has been straight and not called upon to actually do the lifting itself. Incidently, the sling does in fact add mechanical advantage to the lifting job, all other considerations aside.

We quit this instruction here because there are so many different methods of cartage. Some use trailers, some pickup trucks, and some employ covered vans. At any rate, the unloading of the piano at delivery point is the opposite of the procedure outlined here. One warning—don't completely untie the cover until the piano is set up on its three legs! Those who have tried this have found how ready the lid is to fall backwards over the coffee table or open floor. Good luck!

> "it is very important to turn the caster toward the right, or treble, so that it will not unexpectedly swivel under pressure, delivering the equivalent of a hammer-blow to the spindle of the tail leg."

Correction

Some readers have had a problem with the July 1984 edition of this column dealing with "hard hammers." While it is never actually stated in the article, there is a very clear implication that [all] imported hammers have been produced using a second, hot pressing operation. This is not necessarily true. I agree that this conclusion might possibly be in error, and therefore amend the article to read that "many, but not necessarily *all,* of the very hard imported hammers are produced [in the described] manner.

Some thoughts on building a better piano.

"We let machines do what machines do best, and people do what they do best. It's as simple as that. And it's made all the difference in the world."

Joe Kennedy, Quality Control Manager

Joe Kennedy's story is the Baldwin piano story. Joe joined us in 1940 at our Cincinnati plant. Today he's personally responsible for every Baldwin that comes off the line at our newest facility in Trumann, Arkansas.

And just as Joe's role has evolved, so has the way we do things at Baldwin. Nothing represents that more than our state-of-the-art plant in Trumann. This is where we feel we've finally achieved that elusive balance between man and machine.

Under aggressive new ownership, Baldwin has transformed the quality of its products from what has traditionally been termed "very good," to distinctly superior. Not only has the product improved in tonal quality, but it has also been refined and redesigned in terms of cabinet appearance, interior cosmetics, workmanship, raw materials and engineering.

In other words, *there's been a complete rededication to the Baldwin heritage of quality,* and a commitment to an even greater future.

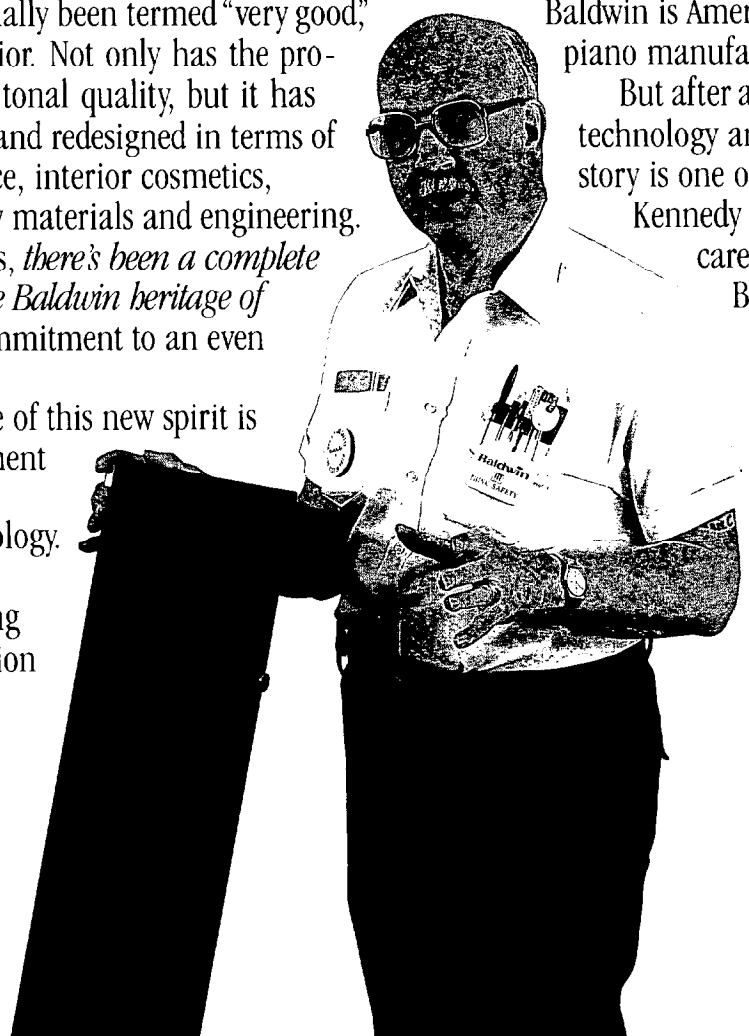
Representative of this new spirit is the major investment we've made in automated technology. This automation gives us the tooling that allows precision duplication of parts, so that each critical relationship is aligned, measured and set exactly to ensure quality that is unequaled in the industry.

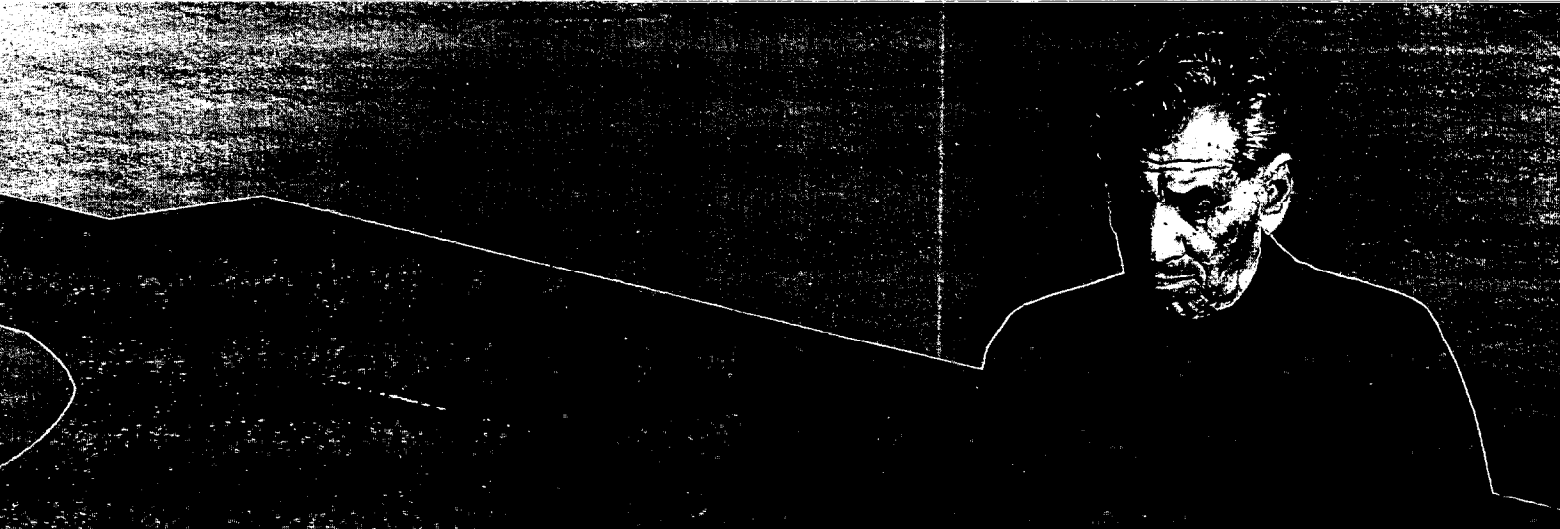
The immediate benefit of this investment is the cost savings we're able to pass on to our customers. But there's another advantage automation gives us. It allows our people to do what people do best. To regulate key action or hand-finish fine wood cabinets, while the machines do what machines do best.

With nine factories, more than 1.4 million square feet of plant space, and over 500 dealers, Baldwin is America's single largest piano manufacturer.

But after all is said and done with technology and statistics, the Baldwin story is one of people. People like Joe Kennedy who have devoted their careers to making what D.H. Baldwin dreamed of 123 years ago: "The best pianos at the best price."

So Joe Kennedy is right. Machines and people working together *are* making all the difference in the world.





"I learned 'Petrushka' on a Baldwin, and composed 'West Side Story' on a Baldwin. I have a Baldwin in my studio and play one just about everywhere I go. I guess you could say Baldwin is my piano."

Leonard Bernstein, Composer, Conductor, and Pianist

The choice of an instrument by a distinguished pianist, composer or conductor is a very personal decision. It's a choice based on professional experience, and as such represents the highest tribute an artist can pay to an instrument. This is not a commercial endorsement, it's a reflection of individual taste, because no performer in the world can afford to entrust his or her career to an instrument that doesn't meet their highest personal standards.

That's why Baldwin takes so much pride in being *the expressed and continued preference of such a celebrated group of renowned musicians.* It is the single greatest testimonial that can be made in support of the principles that guide all of us at Baldwin to build the very finest pianos possible.

What is especially gratifying is that the entire spectrum of the international music community is represented by the classical, jazz and popular pianists, conductors, composers, educators, vocalists and orchestras who request Baldwin for performance, practice and pleasure.

It's a remarkable list that's as rich in variety as it is in talent. To name only a few: *Aaron Copland, Jorge Bolet, Dave Brubeck, Billy Joel, Zubin Mehta, Marian McPartland, André Previn, Liberace, George Shearing, Ronnie Milsap, Burt Bacharach* and *John Williams.*

But our story doesn't end on the stage. Because these artists are continually involved in the critical evaluations of our designs—being asked to judge tone quality, touch, repetition, volume of sound and other crucial factors. This regular judging by artists makes a substantial contribution to the improvement of every Baldwin made, whether it be for the Metropolitan Opera or Mister Rogers' Neighborhood.

"After a week of Pink Floyd in here, only the Baldwin is still in tune."

Rick Hart, Engineer, Producers One, Hollywood

In a recording studio only one thing is asked of an instrument. It's sound. Irrespective of brand names, that's the bottom line. But it has to be reliable sound.

If you have to tune an instrument during a session, you're losing time. And in the recording business, that means money.

That's why Baldwin has the reputation it does with both engineers and session players. Baldwin hangs in there long after the others have folded and gone home.

What makes Baldwin so stable and tunable day after day, year after year? One reason is the 41-ply pinblock in our grands. It's the pinblock that's ultimately responsible for tuning stability. So the more laminations, the more stable the piano. By comparison, a popular competitive grand piano has a 5-ply pinblock. So just how long will *our* pinblock last? We honestly can't tell you since, to our knowledge, we've *never* had a 41-ply pinblock fail.

More reasons for our growing studio reputation are our patented strings and treble termination bars which give Baldwins such rich bass notes and clear highs. We use only the finest maple hardwood for the inner rim so the sound is reflected back onto the soundboard for better volume and sustain qualities.

Not surprisingly, those are also some of the same reasons Baldwins sometimes cost a little more. But when you get down to it, what do you really want in your studio? A delicate instrument that has to be pampered, or one that can't wait for Pink Floyd to come back next week?

"If over the years I've learned one thing about pianos, it's that the original purchase price rarely bears any relationship to the final cost."

Tommie Pardue, Music Education Consultant, Memphis City Schools

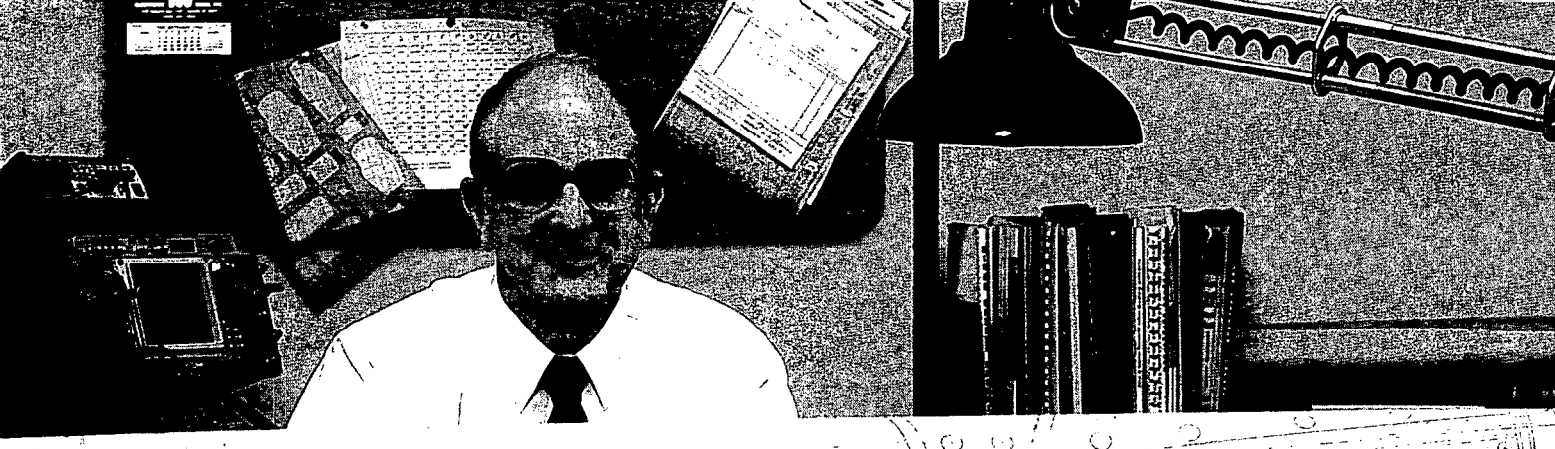
As funding for music education becomes an increasingly critical factor in school budgets, lower-priced pianos naturally become more attractive. But as is true of so many other major long-term investments, the original purchase price can be somewhat deceptive. What must be considered is the *long-term value.*

The reason Baldwins may initially cost more than other pianos is because better quality materials go into them. And in the long run they're a wiser investment because of their lower maintenance costs and longer playing life.

