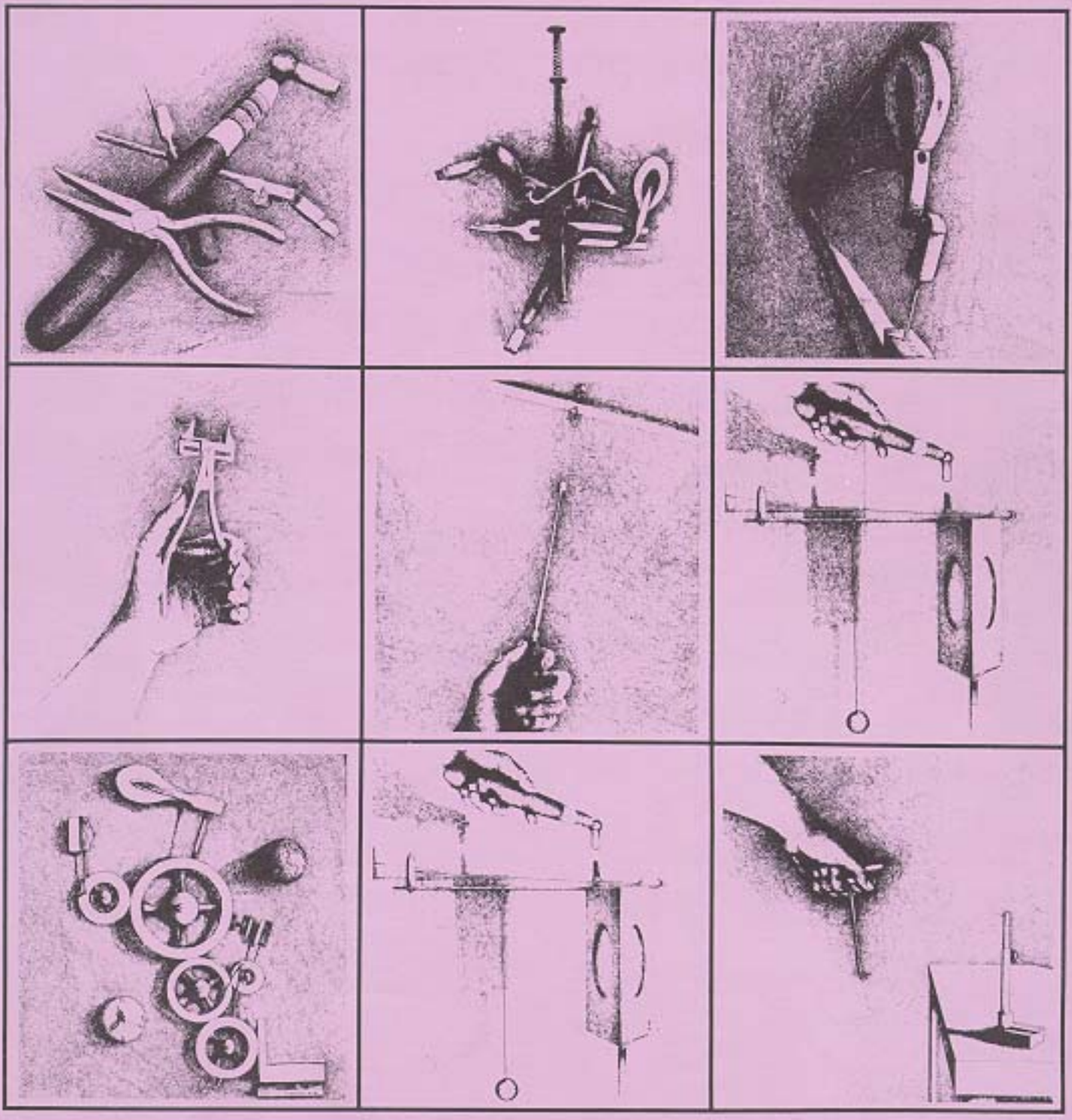
Piano Technicians Journal

November 1982

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Piano Technicians Journal

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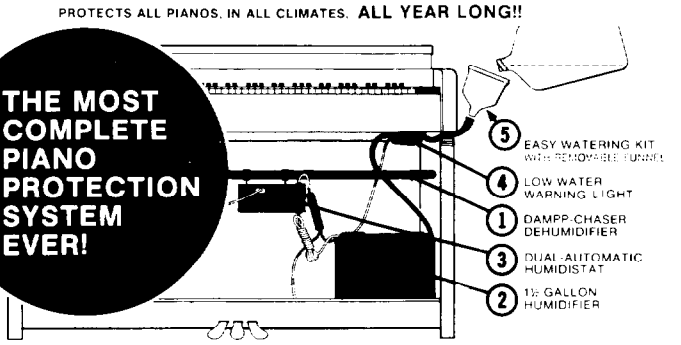

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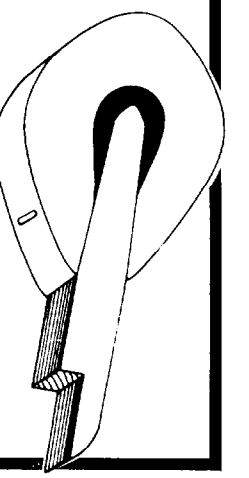

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Editorial

Don L. Santy
Executive Editor

Education — Going Back To The Basics

A Hearst feature service article appeared in a local paper last week which I felt significant enough to comment on . . .

It dealt with going "back to the basics" in education, particularly in the secondary schools.

Ernest Boyer, a former U.S. Commissioner of Education, now heading up the Carnegie Foundation for the Advancement of Teaching, insists that there is an "embarrassingly simple cure" for what ails the high school system in this country. A return to what the schools were designed to do in the first place: teach the basics.

Mr. Boyer states that, "high school education has a lack of focus with its 400 to 500 courses ranging from 'flower arranging,' 'be kind to animals,' to 'film viewing' and even 'driver education.'" He further argues that high schools drop the courses of study currently offered and get back to the basics of "reading, 'riting and 'rithmetic."

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This is great news, of course, if it ever gets put into action. Certainly the daily news, the constant rumbling from the "not so safe" halls of the high schools around the country, harassed parents, perplexed employers and from many of the kids themselves, it should be perfectly obvious that there is a great deal to be concerned about in this crazy arena.

I will never forget the shock I received some years ago when one of my high schoolers came home with a "curriculum schedule." I could hardly believe my eyes at the absolutely ridiculous courses that they considered "study." I have often wished I had kept the book, but those were such crazy times we came to expect almost anything — even from education.

Have you ever asked a recent high school graduate to read to you? You may be in for a shock. You might get lucky and ask a student who paid some attention in school, but chances are you will get a kid who just "did time."

When secondary schools neglect the basics of education and ignore the necessity of preparing their students for the demands of the world by replacing this time and effort with lessons in bowling, nature appreciation, archery, hobbies and general interest junk, it is certainly time to act. As many people suspect, it seems to be partly due to lazy students and fuzzy-thinking educators who just want to wile away their time practicing their major fields of interest.

Many years ago, I heard someone say the trouble with schools are, "the teachers are afraid of the principal, the principal is afraid of the superintendent, the superintendent is afraid of the school board, the school board is afraid of the parents, the parents are afraid of the kids, and the kids — they aren't afraid of anybody."

During the past two decades, the kids have reason not to fear anybody. Nobody really has any control over them. The desire for instant gratification, the mobility they enjoy and the rapid acceleration of independence, all combine to lessen any kind of control they might need. The high school my kids attended was pretty much run by the kids. They determined the schedule of events, including school dances after games which kept them out half the night, and the courses of study in which they felt like spending their time. The principal was a politician trying to get along with everybody and the teachers had long since given up trying to educate many of the kids. The small, almost invisible minority of "troublemakers," once seen clustered in the halls, out in the parking lot and on the edge of the woods in our day, has now enlarged to about one-third of the student body. They are just "putting in time" with as little effort as possible and should really be part of the work force or attending trade school. Those who are interested in an education could then move forward with teachers who would be a lot happier and could accomplish something.

Mr. Boyer pointed out that the basic problem was closely related to the fact that the public schools are expected to be absolutely everything to everybody. They are no longer simply expected to educate, they are now expected to be responsible for children's behavior, moral standards, leisure time, recreation, hobbies avocations, social graces, family relationships, driving abilities, and general health and welfare.

Mr. Boyer claimed that many kids, far too many, simply go to school to see their friends. He complained that high schools today are declared failures if they do not play the roles that parents, church leaders, social workers, police and community once carried. "The parents want the schools to teach the kids how to behave. The business community wants the schools to teach them how to work. Law enforcement agencies want them to reduce delinquency and colleges want them to be more academic." The students? They just want a good time.

"Kids are kept behind school walls until they pass adolescence. They really don't know why they are there," he states. He contends that the curriculum is a disaster now and most state requirements can be finished in just three years. Any parent who has witnessed their seniors wile away the last year in killing time can attest to

that.

Mr. Boyer stated in his article that the high school's basic responsibility should be to provide each student with the ability to read, (the mastery of English), the ability to compute and to give students confidence in the use of the basic symbols of our culture. "The main reason students drop out of schools," he states, "is that they can't read and add.'

He further states that the teaching profession is caught in a vicious spiral downward. He says that "in teaching rewards are few, morale is low and the best are bailing out." You might have read recently about the shortage of math and science teachers. These of course are the "disciplined" areas of study and require much more in the way of ability and technical comprehension. those few who have this special skill are opting for better paying jobs in industry.

Unless the attitude of people changes, including parents, students and the teachers themselves, public education in this country, at least, will continue to experience a wide spread loss of public confidence that will threaten the economic, social and political fabric of the nation.

Mr. Boyer echoes the sentiments of many thinking people. His studies will be read with interest and I can only hope that the educators of the nation will take heed.□

Letters

Sir:

I read with interest your editorial in the June, 1982, *Journal* which discussed recruiting members.

Let share my experience with you. In the mid '60's I was very interested in joining the Guild. I wrote, asking what was required. The reply was to see a member. I wrote back saying surely you must have a standard set of requirements — what were they? The same reply came back. So I called someone listed in the phonebook. He was out and never returned my call.

I concluded from this unhappy experience that membership was meaningless because you had no firmly established standards — entrance depended on the whim of whomever I happened to talk to. Otherwise, you would be able to tell me what they were.

In the late '60's a chapter was being formed again in my hometown. Was I interested in joining? Again I got no satisfactory answer for requirements. No thanks.

Recently I took out a subscription to the *Journal* again after not having taken it for nearly 20 years. I received some literature telling about the different classes of membership, but again no solid information on requirements. I thought briefly about writing, asking about them and decided no, I had given it a fair try. I did not feel like degrading myself by beginning another futile exchange.

Wade Alexander in his article on page 16 speaks of the anxiety involved in taking the tuning test. He seems to have hesitiated some time before taking it. He eventually took and passed it. How many people have gone the other way? How many potential members have you lost because, like me, they had no way of knowing what was expected of them? I think that until you can give interested persons a better answer than I have gotten over the past 20 years, you will continue to have trouble attracting members.

I have made my living the past eight years mostly from repairing wind and string instruments. Before that I worked at a variety of other jobs. I could have been a member for the Guild now 15 or 20 years instead if I had been given some straight answers

Your editorial speaks of members calling on interested individuals. This is fine in some areas. There are no Guild members in this town. The closest chapters are over 100 miles away, I think. What you propose is not always practical.

But there is another issue here. It should be possible for the interested person to be able to learn about it and consider it privately before he calls you or is called upon by others. Your method of confrontation and taking of initiative by members, while it may work after the initial contact is made, initailly shows no respect for the felt needs of the potential member. *He has never been given the information he needs to begin thinking about it in the first place.* I deliberately emphasize this point — that the individual must be able to make some decision and alleviate his anxiety before contact is made with members. Otherwise, it takes a determined person to call and ask for help from a member. It is much easier just to continue doing what you are and leave the Guild alone. Everyone loses from that.

I hope this experience of mine will help you in recruiting members.

Yours truly
Christopher Banner

Dear Mr. Santy:

In conjunction with my forthcoming book on modern piano builders, I am compiling a bibliography (a comprehensive list of books and articles) covering the construction, tuning and history of the pianoforte from 1700 to the present. Many books and articles dealing particularly with piano technology are rare, out of print and were often published in limited editions. Moreover, since the notion that an educated man might elect to work with his hands has only recently begun to receive acceptance, most scholarly research libraries do not have extensive collections of books on technological subjects. I would be most grateful to guild members for their help in making my bibliography as complete as possible. Please write to me if you know the title of a rare or obscure source which should be included in my list. I would be particularly grateful for titles in Eastern European and Asian languages and for information about unpublished and manuscript sources. An example of the type of rare source I am seeking is Albert Vant's excellent book *Piano Scale Making,* which was published in a very limited edition in New York in 1927. Does anyone have a copy of this book which I can briefly borrow?

As the main part of my book provides an international listing of piano makers who manufacture either modern instruments or historical replicas, I would also be grateful for information about small shops, even if production is limited to only a few units a year. All assistance from fellow guild members will be gratefully acknowledged.

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PRESIDENT'S MESSAGE

Ernie Preuitt
President

In the August issue of this publication I spoke to you about finding each other in growth, technical mastery, corporeal entity and companionship. Last month I spoke on growth. At this time I would like to say a few words about the third of these subjects.

One of the most effective ways we can support this or any other organization is by proper communication. Television viewing is not one of my favorite activities, especially on Saturday night, for when the ten o'clock news is over, I usually reach for the "off" button. However, last Saturday night I was preoccupied with some reading, and before I realized it the "Saturday Night Live News" was on. One of the newscasters had as a guest, "Father So-and-So," who gave a book review of the Readers Digest version of the Bible. The good "Father" was quite uncomplimentary, complaining that the work was excessively shortened. The Ten Commandments were reduced to eight, the three wise men were replaced by one smart old man, there were now only ten disciples, Methuselah lived to be only two hundred years old — the complaints went on and on. Then, the good "Father" said, "Because of these shortcomings, I didn't read the book!" Of course this was all in jest, and did furnish me with a few laughs at that late hour.

But what a parallel it brought to my mind regarding our communication, or lack of it. How often do we have complaints or misunderstandings, and later find out that it was because we didn't read our mail or didn't write when we should. I myself have on several occasions asked that certain communications be forwarded to me, only to notice upon receipt that they looked surprisingly familiar. I have had people ask me questions that I was sure I had answered, yet could not find a copy in my files.

I sure am picking on myself here but I'm wondering if you are as human as I am. How many times have you complained and later found that it was because you hadn't read your mail? Or did anyone ever say to you, "Why didn't you let me know?"

Loosely described, corporeal entity means a body of or for self-contained existence. It seems no one on the outside is going to help us, and that is well and good. If we are to exist it is up to us, and us alone. I really believe our biggest enemy is from within, and it is ninety-nine percent due to improper communication.

We in the executive end of the Piano Technicians Guild are trying to communicate. You can do your part by promptly reading your mail (all of it) and just as promptly letting your views and questions be known.

Let's not be like the padre on Saturday Night Live. Before we criticize something or sound off, at least let's read the book! □

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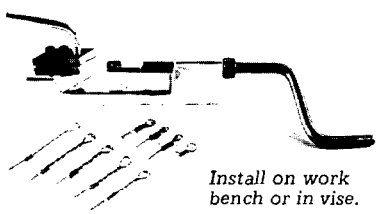

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BOOK REVIEW

Virgil E. Smith, *"Your Piano & Your Piano Technician"*, Kjos West, San Diego, Library of Congress #80-82009

A number of books have been written by technicians for the benefit of the prospective piano purchaser, and all of these fall short in some way when it comes to specific advice. Who can say, for example, that six backposts are better than five, especially if a stable third piano with no backposts at all is also being considered? The one thing all authors of such books seem to agree on is that there are wildly conflicting sales claims in the market place, and that the buying public is susceptible to confusion and skepticism. These books usually start with some specifics and end in caveats and generalities, such as advising buyers to consult experts (which is presumably why they bought the book in the first place) and to deal only with an established, reputable dealer. One would think that such advice would go without saying.

This book has some of the same window-dressing, but fortunately goes much further than that. The section on selection of an instrument has been mercifully limited to four pages, with the bulk of the remainder dealing with piano maintenance, and related areas.

The chapter on selection of a technician is enlightening, as Smith pulls no punches. He points out the vagaries of technician training: "Many learn tuning by correspondence, which is about as effective as learning to play the piano by correspondence." He then puts in a plug for the Guild, but dilutes that by pointing out "Many members are not qualified to expertly voice and regulate a fine instrument." Then he gets off a shot at the practice among state-supported schools of using the technician with the lowest bid: "No faculty member, secretary or janitor is hired this way, so why use this method for selecting a technician where satisfaction is so dependent on ability and experience?" As I stated, he pulls no punches.