That's why so many teachers feel confident in recommending Baldwin to students and parents alike. They know that the tone, touch and long-term value of a Baldwin make it the piano without equal.

The reason Baldwin is committed to the music educators of America is because we believe the future of music is in their hands. Together with a national advisory board, we've created a *goal-oriented* syllabus to assist teachers. We sponsor the Baldwin Music Education Centers, and teachers seminars. We also co-sponsor with the Music Teachers National Association the Baldwin Junior Keyboard Achievement Awards. And look for the Baldwin-sponsored specials on the Arts & Entertainment Network this year.

They're our way of completing the circle that begins at the Baldwin plants. Which in turn has made the Baldwin Hamilton piano *the most popular school piano in America for the past 40 years.* And as we strive to make an even better piano, we're confident that we'll continue to be the preferred piano for the next forty as well.



"When we first introduced the SD-10, a critic wrote, 'If Beethoven had had a piano like this, the course of music would have been radically altered.' It's that kind of talk that keeps me going back to the drawing board."

Harold Conklin, Chief Piano R&D Engineer, Baldwin

For all the professional recognition that Harold's received over the years, fortunately, none of it's gone to his head. He's still hard at work trying to design the perfect piano.

Because at Baldwin we believe that perfect piano tone is an ideal we share with everyone who designs, builds, plays and services pianos. That's why tone has always been the preeminent focus of our research efforts.

An example of this philosophy is how we improved the traditional string. What we came up with was a unique way to synchronize the string's longitudinal and flexural modes. The result is the SynchroTone® string. And it's just one of the many exclusive design breakthroughs developed for our grands that's now found in every piano we build.

Another area of intense research and development is our *electronic keyboard program.* While others are dropping out of this particular market, Baldwin is actually increasing its commitment. An example of our stake in the field is the fact that Baldwin is one of the few American keyboard manufacturers with its own computer-aided design and manufacturing (CAD/CAM) capabilities.

It is in this challenging environment of invention and experimentation that people like Harold Conklin thrive. They have only one objective: *to create the very finest instruments possible.*

Because at Baldwin, good isn't good enough anymore. It *must* be the best. After all, that's what drawing boards are for.

"I don't know what they're doing at Baldwin, but we've never seen instruments of finer quality from anyone."

Bill Washburn, Washburn Musicland, Phoenix

If you've read this far, you probably know a little about what we're doing at Baldwin.

We're building instruments without equal.

And we're offering our dealers and their customers *America's most complete single-brand keyboard line.* Everything from portable electronic keyboards, home organs, and classical church organs to spinets, consoles, full-size uprights, grands and concert grands.

All with one name. Baldwin. All with one purpose: to be the best instruments with the best value. Period.

Because we want everyone, no matter what their budget, to have the kind of quality instruments that Baldwin makes. And we're doing everything we can to make that happen.

Our comprehensive customer financing program is the only one of its kind. It allows our customers to realize the dream of having a Baldwin, whether it's for their home, their school, or their studio.

Baldwin also has an unparalleled service system. We include a service policy with our warranty on every new piano. It pays a qualified technician $40 toward the cost of inspecting, adjusting and tuning your piano. And we have our own fleet of trucks which speeds deliveries and service.

It all adds up to what we're doing for you at Baldwin. We're building better pianos and organs.

This is the Baldwin story. Who we are, what we're doing, and where we're going. We believe that with the right tools and the right people, you can do anything. Including making the finest instruments possible. If you have any thoughts or comments you'd like to share with us, or would like to find out more about what Baldwin can do for you, please write to either of us personally: Dick Harrison, Chairman, or Harold Smith, President, Baldwin Piano & Organ Company, 1801 Gilbert Ave., Cincinnati, OH 45202

Baldwin
Without equal.

ON PITCH

Eleventh In A Series Of Articles Dealing With The Integration And Equation Of Aural And Electronic Tuning Techniques

Rick Baldassin, RTT
Utah Valley Chapter

Last time we discussed compromises between the 4:2 octave used in tuning the midrange and the 6:3 octave used in tuning most of the bass. Procedures were set forth to manipulate the interval tests in an unequal beating fashion which allows the tuning of octaves which are expanded or contracted, as well as pure at a given level. Tests for the 4:2, 6:3, 8:4, 10:5 and 12:6 octaves were presented and instructions on executing transitions between types, both aurally and electronically, were given. Finally, a chart was presented summarizing the interval tests for the various types of octaves which had been covered.

This month we will look at other interval tests which, although they are not octave tests, nevertheless aid in tuning octaves in the piano.

Before a discussion can begin, each reader must have a picture, idea, or concept relating to stretching octaves in the piano. As mentioned previously, there are widely varying opinions as to where and how much to stretch octaves. Rather than impose my personal opinions here, I choose rather to present facts and tests which will allow each reader to experiment and create his or her own opinions as to how and where stretching should be done, based on their successes and failures during the process of experimentation. During the process of experimentation, it is important to be consistent in what is tried. No conclusions can be formed unless a logical procedure is being tested. After all, in octave stretching, what we are dealing with is often more a matter of artistic preference in a gray area than random selection in black and white.

To illustrate these "other" interval tests, working through the process of tuning lends itself well to the explanation of where and how these intervals are used. Most technicians tune a temperament first, then expand it throughout the piano by tuning octaves. Although this is a widely accepted procedure, it is not the only choice available. I have heard and seem demonstrations, both aural and electronic, where the entire bass was tuned, and an octave never played. I have also heard and seen demonstrations where at least a good portion of the treble was tuned in like manner. It must be stated that the technicians who gave these demonstrations had been tuning for a number of years, and had developed and refined these "non-octave" tuning techniques. Such a procedure to a young technician could likely be frustrating and disastrous simultaneously.

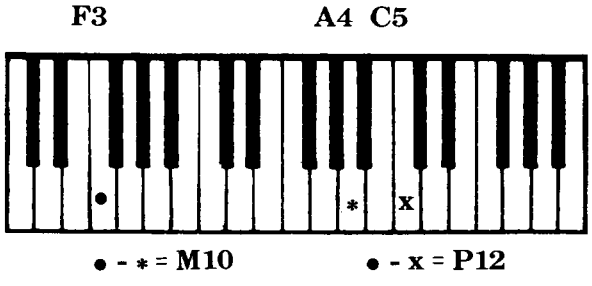
Beginning our tuning procedure, let us assume that our temperament is in tune and that the M3rds, P4ths, P5ths and M6ths all progress in a nice, even manner. When tuning away from the temperament, these parallel progressing intervals are a great aid in determining whether the octaves have been tuned properly. If an F3 to F4 temperament has been tuned and we plan to tune the treble prior to tuning the bass, F#4 becomes the first note to be tuned after the temperament. Try tuning F#4 several different ways. First, try tuning F#4 as a 2:1 octave to F#3, then test F#4 with the parallel interval tests used in the temperament.

Remember that just because the octave tests perfectly as a 2:1 octave does not ensure that it is the proper choice. When the M10-M17 are equally beating, and the P5-P12 are equally beating, a 2:1 octave has been tuned. Now apply all of the parallel interval tests used in the temperament to F#4. Play the C4-E4, C#4-F4 and D4-F#4 M3rds in succession. Note the speed of D4-F#4 as compared to C#4-F4. Next play the B3-E4, C4-F4, and C#4-F#4 P4ths and compare the speed of C#4-F#4 to C4-F4. Next play the A3-E4, A#3-F4, and B3- F#4 P5ths. Again, compare the speed of B3-F#4 to A#3-F4. Finally, play the G3-E4, G#3-F4, and A3-F#4 M6ths, noting the speed of A3-F#4 as compared to G#3-F4. The test results will probably be something like this: D4-F#4 M3rd is too slow as compared to C#4-F4, C#4-F#4 P4th too slow as compared to C4-F4, B3-F#4 P5th too fast as compared to A#3-F4, and A3-F#4 M6th too slow as compared to G#3-F4. In addition, the F#3-F#4 octave could probably stand some improvement as well. All of this leads to the conclusion that the note F#4 is flat and should be raised.

Let us now try tuning the octave F#3-F#4 as a 6:3 octave. When the m3-M6 are equally beating and the P12-P5 are equally beating, a 6:3 octave from F#3 to F#4 has been tuned. Test with parallel M3rds, P4ths, P5ths, and M6ths as before. The test results will probably show that the D4-F#4 M3rd is too fast as compared to C#4-F4, the C#4-F#4 P4th is too fast as compared to C4-F4, the B3-F#4 P5th is too slow as compared to A#3-F4, and the A3-F#4 M6th is too fast as compared to G#3-F4. In addition, the F#3-F#4 octave probably has a bit too much of a low roll to it. As is the case with many things in life, we have gone too far.

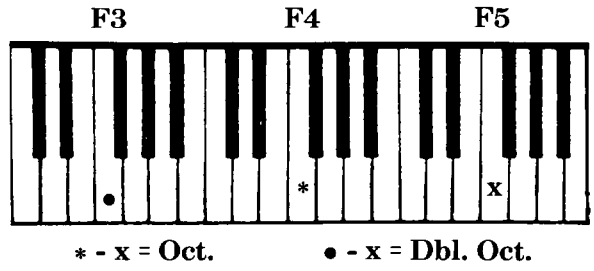
Try now tuning F#3 to F#4 as a 4:2 octave. When the M3-M10 are equally beating and the P4-P5 are equally beating, the F#3-F#4 octave has been tuned 4:2. The parallel interval tests will probably show that the 4:2 matching was the best choice in this area of the piano. If the temperament octave F3 to F4 was tuned 4:2+, then F#3 to F#4 should probably be tuned 4:2+ as well, or the parallel intervals might not sound as good as they might possibly otherwise. This is where consistency enters in. A word of caution—if the temperament octave F3 to F4 is stretched much beyond 4:2, and the octave F4 to F5 is stretched as much as is necessary, the double octave F3 to F5 may beat more than one would like.

Having tuned F#4, tune G4 and G#4 in like manner. A4 is the next note to be tuned, and although it was most likely tuned initially, it is well to check it again at this time. By the time we have reached this point in the tuning, the M3rds are beating very fast. When we have reached A4, in addition to having the F4-A4 M3rd to listen to, we may also listen to the F3-A4 M10th, which beats much slower and is easier to hear. Continuing upward, when we reach C5, we may listen to the F3-C5 P12th as well as the F4-C5 P5th. The 5ths and 12ths will not be beating very fast, but should be listened to so as to ensure that a smooth quality is present.

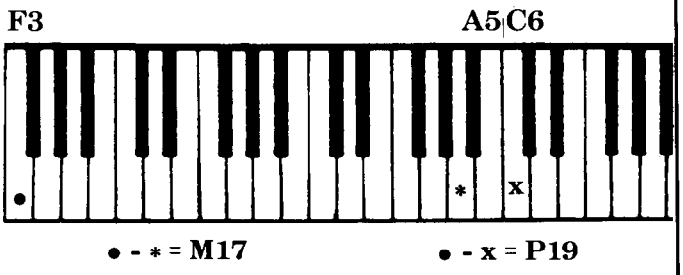


When note A4 is tuned, the F3-A4 M10th may be listened to as well as the F4-A4 M3rd. The 10th will beat about half the speed of the 3rd, making it much easier to hear. When note C5 has been tuned, the F3-C5 P12th may be listened to as well as the F4-C5 P5th. Though the 5ths and 12ths do not beat very fast, they should be checked for smoothness.