The best point brought out in the book, in my opinion, is that technical standards are generally low because pianists are too ignorant about their instruments to know good workmanship from bad, or well-meaning incompetence from shyster work. Smith tells his lay readers how to check a temperament, and suggests that they do so before paying for the tuning. He also discusses regulation, voicing and related topics in simplified language, but points out that these things can and should be checked by the piano owner. ". . . Most pianists," states Smith, ". . . do not know how to evaluate the work of their technician, and they do not know how to demand quality workmanship. And because they do not demand it, it is not readily available.

As a fine musician, pianist and technician, Smith certainly has the background to have written such a book. I would not hesitate to recommend it to every piano owner; indeed, if even a small percentage of pianists had an understanding of the main points of this book, incompetent technicians would be forced to get some training or get out of the profession.

The book is 56 pages long, 6 x 9", paperback with three illustrations, $3.95.

Jack Krefting

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THE TECHNICAL FORUM

Jack Krefting
Technical Editor

As this is written, the sad news of the closing of the East Rochester plant of Aeolian has just reached my office. To think that the great old names of Mason & Hamlin, Knabe and Chickering will never again appear on new instruments is like the closing of a chapter of music history. The best-known personality from the above names is, of course, Jonas Chickering; his achievements in the early nineteenth century would easily rank him with giants like Erard, Stein and Broadwood in the importance of their inventions. Chickering did what the others did not, however, building the "world's largest piano manufactory" which produced what were probably the best pianos in the country for nearly half a century.

Perhaps the demise of Aeolian's prestige lines is a sign of the times, brought on by a combination of escalating production costs, high consumer interest rates and the flood of competition in the form of low-cost, high-polish instruments from the far East. Or possibly there were unrelated reasons, known only to the insiders at Aeolian; in any case, piano people everywhere were saddened by the news.

VERTICAL REBUILDING

Having gone to all the trouble to replace the pinblock, it is important that it be drilled as accurately as possible. This would seem to eliminate the idea of using a hand-held drill, for several reasons: One, the average hand-held drill turns too fast or, if it can be held at a slow enough speed, tends to slow down too much when fed at the correct rate. It just doesn't have enough reserve power to do the job. Two, it is just about impossible to maintain a consistent feed rate even if there were some means of accurately measuring and maintaining the RPM; without these controls, one cannot hope for consistent torque readings from pin to pin. A third reason, less important than the others, is that it is difficult to maintain the proper slant back angle of the drill bit. Angled drill guides don't work well for this purpose because they generally either require the technician to take one hand off the drill to hold the guide, or they interfere with chip ejection. In any event, the drill bit must be kept cool with compressed air, and hand-held drills aren't readily modified to hold an air line; what it comes down to is that a second person must be employed to direct air on the bit.

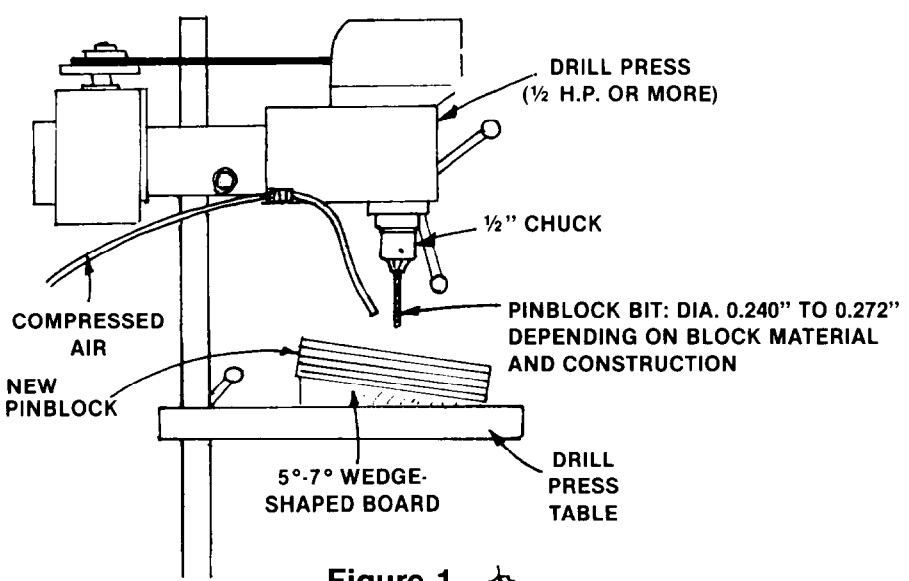


Figure 1

It is necessary, then, to have drill press with at least a ⅓ hp motor running at 1725 RPM. The spindle speed will be considerably slower than that, as we will discuss presently, but this speed is mentioned because this motor is easily confused with its 3450 RPM brother which is used to power saws and jointers and the like. It would be impossible to get the spindle speed low enough for pinblock drilling with such a motor, as the front pulley would be two or three feet in diameter.

There are sophisticated drill presses in piano factories which control the angle, temperature of the bit, speed, feed and ejection automatically. Unfortunately, such machines are economically beyond the reach of the average technician, but most of their functions can be easily duplicated on a small scale by the use of one of the following methods.

The first suggested method, shown in **Figure 1,** may be used in certain instances but not on every piano. The main advantage to this method is that no modifications to the drill press are necessary. Simply make an angled board which will prop the new block up to a 5° to 7° angle and drill it while it is out of the piano. This means that the new block must be fitted to the plate, fitted also to the back, the hole locations marked out with the plate in place but the block not glued in, and then the block removed to the drill press for boring. This represents a lot of extra work, and in some cases it simply cannot be used. If the old block were not entirely removed, for example, and the technician elected to replace only the tuning pin panel and inlay or plug the backup block, it would be necessary to glue the two together before drilling. In any event, regardless of the method used, it is very important that the holes be drilled deeper than the anticipated penetration of the tuning pins, because if the pins bottom out they will not hold.

The drill bit should be a genuine high-helix pinblock bit, not an ordinary jobber's bit. These bits are generally available from suppliers of top-quality pinblocks, but if working with cheaper material it would be necessary to improvise. The bright spot is that in

general the pinblock bits come in larger sizes which can be ground down to a smaller diameter for use in softer blocks. This is strictly a specialist job, however, not to be attempted with ordinary shop grinding equipment. Incidentally, my own feeling is that it's silly to use cheap material in custom rebuilding, because so much of the cost is in the labor anyway. It takes just as much time to put in cheap material as good material, but a few years later the difference becomes apparent. Five or ten years down the road, no one wants to have to apologize for earlier jobs which are not holding up, for whatever reason.

Generally speaking, high-density blocks require a larger hold than softer blocks or blocks with only a few laminae, because in the case of the former it is neither necessary nor desirable to crush wood. With a soft block, extensive wood crushing is necessary to get holding power. Here are some general guidelines for drill bit diameters, assuming we are drilling for standard 2/0 pins:

0.240" - 0.249" Soft, light, inexpensive material

0.250" - 0.259" Quartersawn hard maple, scrollcut 11 - 15 ply, etc.

0.260" - 0.269" Denser multi-ply blocks such as Delignit

0.270" - 0.272" Densest multilaminates (Baldwin 41, Falconwood 27)

Whenever in doubt, especially when using a new drill bit or block material that is not very familiar, make test bores and check pin torque in scrap samples of the same material. One of the most important things to remember about pinblock drilling is that if the spindle speed of the drill press is set in the 900 to 1000 RPM range, *the size of the hole may be controlled by the feed rate.* If the torque on the test pin is high (over 220 inch pounds) the feed rate is too slow. Speed up the feed rate and the added friction will generate a higher bit temperature which causes expansion of the bit, producing a slightly larger hole. This in turn will reduce the torque somewhat.

The upper limit to the feed rate is the point at which the bit clogs. If this happens and the torque is still too high, it will be necessary to use either a shorter tuning pin or a larger drill bit.

If the torque on the test pin is too low (under 150 inch pounds), slow the feed rate somewhat. The limit to how slow the feed rate could be is probably about five seconds in the wood, after which time the size increases again because the cooling airstream cannot reach the tip when it is in the hole. If the torque is still too low, use a longer tuning pin or a smaller drill bit, but never oversize pins. The latter are for emergency repair, not routine use in a new block. The standard in the U.S. is a 2/0 pin, 0.281" in diameter, a size which seems to offer the best compromise between radius (for tunability it should be as small as possible) and stiffness (to minimize "flagpoling", the bigger the better). In my opinion we should stay with this size when rebuilding, except in the case of low-tension scales or open blocks, in which event size 0 would be even better.

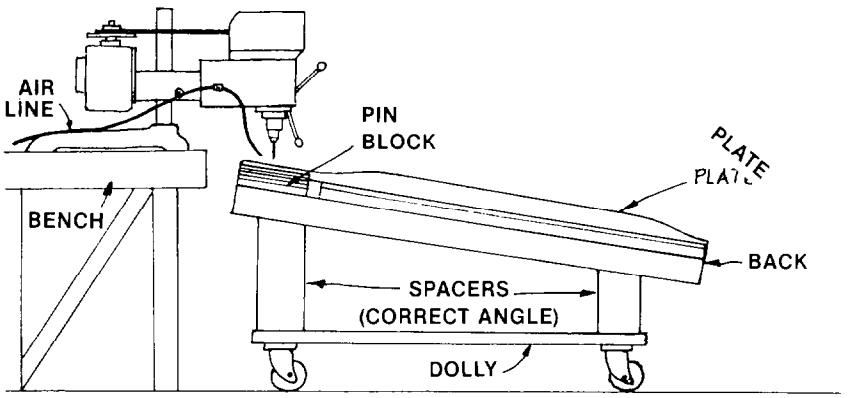


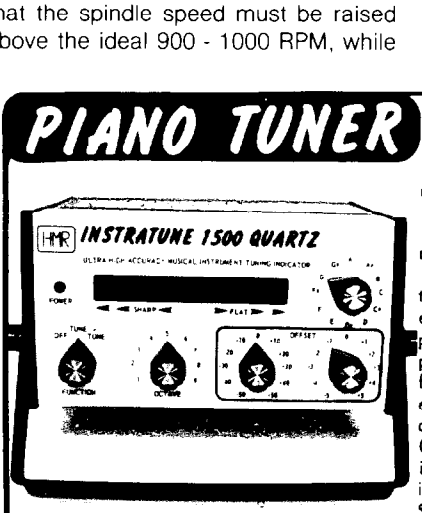
Figure 2

Plate bushings are definitely to be considered, as they affect the drilling technique. They automatically center the drill bit, assuming the block is drilled while attached to the plate, and they are necessary in pianos that have no plate flange, as was discussed on our August 1982 issue. Bushings may be added to a piano that had none originally if this would be desirable, but they should never be eliminated. It has been my experience that there is some loss of control over hole size when drilling through plate bushings, and there is also greater difficulty with chip ejection. This means that the spindle speed must be raised above the ideal 900 - 1000 RPM, while the feed rate is slowed slightly to prevent clogging of the bit. This is especially true with dense multilaminates, less so for other blocks.

When installing plate bushings, bear in mind that there are two available diameters and three heights. The bushing must be a press fit in the plate, otherwise it will turn with the drill bit and climb out of its hole. The visible surface of the bushing should be flush with the plate or slightly lower, but never protruding. Sometimes it is necessary to use two different heights in one piano because of variance in the thickness of the plate casting at the web. A soft machinist's hammer works well for driving bushings in place; a rawhide mallet would probably work well also, but avoid using a hard hammer which could damage the plate.

The second method is illustrated in **Figure 2**. A dolly with three or four fully rotating casters is used under a stationary drill press, which may be a floor model with the table turned out of the way; or as we have illustrated it, a bench model which has been mounted to overhang the bench. The top end of the back assembly has been blocked up, or the dolly was so constructed, so

PIANO TUNER



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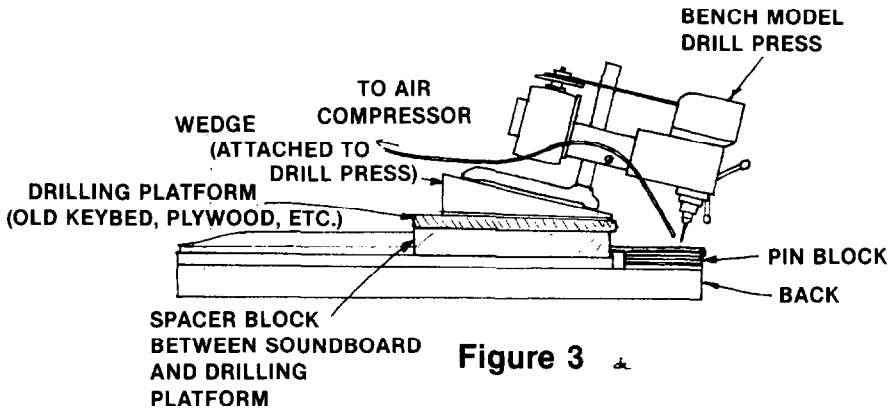

Figure 3

the holes will be drilled at the proper slantback angle even though the drill bit is vertical. Incidentally, a variation on this which involves a straight dolly and angled drill press was discussed in our September 1979 issue.

The biggest advantage of this system is rigidity, together with the fact that the block is drilled after installation, thus saving time. One problem with it is that it takes considerable floor space which is at a premium in most shops, and another is that there is no good place to stand while drilling, but other than that it works fine.

A better idea is shown in **Figure 3**. The bench model drill press is used exactly like it would be in drilling a grand, assuming the shop is equipped with the type of modified press invented by John Kohl **(Figure 4)**. The only difference is that, since the vertical piano has no outer rim to support the drilling board, the technician must somehow attach the board with appropriate spacers so it will clear the plate. To drill the block, the press slides on hardwood runners from hole to hole. This saves time over Method 1 and space over Method 2, although if the press rig is light in weight or not balanced right it might have a tendency to lift up when drilling. If this happens, make a little shelf on the press right behind the chuck and place a box of tuning pins on the shelf.

The drilling angle is adjustable by shimming the wedge on whichever system is used, and should be slanted as much as possible against the string pull, bearing in mind that we must maintain a coil against the becket (not winding down the pin in a helix) and that there must be clearance for the tuning hammer. If the bass section is not stepped, I would recommend increasing the slantback angle in that section to avoid the possibility that the string will overlap its own coil as it leaves the pin. When that happens, the wire is vulnerable to breakage in that spot because it is being bent over a material as hard as itself.

To achieve evenness of torque from pin to pin, one must control the size of the holes; to do that, one must control the temperature of the bit. The best way to do that is to keep a stream of air on the bit and maintain a steady pace, allowing the same amount of time in each hole and the same amount of time between holes. Feed the bit as fast as it will cut without clogging in the treble, gradually slowing the feed rate while progressing toward the bass. This technique, taught me years ago by Cliff Geers, allows the bass pins to have as much torque as the treble even though, because of the difference in wire diameters, the treble pins penetrate further into the block.

Another advantage of Method 3, or any method that uses an angled bit rather than an angled block with a vertical bit, is that the press rig can be turned to keep the slant angle directly against the pull of the string. With a vertical bit, no matter which way the block or back is turned the angle will be the same; to change it one would have to block up one end of the block or back somehow.

The most important thing of all is experience. Technicians who drill a lot of blocks usually do a better job than those do don't, almost regardless of equipment or academic knowledge. A few minutes' time spent drilling holes in pinblock material is probably more valuable than spending a few hours reading about it, although it never hurts to take advantage of the experience and advice of others.

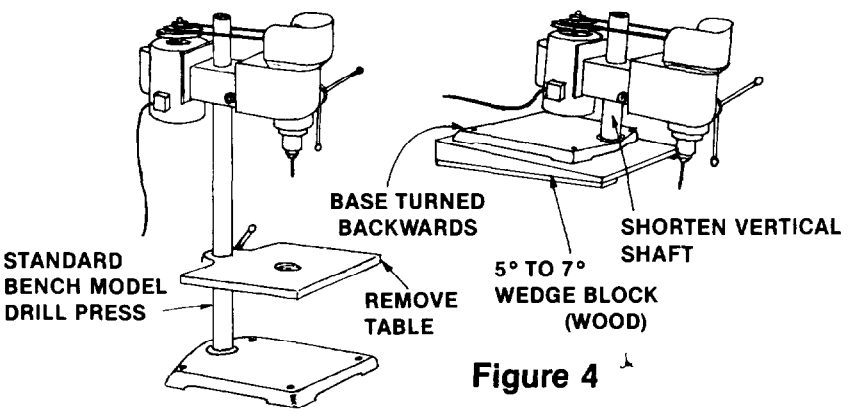

Figure 4

A: The best reason for doing something yourself is that you can do it the way you want to, rather than working with what someone else has done. The results may be better, but they could also be worse, depending on the skill and equipment of the technician.

I am not as concerned about the side angle as I am about the striking distance, which is the distance from the crown to the center of the hole, because the former can easily be altered by reaming while the latter cannot. Let's look at some of the geometry involved in Figure 5.