Continuing upward, when we reach note F5, we have our first double octave to listen to. It is here we may find out that our temperament octave was stretched too much, and we have to start over again. By the time we reach A5, the 10ths are beating very fast. Here we can drop down and listen to the F3-A5 M17th as well as the F4-A5 M10th. When we get to C6, we can add the F3-C6 P19th to our list of test intervals. With practice, the M10th, P12th, double octave, M17th and P19th will guide our octave tuning to the top of the piano.



When note F5 is tuned, we may listen to the F3-F5 double octave as well as the F4-F5 octave. If the double octave is beating too much, the temperament octave was more than likely stretched too much.



When note A5 is tuned, we can listen to the F3-A5 M17th as well as the F4-A5 M10th. The 17th will beat about half as fast as the 10th, as is easier to hear in this area of the piano. When C6 is tuned, the F3-C6 P19th can be tested for smoothness as well as the F4-C6 P12th.

By listening to the beat rates of these M3rds, P4ths, P5ths, M6ths, M10ths, P12ths, double octaves, M17ths and P19ths, we can better tell if our choice for octave type and amount of additional stretch, if any, is correct, or at least the best possible choice. As we have seen from the example presented trying to tune F#4, the fact that we have tests of equal beating, or unequal beating for that matter, does not ensure that the best possible choice has been made.

Tuning the bass presents its own advantages. First of all, there are so many types of octaves to choose from in tuning the bass, and there are plenty of intervals to test with. In addition, rather than beating faster and becoming harder to hear as they do in the treble, the parallel intervals beat slower when going into the bass. Furthermore, the entire treble has been tuned, allowing the large intervals, (M10ths, M17ths, etc.) to be taken into account immediately.

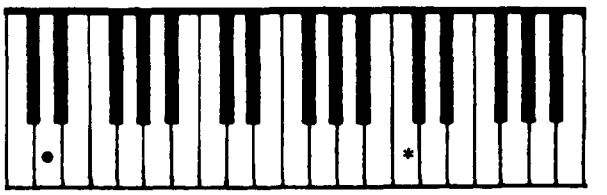
Tuning across the tenor-bass break can present several of its own challenges. It is in this area that the majority of scaling problems occur, there are wound strings as well as plain wires present, and nearly every interval can be easily heard in this area and it can be difficult to make them all sound acceptable simultaneously.

One of the best tips for tuning across this break was given to me by Ed McMorrow. Ed pointed out that the 5th up from the note being tuned should not beat faster than the 4th up from the note being tuned. This does not imply equal, unequal, in a particular ratio, or whatever, just so the 5th is not faster than the 4th. Since F3 was the bottom temperament note, E3 will be the first note tuned into the bass. Once E3 has been tuned as some type of octave, play the E3-B3 P5th and the E3-A3 P4th. Note that very minor adjustments to E3 facilitate the E3-B3 5th beating slower than the E3-A3 4th the majority of the time. This test can be amplified by then playing the parallel M3rds or M10ths to see how E3 falls into the progression. When all of these tests are satisfied (P5th is less than or equal to P4th, M3rds good, M10ths good, octave good), the note is placed as optimally as can be. This P5-P4 test (not to be confused with the P4-P5 4:2 octave test) along with the parallel M3rds and M10ths help to gauge the amount of stretch and facilitate the transition into the bass. If the M10th progression sounds good, the M3rds and M17ths will sound good as well (assuming a good temperament). Having employed the P5th-P4th test, the P5ths and P4ths will sound good, and since the M3rds and P4ths sound good, the M6ths will sound good also (M3 + P4 = M6).

Once well into the bass, the P4th becomes difficult to hear. The P5th, however, should still be tested to be sure it is smooth. There are, after all, a lot of 5ths written in the left hand of piano music. Beside the 5th, the progression of M10ths and M17ths can also be checked. If a decision between good, clean-sounding 5ths and octaves or progression of M10ths and M17ths must be made, the 5ths and octaves should take precedence, in my opinion. I have yet to hear a piece of piano music which employed a run of chromatic parallel M17ths, but I have heard many which contain octaves and fifths. (Now somebody will send me a copy of piano music that does use parallel M17ths.)

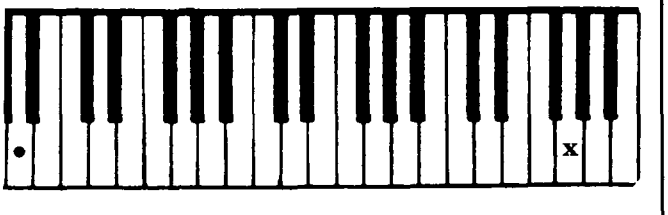
When the M17ths get too slow, try backing up a few notes and playing a progression of m14ths (octave + m7th) or by playing a progression of m21sts (2 octaves + m7th). The m14th and m21st beat faster than the M17th, and are quite helpful clear to the bottom of the piano.

From the above it is evident that other non-octave interval tests can be of great aid in choosing and tuning the proper octaves in the piano. Next month we will discuss the origins of the octave tests and why they work in piano tuning.



• - * = m14

In the low bass of the piano where the M17ths beat too slowly, back up a few notes and play a progression of m14ths (octave × m7th) which beat faster and are easily heard clear to the bottom of the piano.



• - x = m21

In the low bass of the piano where the M17ths beat too slowly, back up a few notes and play a progression of m21sts (2 octaves × m7th) which beat faster and are easily heard clear to the bottom of the piano.

The Fortuitous Glue Collar Worker

David Patterson, RTT
Detroit-Windsor Chapter

Working as a piano tuner/technician provides opportunity, reputation, gratification and uniqueness. First in a series of four. Special thanks to Sid Stone.

Opportunity

Piano work is a wide-open field for the conscientious technician who will take the trouble to be an excellent tradesperson. The opportunities for income are well-known. Piano owners are good people with good incomes and bill-paying qualities. Customers seem to expect that tuning is going to cost them significantly.

Opportunity for improvement exists because there is a chance to learn every day. The many facets and technological areas ensure that this acquisition of knowledge will be diverse. For those who enjoy people, there is the opportunity to meet a broad cross-section and to witness or view many communities, lifestyles, homes and decorative tastes.

Now is an opportune period in the history of pianos. Although manufacturers may have a rough time over the next few decades, the demand and need for piano technicians should increase dramatically. Countless hundreds of thousands of good instruments are waiting to be resurrected. Leisure activities will increase as time goes on. Public education about pianos and better rebuilding techniques are both spreading like never before (thanks to the Piano Technicians Guild).

All of these opportunities help make "Piano Tuner/Technician" a superior occupation.

Acoustics Of Piano A Bibliography

Jack Greenfield
Chicago Chapter

Dr. Thomas D. Rossing is a professor of physics at Northern Illinois University. He has written five books, the most recent of which is *The Science of Sound,* a college textbook on acoustics, including acoustics of music. Following is a bibliography he prepared for the class "Introduction to Acoustics for Piano Technicians" at the Northern Illinois Piano Technicians Seminar in DeKalb, Ill., March 31 through April 1, 1984.

I. Books

Backus, J., *The Acoustical Foundations of Music,* 2nd ed. Norton, New York, 1977). Chapter 13.

Benade, A. H., *Fundamentals of Music Acoustics* (Oxford, New York, 1976). Chapters 8, 9, 17.

Berg, R.E. and D.G. Stork, *The Physics of Sound* (Prentice-Hall, Englewood Cliffs, N.J., 1982). Chapter 13.

Briggs, G.A., *Pianos, Pianists and Sonics* (Wharfedale Wireless Works, Bradford, [U.K.], 1951).

Hall, D.E., *Musical Acoustics* (Wadsworth, Belmont, Calif., 1980). Chapter 9.

Junghanns, H., *Der Piano—und Flugelbau* (Verlag das Musikinstrument, Frankfurt, 1971).

Kent, E.L., *Musical Acoustics: Piano and Wind Instruments* (Dowden, Hutchinson and Ross, Stroudsburg, Pa., 1977). p. 8-99.

McFerrin, W.V., *The Piano—Its Acoustics* (Tuner's Supply Co., Boston, 1972). 52 p.

Olson, H.F., *Music, Physics and Engineering,* 2nd ed. (Dover, New York, 1967). p. 123-28.

Pfeiffer, W., *The Piano Key and Wippen,* trans. J. Engelhardt (Verlag das Musikinstrument, Frankfurt, 1967).

Pfeiffer, W., *The Piano Hammer,* trans. J. Engelhardt (Verlag das Musikinstrument, Frankfurt, 1978).

Reblitz, A.A., *Piano Servicing, Tuning and Rebuilding,* (Vestal, New York).

Rigden, J.S., *Physics and the Sound of Music* (Wiley, New York, 1977). p. 161-69.

Roederer, J.G., *Introduction to the Physics and Psychophysics of Music,* 2nd ed. (Springer-Verlag, New York, 1975).

Rossing, T.D., *The Science of Sound,* (Addison-Wesley, Reading, Mass., 1982). Chapters 9, 14.

Rossing, T.D., *Musical Acoustics: Selected Reprints,* (Am. Assn. Physics Teach., Stony Brook, NY 1976).

Schimmel, K., *Piano-Nomenclatur,* (German, English, French, Italian, Norwegian) (Verlag das Musikinstrument, Frankfurt, 1966).

Strong, W.J. and G.R. Plitnik, *Music Speech High-Fidelity,* 2nd ed. (Soundprint, Provo, Utah, 1983). Chapter 38.

White, H.E. and D.H. White, *Physics And Music,* (Saunders, Philadelphia, 1980). p. 226-30.

Winckel, F., *Music, Sound and Sensation,* (Dover, New York, 1967).

Wood, A. and J.M. Bowsher, *The Physics of Music,* 7th ed. (Chapman and Hall, London, 1975). Chapter 7.

II. Papers, Articles And Theses

Alfredson, R.J. and S. Steinke, "Fourier Transforms Methods for Analysing the Sounds of a Piano," Acustica *39,* 130-32 (1978).

Bacon, R.A. and J.M. Bowsher, "A Discrete Model of a Struck String," Acustica *41,* 21-27 (1978).

Baxandall, A.R., I.S. Brown and C.E. Gough, "Vibrations of Piano Strings and Coupling to the Soundboard," Proc. Inst. Acoustics, Spring 1981.

Bedford, L.H., "Agraffe Friction, Tail Lengths, and Wrest-pin Recoil," Musical Instrument Technology *3,* 89-95 (1978).

Bhargova, S. and R.N. Ghosh, "Elastic Impact of Pianoforte Hammer," Phil. Mag. *47,* 1141-48 (1924).

Bilhuber, P.H. and C. A. Johnson (Steinway), "The Influence of the Soundboard on Piano Tone Quality," J. Acoust. Soc. Am. *11*, 311-20 (1940).

Blackham, E. Donnell, "The Physics of the Piano," Scientific American *99* (6), 88-99 (1965).

Bluttner, F. (Zwota), "Objektive und Subjektive Untersuchungen zum Einschwingen von Pianoklangen" (Objective and subjective investigations of the onset of piano sound), das Musikinstrument *31*, 1140-46 (1982). (English summary on P. 1186)

Darreg, Ivor, "Paleontology: The 12-Toned Pianosaurus," Interval (Winter 1979) 24-25.

Davy, N., J. H. Littlewood and M. McCraig, "The Force-Time Law Governing the Impact of a Hammer on a Stretched String," Proc. Roy. Soc. (London) *27*, 133-43 (1939).

Deb, K.K., "Dynamics of the Pianoforte String and Hammer," J. Sound Vibr. *20*, 1-7 (1972).

Deb, K.K., "Dynamics of a String and an Elastic Hammer," J. Sound Vibr. *40*, 243-48 (1975).

Dhar, S.C., "The Study of the Duration of Contact of a Pianoforte String With a Hard Hammer Striking Near the End," Indian J. Phys. *10*, 305-311 (1936).

Dijksterhuis, P.R. and T. Verhey, "An Electronic Piano," J. Audio Eng. Soc. *17*, 266-71 (1969).

Dijksterhuis, P.R., "De Piano," Publ. No. 7, Netherlands Acoust. Soc., 50-65 (1965). Translated by A.J.M. Houtsma and T.D. Rossing.

Dost, W. (Koblenz), "Neue Klaviersaiten" (A New Type of Piano String), das Musikinstrument *29*, (10) 1378-84; (11) 1500-04 (1980).

Dotzek, D.H., "Upright Piano Action," das Musikinstrument *31* (1) 56-7 (1982).

Dotzek. D.H., "The Model 75 Langer Action by Herrburger-Brooks," das Musikinstrument *28* (2) 318-22 (1979).

Droysen, Dagmar, "'Ibach'-Klang und 'Steinway' Klang" (Ibach sound and Steinway sound), Audio Eng. Soc., 44th Convention, Rotterdam, 1973.

Exley, K.A., "Tonal Properties of the Pianoforte in Relation to Bass Bridge Mechanical Impedance," J. Sound Vibr. *9* 420 (1969).

Feldman, W.C., "Mechanics of Piano String Excitation," B.S. thesis, MIT (1961).

Fenner, Klaus, "On Effects of Non-Uniform Bass String Windings," trans. J. Engelhardt, das Musikinstrument *24*, 58-60 (1975).

Fenner, K., "Causes of Variable Tuning Characteristics of Pianos," Musical Instrument Technology *3* (1) (1978).

Fenner, K., "Inharmonicity and the Piano Tuner," trans. J. Engelhardt, das Musikinstrument *9* (607-09) (1960).

Fenner, K., "The Calculation of the Transition from Wound Strings to Wire," trans. J. Engelhardt, das Musikinstrument *10*, 60, 62, 64, 70, 102-04 (1961).

Fenner, K., "On the Calculation of The Tension of Wound Strings," trans. J. Engelhardt, das Musikinstrument *11*, 810, 341-44 (1962).

Fenner, K. "Unterschiede in der Stimmbarkeit unserer heutigen Klaviere," Europiano Kongress Berlin 1965 Dokumentation. Frankfurt am Main: Fordergemeinschaft Klavier e.V., p. 200-12.

Fenner, K. and H. Fuchs, "Further Research in the Sound of the Pianoforte," Instrument Z. 30-31 (1967).

Fenner, K. (Bad Hersfeld), "Der Einflusz der Zeit auf die Stimmhaltung des Klavier-Saitendrahtes," das Musikinstrument *25*, 1184-87 (1974).

Fletcher, H., E.D. Blackham, and R. Stratton, "Quality of Piano Tones," J. Acoust. Soc. Am. *34* 749-61 (1962).

Fletcher, Harvey, "Normal Vibration Frequencies of a Still Piano String," J. Acoust. Soc. Am. *36*, 203-09 (1964).

Fuchs, Helmut, "Mechanical Impedance of the String and Soundboard," trans. J. Engelhardt, das Musikinstrument *25*, 286-90 (1976).

Garber, Mindy Lu, "Computer Modeling of a Vibrating Piano String," unpublished B.S. thesis, MIT (June 1982). 43p.

Geluk, J.J. (Hilversum), "Acoustics Within and Around the Grand-Pianoforte," Preprint 1982, AES Convention, Eindhoven, March 1983.

Ghosh, Mohinimohan, "Dynamics of the Pianoforte String and the Hammer, Part I Hard Hammer," Indian J. Phys. *12*, 317 (1938); Part II. Elastic Hammer," Indian J. Phys. *12*, 437-52 (1938); See also Indian J. Phys. *13*, 227 (1939); *14*, 425 (1940); *14*, 489 (1940); *15*, 1 (1941), *15*, 11 (1941).

Ghosh, Mohinimohan, "Experimental Study of the Duration of Contact of an Elastic Hammer Striking a Damped Pianoforte String," Indian J. Phys. *7*, 365-82 (1932).

Ghosh, R.N., "On the Quality of the Pianoforte," J. Acoust. Soc. Am. *7*, 27-28, (1935). See also: Phil. Mag. *9*, 1175 (1930).

Ghosh, R.N., "Elastic Impact of Pianoforte Hammer," J. Acoust. Soc. Am. *7*, 254-60 (1936).

Ghosh, R.N., "Elastic Impact of Pianoforte Hammer," J. Acoust. Soc. Am. *20*, 324-28 (1948).

Ghosh, R. N. and H.G. Mohammad, "Kinks on Impact Diagram of Struck String," Phil. Mag. s7 *19*, 260-77 (1935).

Grutzmacher, M. and W. Lottermoser, "Uber die Stimmung von Flugeln," Phys. Z. *36*, 903 (1935).

Hanson, L.H., "Overstretching of Piano Strings and Inharmonicity," M.S. thesis, Brigham Young University, 1967.

Harker, G.F.H., "The Principles Underlying the Tuning of Keyboard Instruments to Equal Temperaments," J. Acoust. Soc. Am. *8*, 243-56 (1937).

Hart, H.C., M.W. Fuller and W.S. Lusby, "A Precision Study of Piano Touch and Tone," J. Acoust. Soc. Am. *6*, 80-94 (1934).

Hundley, T. Chase, Hugo Benioff and Daniel W. Martin, "Factors Contributing to the Multiple Rate of Piano Tone Decay," J. Acoust. Soc. Am. *64*, 1303-09 (1978).

Jansson, E. and A. Askenfelt, "Piano Touch, Hammer Action, and String Motion," Quarterly Progress Report, 4/1983, Department of Speech Communication and Music Acoustics, Royal Inst. of Technol. (KTH), Stockholm, 1984.

Kaufmann, W., "Uber die Bewegungen geschlagener Klaviersaiten," Ann. Phys. *54*, 675 (1895).

Kent, E.L., "Influence of Irregular Patterns in Inharmonicity of Piano Tone Partials upon Tuning Practice,: J. Acoust. Soc. Am. *35*, 1902 (A) (1963).

Kent, E.L., "An Objective Appraisal of

Piano Tone Quality," Audio Eng. Soc., Preprint No. 505, (1967).

Kent, E.L., "Basic Elements in Piano Scale Design With Plain Strings," J. Acoust. Soc. Am. *50*, 128 (A) (1971).

Kent, Earle L., "Influence of Irregular Patterns in the Inharmonicity of Piano-Tone Partials upon Tuning Practice," das Musikinstrument *31*, 1008-13 (1982).

Kirk, R.E., "Tuning Preferences for Piano Unison Groups," J. Acoust Soc. Am. *31*, 1644 (1959).

Lange, W., "Zur Physik des Konzertflugels," I, II. Hochfrequenztech. Elektroakust. (1935) 118, 159.

Liepp, E., "Was ist ein Klavierton?" in H. Junghann, *Der Piano - und Flugelbau,* (Verlag das Musikinstrument, Frankfurt, 1977). p. 93-99.

Lieber, E., "The Influence of the Soundboard on Piano Sound," das Musikinstrument *28* (2) 304-16 (1979). Original: das Musikinstrument *15*, 858- (1966).

Lieber, E. (Zwota), "Der Einflusz des Resonanzbodens auf den Pianoklang," trans. J. Engelhardt, das Musikinstrument *15*, 858 (1966).

Lieber, E. (Zwota), "On the Tuning Stability of Pianos," trans. J. Engelhardt, das Musikinistrument *31*, (4), 602-04 (1982).

Martin, D.W. "Decay Rates of Piano Tones," J. Acoust. Soc. Am. *19*, 535-41 (1947).

Martin, D.W., "Research in Piano Tone," Music J. (February 1965).

Martin, D.W., "Acoustics of an Educational Electropiano," 7th ICA, Budapest, 1971.

Martin, D.W., "Baldwin Electropianos and the Tuner Technician," Piano Tech. J. (December 1972) 14-15.

Martin, D.W., "Why do Piano Tones First Decay Rapidly, Then Sustain?" Piano Tech J. 15.

Meijer, Erwin and Buchmann, Sitg. Ber. Preuss Akad. Wiss. Kl. 32 (1931).

Meissner, B.F., "Piano Sounding Board Vibration," J. Acoust. Soc. Am. *33*, 539-540 (1961).

Meyer, Andreas F. (Detmold), "Acoustical Research into Piano Tone II. Auditory Testing as a Means of Determining Quality," das Musikinstrument *24*, 1034-44 (1981) Original: Ibid *23*, 1423-41 (1980).

Meyer, J., "Die Richtcharakteristik des Flugels," das Musikinstrument *14*, 1085-90 (1965).

Meyer, J. and W. Lottermoser, "Uber die Moglichkeiten einer klanglichen Beuerteilung von Flugeln," Acustica *11*, 291 (1961).

Meyer J. and W. Lottermoser, "On the Feasibility of Evaluating the Tone of Grand Pianos," Piano Tech. J., 11-15 (1965).

Meyer, J. and A. Melka, "Messung und Darstellung des Ausklingverhaltens von Klavieren," das Musikinstrument *32*, 1049-64 (1983).

Miller, Franklin Jr., "A Proposed Loading of Piano Strings for Improved Tone," J. Acoust. Soc. Am. *21*, 318-22 (1949).

Morgan, E.M., "Development of the Electropiano," Musical Instrument Technology *3* (3), 82-89 (1978).

Muller, H., M. Schildbach and D. Wolf, "Nachbildung von Cembalo-und Pianoklangen durch elektromagnetische Seitenanregung," Acustica *23*, 156 (1970).

Nakamura, Isao, "Simulation of String Vibrations on the Piano—A Struck String," Coop. Workshop on Acoustics of Stringed Instruments, Wallongong, Australia, July 1980.

Nakamura, Isao (Shizuoka, Japan), "The Vibrational Character of the Piano Soundboard," 11th ICA, Paris, 1983.

Nakamura, Isao, "The Formation of Piano Sound," Proceedings, Stockholm Music Acoustics Conf., 1983.

Nakamura, Isao, "Computer Simulation of the Piano," 10th ICA, Sydney, July 1980.

Neupert, W. D., "Physikalische Aspekte des Cembaloklanges," das Musikinstrument *20*, 857 (1971).

Pasquet, J., "The Pedals: Three or More," Piano Quarterly No. 115, 29-32, (1981).

Pfeiffer, Walter, "The Piano Hammer" (excerpt from book of the same title), das Musikinstrument *28*, 1500-06 (1979).

Quitter, J.P., "Research and Development on the Piano," IRE trans. on audio *AU-6*, 96 (1958).

Ruiz, P., "A technique for simulating the vibrations of strings with a digital computer," MM thesis, Illinois, 1970.

Sabine, H.J., "Decay characteristics of piano tones," J. Acoust. Soc. Am. *32*, 1493 (1960).

Sawade, O., "Beitrage zur Theorie alter und neuer Klavierformen," Z tech. Phys. *14*, 353 (1933).

Shuck, O.H. and R.W. Young, "Observations on the Vibrations of Piano Strings," J. Acoust. Soc. Am. *15*, 1-11 (1943).

Sivian, L.J., H.K. Dunn and S.D. White, "Acoustic Output of a Piano," IRE Trans. on Audio *AU-* (1959).

Srinivasamurthy, G.S. and B.S. Ramakrishna, "Nonlinear character of resonance in stretched strings," J. Acoust. Soc. Am. *38*, 461 (1965).

Thomma, L., "On Calculating the Diameter and Tension of Wound Strings," das Musikinstrument *16* 274 (1967).

Trendelenburg, F., and E. Thienhaus and E. Franz, "Zur Klangwirkung von Klavichord, Cembalo, und Flugel," Akust. Z. *5*, 309 (1940).

Van Wye, J.R., "Wrapped String Weights and Tension Calculations," das Musikinstrument *15*, 820-22 (1966).

Viereing, O., "Vibrations of Piano Strings," Ann. Phys. *26* 219 (1936).

Weinreich, G., "Coupled Piano Strings," J. Acoust. Soc. Am. *62*, 1474-84 (1977).

Weinreich, G., "The Coupled Motion of Piano Strings," Sci. Am. *240* (1), 118-27 (1979). (offprint No. 3035 from W. H. Freeman)

Weyer, R.D., "Time-Frequency Structures in the Attack Transients of Piano and Harpsichord Sounds," Acustica *35*, 232-52 and *36*, 241-58 (1976/77).