Ideally, both angles A and B should be 90°, and if the striking distance is measured carefully the shank will be parallel to the string at the point of impact, theoretically at least. This is what we aim for, but what we end up with is usually something else, for a variety of reasons. If we bore for a striking distance (not to be confused with blow distance) of, say, 1-7/8", this means that all treble hammers will measure that dimension from the crown to the centerline of the hole. Now when we file the hammers after installation, the higher treble hammers become smaller because they have no compression felt, while the hammers further down in the scale remain about the same size after filing as they were before. As tension felt is filed off, the compression felt inside the hammer pushes outward, restoring the size although not the weight.

So does this mean that the high treble will now be overcentering on the strings? Maybe not. The draft, or upward angle of the strings as they go from the capo to the bridge, will be steepest at note 88 because there the bridge is closest to the capo. If the draft elevation difference between the capo

and the bridge **(See Fig. 6)** consisted of 1/8", assuming the strings are identical in height throughout the treble, then the draft angle becomes really noticeable in the top section. It is easily observed in the reflections of light across the strings. That means that, to some extent at least, the draft angle compensates for the filing loss.

There are other variables, too. A moment ago we assumed that all treble strings were the same height, which is never the case. And even if they were, at some point a change in humidity would increase the height of the strings a little because the soundboard and bridge grew in the wetter environment. To get really picky, one could even argue that agraffe washers, capo bar grooves and string impressions in the bridge affect draft angle and string height, as of course they do in a very minor way. To use that kind of pickiness as justification for boring one's own hammers, each custom-fitted to its shank and strings, is carrying a point to extremes in my view. What we should do is to measure the height of the hammershank centerpin above the keybed, subtract that figure from the average treble string height, and the remainder would be our striking distance. Minor discrepancies one way or the other are resolved by sacrificing angle B **(Fig. 5)** in favor of angle A when we ream and hang the set.

Since the generally accepted method of reaming involves removing material from the front side only, we can see that the back side of the hole will remain about the diameter of the shank, but the hammer may be twisted for alignment with the strings. Fred is correct when he states that the ideal angle of the hammer is the same as that of the strings, and one may readily observe whether this principle was followed by noting whether the string cuts in the old hammers are parallel to the sides of the hammer. In **Figure 7** we see an illustration of a top view of a partial set of grand hammers, with string cuts running across at an angle. In very small pianos, the overstring angle is often so radical that it is virtually impossible to angle the hammers properly and still have working clearance. Many times, however, the skilled and dedicated rebuilder will bore his own hammers and effect a real improvement in the piano.

The existing boring angle can best be determined with the old hammer still on the shank, because the pulling tool can damage wood inside the hole, leaving room for doubt about the original angle. A protractor with sliding straightedge is all that is really needed, although one could use the boring jig itself with an old hammer and shank if the existing boring is correct. If it isn't, then one might project the correct angle by comparing string cuts to the centerline of the shank as shown in **Figure 7**. This works best if the hammers are badly worn, because then the cuts are longer.

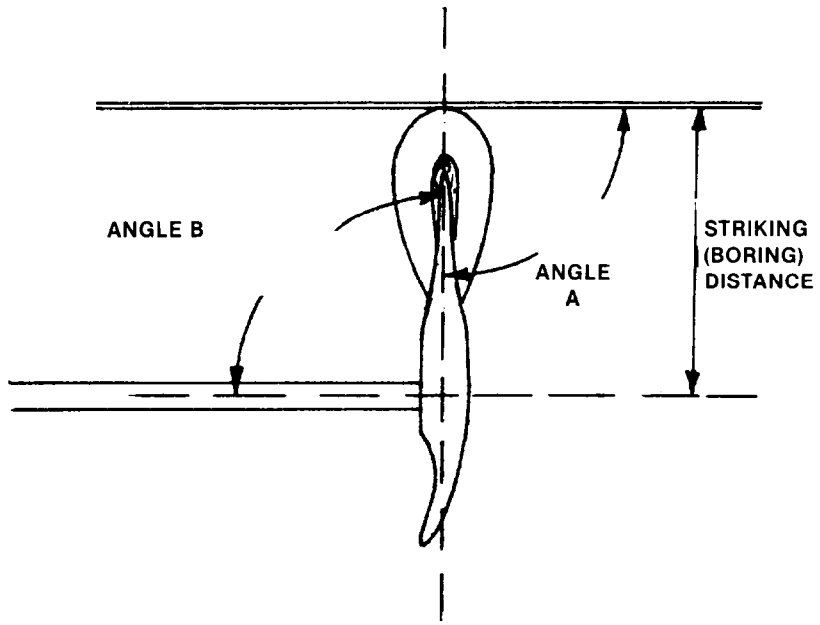

Figure 5

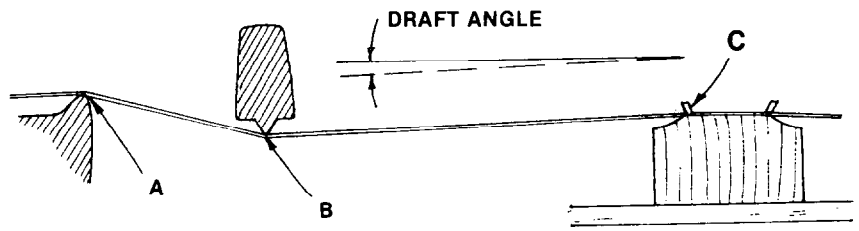

Figure 6

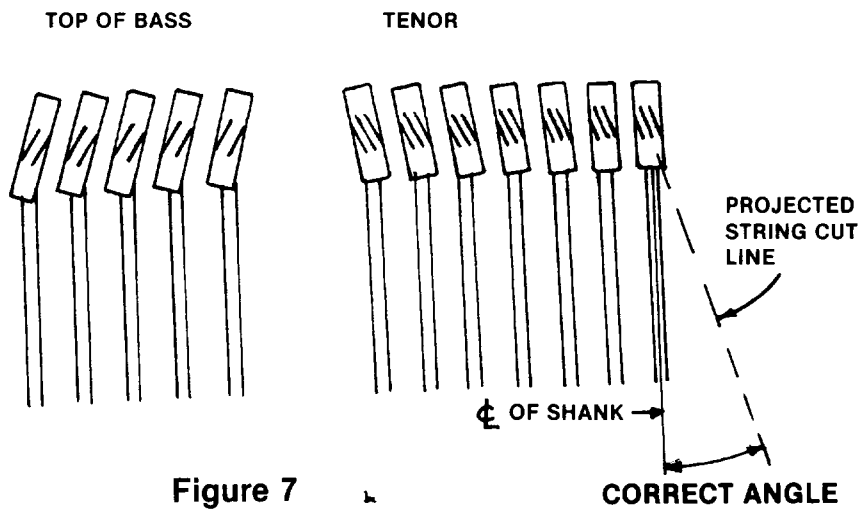

Figure 7

Alternatively, the technician could check with a framing square to determine whether the shanks are perpendicular to the keyframe, and whether the keyframe is parallel to the front rail or stretcher. If so, then the framing square could be laid against the inner face of the front rail (stretcher) and the

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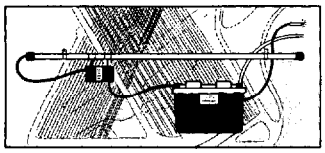

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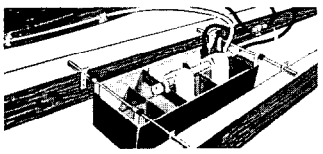

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protractor used to determine the angle of the strings from the square. Again, this doesn't have to be precise because the hammers will be reamed anyway; it's easy to get within a degree or two this way, which is close enough.

Yat-Lam Hong, my predecessor in this job, used to talk about a PDR (point of diminishing return) and a theoretical PZR (point of zero return) with respect ot accuracy in tuning, and I think the same concept could be applied to this topic. one could get extremely picky about minor changes in boring angle, but if the aural result of hours of agonizing is no better than before, that time might be better spent in weighing off the keyboard or overhauling the lyre. As a practical matter, the string cuts can never be perfectly parallel to both sides of the hammer anyway, because the strings fan out toward the bridge; if the left string is parallel, the right one can't be.

Finally, let's briefly consider the question of which of the 90 to 94 hammers to discard. Look at the set and check the ends first. Normally the grossly misshapen end hammers will have been discarded already, but if not, these would be the first to go. According to Geers, select the *smallest good hammer* for number 88, and the *largest good hammer* for number one. Any other extras may be pulled at random from the set, but don't take any two together or any from the end of a section. This gives the best chance of bridging scale breaks without a major change in tone.

NEWSLETTER TECH REPRINT

The following is reprinted from the Alpha News, newsletter of the Washington D.C. Chapter: The writer is R. Errol Floyd, and the editor is Michael Travis:

Soundboard Decals

After some experimenting and several failures and near-failures, we have come to the conclusion that patience is the virtue that will get those large soundboard decals installed satisfactorily. Before beginning, loosen a corner of the heavy paper backing of the decal to assist removal later. We use a varnish that dries to the touch in about 4 hours. After varnishing the board, wait approximately three hours and then apply the decal. The heavy paper backing may be left on, or carefully removed, either before or after applying the decal to the varnished board. Removing the heavy paper before application can assist in properly locating the decal (you can see through the tissue), but it is fragile without the heavy paper. Immediately after application, smooth the decal with the fingers or a roller. Great pressure is not necessary and may damage the decal. Leave the decal overnight, and then wet and remove the remaining paper. Let dry another day and apply another coat of varnish to the entire board. Applying varnish too soon will lift the edges of the decal.

We don't recommend polyurethane varnish for this procedure. Recoat time is too critical.

Applying the decal after only 20-30 minutes leaves the varnish under the decal still wet after several days.

The decal may be applied to a dry board by varnishing the decal, but still wait 2-3 hours, even with a thin coat. Only the emblem parts need be varnished, but there is no harm in varnishing the entire unit.

Some instructions suggest washing the decal after removing the tissue paper. We believe that this is unnecessary and risky. The next coat of varnish will smooth the surface.

R. Errol Floyd

HAMMER BORING

Q: *"I know that many technicians bore hammers in their own shops for what they consider good reasons. I would like to discuss the pros and cons of this practice and to talk about hammer boring in general. Also, I just acquired a grand that had a set of hammers installed, but the job was not well done and I am reluctant to order a new set using these as samples. Several questions come to mind:*

What equipment is needed, either to match the old bore or establish a new, proper angle? Also, what size drill bits are used, and should they be of a particular design? I recently heard that a jig is available.

In factory boring, a certain angle is repeated for several hammers before it is changed. I assume this is to cut costs of the operation. Would it be better to change the angle of each hammer or at least change it for, say, two or three hammers?

Bass hammers, on the other hand, do not change angle (is that correct?), and that the proper angle is critical. How is this angle found? I have seen hammers

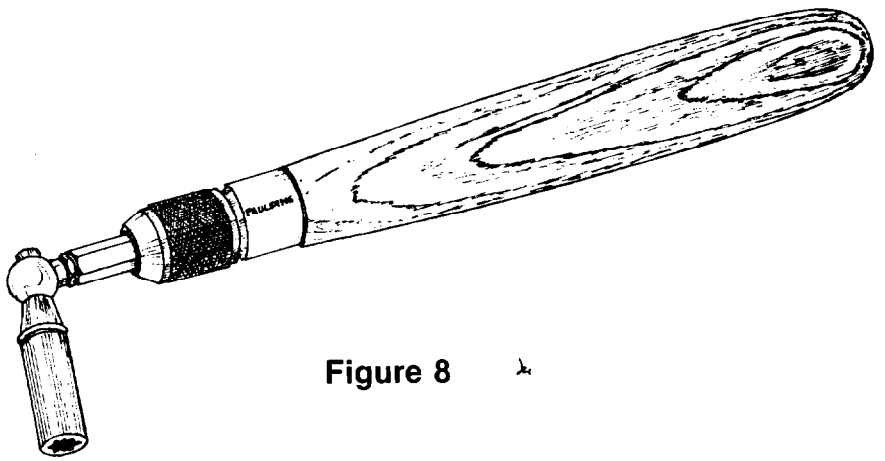


Figure 8

cut along an edge to make way for an action bolt or some other obstruction. Can this be avoided?

The angle of the bore is ideal when the run of the string and the hammer are parallel; so how does one measure the angle of the string so that it can be duplicated in the hammer?

I have seen advertised "standard bore" hammers as off the shelf items, and they are quite a bit cheaper than custom bored hammers. On which pianos can these hammers be used? How can we be sure that it is all right to use them?

Hammer manufacturers regularly furnish more than 88 hammers to a set Allowing that the extreme end hammers should be discarded, what are the criteria for selecting among them?"

Fred W. Tremper, RTT

GADGET OF THE MONTH

Bart Paulding of Oakland, California, who builds the hammer boring jig which we noted last year, now is manufacturing tuning hammers. **Figure 8** is a drawing of his latest effort in cocobola wood, although his standard handle is rosewood.

The fittings are all machined from solid brass, and the hex shaft is of stainless steel. My sample is 10-5/8" long when retracted, 13-1/2" long when extended. It has a one-piece head and tip, 2-1/2" long. The head is 5° from the perpendicular, although I would imagine that other tip/head combinations would be available on request.

This is a high-quality tool, a pleasure to use, and is available from the maker for $120. It feels somewhat lighter than the Hale with a nylon handle, especially at the end of the handle. It would be an exceptionally fast hammer for pitch raises, even faster if the stainless shaft were about 2 inches shorter. I think I might be tempted to modify one this way, although if it were the only hammer in my case it might be better as it is. For the tool nut who must have one of everything, this is another beautiful tool.

TIP OF THE MONTH

Bill Balamut of the Twin Cities Chapter sends in the following idea:

"...Enclosed is a picture of my action cradle holding a grand stack. After listening to many ways of checking action flanges, by removing one shank and flange and swinging it seven (?) times I knew if I needed to replace the pin..."

"As the picture illustrated, I merely swing the action and mark the loose hammers with an X. To me it is a great time saver. I hope everybody can also."

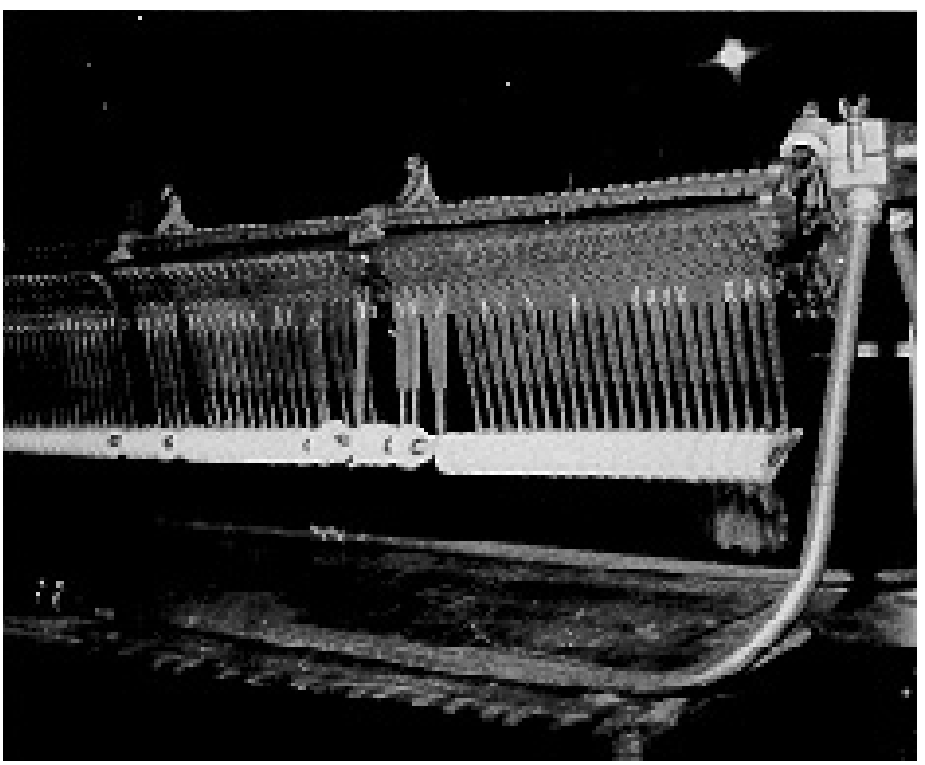
Wm. J. Balamut, RTT
Columbia Heights, Minnesota

IN CONCLUSION

The response to our repeated requests for technical articles has been very good, and we have been able to use most of them to excellent advantage. There is a continuing need, however, because writing a periodical is like writing for television – the gaping maw is always there, eager to gobble more and more material. One or two of our regular columnists will be leaving us for one reason or another, and two or three more regulars would be welcomed. If you think you would like to try this, send me a sample article and an outline for an extended series, or just some miscellaneous material. We can talk about it.

Comments, tips, tool ideas and technical questions are always welcome, too. Please send all technical material for publication to me at this address:

Jack Krefting, Technical Editor, PTJ
3802 Narrows Road
Erlanger, KY 41018



THE INTERNATIONAL SCENE

Fred Odenheimer, Chairman International Relations Committee

In speaking about the IAPBT, we hope that eventually we will be worldwide in scope, although it is a long and difficult way to go. Keen international competition at the manufacturer's level seems to have spilled over into the service field. As technicians, it is our task to keep instruments sold to the public in the best possible condition for years of good service. This does not mean that we should keep quiet about inferior merchandise, or where our opinion is asked, help our customers to make intelligent choices. But wherever in the world we go, wherever there are pianos, service has to be performed. Depending on climatic conditions, heating and cooling — or the lack of, even the way houses are built or where a particular instrument is located; can cause differing problems. Internationally, we want to be aware of these problems and discuss them, find alternate ways in performing our regular service. In the end, this will enrich our knowledge and lives. Finally, and perhaps most important, we can make new friends in our travels and even if there are language barriers, *tools will speak.*

This brings us back to the International Conference in Tokyo. Letters have gone out with invitations for attendance to Europe, Australia and New Zealand, and it is quite possible that we will have an extensive international attendance. This means that we will meet craftsmen from different parts of the world, we will learn, and we will have an opportunity to make new friends. The various tours should give us some insight into the Orient.

There will be the extensive Piano Technicians Guild-sponsored trip which you can take in it's entirety, or in parts, as well as the much less ambitious IAPBT tour which we hope, will be more international in flavor. However, your decisions should be made in the very near future. JPTA wants to have a list of participants by the end of the year and the $350.00 per person for the convention is due then. All inquiries concerning the IAPBT tour should go to: Fred Odenheimer, 15358 Wyandotte St., Van Nuys, CA 91406.

Finally, we want to invite you again to join "Friends of IAPBT." This way you can directly support the international program.□

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Itinerary

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Day 01	**May 19, 1983**	**LOS ANGELES TO TOKYO**
Day 02	**May 20, 1983**	**ARRIVE TOKYO** Transfer to hotel. Accommodations at Akasaka Hotel. Arrangements by Japan Conference Hosts.
Day 03	**May 21, 1983**	**TOKYO** Full day sightseeing with lunch along the way. Accommodations at Akasaka Hotel.
Day 04	**May 22, 1983**	**TOKYO** Day at leisure to explore tourist sights and to visit shops. Conference begins in late afternoon. Accommodations at Akasaka Hotel.
Day 05	**May 23, 1983**	**TOKYO** Sightseeing to be hosted and arranged by the conference hosts. Visits to include sights that were not seen on May 21.
Day 06	**May 24, 1983**	**TOKYO TO HAMAMATSU** Travel from Tokyo to Hamamatsu and follow arrangements of hosts.
Day 07	**May 25, 1983**	**HAMAMATSU** Visit piano factories and enjoy plans of host.
Day 08	**May 26, 1983**	**HAMAMATSU TO TOBA** Transfer to Hamatsu station. Travel by Bullet Train to Toba. Visit **Pearl Island** and see pearl culture in process and women pearl divers at work. Accommodations at Toba International.
Day 09	**May 27, 1983**	**TOBA TO OSAKA** Travel via Limited Express Train from Toba to Osaka. See the **Ise Jingu Shrine**. Accommodations at Osaka Plaza.
Day 10	**May 28, 1983**	**OSAKA TO AMA-NO-HASHIDATE** Travel via motor coach. Sightseeing of one of the most **picturesque landmarks** in Japan. Accommodations at **Genmoyan Inn.** A ryokan with lovely view of the island dotted bay. **Japanese dinner** is included.
Day 11	**May 29, 1983**	**AMA-NO-HASHIDATE TO KYOTO** Enjoy a **Japanese breakfast**. Sightseeing to include famous **"Floating Bridge to Heaven"** where ancient mythology says the gods stood when they created Japan. **Visit Kasamatsu. Park on Mt. Nariai.** Travel by private motorcoach to Kyoto. Accommodations at Kyoto Royal Hotel.
Day 12	**May 30, 1983**	**KYOTO** Sightseeing to include **Gold Pavillion, Kaikakuji Temple, Tenruji Temple** with its delicately landscaped gardens. Accommodations at Kyoto Royal.
Day 13	**May 31, 1983**	**KYOTO** Day at leisure. Suggestions for shopping for traditional woodblock prints cloisonne and lacquerware. Suggestions for optional sightseeing of Todaiji Temple and its colossal bronze image Buddha, Nasuga Shrine noted for its long avenue of stone lanterns, Deep Park, Byodoin Temple (Phoenix Hall) in Uji and Kofukuji Temple with its Treasure House. Accommodations at Kyoto Royal.
Day 14	**June 1, 1983**	**KYOTO TO HAKONE** Travel by Bullet Train to the resort town of Hakone. Enjoy a farewell sukiyaki dinner and kimono party. Accommodations at Kowaki-En Hotel.
Day 15	**June 2, 1983**	**HAKONE TO TOKYO TO LAX** Transfer to airport for flight home.

In The Field

Ben McKlveen, RTT
Cincinnati Chapter

When I started servicing pianos there was a curious lack of communication and cooperation between dealers and tuners. In the early days of my career tuners were an iconoclastic group who fought with dealers, belittled contemporary pianos, and even fought with each other. There were, in fact, two tuners' organizations.

We have just celebrated the twenty-fifth anniversay of the Piano Technicians Guild, so a lot of progress has been made in tuners' relations with each other. New technicians, coming into the the field during the Piano Technicians Guild's existence, have brought with them backgrounds of rich diversity in education and music, as well as technology. The craft has been enriched by this. And, generally, manufacturers, dealers, and technicians have come to recognize their interdependence, a positive factor in the piano industry.

With an eye toward this interdependence I am writing this month with some suggestions to help smooth the way for dealers and technicians regarding warranty problems.

Dealers must depend on those of us who service the pianos they sell to be their eyes and ears in the field. We work to see that pianos are kept in tune and work properly. Ninety nine times out of a hundred everything is fine. But what happens when something goes awry? How well do we handle problems that turn up in newer pianos — those still under warranty — especially if we are independent technicians and do not do service work for the dealer or manufacturer whose piano is involved?

When a flaw is found or suspected there are procedures that should be followed to see that the problem gets solved. 1. The defect must be noted. 2. The proper dealer should be notified. 3. The customer must not be unduly alarmed. 4. The corrective procedure should be handled fairly and in a professional manner.

There are some things that should *not* be done! For example, don't get hoof-in-mouth disease. Don't start babbling away making judgements, claims, or give advice that you have no business giving. Don't say anything negative about the dealer or the manufacturer. Don't say things like, "Well, they really aren't building them like they did in the old days!" Negativism reflects badly on the industry in general and, in this case, on you in particular if you use it.

I visited the Detroit chapter in April. The chapter meeting was held in the show rooms of the Hammell Music Co. of Lavonia, Michigan. As part of the program that evening, the store manager discussed warranty problems and gave to each technician a copy of their service policy. I have been given permission to reproduce it for you as a guide to follow in dealing with warranty problems. I think it embodies the essential elements of expedience, fairness and professionalism that I mentioned earlier.

HAMMEL MUSIC SERVICE POLICY

Since piano warranties vary significantly from one manufacturer to another, it is often times difficult for a technician who has discovered a defect in a piano to determine who is liable for repair of said instrument.

Point 1: If in the process of tuning a piano in a customer's home, a technician should notice a defect in an instrument, first determine where the instrument was purchased. If the piano was purchased at Hammell Music, call us. If the store should be closed, or the service manager inaccessible, leave the customer with a written description of the nature of the defect, and ask him to call us. The music dealer can then make a determination as to the best method to resolve the problem.

Point 2: If the defect found is covered under the manufacturer's warranty guidelines, and the problem is one that is not serious and can be quickly repaired, we may be able to authorize a piano technician to make the repair on the spot. If the problem is of a more serious nature, we may need to see the piano before we authorize a repair.

***PLEASE NOTE:** Because of ambiguously worded warranties from many manufacturers, and since in many instances the costs relating to warranty repairs are borne by the dealer, it is *absolutely imperative* that the dealer who sold the instrument be contacted if the technician feels a piano is defective. This should be done in a professional manner and without alarming the customer. PLEASE, do not try to determine or make a judgement as to whether a defect is or is not covered under a warranty, as we often times make exceptions to warranties as good will gestures, etc.

Hammell Music, Inc. has a responsibility and a strong committment to stand behind the products that we sell. In order for us to live up to our responsibilities and keep our committment, it is imperative that we are made aware of problems that exist.

It will be with your help that the music stores and their technicians, and the piano makers whom they represent, can properly work together to solve technical problems in such a way that all our profession will benefit and that will lend integrity and credibility to an industry that can still be improved.□

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THE TUNER

Paul Monroe RTT
Orange County Chapter

The Unison

Diverting from my usual format of articles directed toward the beginning tuner, I would like to continue the discussion of that interesting subject, the UNISON.

During my experience of teaching a piano tuning appreciation course in an adult education class, I discovered that no two people hear alike. Out of the three hundred plus that took my course (six went on to become tuners), no two of them could hear the same.

The most unusual student out of the group could not hear any beats in the temperament octave, F3-F4. He could hear them in the fourth octave above. He could vaguely hear an octave in the wound strings but yet he could hear an octave very clear in the seventh octave.

Some could not hear beats, others could hear them clearly. Some could not hear the difference between a unison out of tune by half a beat and one that was pure.

Spending a great deal of time analyzing and checking each student, including a discussion of their musical past, pointed out one very important fact to me. They really did not know how a tuned piano was supposed to sound. Almost all of them had their pianos tuned every 5-10 years because they thought they should, not because they thought they were out of tune.

This points up the fact that listening to an untuned piano trained their ears to accept what they heard with no thought as to whether it was right or wrong.

I believe this is related directly to the various discussions and articles on the subject of unison tuning. The writers of some articles say a pure unison is soft and dead. Others say a unison out of tune is objectionable and that a pure unison is beautiful. My feeling is that a pure unison sings out with beauty. The strident tones or even the slow beat of an impure unison are very distracting to me.

We go to great lengths and put a great deal of effort to establiish the proper beat rates. We strive to have the clear beat rates increase evenly in speed as we progress up the keyboard, and the opposite when progressing down the keyboard. This great effort can be affected (destroyed) by unisons that are not pure.

Try the following experiment. With your muting strip in place in the temperament octave, tune F3 to A3 to 7BPS. Remove the muting strip from string #3 of note A3. Tune it so the unison is as pure as you can make it. Compare the beat rate of the interval, first with #3 string of A3 muted and then with the mute removed from string #3. The beat rates should be the same.

Next, retune string #3 of A3 so that there is one beat per second in the unison. Compare the beat rates again as you did before. You will notice a change in the beat rates of F3-A3 caused by the out of tune unison.

We should remember that the beat rate of F3-A3 major third is created by the difference in frequencies of their coincidental partials. For F3 it is the 5th partial, 873HZ and for A3 it is the 4th partial, 880HZ. (read Braid White's book on partials.) A unison that is not in tune causes all kind of conflict in the partial structures, creating a condition known sometimes as strident tones. Strident means harsh, shrill, rough, "martellato".

To further explain, when tuning the wound strings you can build in color by tuning with the use of coincidental partials, for example: In some piano scalings pure 12-6 coincidental partials will give you octaves that roll about one-quarter to one-half beat per second. To tune the bichords other than pure will destroy the color you worked so hard to attain when you were tuning the octaves.

In conclusion, I think we all must admit it is extremely difficult to tune unisons perfectly. In most pianos we tune, except maybe on the concert stage where the pianos are tuned very often and on a regular basis, to tune all the unisons perfectly is impossible. Therefore, I feel we don't need to try to distune unisons, our human errancy will contribute enough.□

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UNISONS — THE EFFECT OF TUNING ON PERSISTENCE AND TIMBRE

James F. Ellis, RTT
Knoxville Chapter

Third in a three part series.

False Beats

There are some abnormal conditions, however, where the parallel mode does make a significant contribution to the tonal pattern. **Figure 5** is a plot of the amplitudes of the normal and parallel modes of a single string of note A_3 on the 6' 4" (1904) Chickering mentioned earlier. The normal mode decays at 8.8 dB per second for 2.5 seconds, rises and falls slightly, and then settles down to a decay of 1.6 dB per second. At the same time, the parallel mode starts out at 18 dB below the normal mode, rises 11 dB in two seconds, rolls over, and finally settles down at a 1.6-dB-per-second decay rate, the same as for the normal mode. The dotted line represents the combined string displacements in both modes, converted to dB. What is happening is this: Due to some defect in one of the string terminations (probably a loose bridge pin), some of the energy in the normal mode gets converted to the parallel mode. This gets the string to vibrating in an ellipse that finally settles down into a diagonal pattern. The smooth dotted line representing the combined displacements indicates that the string's energy is decaying at an almost constant rate, but the lines representing the normal and parallel modes indicate that the plane of vibration rotates. This is typical of one type of false beat.

Faulty hammer spacing is another thing that can cause excessive amounts of parallel motion. For example, if the hammer is off to one side and strikes one of the strings with a glancing blow, it will immediately start that string vibrating in an elliptical pattern. Also, the reaction of the glancing blow against the hammer will cause it to wobble, and that will tilt the angle of vibrations of the other two strings **(Fig.6)**. Therefore, under *abnormal conditions*, the contribution of the parallel mode to the overall tone is measurable.

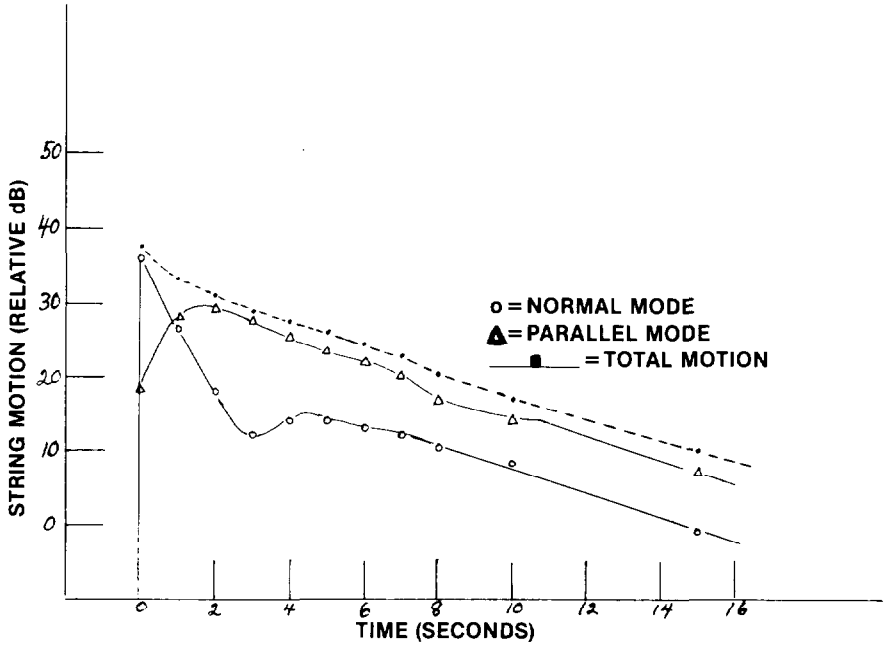


Figure 5 Slow False Beat

Frequency Lock

In Case 5, (Part one, September 1982 Journal), we saw that the three pendulums would become synchronized when they were tuned to the same frequency. In Case 6, (Part one, September 1982 Journal), we saw that they would maintain the same frequency even though their natural frequencies were slightly different, and that they would "hunt" to try to get synchronized. If we had detuned them by greater amount, they would have completely pulled out of step, and each one would have swung at its own average frequency. Piano strings do something very similar because of the mutual coupling provided by the bridge. However, because of the complexities of the bridge and soundboard, particularly their resistive components, piano strings tuned to perfect resonance with one another tend to lock frequency when their phases are opposing. For exact-tuned unisons, this means that frequency lock will be acquired during the aftersound. If the strings are detuned about 0.5 cent each, they will pull out of perfect anti-synchronism but still maintain frequency lock. If they are detuned about 1.0 cent each (2 cents total), some will pull out of frequency lock and begin to beat very slowly. The critical amount of detuning depends upon the amount of mutual coupling built into the piano.

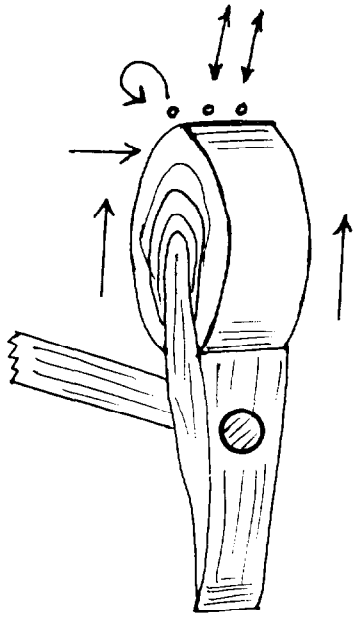


Figure 6 Elliptical Motions

Intentional Stagger Tuning

One way to prolong the tones somewhat is to very-slightly stagger the tuning of the unisons. This upsets the synchronization of the strings, and causes the phase shift to occur sooner. Stagger tuning causes three things to happen.