White, W.B., "The Human Element in Piano Tone Production," J. Acoust. Soc. Am. *1*, 357-65 (1930).

White, W.B., "The Problem of a Stringing Scale for Small Vertical Pianofortes," J. Acoust. Soc. Am. *12*, 409-411 (1941).

Wogram, Klaus, "Acoustical Research on Pianos. I. Vibrational Characteristics of the Soundboard," das Musikinstrument *24*, 694, 776, 872 (1981). Original article in Ibid. *23*, 380-404 (1980).

Young, R.W., "Inharmonicity of Piano Strings," Acustica *4*, 259- (1954).

Young, R.W., "Influence of Humidity on the Tuning of a Piano," J. Acoust. Soc. Am. *21*, 580-85 (1949).

Young, R.W., "Inharmonicity of Plain Wire Piano Strings," J. Acoust. Soc. Am. *24*, 267-73 (1952).

Young, R.W., "Inharmonicity of Piano Strings," Acustica *4*, 259-62 (1954).

Young, R.W., "Inharmonicity of Piano Bass Strings," J. Acoust. Soc. Am. *26*, 144 (A) (1954).

III. Books And Papers On Scales, Tuning And Temperaments (A Partial List)

Barbour, J. Murray, *Tuning and Temperament* (Michigan State, E. Lansing, 1953).

Burns, E.M. and W.D. Ward, "Intervals, Scales and Tuning," in *The Psychology of Music*, ed. D. Deutsch (Academic, New York, 1982).

Cordier, Serge, "Piano Tuning and Inharmonicity," das Musikinstrument *32*, 679-81 (1983).

Engelhardt, J., "A Comment on 'An Introduction to the Historic Temperaments' by G. Rehm," das Musikinstrument *29*, 860-62 (1980).

Engelhardt, J., "A Comment on 'A Reconstruction of the Well-Tempered Tuning of J.S. Bach' by H. Kellner," das Musikinstrument *29* 956-60 (1980).

Greenfield, Jack, "Sound Background-Mathematical Theory of 1/4-Comma Meantone Temperament," Piano Tech. J. (Jan. 1984), 16-19.

Hall, D.E., "The Objective Measurement of Goodness-of-Fit for Tunings and Temperaments," J. Music Theory *17*, 274-90 (1973).

Hall, D.E., "Quantitative Evaluation of Musical Scale Tunings," Am. J. Phys. *42*, 543-52 (1974).

Hall, D.E., "Acoustical Numerology and Lucky Equal Temperaments" (unpublished).

Helmholtz, H.L.F., *Sensations of Tone as a Physiological Basis for the Theory of Music*, trans. A.J. Ellis (Dover, New York, 1954).

Jorgensen, O., *Tuning the Historical Temperaments by Ear* (No. Michigan, Marquette, Mich., 1977).

Jung, K., "Gottfried Silbermann's Temperament," das Musikinstrument *28*, 1130 (1979).

Kellner, H. A., "A Reconstruction of the Well Tempered Tuning of Johann Sebastian Bach," das Musikinstrument *29*, 952-56 (1980).

Kellner, H.A., *The Tuning of My Harpsichord* (Verlag das Musikinstrument, Frankfurt, 1977).

Lehman, P.R., "Ancient Scales and Modern Musicians," Selmer Bandwagon No. 59, 8-11 (1970).

Lloyd, L. S. and H. Boyle, *Intervals, Scales and Temperaments* (St. Martins, New York, 1978). 322 p.

Martin, D.W. "Musical Scales Since Pythagoras," Sound *1* (3), 22-24 (1962).

Martin, D.W. and W.D. Ward, "Subjective Evaluation of Musical Scale Temperament in Pianos," J. Acoust. Soc. Am. *33*, 582 (1961).

Phelps, N., "Science or Art? The Ambiguous History of Musical Scales," Selmer Bandwagon No. 59, 3-7 (1970).

Railsback, O. L., "Scale Temperament as Applied to Piano Tuning," J. Acoust. Soc. Am. *9*, 274- (1938); See also *9*, 37 (1938) *10*, 86 (1939).

Rehm, G., "An Introduction to the Historic Temperaments," das Musikinstrument *29*, 856-60 (1980).

Terhardt, E., "Die Stimmung von Tasteneinstrumenten" (The Tuning of Keyboard Instruments), Instrumentenbau *29* (4), 361-62 (1975) [translated by T. Rossing, February 1984].

Terhardt, E. and M. Zick, "Evaluation of the Tempered Tone Scale in Normal, Stretched and Contracted Intonation," Acustica *32* 268-74 (1975).

van der Woerd, A.C., "New Electronic Tuning Device for Pianos," J. Acoust. Soc. Am. *51*, 2010-17 (1972).

White, W. B., "Mean-Tone Temperament," J. Acoust. Soc. Am. *15*, 12-16 (1943).

Low Bid

Fred W. Tremper, RTT
Chicago Chapter

Mrs. Gladys Rysdale
185 Glynmore Lane

Dear Mrs. Rysdale:

Thank you for the opportunity to bid on the rebuilding of your fine no-name piano. It is one of the oldest names in manufacture and it is well known among technicians for its advanced design and innovative assembly.

First a word about our business. The Schlockmeister Piano Works is owned and operated by myself. I received my initial training at the Divine Inspiration School of Piano Technology. There I underwent an intensive three-week course in all phases of piano work, including how to absorb the musical energy that emanates from a well-adjusted piano. We have been in the piano business for several years and we are located between Jerry's Happy Hour Garage and the J&B Ice Cream Parlor.

Whenever we bid on a new job, we like to explain things in detail, so the customer will always know what he is getting into (Ha! Ha!).

Refinishing

Of course we will be glad to refinish the piano in either natural lauan, a rare and exotic mahogany, or ebony. Unfortunately, you will lose your priceless decal on the name board, and we regret the loss. We can finish it in either satin or high gloss. An alternative is to "antique" it, which is done right in our own shop by our own skilled union painters. If you prefer, we can match any color in your living room. We use the best-quality Sears decorator paint. If you like the popular high-gloss finish, we use Glidden's "HighGlow."

Refinishing: $775.00/Antique finish $35.00

Soundboard

Ordinarily we use only genuine Rumanian pine from the north slopes of the Swiss Alps to fill the cracks in the soundboard. Unfortunately, the embargo on goods produced in Communist territories has put us in a bind. We do have a small supply salvaged from other pianos, and we will use that if you prefer. However, I am glad to report that we have had amazing results using a mixture of sawdust and roof cement to fill the cracks. (We have our own mixing process and a secret bonding agent.) No other rebuilder uses this process.

Genuine Rumanian pine $375.00/Special Schlockmeister mix $15.00

Pinblock

They certainly don't make pinblocks like they used to. Your block is made from genuine hard rock maple from Vermont (no Communists there! Ha! Ha!) and 1898 was a good year! We will shim the cracks in your block, fill the tuning pin holes with spackle, reveneer the entire pinblock in lauan. (In addition to being a rare and exotic mahogany, it has been found to be much superior to Sitka spruce as a transmitter of sound, so your pinblock will also act to make your piano more resonant. This is another example of Schlockmeister advanced technology.) We will retap the tuning pin holes (We use only Montgomery Ward best quarter-inch drill bits). At no additional cost, we will seal the pins with superglue, thus preventing their subsequent movement, which will ensure you a permanent pitch level; i.e., you will no longer have to have your piano tuned.

Pinblock repair $65.00

Strings

When we remove the strings we save them, carefully storing them in a moisture-controlled environment (only after having cleaned them with a high-quality detergent to remove all dirt, grit and corrosion). After the plate, pinblock and bridges are installed, we return them to their original position. We take great pride in this operation, for other rebuilders, I am sorry to say, take the easy way out and install new strings, disregarding the quality that made your piano great. This results only in an additional expense to you. Also, the new strings stretch and go out of tune very quickly; ours have all the stretch taken out of them and they stay permanently in tune.

Restringing $25.00

Bridges

As we explained when we talked, the purpose of the bridge is to align the strings to the hammer and to keep the strings off the soundboard. In both bridge repair and replacement we use only the best plywood direct from the Hines Lumber Co. We have it in birch, fir and exotic lauan.

A better way is to plane down the top of the bridges, thus removing all cracks, splinters and dirty graphite that interfere with good string vibration. Bridge pins are then returned to their original holes, which is impossible if a new bridge is made. Our bridge pins, incidentally, are first-quality finishing nails.

Reconditioned bridge $25.00

Action

We will be glad to recondition and regulate your old action. The hammers must be replaced, however; and we suggest eight-pound hammers, which are lightning fast and don't tire your arms. (Fourteen-, 18- or 19-pound hammers are much too sluggish. Can you imagine the fatigue of lifting 19 pounds every time you play a note?). We also sand down the shanks, which, when combined with the eight-pound hammers, guarantee the fastest, lightest touch you have ever experienced. You will be able to play "Flight of the Bumble Bee" faster than ever before. (Ha! Ha!).

While we are able to recondition your action, we have another suggestion for you. We have a used Clementi-Hoppier action we can install for less than the cost of the reconditioning. A few minor adjustments here and there and it will work perfectly. If you would like a more modern action, we have a slightly used Brombach that should fit nicely. Your choice.

Reconditioning $275.00/Used action $100.00

As you can see from totaling the figures, we can bring in a complete rebuilding and refinishing of your piano for as little as $265.00, far less, we are sure, than any other rebuilder. Mind you, this is done with a real concern for quality that is the hallmark of Schlockmeister. A word of caution, however: Schlockmeister's techniques are state of the art, and lesser rebuilders might try to convince you that "old world techniques" are better. Pay them no mind.

Finally, as a "get acquainted" offer, we will be able to deduct 10 percent from the cost; but you must hurry—this offer is good only to the end of the week. Our financing is carried by the Corleone Olive Oil Finance Corp. They will offer you a proposition you will find difficult to refuse.

Thank you for considering Schlockmeister. We know you will be more than satisfied with our work. We know, also, that our work is of such quality that you will never see us again. That we can guarantee!

Sincerely,
Gogol S. Schlockmeister

Saga Of A Concert Tuning

Edward H. Pettengill, RTT
Southern Tier, NY, Chapter

There was great excitement in our local musical circles when a mall keyboard establishment announced the acquisition of a leading concert brand of piano and that the musical organizations here would not have to rely on the local college to furnish a concert grand for performances. We eagerly awaited the shipment of the grand, but when it arrived, we were shocked to find that the piano had torn from the inside of the crate and the keybed had separated from the bottom of the rim. The piano went back to the factory with a several-month waiting period for another to arrive.

Our local symphony orchestra scheduled a prominent piano soloist to perform for the first concert of the season and the new concert grand was scheduled to arrive early in the week of the concert. It did—on Tuesday—and guess what? Yes, it had torn loose from the crate, put a two-foot split in one of the planks of the keybed and removed another chunk where the screw held down the end block. Our opinion at that time was to advise the manufacturer to crate 'em better or change drivers.

Now we were faced with a dilemma: ship it back and wait seven more months or keep it and fix it on the spot because it had to be moved to the concert hall for a rehearsal that Thursday evening. Enter your daring and resourceful piano technician with a fine drill, a mastitis syringe, some Tite-Bond and four Jorgeson clamps. I drilled about a dozen and a half holes up into the separated parts of the plank and stopped when I felt the void inside the split. The size of the drill was determined so that the injector part of the syringe formed a tight fit in the hole. I then

injected a small amount of Tite-Bond in each hole. The Jorgeson clamps did a fine job of drawing up the plank tightly and in line with the other planks and the glue spread around inside the split, holding it beautifully. The other chunk was also glued in and our refinisher made the repairs almost invisible.

Up until now, we had had fairly mild weather, but the afternoon of the move turned cold, the heat went on and all the moisture went out of the air. The piano dropped two Hz, to A-438. On top of all this, the hall was locked so the piano arrived less than one hour before the scheduled rehearsal. Enter again your daring and resourceful piano technician with some speed-tuning techniques up his sleeve. I pitch-raised the piano to A-441 and did a semi-fine fast tuning where it settled, A-440.