1. It causes the prompt sound to decay faster and end sooner. As a result, the aftersound begins at a higher level than it otherwise would,

because less energy is dissipated during the prompt sound. The detuning gives the strings a "head start" on their way to an out-of-phase relationship.

2. When the strings become nearly opposing in phase angle, they will "hunt" - some will speed up and others will slow down by minute amounts - as they try to get into a perfectly anti-synchronous state, which they can't do because their frequencies are slightly different.
3. The strings will eventually settle down to some out-of-phase relationship that is not in perfect opposition. As a result, two strings will not be vibrating at exactly 180 degrees out of phase, or three strings at 120 degrees out of phase, and the resulting sound will be a little louder during the aftersound than it would otherwise **(Fig. 4)**. Weinreich shows a good graphic picture of this effect.[4]

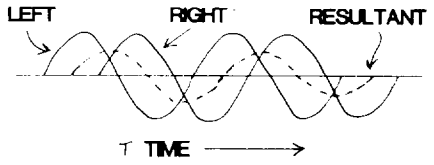


Figure 4
Phase Shift and Resultant

To use the yardstick analogy again, exact tuning is like standing a yardstick on its end and bringing it as close to perfect balance as possible before turning it loose. It will stand for a few seconds, lean, and quickly fall. Stagger tuning is like standing the yardstick on its end and slightly leaning it before turning it loose. It will fall more quickly, and in a predetermined direction.

Kirk shows traces of decay rates for B_3 tuned with 0, 1, 2, 4 and 6 cents total deviation.[2] He states that the characteristic dual diminution slope is absent in the 0-cents tuning. Actually, it isn't absent. It just begins later and at a lower level than that of the 1-cent deviation tuning (30 dB down as opposed to 20 dB down for the others). This indicates a very "tight" unison - one tuned so nearly perfect that it almost decayed away before the strings even got out of phase, but it didn't quite make it. The traces of the 2, 4 and 6 cents deviation tunings show prominent beats. Also, the 6 cents tuning was staggered so widely that the dual decay characteristic disappeared.

TABLE 2 PERSISTENCE AS A FUNCTION OF TUNING

Piano	Note	Extrapolated Time Required For 60 dB decay (Seconds) Exact Tuning	Plus, Minus 1 Cent
Chickering 6'4"	G_3	15	20
Chickering 6'4"	A_3	16	22
Steinway 46.5"	Mid. C	8	16
Walter 43"	B_3	15	22
Walter 43"	Mid. C	12	18

In acoustical studies, the duration of a sound is often specified as the length of time required for that sound to decay by 60 dB. Because of background noises and limitations in my measuring equipment, I was only able to measure the piano tones over a 40-dB range. I therefore extrapolated the decay rates to determine how long it would take for the whole tone to decay by 60 dB (a technique also used by others.)[1,6] Table 2 shows the extrapolated 60-dB persistence times for typical unisons tuned exactly, and staggered by plus and minus one cent. The pianos I used for this measurement were the 6'4" (1904) Chickering, a 28-year-old 46.5" Steinway "Professional", and a 43" Charles R. Walter vertical.

Stability

We all know that the stability of a tuning depends in part upon how "solidly" it is done. If the total deviation among the strings of a unison is within 1.0 cent (0.5 cent per string), the unison is not likely to beat. If the total deviation is 2.0 cents or more, beats will begin to appear (depending upon the piano's characteristics). This is about the limit. Errors of 1.0 to 1.5 cents per unison are not uncommon in routine tunings. Errors consistently within 0.5 cents (total) are the work of very skillful tuners. The point is, that if we tune for maximum accuracy, we are still apt to end up with errors of 0.5 cent or more. We would then have another 0.5 cent margin to allow for drift, or shift, before the unison would begin to beat. However, if we try for a stagger-tuned unison with a deviation of 0.5 cent per string (1 cent total), it is going to be right at the limit, even if we get it exactly where we want it (which we aren't apt to do). There will be no margin left to allow for tuning drifts, depending upon the direction of the drift, of which we can't be sure. Consequently, as the unison tuning begins to drift, beats will begin to show up immediately. It takes a fine piano and a fine tuner to enable the concert pianist to make it through the first movement of a Rachmaninoff concerto, and still have acceptable unisons. Those that make it through the finale are rare exceptions!

Unintentional Stagger Tuning

In the INTRODUCTION, (Part one, September 1982 Journal), I said that (in stagger tuning) it did not matter which strings of a unison were tuned sharp and which were tuned flat, but that there were exceptions. These are some of the exceptions:

1. In the bass of a vertical piano, there is often a slight difference between the lengths of the two unison strings due to the stringing angle relative to the angle of the V-bar. In spite of bridge notching, this often makes the left string slightly longer. As a result, the two strings don't have exactly the same partials. If we tune aurally for the best compromise and then measure the frequencies of the individual strings, we will often find a definite stagger pattern in the fundamentals.

[1]"Decay Rates of Piano Tones", by Daniel W. Martin, *The Journal of the Acoustical Society of America*, Vol. 19, No. 4, July 1947, pp. 535-541

[2]"Tuning Preferences for Piano Unison Groups", by Roger E. Kirk, *The Journal of the Acoustical Society of America*, Vol. 31, No. 12, December 1959, pp. 1644-1648

[4]"The Coupled Motions of Piano Strings", by Gabriel Weinreich, *Scientific American*, January 1979, pp. 118-127

[6]"Factors Contributing to the Multiple Rate of Piano Tone Decay", by Chase Hundley, Hugo Benioff, and Daniel W. Martin, *Piano Technicians Journal*, May 1979, pp. 15-23, Copyright 1978, Acoustical Society of America

2. Some cheap pianos have no notched bridges at all. This gives rise to stagger patterns during aural tunings similar to those described above, but they extend into the plain strings as well as the wound.
3. Sometimes a slight irregularity in the wire will cause one string to have certain partials that are offset from the same partials in the other strings. The aural tuner will automatically tune for the best compromise. If the frequencies of the strings are measured and compared to those of the same notes tuned at other times, even by other tuners, a consistent mistuning pattern will be found. This might help to explain the consistent "mistunings" Weinreich observed.(4)
4. Sometimes we intentionally or unintentionally stagger one string in an effort to cancel a false beat.
5. Regarding the una-corda, Dr. Loeb says it can make a difference whether the un-struck string is tuned sharp or flat.(3) This is because a string's tension increases when its vibrational amplitude increases, making it go sharp. He therefore suggests tuning the una-corda string slightly sharp. My calculations, based upon transient frequency measurements, indicate that a hard blow typically increases the average tension by 0.1 to 0.2 % (as opposed to Loeb's estimate of 10-20%). Be that as it may, the tuning of the un-struck string will make a difference in the response, *if* the una-corda is used while the note is played *loudly*. This is because the struck strings tighten up and go slightly sharp on a hard blow before the third string begins to vibrate. This effect is negligible for softly-played notes. I do not believe the una-corda should be used for loud passages, therefore, I tune that string just like all the others - as close as I can get it.

Timbre

As I indicated under the "Aural Observations" heading, there are characteristic sounds that we hear as we tune unisons. Stagger-tuned unisons have a slightly different timbre from that of exact-tuned unisons. Even though a stagger-tuned unison may not beat at the fundamental frequency, or even at the second partial, it will beat at some higher partial. In addition, the "hunting" effect will be audible, sounding like a slow subdued beat that eventually becomes inaudible. In fact, these are the sounds that we hear that enable us to tune accurately. The fundamental beats are much too slow to give us this fine resolution. There is no such thing as a beatless stagger-tuned unison. These reinforcements, cancellations, and phase shifts - different partials dominating at different times - produce variations in the timbre of the note. The way the unison is tuned affects the way the timbre changes as the tone decays. Exact tuning produces a tone that is rich in all the main partials at first, but the fundamental tends to go out of phase first, leaving the second and third partials to dominate. If the tuning is staggered, the initial decay of the fundamental will occur more quickly, but the fundamental component in the aftersound will be greater. There is little difference in the total energy dissipated. It is just re-distributed in time.

Soundboard Resonances

As I mentioned under *"Compound Inharmonic Motions"*, the soundboard is not restricted to simple modes of vibration. If it happens to be resonant at some frequency that coincides with some partial (fundamental or overtone) of a given unison, the sound of that unison will stand out from all the others. A resonant mode increases the coupling at that particular frequency. As a result, that partial will produce a burst of sound that will be louder at first, but diminish faster, than the others. This is the sort of thing piano makers try to avoid.(7) Nevertheless, the tones of a piano cover a wide range of frequencies, and a coincident resonance is likely to occur somewhere along the scale. When it does, there is little the tuner can do. Fudging the unison tuning doesn't help much. Sometimes a loose rib or buckled area in the soundboard, etc., will cause the problem. If so, the technician can repair it. If the problem is basic to the piano, my suggestion is to tune the piano as accurately as possible, and let the board alone, unless the technician is skilled in soundboard work. Multiple reflections in a small "live" room can do similar things, and these are not under the technician's control either. No amount of fudging the tuning will help.

Musical Significance

After all is said and done, the musical performance is the crux of the entire matter. We want the piano to have a "singing" quality, and this requires tonal persistence. If the persistence is too long, the piano will sound like a percussive organ. If it is too short, it will have a "banging" quality. Somewhere in between these extremes there is a happy medium. We want to optimize the piano for playing piano music. Can you imagine Chopin's "Polonaise in A Flat" played on a pipe organ, or Bach's "Toccata in F Major" played on a piano? This is absurd. Certainly, there is music that can be played on either instrument, but I am referring to *piano* music, which needs a clean, clear attack without being harsh, and some diminution of volume. The question is, how much? To answer this question, we must consider how the piano is to be played. All of the studies I described were conducted in a manner in which the piano is *not* normally played. Single notes and phrases won't produce the same effect they would if they were played within the framework of the entire piece of music. From a musical standpoint, such samplings are taken out of context, and making conclusive musical judgments based upon them is risky.(2)

As I indicated earlier, the aftersound does not begin until the tone has decayed by 20 dB or more. In most music written for the piano, the individual notes end before the prompt sound gives way to the aftersound. Therefore, the tones of primary interest are those of the prompt sound. This is also true in the bass, where the notes are held for longer periods of time, because the prompt sound also persists for a much longer time due to the large mass and low frequency of the strings. It takes longer for the bass strings to go through the phase-shift transition from in-phase to out-of-phase. In addition, the prompt sound persists a little longer when the strings are exact tuned. Sound energy is neither gained nor lost as a result of either tuning method; it is just re-distributed in time.

The tests I have described were done without using the sustaining pedal. When a pianist plays long sustained notes or phrases, he usually uses the sustaining pedal, which allows the string vibrations to mutually couple throughout the entire instrument. This changes everything, and produces an

[2]"Tuning Preferences for Piano Unison Groups", by Roger E. Kirk, *The Journal of the Acoustical Society of America*, Vol. 31, No. 12, December 1959, pp. 1644-1648

[3]"Intentional Non-Consant Tuning — Why and How", by Gerald E. Loeb, *Piano Technicians Journal*August 1981, pp. 17-19

[4]"The Coupled Motions of Piano Strings", by Gabriel Weinreich, *Scientific American*, January 1979, pp. 118-127

[7]"Soundboard Soundings", Mathew Slaats, P.T.G. Convention, Philadelphia, July 14-18, 1980

overall resonating quality that is absent when only one note is played. Staccato playing demands a clean-cut attack and very rapid decay, but this does not mean that legato playing demands no decay. On the contrary, some decay is desirable in order to help one tone fade into the next. It turns out that the piano's peculiar dual-decay tonal characteristics are ideal for this. I think perhaps this is why many of the clever devices and gadgets that have been invented to do nice things for piano tones have almost all disappeared, and the traditional acoustic piano has stood the test of time.

The preferences people have with regard to musical details are highly subjective, and that makes any scientific analysis nearly impossible. I do not normally stagger tune unisons. Sometimes I will vary the tuning of one string slightly in an effort to offset a false beat, but that seldom works very well. I inquired among some of my colleagues scattered about the country, and majority of them try to tune beatless unisons. One states that he did occasionally stagger one strings only, very slightly, depending upon the piano, the performer, and the music played.(8) Another gentleman, who has tuned pianos longer than any living person I know, and who was the tuner for the last concert Rachmaninoff ever played, told me that when he was trained at Steinway (prior to World War I), he was taught to tune *everything* just as accurately as possible.(9)

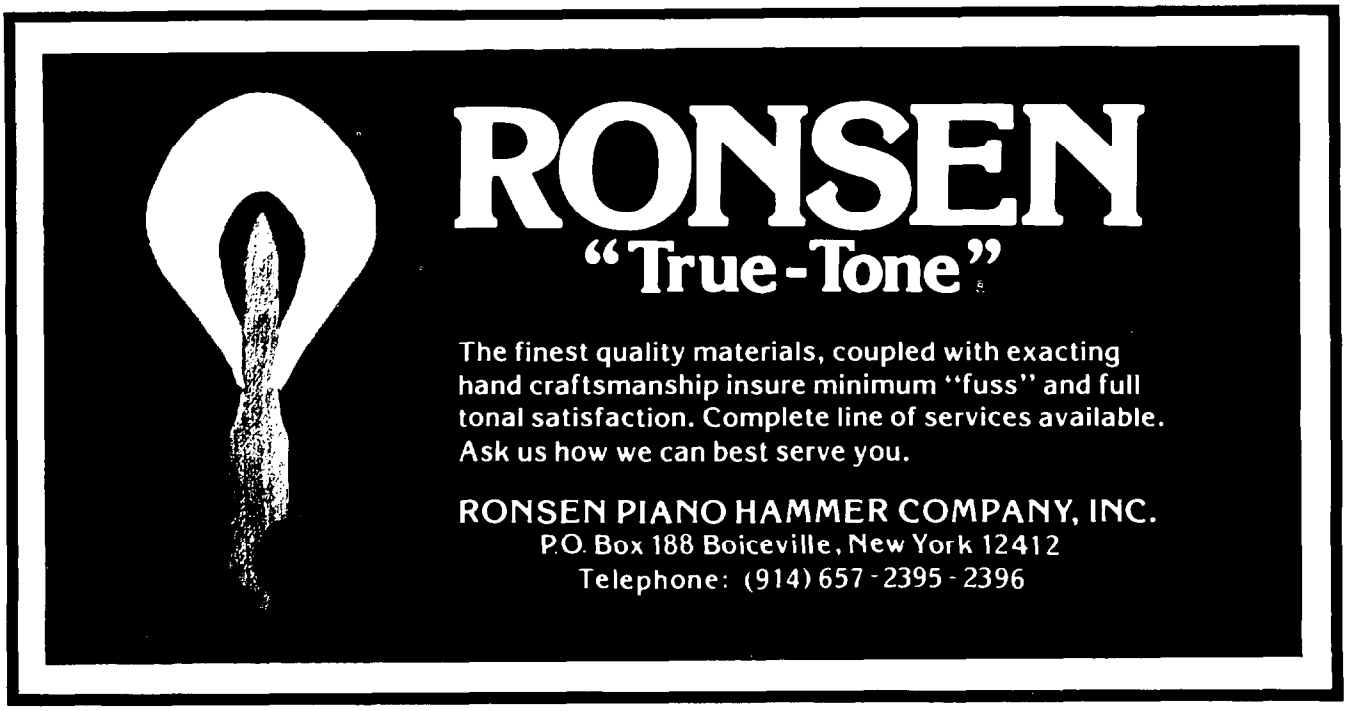
Personally, I prefer the sounds of very closely tuned unisons (in almost all cases), and I believe they are more suitable for the kinds of piano music I like - classical and otherwise. "Ragtime", for example, takes on its full intricate dimensions when played on a good, well-tuned piano. In my opinion, with all the overtones and subtle inharmonicities of the piano combined with all the beats in the equal temperament, we don't usually need busy unisons to liven things up. One of my colleagues once told me that, before a concert, Arthur Rubinstein asked him to "Tune it up tight".(10) I leave the interpretation of that request up to the reader! Again in my opinion, the greater part of piano music is better off when played on a piano whose unisons are tuned as closely as is practical. This type of tuning delivers more and clearer sound power within the duration of the individual notes of the music. For full chords that are held for very long periods of time, it also produces a persistent low-volume "singing" effect that sets the piano apart from all other instruments. My purpose in writing this article was not to insist upon any particular tuning method, but it was to give piano technicians a clear understanding of what this subject is all about. For that reason, I don't want to put words into the mouths of others. Instead, I leave it to them to describe their own methods for their own purposes. As one of my friends said (when speaking about things musical), "Never say never, and never say always".(11) Even though I have some strong preferences, I have to agree with him.

SUMMARY AND CONCLUSION

Piano tones exhibit two separate decay rates. There is a high-amplitude prompt sound that decays rapidly, and a lower-amplitude aftersound that decays slowly. The main cause of this dual decay characteristic is interference among the unison strings. This interference has its greatest effect in the normal vibrational mode of the strings. The parallel mode appears to play a much lesser role in generating the dual decay characteristic. The closeness of the unison tuning affects the overall persistence and timber of the tone. Very precise tuning accentuates the prompt sound, eliminates subdued beats, reduces the total persistence of the tone, and provides maximum tuning stability. Slightly staggered tuning decreases the duration of the prompt sound, increases the persistence of the total sound, generates subdued beats even though the lower partials may frquency lock, and provides minimum tuning stability.

Very slightly staggered tuning has its place for special occasions when both the artist and tuner know what they are after. However, in my opinion, its use in routine tunings, or for the majority of concert tunings, is highly questionable.

[8]Personal communication, Robert R. Dennis, March 2, 1982
[9]Personal communication, Harold C. Clark, January 2, 1982
[10]Personal communication, Frank H. Hambright, April 20, 1982
[11]Personal communication, Robert R. Dennis, April 19, 1982



SOUND BACKGROUND

Jack Greenfield, RTT
Chicago Chapter

Post-Pythagorean Tuning Changes

Cultural and Social Background

The transition from traditional Pythagorean tuning to later systems of tuning and temperament was part of general change in fine arts in Europe that began during the Renaissance. Although there was no "rebirth" of ancient music in the same sense as in other fields of art, music historians adopted the term "the Renaissance" as a chronological label for music of the period from about 1450 to 1600.

The scope of musical activity widened considerably during the Renaissance. Music tended to become more autonomous; that is instead of merely supporting religious services, court ceremonies, and dancing, it became an art to be enjoyed for its own values. Composers and professional musicians rose in status. Aesthetic standards for composition and musicianship became more exacting and the practical demands of performance exerted greater influence on the progress of musical theory.

Many theorists lagged behind in acceptance of new ideas. The treatises of the thirteenth and fourteenth century show no great concern with the problems of intonation and indicate the writers had only superficial knowledge and understanding of Boethius. However, the later theorists of the Renaissance could not ignore the changes that were taking place in performance. Bitter controversy arose between those who wished to adhere to tradition, opposed by those who wished to follow the lead of practical music.

During the second half of the fifteenth century music scholars began to study Boethius more carefully. This led to a search for the works of the ancient writers he discussed — Aristoxenus, Archytas, Ptolemy and Nichomachas. With the Renaissance revival of Greek and Latin languages, scholars could now read those original writings of the "Golden Age" of antiquity that could be found.

The traditional theorists maintained their high esteem for Boethius, but other theorists who disagreed formed a strong movement away from the Pythagorean principles of music accepted through the Middle Ages. This coincided with the beliefs of many Renaissance intellectuals who considered the Middle Ages to have been a 1000 year gap in cultural and social progress and looked back with admiration on the glories of ancient Greece and Rome.

Introduction of New Tuning Principles

Although it had become a fairly common practice for keyboard instruments by the middle of the fifteenth century tempered tuning was not discussed in the writings of theorists until the final decades of the century. Bartolomeus Ramis de Pareja, a Spanish mathmetician who taught as a professor in Bologna wrote a book *Musica Practica* (Bologna, 1482) in which he referred to the widespread use of mean-tone temperament on keyboard instruments. Franchinus Gafurius, another prominent music scholar of the day reported the practice of tuning organs with slightly contracted fifths in his book *Practica Musicae* (Milan, 1496) and was first to use the term *temperament* for alteration of a pure interval, although he did not approve of the procedure. Gafurius was an Italian priest who had risen from a position of teacher-composer at the Milan cathedral to professor at the university there.

Ramis' book was highly significant historically because it also presented his own tuning system, the first departure from Pythagorean tuning known to have been published. Ramis was a leader in the movement to tuning reforms. Ramis was probably unaware of the musical consequences of his work. He had devised his method of monochord division as a simplified procedure for singers. It is likely that other later Renaissance monochord divisions were also designed for mathematical, rather than for musical goals. The determination of Pythagorean chromatic notes on a monochord required complex arithmetical or geometric calculations.

Ramis' directions produce a chain of six pure fifths from A^{b} - G. The interval G-D is a wolf fifth, one syntonic comma narrow. The remaining six notes D - C# form another series of pure fifths pitched a syntonic comma (22°) below the corresponding notes of Pythagorean tuning.

The following table gives the intonation of Ramis tuning and illustrates the exponent system used in tuning theory to indicate deviations from Pythagorean tuning. The unit is the syntonic comma. Plus values are sharper and minus values are flatter. Fractional exponents are not present in this tuning but they are used to indicate subdivisions in temperaments where the comma is divided.

Ramis' Tuning (cents from low C)

C^{o}	$C^{\#}$	D^{-1}	E^{b_o}	E^{-1}	F^{o}	$F^{\#-1}$	G^{o}	A^{b_o}	A^{-1}	B^{b_o}	B^{-1}	C^{o}
0	92	192	294	386	498	590	702	792	884	996	1088	1200

Lowering the second half of the tuning chain places four of the notes to form the pure major thirds (386°) $B^{b^o} - D^{-1}$, $F^{o} - A^{-^o}$, $C^{o} - E^{-1}$ and $G^{o} - B^{-1'}$ which can be included in several pure triads in keys frequently used. The interval $C^{\#-1} - A^{B_o}$ (700°) is a *schisma* fifth—smaller than a pure fifth by a schisma (about 2°), the interval derived from the difference between the Pythagorean or ditonic comma and the syntonic comma. The Schisma fifth and equal-tempered fifth coincide almost exactly, the difference is + .002°.

Another example of a tuning modification of the period similar to Ramis' was found in an anonymous late fifteenth century manuscript discovered around 1935. This tuning pattern known as "The Erlangen Monochord," was discovered in the library of the Erlangen (Germany) University.

Revival of Ancient Greek Music Theory

Ramis was severely criticized by the theorists of his day who clung to the established doctrines. Gafurius was one of these firm believers in Boethius. He never turned away from Pythagorean tuning throughout his entire career, but Gafurius' studies of Latin translations of long-forgotten music writings were a major influence that helped end the domination of Pythagorean theory. Gafurius was primarily responsible for presenting to Western musical scholars for the first time material based on the *Harmonics* of Ptolemy and on other ancient Greek writings on music theory and acoustics.

Influence of Ptolemy's Principles

During the first half of the sixteenth century, the rediscovered teachings of Ptolemy ascended in influence rapidly and Pythagoras became outmoded. Ptolemy's view that aural judgement as well as theory determine musical value introduced a way of thinking that was bound to bring theorists and practical musicians closer together.

Among the ancient Greek scales presented by Ptolemy, the one that received most attention and further development was his syntonic diatonic scale, shown below, the one he had favored because its superparticular ratios fit in with his numerological beliefs. Sixteenth century theorists were attracted by the beatless thirds and sixths. Beatless intervals formed by simple ratios became known as *pure* and *just*. Occuring in the harmonic series, they have also become known as *natural* intervals.

SYNTONIC DIATONIC TUNING OF PTOLEMY
(Ration to Bottom C)

C	D	E	F	G	A	B	C
1	9:8	5:4	4:3	3:2	5:3	15:8	2

Giovanni Spataro, a disciple of Ramos, wrote a treatise (1521) in favor of this scale. He maintained that it was the intonation followed by singers and instrumentalists who could control thier pitch — an idea which has been supported by many theorists since then. Other theorists who promoted the syntonic diatonic pattern in their books included the Italian composer and theorist Ludovico Fogliano (1529) and the Franciscan monk Gioseffo Zarlino (1550) who played the organ, wrote church music and later became choir master of St. Marks, Venice.

Soon afterward, however, there was a change in views as other scholars began to point out serious musical difficulties that made sytonic diatonic tuning impractical for musical performance and prevented its acceptance. Syntonic diatonic tuning did not disappear entirely but has continued to interest mathematicians, physicists, and others who believe it has unique acoustical properties. Present textbooks on acoustics of music refer to it as the "just" and "natural" diatonic scale.

Revival of Greek Genera Patterns and Quarter-Tone Tuning

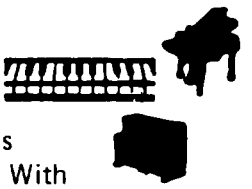
The sixteenth century revival of Greek music theory also included efforts to bring back the ancient chromatic (½-½-1½-) and enharmonic (¼-¼-2) genera tetrachords which had been ignored in medieval music. Among the leading scholars who studied the subject and who wrote books that helped spread interest in revival of Greek genera were Zarlino, Don Nicola Vicentino, and Francisco di Salinas. Vicentino was an Italian musician who became the most ardent exponent of Greek genera. He had fame as a keyboard player and wrote theoretical treatises but was frequently involved in controversies that left him few friends among the erudite. Salinas, a Spaniard, blind since childhood, professor or music at University of Salamanca, 1567-87, after several decades as an organist in Rome and Naples, was probably the first theorist who studied the problems of keyboard tuning intensively. His voluminous book *De Musica* published in 1577 considered Greek music theory in great detail.

Quarter-Tone Keyboard Instruments

Zarlino and Vicentino each designed and had built for them experimental instruments for demonstration. In 1562, Zarlino wrote a description of a nineteen-tone (per octave) clavichord he had built for him in Venice in 1548. Vicentino designed a much more elaborate instrument which he named an *arcicembalo*. The design in his 1555 book *L'Antica musica* calls for six banks of keys dividing the octave into thirty-one divisions. Two instruments of this design were built later. Vicentino went beyond merely demonstrating ancient scales but also wrote compositions based on such scales containing quarter-tone intervals. Unfortunately, he continued to expand his system until it became a complicated "Labyrinth of tonalities" opposed by many learned musicians of the day. Vicentino's arcicembali, now know as *enharmonic harpsichords*, received little use because of tuning and maintenance problems and the scarcity of suitable compositions. Some of Vicentino's concepts, however, were accepted by a small number of distinguished musicians who continued their development and more enharmonic harpsichord were built during the remainder of the sixteenth century and into the seventeenth.

The only instrument of this type still known in existence is the 1606 *clavemusicum onmitonum* in a museum in Bologna. This enharmonic harpsichord said to have been built to Vicentino's specifications has a compass of four octaves with thirty-one tones per octave. The accidental keys, as wide as the naturals, are split in four sections and there are added shorter keys between the E and F, B and C keys.

Interest in Greek genera faded before the spread of other more practical tuning systems but quarter-tones were revived again in the late nineteenth century. This led to the building of enharmonic harmoniums and organs and in the twentieth century even some quarter-tone pianos. The recent more easily tuned electronic keyboards may advance quarter-tone and other microtonal tuning more rapidly than has occurred in the past. □



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BRASS FLANGE REPAIRS

Gerald F. Foye
San Diego Chapter

Some old pianos used brass rails on which the hammer butts were mounted. These rails were designed specifically for this purpose and were machined with small tabs with a "V" groove through the tab which located the center pin. The center pin was clamped to the "V" with a small brass plate. This system required butts designed to suit. Basically the concept was good but like so many other foolproof ideas it has been subject to failure. As a result of fatigue and over tightening of the plate screw either the plate (clamp) or the tabs fracture or break off. This requires some form of repair.

Fracture of the plate is simply a matter of replacement. The plates are inexpensive and a few should always be a part of your toolkit inventory. It is very likely that there are more cracked plates than first meets the eye which means it might be worth the time to examine the action for more of the same, expecially when performing major action work.

Fractured or broken flanges are a more difficult problem to solve. If the tab (tongue) is fractured it leans away from the clamping pressure with a resultant loose hammer butt assembly. An old and clever method of repair is the addition of a butt plate behind the fractured tab for support. (The fractured tab is thus sandwiched between the front butt plate and the additional rear butt plate.) However, the standard machine screw must be replaced with a smaller diameter screw unless you want to go through the additional labor of enlarging the existing threaded holes. Using the smaller diameter #2 X 1/2" long with a nut on the back is less troublesome. Clip off excess length. (These screws can be found at hobby or model stores.) This arrangement serves the purpose only if the fracture does not go through.

If the tab has broken off there are two basic repair clips available through piano parts supply houses. The clip used depends on where the break is — through the "V" groove or through the screw hole.

For a better and permanent repair broken tabs should be replaced, especially when rebuilding the action. If a lot of tabs are broken than replacement of that rail section might be considered. Supply houses can duplicate a rail section, although the cost is considerable.

But now, getting down to brass tabs, which is what the basics of this information is about anyway, there is an individual replacement flange. Replacement of an individual section requires some time, basic shop tools and a small bit of common sense.

Naturally the action is out of the piano and on a work bench. If there is a jack cushion rail, remove it. Remove only enough wippens and hammer butts to get at the areas to be worked on. Remove the entire brass rail section that requires the repairs — handle carefully to avoid flipping the remainder of the hammer butt assemblies and possibly damaging other flanges and brass tongues.

With the rail out of the action, mount it in a bench vise using care not to damage the plate locaters, which in the photo shown are small pins pressed into the brass rail.

Keep in mind the operation is relatively simple but the key to success is alignment of the "V" groove. It should end up being in line and parallel to its neighbors. Parallelism is the more critical factor or there will be a travel problem.

On the repair flange shown, the plate detent (locator) is punched in the flange which creates a dimple in the back side. On this particular application it worked out quite nicely as the dimple fitted over the locating pin in the rail and was pretty much self-locating. It was also snug enough that finger pressure was all that was required to secure the repair flange in place while scribing the lines. If this were not the case then a small clamp would be advisable (small machinist') parallel clamp would be the most suitable and practical.) Also, if the locating arrangement happens to be not as convenient as this particular flange unit then additional care would be required to center the flange between its neighbors.

At this point the most critical problem is the "V" grove which must be parallel with its neighbors. Check with a small square or align the botton of the repair flange with the bottom of the rail as a guide. It all appears to be in order, scribe each side with a very sharp scriber. **(FIG. #1)**.

Remove the repair flange. With the area to be cut placed near the vise jaws for strength, cut with a hack saw. A blade with 24 teeth per inch works nicely. Keep the cut on the inside of the scribed line — this is important to obtain a snug fit which makes a more suitable repair.

After cutting (the rail will be separated) deburr the edges lightly. Only the sawed corners — not the sides since you do not want to take a chance taking metal off the edges or causing any sort of out-of-square conditions.

Remount the brass rail to the action main rail. Additional screws may have to be added to the brass rail depending on where it was cut. There should be a screw somewhere within a half inch of each rail end as shown in FIG. #3. If necessary to add screws select a spot

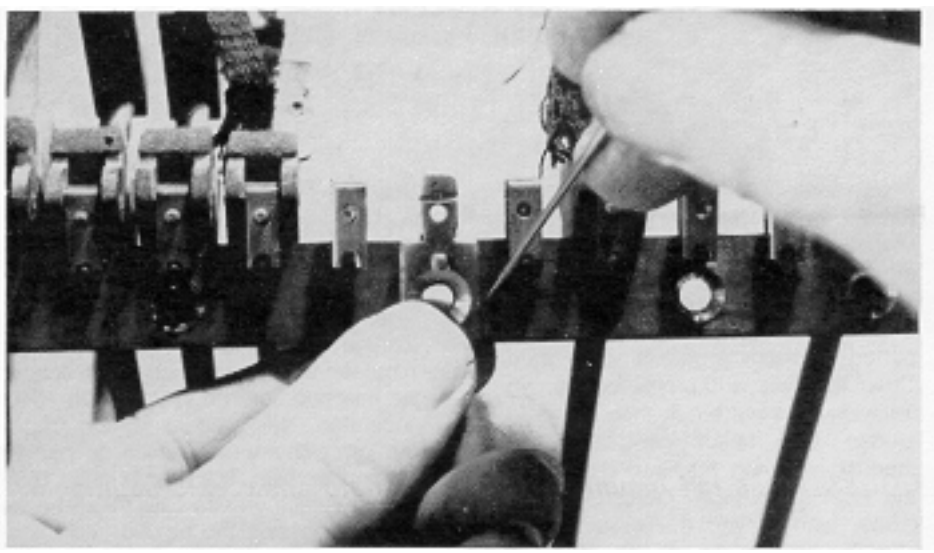


FIG. #1. Brass rail mounted in vise. Repair flange in place. Use sharp scriber to scribe lines where rail is to be cut.

where there will not be interference with other action screws such as damper screws. Exact location of these screws is not critical. Punch mark and drill through brass rail and into wood main rail (it is not necessary to drill through main rail) with a #40 drill.

Remove the brass rail again, remount in vise and open up the #40 holes with a #10 drill. (Use low RPM and light pressure to avoid grabbing in soft brass.) Countersink (a 5/16" diameter drill is suitable) again with low RPM — barely turning. Check depth of countersink to see that screw head is flush.

Remount the brass rail to the wood main rail with the addition of #8 X 1/2" flat head screws in the new holes to secure the rail flat to the main rail.