Now bear in mind that the concerto being played was Prokofiev #2 and the pianist was a Russian "Teddy Bear" who attacked the piano like a Siberian tiger. He also informed me that no piano he played on ever stayed in tune after the first cadenza. After I recovered from the shock of what our piano sounded like after the rehearsal, I assured the conductor and the soloist that I was up to the job. I, personally, challenged myself that our concert grand would still be in tune after the cadenza in the first movement (trumpet fanfare)!

I rescued what unisons I could after the rehearsal so our soloist would not have a disaster area on which to practice and vowed to return next afternoon to renew his faith in American piano technicians.

Arriving at the hall at 4:30, I chased our "bear/tiger" out (politely, of course) and commenced the usual "concert tuning" procedure. Fortunately the weather had turned mild again and we had no more drying out with resultant pitch drop. I then added another solid hour of pounding unisons. My fingers were so sore I could hardly play the concert. (I should add that I am a principal string player in the orchestra.)

About 15 minutes before concert time, I did a last-minute check of things and found to my alarm that the pedal lyre was loose! A further investigation revealed that our soloist had loosened three of the four glued dowel joints in the lyre and every time the pedal was pressed, the whole thing twisted. Rather than alarm anyone—especially the conductor and soloist—I just kept an eye on the lyre during the performance and prayed it would hold. It held!

> "I drilled about a dozen and a half holes up into the separated parts of the plank and stopped when I felt the void inside the split. The size of the drill was determined so that the injector part of the syringe formed a tight fit in the hole. I then injected a small amount of Tite-Bond in each hole."

Now how do you repair a concert grand pedal lyre when there is a repeat performance the next evening and the soloist wants to practice at noon? Enter your daring and resourceful model airplane builder/piano technician. In the model business, we have a great deal of research going on to develop better and faster ways of joining wood and other various and sundry materials to endure the high stresses of flight and to make fast and permanent repairs.

So all you piano technicians out there visit your local hobby shop. Of special interest is a line of "super glues" under the brand name "Zap Gap." This product comes in both thick and thin types, is crystal-clear and dries and sets in about 10 seconds. I normally use the thick stuff for a quick ivory reglue because the thin stuff is absorbed by the wood pretty fast.

Idea! Why not drill some tiny holes—about 1/32 inch — around the dowel joint in the pedal lyre mounting plate and drop the thin stuff down into the holes. Then the Zap Gap will be absorbed all around the joint and hold like crazy. It worked! I also let it be absorbed in the joints of the pedal box and put a small amount on the outside of the joints where it flowed in and added further strength to the repair.

The result was that I had the job done in less than half an hour, the lyre was back on the piano the next morning and after several hours of *heavy* practice, another tuning and a second performance complete with cadenzas, the pedal lyre was as solid as Lenin's tomb.

Getting The Organizational Spirit!

Taking The Plunge!

M. B. Hawkins
Vice President

Just as walking around a swimming pool without ever getting into the water can never convey the actual feeling of the plunge, so it is with catching the spirit of any given situation. We may think about what it is we want to do and we may talk about it for long periods but until we put the thought we have talked about into action, absolutely nothing happens. Although we must dream in order to fully establish the desire, there comes the time we must take the plunge. The ignition key must be turned or, as some would say, where the rubber hits the road.

Isn't that the way it was when we started in this business? It has not really changed. The people who will shape the arena of piano technology of tomorrow are walking around the pool now. Being in the water, we have the opportunity of helping those walking around the pool wanting to take the plunge come to a decision. Our attitude and enthusiasm relative to the temperature in the pool and how good the water feels will do a great deal for the onlooker. Our attitude will help give direction to the almost-initiated. Our enthusiasm will play a large part in the development of a positive attitude of the newcomer.

So, spend some time thinking about the new buds that burst forth in the springtime. Look down the road to the fall and harvest time. The energy we have used to work the soil, the fertilizer, water and fresh air are all ingredients of the finished product. Our attitude toward the one about to make the plunge or the new bud that bursts forth in spring can very well be the deciding factor in what the end product will be.

I invite you to revisit this piece from time to time and hope it will help someone catch the spirit.

New Members

Registered Technician

Appleton Chapter
Heiden, Mary G.
1019 N. Durkee Street
Appleton, WI 54911

Shannon, Rachel M.
844 E. South St.
Appleton, WI 54911

Charlotte Chapter
Clayton, William J. II
1539 Grovewood Dr.
Charlotte, NC 28208

Cincinnati Chapter
Von Walthausen, Rolf A.
111 Glenmary Ave., Apt. 1
Cincinnati, OH 45220

Associate

Toronto Chapter
Chang, Ming Hui
Sichuan Conservatory of
Chengdu Sichuan
China

Keenan, Gerard J.
101 Prudential Dr., Apt. 411
Scarborough, Ont., Canada
M1P 4S8

Mackie, Robert A.
51 Davenport Crescent
Bramalea, Ont., Canada L6T
3L5

Member-At-Large

Maczijewski S.
C. Bechstein
Pianofortefabrik GmbH
D-1000 Berlin 36
Federal Republic of
Germany

Student

Atlanta Chapter
Bryant, Gordon Patrick
209 Bryant Rd., Box 113
Sargent, GA 30275

Woodall, Andrea G.
110 Allen Lane
Athens, GA 30605

Boston Chapter
Harris, John E.
540 Mass. Ave., Apt. #4
Boston, MA 02118

Fischer, Frank L.
588 Main St., Apt. 3C
Stoneham, MA 02180

Maritime Provinces
Riegger, Rolf
Sandy Point Rd.,
PO Box 1322
St. John, B.C., Canada E2L
4H8

Allied Tradesman

Portland Chapter
Milburn, Orville D.
28093 Liberty Road
Sweet Home, OR 97386

Apprentice

Charlotte Chapter
Dunn, Charles R.
6624 Dwight Ware Blvd.
Charlotte, NC 28212

Chicago Chapter
Doyle, Carole J.
7739 Nottingham Dr.
Tinley Park, IL 60477

Cincinnati Chapter
Lerant, Joseph M.
3934 Regent Ave.
Cincinnati, OH 45212

Wilson, Eugene E.
976 Hatch St.
Cincinnati, OH 45202

Nebraska Chapter
Crandell, Donovan G.
2116 15th Ave.
Central City, NE 68826

Northwest Florida Chapter
Thrift, Friel B.
Route 2, Box 705C
Yulee, FL 31553

Portland Chapter
Vik, Mark E.
156 E. Sunny Sands
Cathlamet, WA 98612

Wichita Chapter
Nelson, Janice K.
1227 Tulsa
Wichita, KS 67216

Affiliate

Member-At-Large
Briza, Nicholas M.
158-Bolosan Dagupan City
Pangasinan, Philippines

Reclassifications

Milwaukee Chapter
Terski, Chris G.
1002 Highway NN
Mukwonaga, WI 53149
(From Apprentice to RT)

Connecticut Chapter
TeHennepe, Anita J.
740 Williams St.
New London, CT 06320
(From Student to Apprentice)

Member Recruitment Points

June 1, 1984—Feb. 1, 1985

	Pts.	Mbrs.		Pts.	Mbrs.		Pts.	Mbrs.
Ackman, W. Harold,	1	1	Harmon, Clayton C.	1	1	Mrykalo, Vincent E.	4	1
Anderson, Robert A.	4	1	Harris, Dale L.	1	1	Nelson, Clifford G.	1	1
Bailey, Benjamin N.	5	1	Hazzard, Nancy M.	9	2	Odenheimer, Fred	1	1
Becker, Sam	1	1	Heismann, Barry	1	1	Ostrosky, Alexander	5	1
Bessette, Roland	5	1	Heneberry, Alan J.	4	1	Ousley, Robert L.	5	1
Betts, David C.	4	1	Henry, Fern L.	4	1	Pagano, Joseph L.	4	1
Bittinger, Richard E.	3	1	Hess, James N.	5	1	Palm, Stanley S.	1	1
Blacklock, David	1	1	Hess, Marty A.	6	2	Pearson, Walter T.	5	1
Blanton, Tom R.	1	1	Hines, David M.	5	1	Pettit, Thomas V.	5	1
Blees, Willem	6	3	Hitt, Henry L. Jr.	4	1	Phillips, Webb J.	10	2
Bridges, Nate	2	2	Holder, Leopold,	5	1	Pierce, James C.	4	1
Bryant, Ken L.	7	3	Hornberger, Paul R.	1	1	Pierson, James B.	1	1
Bullock, Wilbur W. Jr.	4	1	Houston, James P., Jr.	9	2	Pike, Gene A.	5	1
Burow, Burtis L.	4	1	Howell, W. Dean	1	1	Prentice, Randy A.	1	1
Burton, Janes H.	1	1	Hudson-Brown, Karin	9	3	Quint, Richard B.	4	1
Burton, Robert H.	4	5	Jackson, Stephen S.	1	1	Riedel, Paul W.	4	1
Callahan, James J.	4	1	Johns, Barney J.	1	1	Roe, Donald E.	1	1
Cannon, James D.	5	1	Jones, Thomas F.	1	1	Rosenfeld, James I.	5	4
Churchill, Kenneth R.	1	1	Jorgenson, Les O.	1	1	Schmitt, Jake E.	5	1
Coffey, Barbara L.	10	2	Jorgenson, Owen	1	1	Schoppert, Robert L.	5	1
Coffey, Bruce F.	2	2	Kadwell, Kenneth A.	1	1	Sierota, Walt	1	1
Coleman, James W. Sr.	5	1	Keast, Lawrence J.	1	1	Sloan, Kenneth A.	4	1
Conrad, Robert	5	1	Kerber, K. Walter	1	1	Sloffer, Phillip C.	5	1
Cox, Merrill W.	1	1	Kreitz, Richard C.	1	1	Speir, Leon J.	5	1
Crabb, Larry B. Jr.	1	1	Krentzel, Jim L.	1	1	Stone, Sidney O.	6	3
Curtis, Dennis	1	1	Laity, Donald G.	1	1	Stout, Clarence P.	1	1
Dante, Richard	4	1	Leary, Kevin M.	9	2	Towne, Christine S.	5	1
Delpit, John A.	4	1	Leonard, Grant G.	1	1	Tremper, Fred W.	5	2
Doss, Harry W.	4	1	Lillico, John E.	2	2	Vanderlip, David A.	5	1
Draine, Patrick	1	1	Lord, Frank R.	4	1	VanPatten, Aija B.	1	1
Duncan, David R.	2	2	Lovgren, Christine	26	7	Vogellehner, Karl	1	1
Fandrich, Delwin D.	1	1	Macchia, Frank S.	5	1	Walmsley, James O.	1	1
Farley, Timothy M.	5	1	MacKinnon, Karl T.	1	1	Wathen, Michael J.	5	1
Foss, Mark E.	5	1	Manna, Tony	1	1	Welton, T. Scott	1	1
Fox, John D.	5	1	Markins, Charles W.	1	1	West, Ivan	4	1
Garrett, Joseph A.	3	1	Martin, Edward E.	4	1	West, Richard E.	2	2
Geiger, James B.	1	1	Matley, Wayne O	6	2	Wilkinson, Asa	4	1
Godfriaux, Stan R.	1	1	McKay, C. Guy	1	1	Winters, Kenneth E.	5	1
Graham, Susan E.	4	1	McNeil, Thomas	1	1	Wisenbaker, Martin G.	1	1
Greenbrook, Reginald	1	1	McVey, James I.	5	1	Wolford, Peter	4	1
Groot, Gerald W.	1	1	Mehaffey, Francis	3	3	Wood, Edward E.	4	1
Grossman, Matt	1	1	Melton, Eddie J.	1	1	Wurz, Douglas K.	5	1
Grossman, Michael S.	14	3	Metz, J.A.	4	1	Yonley, Fred T. Jr.	9	2
Hale, Robert R.	4	1	Morgan, David H.	5	1	Zastrow, Lila M.	10	2
Hansen,Charles	2	2	Morrow, Hope E.	1	1	Zeringue, Nolan P.	6	3

The Auxiliary Exchange

From The President

I see in our future an Installation Luncheon in the revolving restaurant at the top of the Hyatt Regency Hotel overlooking Kansas City. If you have not ridden slowly around, gazing at a panoramic view of one of our larger cities, you have a lovely sight waiting for you! I can think of no better way of showing our new members and our International Auxiliary members a royal welcome!

I see in our future many tired Auxiliary members dragging into the beautiful hotel spa to do some morning exercises to give them more sparkle and to renew their energy. (Don't forget your spa clothes!) For, on Friday morning, after our computer class, we will be sketched by some very talented people. We may take our sketches home with us as a memento of the convention!