Now fit the repair flange in place. If you have done your work carefully the flange should fit in place with a slight tap.

Now, check "V" groove alignment with a drill, pin or whatever is long enough. Locate it as shown in **FIG. #3** for alignment and parallelism. As previously mentioned parallelism is the more critical factor; a slight misalignment up or down is not good but will not be as detrimental in the final result as an error in parallelism.

If alignment is within reason, spot the main rail using the same drill as for the countersink. Finish drilling with a #40 drill about 5/8" deep. Add a #8 X 1/2" flathead screw to secure the repair flange in place and the job is done.

There was a time when all this effort was not worthwhile. But with rising cost and the increased value of old pianos it is becoming economical. More than that, there is a sense of accomplishment in performing repairs of this nature, especially when you have confidence in the repair you made because you know it is a lasting repair.□

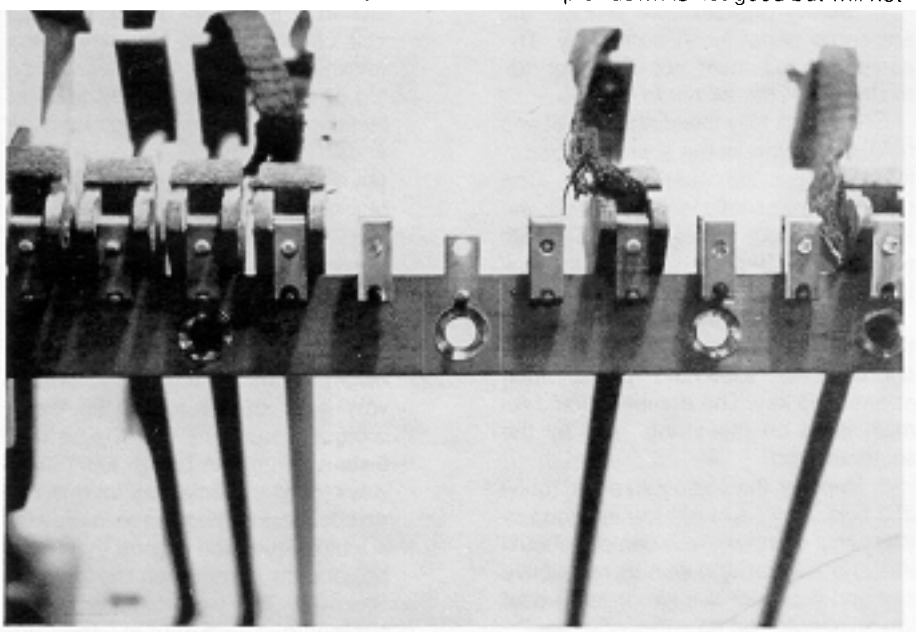


FIG. #2. Brass rail mounted in vise. Scribed lines shown. Note: When cutting it is important to cut on the inside of the lines in order to obtain a snug fit.

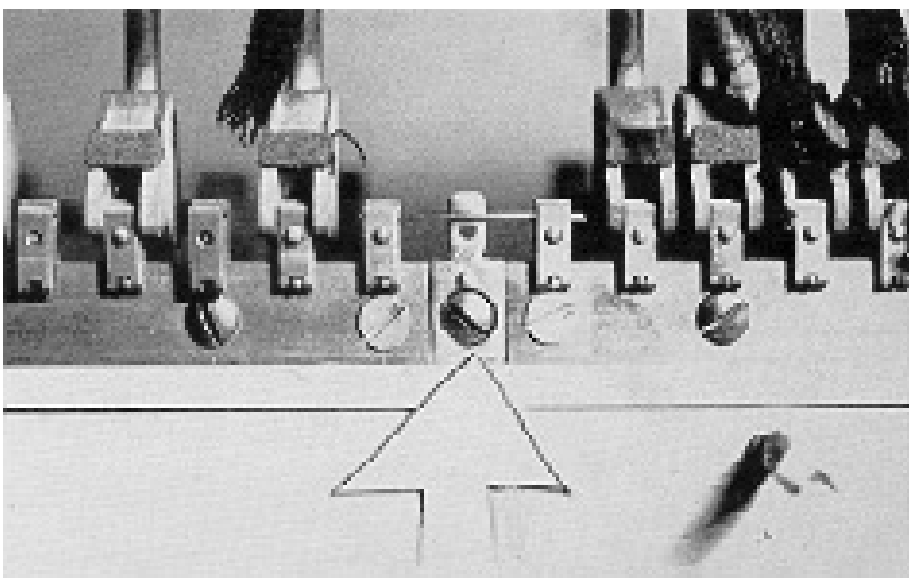
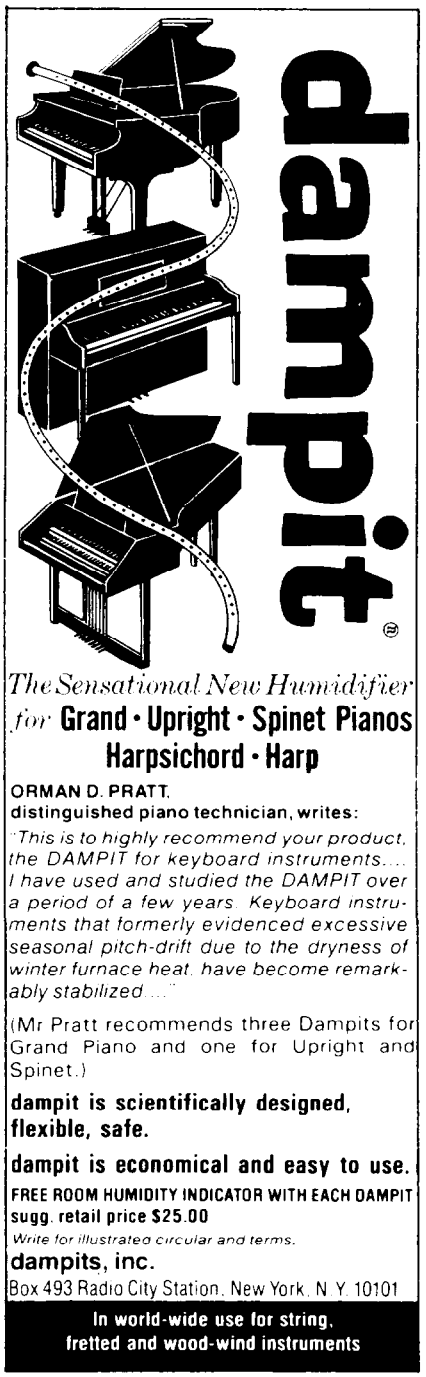


FIG. #3. Brass rail mounted in action. Photo shows the additional brass rail mounting screws which may be required depending on where rail is cut. Also, shows method of checking alignment of "V" groove. Alignment of groove is very important or travel problems will result.



REGULATING THE STEINWAY SOSTENUTO

Matt Grossman, RTT
Memphis Chapter

The Steinway sostenuto mechanism remains an enigma to many technicians despite the fact that it has been around since the 1870's.

I imagine most tuners would like to see it mounted on the middle and top belly bars,[1] the same as most other grand pianos instead of on the action brackets. However, there are two drawbacks to the belly bar mounted sostenuto: 1) when the belly bars change dimensions due to humidity fluctuations, the sostenuto will often cease to function properly and 2) when work needs to be done on the damper action, it is not unusual to have to remove the sostenuto rod. But even if Steinway redesigned their sostenuto system and put it into production tomorrow, there are still thousands of Steinway pianos with the current sostenuto design. This means it is likely that at one time or another we technicians will be faced with the job of regulating the present Steinway sostenuto.

The main obstacle when regulating the Steinway sostenuto is that one cannot see directly what the position of the rod is because the action must be in the piano before the mechanism will work. Furthermore, the action must be removed before most adjustments can be made. So it is essestial that a procedure be worked out and followed carefully when adjusting the sostenuto mechanism.

The first requirement for the regulating procedure is to know what we are trying to accomplish, or what exactly is the sostenuto supposed to do. For this, we have a series of tests that will give us the information needed to determine what adjustments, if any, have to be made and in addition, will prove out any adjustments that are made. These tests will be performed with the action in the piano and with the keyblocks in place.

The tests are as follows:

1. Slowly depress and release the sustain pedal (only) repeatedly. Make sure that no damper tabs touch the sostenuto rod or hang-up on it.

2. Slowly depress and release the sostenuto pedal (only) repeatedly. The sostenuto rod must not touch or activate any of the dampers.

3. Depress fully the sustain pedal and hold, then depress the sostenuto pedal, then release the sustain pedal. The dampers should lift slightly when the sostenuto pedal is engaged and should remain lifted off the string when the sustain pedal is released.

4. Strike an average blow to each key that has a damper, hold it down, depress the sostenuto pedal, then release the key. The damper should remain lifted off the string, held by the sostenuto rod.

5. Depress the sostenuto pedal (only) and hold. Strike a hard blow to each key that has a damper. Each damper should rise and fall normally with its respective key and must not sustain or jump past the sostenuto rod lip.

These five tests will enable the technician to ascertain whether or not the sostenuto mechanism is regulated properly. If no deficiencies occur during the tests, then the sostenuto is regulated properly. If problems occur during the tests, the sostenuto must be regulated.

For the purpose of this discussion we will assume that the sostenuto is totally out of regulation so we must start from point zero and that all parts of the piano are in good condition.

Before any adjustment can be made to the sostenuto mechanism it is imperative that the damper action be regulated to the finest degree possible. Specifically, the sostenuto tabs on the damper lever wire flange (top flange) must be aligned so that all of the tabs are in the same geometric plane, i.e., all tabs must be in perfect alignment both horizontally and vertically.

Now sostenuto regulation can begin:

1. Remove the action to a suitable workbench and adjust the position of the sostenuto rod so the lip is pointing downward in approximately the 7 o'clock position when it is at rest. This can be adjusted by carefully bending the sostenuto rod monkey hook. Bend the hook the opposite from the way you want the lip to go.

2. Make sure the sostenuto pedal rod is adjusted so the sostenuto lift rod (dowel) is flush with the top of the key bed. Install the action in the piano and replace the keyblocks. Now, when the pedal is fully depressed the sostenuto rod lip should be in approximately the 9 o'clock position. (To observe the rod position while it is in the piano, use a flashlight and look in at the treble end of the rod..) This can be adjusted by varying the thickness of the felt block located on top of the sostenuto pitman lever or by taking further lost motion from the pedal. For example, if the rod lip is not rotating far enough, make the felt block thinner and vice versa.

3. Remove the action to the bench. Measure from the keybed up to approximately 1/16 inch above the top of the very edge of one of the sostenuto tabs. Now adjust the height of the sostenuto rod so the very edge of the rod lip (in the 7 o'clock position) is the same distance from the bench top. (Steinway makes a special tool for this, but an adequate setting can be made with a small T-rule and a good eye). This adjustment is made on the modern Steinway by bending the brass sostenuto brackets in the appropriate direction. On older Steinways, with cast brackets, leather washers must be added, taken away, or trimmed. Do not use paper punchings for this.

4. Loosen each of the back sostenuto bracket screws. (The ones nearest the back of the keys). This is done so that the bracket will be held firmly by the front screw, but can still be moved forward and back by a gentle top with a small hammer. Now tap the brackets all the way to their forward limit (toward front rail). If the bracket will not move with a gentle tap, loosen the front screws a bit.

5. Install the action in the piano and replace the key blocks. Now depress the sustain pedal and hold, then activate the sostenuto, then release the sustain pedal. At this point no dampers should be caught as the sostenuto rod should be too far forward. Using a straight rod 1/4" in diameter and about 18" long (an old pedal rod is perfect), tap each of the sostenuto brackets an equal amount toward the back of the piano. Insert the straight rod between the action bracket and whip-

[1] **All terminology for piano parts was taken from *Piano Parts and Their Functions.***

pen under the let-off button. Bring the end of the straight rod to bear on the front end of the sostenuto bracket (end nearest front of key). Keep testing (as above) until you get the sostenuto rod in far enough so it will hold all of the dampers off the string after the sustain pedal is released. Now re-tighten the sostenuto bracket screws — front and back and check again. (Do not over-torque these screws). Now that this preliminary setting has been made we can use the tests which were given previously to make further adjustments.

Please note that for this part of the discussion, the test to be performed will be given first. Next, the problem that is anticipated will be stated, then the remedy will be given. Also, to observe the sostenuto rod while it is in the piano, sight through the space between the dampers or look through the gap at the bass-tenor break or watch it through the undamped strings at the treble end.

Perform Test #1

Problem: All or some of the damper tabs touch or hang-up on the sostenuto rod when the sustain pedal (only) is depressed. This indicates that the rod is too far in or some tabs are out of line.
Remedy: Check tab alignment and/or tap rod brackets for the affected sections toward the keys a bit. Test again and repeat if necessary.

Perform Test #2

Problem: All or some of the damper tabs are touched by the rod as the sostenuto pedal (only) is depressed. This indicates that the rod is too low or some tabs are out of line.
Remedy: Check tab alignment and/or bend the sostenuto brackets for the affected sections upward slightly. Test again and repeat if necessary.

Perform Test #3

Problem A: None of or only a few of the dampers are being held off the string. This indicates that the action is out of place or preliminary setting was incorrect.
Remedy A: Make sure keyblocks and action are in the proper position and/or repeat beginning steps of regulating procedure where preliminary setting was made.
Problem B: Some dampers are not being held when the sustain pedal is released. This indicates that the sostenuto rod is slightly too high or some tabs still are out of line.
Remedy B: Check tab alignment and/or bend the rod brackets for the affected section down slightly. If this does not correct the problem, then repeat the preliminary setting procedure.
Problem C: Dampers not lifting slightly when the sostenuto is engaged after sustain pedal is depressed. This indicates that the sostenuto rod is slightly low or the sustain pedal is lifting the dampers too high.
Remedy C: Adjust sustain pedal lift and/or bend sostenuto rod brackets for the affected section up slightly.
Problem D: Dampers are lifting too much when sostenuto is engaged. This means that the rod is too high or the sustain pedal is not lifting the dampers enough.
Remedy D: Adjust sustain pedal lift and/or bend sostenuto rod brackets for the affected section down slightly.

Perform Test #4

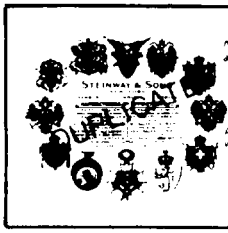
Problem: Dampers are not being held when key is released. This indicates that the distance the damper travels with the sustain pedal and the distance the damper travels with the key differ greatly.
Remedy: Re-check sustain pedal adjustment, then repeat from the beginning the sostenuto regulating procedure.

Perform Test #5

Problem: Damper tabs jump past the sostenuto rod allowing the note to sustain. This indicates that the rod is out slightly too far.
Remedy: Using the 18 inch rod and small hammer, gently tap the sostenuto brackets for the affected sedtion inward slightly.

Finally, repeat the entire test sequence to ensure that the adjustments made previously remain permanent and the sostenuto mechanism operates freely without any deficiencies

By using this method of regulating the sostenuto, a good understanding of the mechanism and reasonable degree of proficiency can be attained for making the adjustments. After that, add your own ideas, make a few changes here and there in the procedure and you will find that the mystery of this important mechanism of the Steinway piano will disappear completely. □



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REPAIRS AND REMEDIES OF THE PIANO BUSINESS

Paul W. Sprinkle, RTT
Macon, Georgia Chapter

(Note: Mr. Sprinkle is the editor of the Braille Piano Tuner's Journal, from which this article is reprinted.)
—J.K.

The field of piano technology encompasses various branches of work, including repairwork and reconditioning, regulating, replacement procedures, involving strings, action parts, main structural features, such as case parts, pinblocks, soundboards, & the like, refinishing, and lubrication, just to name a few. This month's topic is concerned with action center-pinning, repinning, and how to test and correct wobbly, as well as sluggish action centers.

Centerpinning is an exacting art, one that demands precision in workmanship and ample experience of all technicians. This technical branch, of which there are many, is quite challenging to teach to students and much time, tolerance, and experimentation must be granted each individual if he is to become thoroughly familiar with centerpin sizes, centerpin fitting among the various moving parts of an action and what steps to take when confronted with problematical situations, involving noisy pins, bent pins, rust pins, swollen bushings and the like.

In order to avoid confusion or ambiguity, I shall use only two works when describing actual centerpin fitting into different action joints. These words are tight and firm. I use the word, tight, to indicate that the pin should fit this way in all unbushed members of action joints, whether they be of wood or metal. I use the word, firm, to indicate that the pin should fit this way in all bushed members of action joints to avoid loose, or wobbly connections.