I see in our future an all-day trip around Kansas City by bus which includes the Truman Library and Home in Independence. This is a place all of us should wish to see. Yes, even the Republicans!

I see in our future a grand reunion of our friends from the last convention in Indianapolis and making new friends whom we shall meet for the first time in Kansas City.

You think it is too early to make these plans? The snow will melt. The spring flowers will bloom. The summer will be here soon. Plan now to join us at the convention. Your registration will cost less if you send in your money before June first. Then you can relax and wait with us for the big week in July.

Mary Louise Strong

Edited by:
Ginger Bryant
1012 Dunburton Circle
Sacramento, CA 95825

It's Only Common Courtesy

As most of you are aware, this year's Convention in Kansas City will include the biannual conference of the International Association of Piano Builders and Tuners. With delegates attending from throughout the world, it is likely some wives will be attending Auxiliary functions.

We hosted a group of officials and members from the Japanese Tuners Association a few years ago and your Editor observed things that should *not* have occurred. For example:

Talking about someone in front of them on the assumption that it is all right because they don't understand what is being said is *not* all right. It is rudeness in the extreme. Because someone doesn't understand our language does not imply that person is unobservant or insensitive. One need not understand the language to realize they are the subject of the conversation. The covert glances make it perfectly clear. And, of course, they may understand quite well but be insecure speaking because of accent and unfamiliarity in speaking English.

When there is a non-English-speaking visitor at a table, jokes and anecdotes that will provoke laughter should be avoided unless someone is available to interpret.

Smile. A smile transcends all language barriers.

Most of the non-English-speaking visitors will be from the Orient, particularly Japan. While the Japanese are among the world's busiest travelers, many of the technicians and their wives may be visiting the U.S. for the first time. Even so, they are aware that customs differ throughout the world. It is not necessary to emulate their customs to "make them feel at home." As most of you know, the Japanese bow. It is not necessary to return the gesture since they are aware that it is not our custom. A slight nod of the head and shoulders is acceptable and courteous *if* it feels natural for you to do so. An exaggerated bow would most likely be taken for what it is —insincere posturing.

It is quite proper to greet foreign visitors in English, but keep it to a few words. Good morning or afternoon. Hello. How do you do, etc. This will be recognized as a greeting and will probably be returned in their own language. For the brave among you I have listed a few of the more essential Japanese words elsewhere on the page.

One last word of caution. *Please* keep your voice at normal levels. Why so many people assume that anyone who doesn't understand the language also has a hearing loss is beyond me. Sign language also is taboo. It is too easily misconstrued. If you were to rub your tummy and say "yum yum" to a Japanese lady, she would be likely to put you to bed with their equivalent of chicken soup.

The IAPBT is a relatively new organization but is experiencing steady growth. The day may soon come when meetings between the technicians of the world are commonplace. PTGA should do what we can, in our small way, to help further this goal.

Some Essential Japanese Words

English: Yes
Japanese: Hai (Ha ee) Pronounced rapidly so it almost resembles our "Hi."
English: No
Japanese: Iie (Eye ee eh) Pronounced rapidly so the final "eh" is chopped short.
English: Goodbye
Japanese Sayonara (Sigh un ar ah)
English: Thank you
Japanese: Aligatou (Ah lee ga toe)
English: Please
Japanese: Dohzo (Doe Zoe) Has many meanings, including "Here you are," "here is," "after you," "allow me," "come in," "welcome," etc.
English: I accept
Japanese: Dohmo (Doe Moe) Also multipurpose. It is always said after something has been offered in answer to Dohzo above.

Dohzo and Dohmo are very important words to the Japanese since they connote courtesy.

Touring The South With Jack and Jewell

Jewell and **Jack Sprinkle** were busy last year attending both the Florida State Convention and the North Carolina State Conference. While there was no planned Auxiliary program in Fort Lauderdale, Fla., when they went out to dinner one night, they found Guild member **Ewe Zehme** entertaining. They also took a tour of the Everglades via airboat.

At High Point, N.C., **Anna McAmis,** who works for **Ralph Caskey,** had two days of luncheons and tours planned for the spouses. They visited the huge Furniture Mart (They claim to be the furniture capital of the U.S.) and took a three-mile tour of showrooms filled with beautiful furniture arranged in decorator settings. They also visited the museum of furniture and tools of the past. They also went to "Old Salem," a working village of persons of the Moravion faith and found their way of life very interesting. An interesting observation was the important part that music plays in their lives. The early settlers brought various musical instruments with them from Europe and music is an important part of their culture.

Hallmark Tour: Cards And More

In the early years of this century, a young traveling salesman from Nebraska came to Kansas City in search of a better territory. Taking a room at the YMCA, he began selling postcards from a suitcase he kept under his bed.

When he died two years ago, the former traveling salesman, Joyce Clyde Hall, had become a friend of presidents and kings, as well as one of the richest men in the United States. His company, Hallmark Cards, Inc., had grown to one of the nation's largest private corporations. Its advertising slogan, "When you care enough to send the very best," and its acclaimed television series, the "Hallmark Hall of Fame," are symbols of excellence in industry.

When you attend the Convention in Kansas City, you will be staying within a stone's throw of Hallmark's corporate headquarters. Hallmark, which celebrates its 75th anniversary this year, has just unveiled a new visitors' center. A tour of the new center is scheduled for the afternoon of July 18. It will be an experience not to be missed.

Using state-of-the-art electronics and the talents of the world's largest corporate creative department, the visitors' center will take you through all the stages in the production of a greeting card, from the drawing board to the finished product. Other products, such as jewelry, figurines and writing instruments, also are featured.

So when you come to Kansas City, plan on touring the "house of cards" that J.C. Hall built. You'll be fascinated.

Dining With Bobbi

There are so many exciting things planned for the International Convention in Kansas City in July that if we don't start telling you about them now we won't possibly be able to get them all in! Among the many planned events will be a cooking seminar/demonstration presented by someone of outstanding credentials.

Bobbi Marks is an ardent enthusiast of the culinary arts and has studied with the best in the world, from Julia Child to Jacques Pepin. A certified member of the International Association of Cooking Schools, Bobbi has attended Guiliano Bugialli's Cooking School in Florence, Italy, Cordon Bleau in London, and La Verenne in Paris, among many others. She also hosts "Dining with Bobbi" on KCMO radio in Kansas City and is a popular speaker. Her topics include "Food Trends," "The Passion of Food," and "The Art of Cooking Anything."

Tidings And Tidbits

Two items from totally different sources and both about members residing in Bethel, Conn.! Congratulations to **Mr. and Mrs. Robert Nelson** on the recent birth of a son, **Carl Robert. Barbara (Mrs. Scott) Welton**, also of Bethel, has two good reasons for coming to Kansas City in July. She's been doing a genealogical search for the past few years and has had trouble tracing a "renegade" uncle. His last known residence? Kansas City! She'll divide her time between Auxiliary functions and the Public Library's archives.

Norma Lamb reported on the LA Christmas party. It sounded like a grand affair. After a delicious dinner in the Taix Restaurant and beautiful decorations in the room and on each table provided by **Fern Morton** and some of the ladies from the Auxiliary, they were entertained by **James Graber**, a 14-year-old piano prodigy who was the guest of **Dorothy** and **Elvah Brown. Harold Arp**, a Guild member from Simi Valley, sang some seasonal songs and led the group in Christmas Carols. **Pauline Miller** gave a presentation entitled "Psychograph of Santa Claus" based on a book by the same name by Samaliel Bradford. The program concluded with the wisdom of **W. Don Morton** on the subject: "Who We Are, How We Got Here, And Where We Are Going." One point on which Don elaborated was that it is not the trials or crises we undergo, but our attitude toward what we are going through that can affect our lives for better or worse. How true that is.

Coming Events

Date	Event	Site	Contact
March 28-30, 1985	Pacific Northwest Conference	Ridpath Hotel Spokane, WA	Scott Colwes 1315 Coeur D'Alene Ave. Coeur D'Alene, ID 83814 (208) 667-3393
March 28-31, 1985	Pennsylvania State Conference	Philadelphia	Walter Sierota 5201 Whitaker Ave. Philadelphia, PA 19124 (215) 533-3231
April 12-14, 1985	Michigan State Conference	Hilton Inn Lansing, Mich.	Dale Heikkinen 1914 Wayne Ann Arbor, MI 48104 (313)662-0915
April 19-21, 1985	Northern Illinois Piano Technicians Seminar	Northern Illinois University, DeKalb, IL	Jack Greenfield 259 Riverside Drive Northfield, IL 60093 (312) 446-9193
April 26-28, 1985	Central West Regional Seminar	Minneapolis, MN	Jonathan C. Nye 1515 Almond Ave. St. Paul, MN 55108 (612) 646-1622
April 27, 1985	Los Angeles Chapter Annual Seminar	El Camino College, Torrance, CA	Lindasue Darling 828 Dickson St. Marina Del Rey, CA 90292 (213) 822-9690
May 3-5, 1985	New England Regional Seminar	Sheraton Motor Inn West Lebanon, NH	George H. Wheeler 11 Cherry Hill Springfield, VT 05156
May 18-19, 1985	Denver Chapter Seminar	Hilton South, Denver, CO	John Bloch 1584 S. Broadway Denver, CO 80210 (303) 722-4221 (303) 757-0004
June 22-25, 1985	NAMM Music Expo	New Orleans, LA	NAMM 15140 Avenida Encinas Carlsbad, CA 92008
July 15-19, 1985	Piano Technicians Guild Annual Convention & Institute	Hyatt Regency Kansas City	Home Office 9140 Ward Parkway Kansas City, MO 64114 (816) 444-3500

MOVING?

Be sure to let us know!
If you're moving, whether it's across town or around the world, be sure to let us know so your *Journals* can follow. To speed the change, send a mailing label from an old issue and your new address to: ***Subscriptions, Piano Technicians Journal, 9140 Ward Parkway, Kansas City, MO 64114.***

The **Vermont Chapter** is hosting the **1985 New England Regional Seminar** to be held **Friday, Saturday and Sunday, May 3, 4 and 5** at the **Sheraton Motor Inn** in **West Lebanon, NH.**

For more information contact: **George H. Wheeler; 11 Cherry Hill; Springfield, VT 05156;** or **Thomas A. Roby, co-chairman; 14 Kingman St.; St Albans, VT 05478.**

Classified Advertising

CLASSIFIED ADVERTISING rates are 25 cents per word with a $7.50 minimum. Full payment must accompany insertion request. Closing date for ads is six weeks prior to the month of publication.

Box numbers and zip codes count as one word. Telephone numbers count as two words. Names of cities and states count as one word each.

Send check or money order (U.S. funds) made payable to Piano Technicians Journal, 9140 WARD PARKWAY, KANSAS CITY, MO 64114.

The Journal does NOT provide a blind box service. Please include a mailing address and/or telephone number with your ad.

Ads appearing in this publication are not necessarily an official endorsement of the services or products listed.

FOR SALE

SIGHT-O-TUNER SERVICE. Improve the accuracy of your tunings with a correctly calibrated SOT. Also do repairs and modifications. **Richard Weinberger, 14130 Alta Vista, Saratoga, Calif. 95070. (408) 867-4513.**

ACCURATE ELECTRONIC TUNING Substantial improvement over any published method. Clearly written instructions. Easy-to-learn routine. Designed for use with Hale Sight-O-Tuner—can be adapted for others. $10.00. **Don Hardin, 2620 Cypress Ave., Stockton, CA 95207.** (I)

COMPUTER SOFTWARE. The "Piano Business Manager" is a professional business program developed specifically for piano technicians. Customer records system saves you hours and headaches. Tracks all past tunings. Searches by name, phone and address. Will print due list, schedule, invoices and more. Complete financial system keeps track of income and expenses by user-defined categories. Prints transaction report, income and expenses listed by category, income statement and more. Will fit 1,000-plus customers on one disk. PC/MSDOS and most CP/M formats available. Total price $395. Or send $50 for a complete working demo. **Manager Software Systems (602) 830-4670.** (I)

BUILD BUSINESS and educate your customers. THE PIANO: A Piano Technicians Guide for the Piano Owner, by Philip Gurlik, R.T.T., tells them why their piano needs the services you provide and answers all the most-asked questions. Special introductory price $1.95. Trade discounts up to 40%. For sample copy send $1.00 to: **Bookman House, PO 271804, Houston, TX 77277.**

PIANOS FOR SALE—Always on hand, 150 to 300 uprights! Plain case, art case and players. Also 50 to 150 grands at all times, as is or rebuilt. Excellent brand names—no junk! All set up for inspection. Lowest possible prices. Call for quotes. **Owen Piano Wholesalers, 2152 W. Washington Blvd., Los Angeles, CA 90018. Telephone (213) 883-9643.** (I)

FOR SALE: Priceless antique! 1919 Chickering Baby Grand Ampico Electric player piano in *very* good condition. Player mechanism still works! Interested parties call **(904) 286-6273** and make an offer.

NILES BRYANT OFFERS TWO HOME STUDY COURSES: Electronic Organ Servicing: Newly revised. Covers all makes and models—digital, analogue, LCI's, synthesizers, etc. Piano Technology: Tuning, regulating, repairing. Our 87th year! Free Booklet: Write or call **NILES BRYANT SCHOOL, Dept. G., Box 20153, Sacramento, CA 95820—916-454-4748 (24 hrs)**

GRAHAM ANDERSON, Piano Rebuilding and Repair, 1225 Bennett Drive, Alabaster, Alabama 35007. 20 years' experience with Steinway—London. Specializing in replacement of action rails. **Also available GENUINE IVORY KEY TOPS replaced.** Call or write for free estimates. **(205) 664-2527 or (205) 663-6449.(I)**

BUSINESS FOR SALE, full service, in tuning and rebuilding, also refinishing, player restoration, school and concert work. Business is well-established and profitable, needs experienced technician. Located in rapidly growing area of northern Arizona. Will sell separately or with home and 1,000-square-foot-shop on 1.19 acres. Reasonably priced, must sell soon. All inquiries answered. **Jack Knox, PO box 642, Cottonwood, AZ 86326. (602) 634-8756.** (1/1)

COMPLETE CORRESPONDENCE COURSE. Piano Tuning, Repairing, Servicing. **Don Flippin, RTT, 569 N. McLean, Memphis, Tenn. 38112.** Information sent on request.

KORG AT-12 AUTOCHROMATIC TUNER. Play any note on your instrument and the AT-12 instantly indicates the note and octave (by LED) and how many cents sharp or flat (by V-U) meter in 7 octaves: C1 to B7. Generates 4 octaves: C2 to B5 at 2 volumes. Calibrate tuner A=430 Hz to 450 Hz. Quartz Crystal. Case, stand, AC adaptor, batteries, earphone. One lb. One year warranty. Introductory offer: $125 ppd. ($180 list). **Song of the Sea—Dept. PTG. 47 West Street, Bar Harbor, Maine 04609. (207)-288-5653.**

VICTOR A. BENVENUTO VIDEOTAPES. Stimulating Chapter Technicals. PIANO TUNING AURAL/ELECTRONIC...$175. The most accurate approach in fine tuning. KEY MAKING...$124.75. GRAND REBUILDING (2 tapes)...$225.75. Preparation, pinblock replacement, damper installation, restringing. GRAND REGULATING...$175.75. Hammer Reshaping. SOUNDBOARD REPLACEMENT...$94.75. Ship old board—new board comes to you ready for installation. Please specify VHS or Beta. All prices include shipping. **THE PIANO SHOPPE, INC. 6825 GERMANTOWN AVE., PHILADELPHIA, PA 19119. (215) 438-7038. (I)**

DIMENSIONED AND CUSTOM BRIDGE STOCK Quarter-sawn cured rock maple. Bass-tenor-treble bridge duplication. **GRAND WORKSHOPPE PIANO CO., Church St., N.Y. Mills, NY 13417 Ph. (315) 736-2272.** Quality service guaranteed. (I)

NEW SOUNDBOARDS MADE FOR YOU. Ship old board. New board comes to you ready for installation. Send for instruction on: **Victor Video Tape, $94.75. Victor A. Benvenuto, 6825 Germantown Avenue, Philadelphia, PA 19119. (215) 438-7038.** (I)

KEY RECOVERING MACHINES. Send stamped S.A.E. for new LOWER prices and description. **SOLENBERGER PIANO SERVICE, 1551 LYNN CT., SANTA ROSA, CA 95405. (707)542-1756.**(I)

COMPLETE HOME STUDY COURSE in Piano Tuning, Regulating and Repairing. Write or call for free brochure. **Aubrey Willis School of Piano Tuning, PO Drawer 15190, Orlando, FL 32858. Phone: (305) 299-3690.** (I)

PIANO KEYS RECOVERED. Satisfaction guaranteed, 15 years experience, quick service. 52 keytops: $49.95, 36 sharps replaced: $24.95. Send check or money order with keys *numbered* to: **Key Tops, 3540 Lori Lane South, Lakeland, FL 33801.**

52 PIANO KEYS RECOVERED—.050—$35.00 88 Piano Keys Rebushed Front & Center—$35.00 Complete Piano Key Service Return Postage Paid—24-Hour Service. CHARLES WILSON, 1841 Kit Carson, Dyersburg, TN 38024 Telephone 901-285-2516. (6/3)

HARPSICHORD AND FORTEPIANO PARTS and kits, original factory materials from the finest early keyboard suppliers in the world. Also troubleshooting and assistance to fellow RTT's on harpsichord problems. Authorized Zuckermann Agent. Lowest Factory Direct Prices—buy from the source. Catalogs, price lists free. **Yves A. Feder, RTT, Harpsichord Workshops, 2 North Chestnut Hill, Killingworth, CT, 06417.** (I)

TUNE AND RESEARCH HISTORICAL TEMPERAMENTS with the Widener Model 120 or 300 computerized tuners. Designed primarily for harpsichordists, organ builders offers selection program cards various temperaments. Large library available, also record and store your own. Substantial Professional discounts to RTT's Authorized Widener Engineering Factory Distributor **Yves A. Feder RTT 2 North Chestnut Hill Killingworth CT 06417 (203) 663-1811.** (I)

WANTED

MASON & HAMLIN EX-PLAYER. Have mechanism to install. Also want original literature pertaining to player pianos or other self-playing instruments. **BRADY, 4609 CRANBROOK, INDIANAPOLIS, IND 46250. (317) 259-4305. AFTER 5 P.M. (317) 849-1469.** (I)

WANTED: Art-Case Wurlitzer or Apollo Player grand piano 5'8" or larger with Artecho or Apollo reproducing mechanism, preferably unrestored. Reward for sucessful lead. Also want Artecho and Apollo reproducing piano rolls. **Kavouras, 2740 Lighthouse, Lynwood, Ill. 60411 (312) 474-8787.**

COLEMAN-DEFEBAUGH
Video Cassette
#1 — Aural and Visual Tuning
Covers pitch-raising, temperament setting, beat counting, Sanderson Accu-tuner, etc.
#2 — Grand Action Rebuilding
Hammers, shanks, wippens, key bushings, backchecks, etc.
2 hrs. VHS or Betamax... $79.50
Superior Instruction Tapes
2152 West Washington Blvd.
Los Angeles, CA 90018
(213) 735-4595

INVENTRONICS, INC.
MIDWEST DEALER
ROBERT CONRAD—Kansas City, MO
Complete line of Inventronics Products featuring the
SANDERSON ACCU-TUNER
VISA/MasterCard (816) 444-4344
605 Wyandotte, Kansas City, MO 64113

HELP WANTED: Recent Tuning School grad or person with a similar level of skill to work 30-50 hours per week in piano sales, service, and rebuilding business. Salary negotiable. Send resume to **Walkup & Frank, 310 Fourth St., Ithaca, NY 14850.**

HELP WANTED: Concert Piano Rental Firm seeks highly skilled piano technicians starting at $400.00 weekly. **(212) 206-8794.**

WANTED—Keys with frame, action from 1890s Mehlin upright grand. Would consider complete piano. 26 bass, 31 tenor, 31 treble. **Nelms Piano Service, RD 7, Box 7281, Mercer, PA 16137. (412) 346-4876.**

MISCELLANEOUS

EDUCATE YOUR CUSTOMERS in piano care through distribution of THE PIANO OWNER'S GUIDE! Softbound, $3.95; hardbound, $6.95. Quantity discounts from 15 to 40 percent. Terms. **APEX PIANO PUBLISHERS, P.O. Box 1009, Mountain Home, Arkansas, 72653.** (4/1)

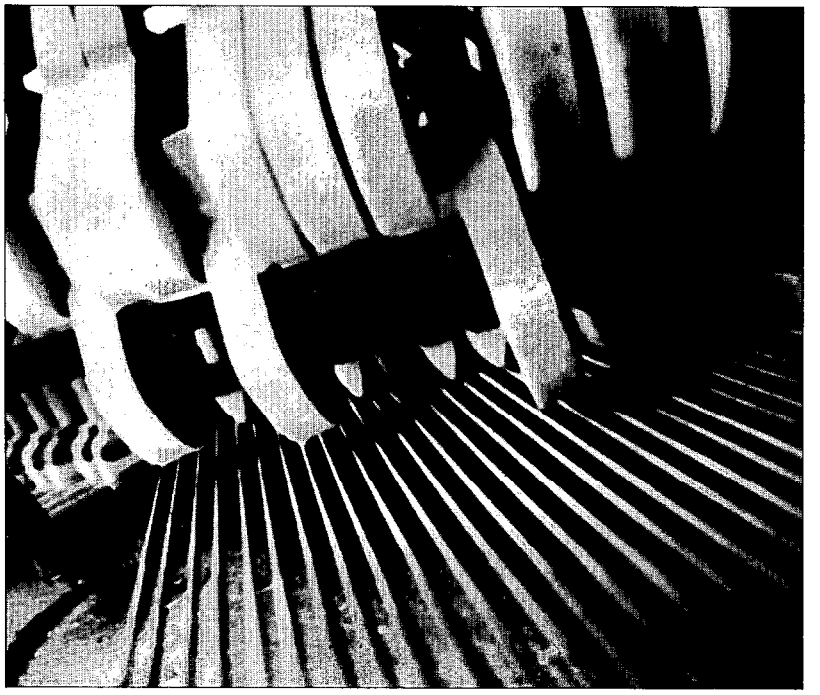
SIGHT-O-TUNER MODIFICATION. Bourns Knobpots are not enough. Exclusive **Internal Error Compensation** is necessary for truly accurate modification. Factory recalibration and repair procedures available. **Sales**—modified or stock, new or used. Work endorsed by the inventor of the Sight-O-Tuner, Albert Sanderson. Also, **SANDERSON ACCU-TUNER** authorized distributor. Tuning lever note switch for Accu-Tuner $15. Supplying the most accurate tuning aids for craftsmen with the most discriminating ears. **Rick Baldassin (801) 374-2887. Solving your pitch problems since 1981.** (I)

Kawai...
The Standard
of Excellence.

At Kawai, the tuner's hands and ears alone can determine the final "rightness" of a piano in the final tuning process.

KAWAI
The Master Builder.

The Consistent Hammer



Wurlitzer understands your frustration in voicing an instrument with hammers that are not of uniform density. That's why we have new hammer presses that control both vertical and horizontal pressure on the hammer. They allow us to produce a hammer with more uniform density, one that will require less voicing and care, one that will be more consistent, from piano to piano. And the shanks are cut with such precision that the striking point on a Wurlitzer Piano is consistent within each model.

Wurlitzer goes to great effort, too, to make sure all hammer shanks are positioned so the grain is the right way to provide the best blow to the strings. (Just as a baseball bat will crack if you hit the ball against the grain incorrectly, if the shank is not installed correctly it will not give as it strikes the string.)

All of this, of course, provides a more uniform and dependable piano that can make your job a little less frustrating.

Our continuing commitment to you, the technician, is apparent in our ongoing willingness to teach and train. Our key technical people attend PTG meetings and conventions and conduct training sessions. Our service department continues its seminars. Our technical staff is at your service to provide any assistance you might need, just call 800/435-2930 toll-free between 8:00 a.m. and 4:30 p.m. For parts call Code-A-Phone 800/435-6954. In Illinois call 815/756-2771.

We recognize that a quality instrument must be well maintained. That's why Wurlitzer Pianos are designed, engineered and built with you in mind.

WURLITZER®

The Music People

Dekalb, Illinois 60115