Centerpin sizes, given in terms of gauge and diameter in inches include: 18 in.046, 18.5 in.047, 19 in.048, 19.5 in.049, 20 in.050, 20.5 in.051, 21 in.052, 21.5 in.053, 22 in.054, 22.5 in.055, 23 in.056, 23.5 in.057, 24 in.059, 24.5 in.061, 25 in.063, 25.5 in.0645, and 26 in.066. When you know a particular size centerpin from numbers 18 through 23.5, and you wish to determine its diameter, multiply centerpin size by 2 and add ten. For example, 18 multiplied by 2 yields in.036, plus 10 equals in.046. Reverse this procedure to determine centerpin gauge. For sizes 24 and above, enlarge the number in your addition problems. For instance, instead of adding ten to size 24, add eleven. For 24.5, add twelve, for 25, add thirteen, for 25.5, add 13.5 and for 26, add fourteen.

All tuners should carry a twelve-compartment centerpin holder with pins kept in proper order according to size in the proper compartments. Also you should carry fine-quality centerpin cutters, which should not be used for any other purposes other than that for which they were designed, pinpunch, either manual or automatic spring-load punch, whereby you can adjust tension to remove pin, broach, rat tail file, and your choice of reamers, be they round and tapered, or a centerpin of the size to be used which has been filed flat on opposing sides to be inserted through bushings and rotated. If by chance you use the tapered reamer instead, insert the tool through bushings and mark the area where you begin your reaming process by placing your thumb next to, or against the side of the action part being reamed, on the side away from the reamer's point so that when the part is turned around to be reamed in the other direction, both sides will be evenly reamed. A pin vise in which to store your tapered reamer is a handy gadget that will prevent bent or broken reamers from littering your toolbox. A reamer is also easier to handle and operate in a pin vise rather than in between the jaws of pliers. One should also carry glue, bushing cloth, scissors, and a set of razor blades for the rebushing process but that's a subject to be discussed later.

All action centers on any type of piano are composed of for-and-tongue joints. Outside of a few exceptions to the rule, all forked members of actions are bushed and all tongue members serve as parts to grip the pins and hold them stationary. Any rotary motion of pins while keys are struck and released should take place in the bushed holes of the action centers. Let's expound on the construction of these joints at this time. First, to begin with the standard wood flange action on an old upright. The wippen flange to wippen action joint is one of fork-and-tongue construction. The flange is forked and is bushed on both sides. The wippen serves as the tongue and fits between the "prongs" of the forked flange. When repinning this joint and other similar joints, first test your selected size centerpin in the wood or tongue member of the joint. The pin should start very tightly in the hole of the birdseye with considerable persuasion of the fingers but should not be able to travel through the hole at all. Then, test your pin in the forked member of the joint. The pin should fit firmly in the bushed holes. This means that it should be possible to push the pin through the holes with your fingers, but there should be no wobbling, nor should the pin be able to slip through without a little pressure applied to it. The sensitivity of your fingers is vital in this phase of the profession in so many ways. Always start a pin into an action joint, point first. Your fingers must be sensitive to the "feel" of the pin when connecting action joints. Some of us can even detect various sizes of centerpins by running assorted diameters of pins through our fingers in much the same way that some of us can detect several sizes of piano wire while restringing. When inserting a pin into an action center, have all parts resting on a solid, flat surface, whether it be workbench, small wooden block or a compartment of your centerpin carrier. Pins can be inserted by means of oscillating them through action parts with centerpin pliers, or pushed through either with dual-purpose tool or applying pressure on protruding end of pin against surface with steady hand so as not to damage bushings. Also when replacing such parts as flanges, never count on the pin you find in one to be the size in need. It rarely works out that way. Anyway, when the wippen flange to wippen action center is properly pinned, the pin should rotate with the movement of the wippen. Incidently, when you have just finished repinning any action joint, before cutting and filing the pin to the proper length, test your action center, moving the parts as you feel the pin to be certain that you have the correct fit. In the case of a hammer butt flange to hammer butt, the flange is the fork and the butt is the tongue. In case this word, tongue, is causing confusion with the abstract guide, or tongue, you may also consider these joints to be of mortise-and-tenon construction. When this center is properly pinned, the pin should rotate with the movement of the hammer butt.

Strangely enough, different action centers are pinned according to actual difference of fit. In fact, the list of action centers pinned in order of tightness from the tightest pinned centers to the looser ones follows: hammer flange to hammer butt, wippen flange to wippen, jack flange to jack, damper flange to

damper lever, tongue flange to tongue, abstract to wippen, and tongue to abstract; in grands, repetition lever to flange, damper top flange to underlever, (top flange), underlever flange to underlever, sostenuto tab to top flange. In the case of butts containing Billings flanges, the pin does not move at all while action is in operation. The pins in continuous brass-rail action butts also do not move. However, in both instances, our bushed and unbushed members of the joint are in reverse. In these actions, the butts are forked and bushed so your pin should be only a firm fit. Billings flanges are the hardest to repin. These brass flanges should be removed from the butts an opened slightly from in between their clamp-like jaws with a small screwdriver. This can be overdone and the flanges broken so perform this operation with caution. Smaller size pins should be used as much as possible when working with butts and plates of the brass-rail kind or screw-butt kind. In jack flange to jack, the flange serves as the fork, the jack serves as the tongue. When properly pinned, rotation of the pin takes place with the movement of the jack. When pinning damper flange to lever, the pin should rotate with the movement of the lever. Now we come to a few exceptions. When pinning abstracts to wippens, the pin should fit tight enough in the wippen so that no lateral, or side movements should take place and should fit in the bushed abstract hole fairly firmly with just a little wobble allowed. This means that the underside of the wippen is the fork, the upper end of the abstract with its bushed hole is the tongue. In this manner, the tongue member is bushed and only slight rotation of the pin should take place in the abstract as the key is struck and released. The other somewhat wobbly joint in the action is the tongue to abstract joint. In this case, the tongue on the end facing the piano player is bushed and the lower end of the abstract is unbushed.

But the tongue contains a birdseye at its other extremity which fits between the "prongs" of the bushed tongue flange. The pin should be a tight fit in the tongue birdseye and a firm fit in its flange. This fit in the rear of the tongue prevents the tongue from wobbling and also keeps the abstract aligned above the proper capstan. The four action joints, which are wippen flange to wippen, tongue flange to tongue, tongue to abstract, and abstract to wippen, must all move simultaneously when the piano is played. In the case of wippen flange to wippen and tongue flange to tongue, the forks are bushed. In the case of tongue to abstract and abstract to wippen, the tongues are bushed. The reasons for these last two joints to be loosely pinned are: (1) to minimize friction; (2) to prevent internal stress from occurring throughout the system so that all action joints work as a unit rather than working as separate units against one another.

Wandering Pins. This condition is frequently seen and seems to occur most often in the hammer-butt and flange joints, as well as the jack and flange joints. Unless it is only an isolated one or two in either case, I would repin as necessary. However, if this condition results sporadically throughout the action, then your best bet is to repin the set. To repin jacks, unhitch bridle straps from wires, with action placed in cradle on workbench. Remove wippens, lay them out or hang them up in sequence. Also keep the wippen flange screws in order for there may be slight variations in size. Repin all flanges either by set, by section, or smaller groups as space permits. Gauge a few of the old pins with centerpin gauge or micrometer to help determine the correct size for repinning. This will also save considerable time individually fitting all action parts together as you progress down the line. Punch out jack-flange pins taking care not to damage bushings. At this point, you may punch them half-way out, then remove with pliers, twisting them out the rest of the way, or you can do this with pin vise, or you may start the new pins into place pushing the old pins out. This last technique is faster than the first. If you use this last method, be sure that the point of the new pin contacts the flat end of the old pin, otherwise the new point of the replacement pin may slip off the cut end of the original pin, causing bushing damage or split action parts. The dual purpose repinning tool with flat pusher is an excellent device to use in this operation. When the job is completed, go back and check your work thoroughly. You may have to repin a few of the jacks with a pin several sizes larger so this is the time to find that out rather than on your return trip with the action.

Noisy Centers. These can be caused by felt rubbing against the corroded metal of the pin. This calls for burnishing, or reaming and repinning as a durable solution to the problem. Noise can also occur when the pins are too loose in the bushings. In this case, repin as stated and if reaming is necessary, this should be done only in the bushed

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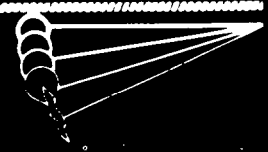

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members of action joints, never in the gripping parts, under any circumstances. If you run into a situation where a few flanges must be pinned with a size much larger than expected, do not ream the jack, you could split it. Instead, rebush the flange or use a replacement flange. Carry an assortment of flanges with you as there are many sizes in terms of length and width of notch. Be certain that your pin is a tight fit in the wood and adjust the bushings to fit the pin. Never use a smaller size pin in any action joint to relieve sluggishness. Chances are quite high that the pin will travel longitudinally working its way out of the center, pushing adjacent pins out of their centers. When treating swollen bushings by chemical solutions, always refer to piano service manuals of the various manufacturers printing them, this is just another way by which these documents can help make you a better technician on a particular brand of piano to be serviced. If you service instruments with teflon bushings, the Steinway service manual along with a teflon bushing kit, complete with assorted sizes of centerpins, bushings, reamers, and bushing inserter will be of tremendous value to you. Teflon is Du Pont's trademark for tetrafluoroethylene and is a type of plastic that is highly resistant to heat and most chemicals so neither lubrication nor the "zapper" would be useful with this material. The "zapper" is quite valuable in treating swollen felt bushings however, so long as corrosion or verdigris is the culprit. This device is a great timesaver and will relieve a set of hammer or wippen flanges in a matter of minutes. In places where the spacing is so extremely close that you can't fit the probes down between the flanges of the grand action, simply loosen every other flange screw to eliminate this problem.

Testing for Sluggish Action Centers. To check for sluggish butt centers, depress soft pedal and release abruptly. Hammers should fall back with the rail as one. Sluggish hammers can be spotted immediately, for they will hesitate or lag behind. To check for wipp centers, depress full sustaining pedal, hold damper levers away from spoons, removing all spring tension from wippen assembly. Fully depress each key and release slowly. If key does not return completely or returns slowly either the wippen or jack centers, or both, are sluggish. It is important to note that all action inspection to check for free centers should take place only after all keys have been properly eased.

Verdigris On Action Centers. This is a problem frequently overlooked and various methods for eliminating the excessive friction and stiffness of action response by means of lubrication, repinning, regulation, and adjustment of repetition springs have produced devastating effects. Verdigris is a greasy substance and is found literally coating the ends of centerpins as well as on the bushings. To repin is the least of all evils mentioned above, but you still have verdigris-laden bushings, so this solution is not foolproof. This problem is quite common in pianos whose flanges and bushings were dipped in paraffin in the factory to serve as a long-lasting lubricant. So you must get rid of the paraffin. To do this, use a high-grade, dry-cleaning fluid, such as picrin, or spot and gum remover. Begin by applying liberal amounts of choice fluid to the hammer flanges. Work shanks up and down vigorously. This helps loosen, dissolve, and seep paraffin out of the bushings. Check wippen centers. If tight, remove wippens from action. Treat in like manner, moving flanges up and down in quick movements. Before replacing wippens, check jack and balancier centers. If found to be tight, treat accordingly. Also clean and lubricate repetition spring grooves. Replace wippens in action, replace action in piano and test its performance. If the response remains unsatisfactory, inspect the damper-action. The problem may also be found in damper top-flanges, underlever flanges, as well. This will create a lot of work and even more so if a piano with this problem has already been "tampered" with by other solutions that in this kind of situation proved futile. But in the end, this accomplishment is a most gratifying one and it will certainly win you a customer.

Rebushing. This type of work becomes essential in situations where you encounter extremely wobbly action centers, due to moth-eaten bushings, or bushings that have been saturated with water or chemicals causing squeaks, or bushing to fall out altogether. Bushing cloth for the piano industry comes in three general thicknesses. I am presently only concerned with the thin bushing cloth which is used for flanges. Carry some strips of this cloth with one end remaining the proper width, the other end tapered to point. If necessary, remove the remains of old bushings, draw tapered point of cloth through both flange-holes, or through a group of flanges. Touch opposite end of strip with a few drops of glue, draw strip through until glue contacts flange hole. Insert centerpin to hold glued portion of strip securely to flange before glue dries. Cut off strip nex to width of flange. When glue has dried, remove centerpin and cut off all surplus felt with razor blade. □

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AFTER TOUCH

David W. Pitsch, RTT
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50 Point Guide To Grand Regulation Part XXV

Step number 38. Check gram weight resistance all 88 keys continued

The proper method to check the gram weight resistance of the keys is to either block up the dampers if the action is in the piano, or to remove the action to a bench. All repairs and regulations should have been performed to the action mechanism. I like to start at one end of the keyboard, say at A#1, and work up chromatically doing the downweight measurement on every key. On a typical grand, the proper downweight should be somewhere in the mid 50's for the lowest notes gradually decreasing to the upper 40's for the top notes. If the downweight for a specific key is within an acceptable range, like 54 grams for note #10 in the bass, I'll pass over that key without making any chalk marks on it. If the downweight is something more like 60 grams, I'll chalk exactly that number on that key.

Once all of the downweight measurements are taken, I do the same for upweight. Again, chalking only those keys which are out of range. The proper upweight should be 25 to 30 grams less than the downweight. That is, if the downweight was 50, the proper upweight should be 20-25. With a little practice, taking these measurements goes rather quickly. My system is to mark downweight behind the key buttons, upweight in front of the buttons. When finished, all keys out of the proper range can be analyzed at a glance. Try to be very accurate when taking these readings. Rarely should a key be chalked for a wrong downweight without also showing something wrong with the upweight, and vice versa.

All measurements should be taken to the nearest gram. Using the downweight as an example, the key may not go down at all with 49 grams of weight, but when another gram is added, the key goes down very slowly. A light tapping on the keyframe to aid the key in going down is acceptable. Record the downweight for this key as being 50 grams. Likewise, in doing the upweight, the key at the point of escapement may not come up with 26 grams of weight on it. But taking one gram off, the key may rise slowly. A record of 25 for the upweight is correct for this key.

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To illustrate what readings are possible, let us take five sample keys and list their down and upweight measurements:

	D	U	F	W
Key 1	50	23	13½	36½
Key 2	60	12	24	36
Key 3	45	27	9	36
Key 4	60	35	12½	47½
Key 5	43	18	12½	20½

Remember that the down and upweight measurements must be used in an equation to find the actual frictional and weight resistances. The equations are $F = \frac{D-U}{2}$ and $W = \frac{D+U}{2}$. However, the experienced technician can look at the down and upweight measurements and without computing the frictional and weight resistances, know what is going on.

Key number 1 is about ideal. The key is in the treble portion of the piano and should have a downweight of near 50, which it does. The upweight should be around 25-30 grams less than the downweight, which it is at 23 grams. Key number 2 has measurements which increase the spread between the down and upweights. Notice that the frictional resistance is about double while the weight resistance is the same. Somewhere in this key is an extreme amount of excess friction. Key number three's measurements go in the opposite direction from key number two's relative to the ideal key number one. Here again the weight resistance is the same as key number one, but the friction is considerably less. This could be caused by very worn action parts, especially action centers. These two problems, keys number 2 and 3, are frequently encountered in actions.

Keys number 4 and 5 on the other hand have about the same friction factor as key number one, while the weight resistance has been changed. It would be a safe assumption that key number 4 has had lead removed from the front of the key (or even worse, added to the back giving more mass to the entire key). Key number 5 probably had jiffy leads added to the front of the key, hoping to give the action a lighter touch. Unfortunately, adding or subtracting lead from the keys does not work like many people think it should. Key number 4 with greater weight resistance will be very tiring to play. If the piano is an upright and more lead was added to make it play like a grand action, the keys will require more pressure to play, but the action will still not feel like a grand action! Key number 5 will be easier to play than key number 1, but it

Continued on page 33

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Industry News . . .

Lloyd W. Meyer, who has been appointed president of Steinway & Sons, the 129-year-old piano manufacturing firm.

NEW YORK — The appointment of Lloyd W. Meyer as president of Steinway & Sons was announced by John C. McLaren, president of the CBS Musical Instruments Division. The 129-year-old Steinway piano manufacturing firm is a unit of CBS.

Mr. Meyer succeeds Peter M. Perez, who resigned. The new Steinway president has been in the musical instrument industry for nearly 20 years. Since March 1981 he has been president of Gulbransen Industries, organ manufacturers, also a CBS unit. He had previously been marketing vice-president of the CBS Musical Instruments Division for three years.

For 10 years prior to joining CBS, Mr. Meyer was with Chicago Musical Instrument Co., predecessor of Norlin Music Company. He joined that company in 1968, after two years in the U.S. Army, and rose rapidly through a series of positions in sales management. When he left in 1978 to join CBS, he was vice-president of sales and marketing for Norlin's keyboard division.

Mr. Meyer began his career in keyboard marketing while attending college in Minneapolis. In his senior year he served as manager of the keyboard department of the Dayton-Hudson department store chain in Minneapolis. In 1965, he joined Northwest Organ, a Minneapolis keyboard retailer, and spent a year managing one if its stores.

Born on July 21, 1941 in Los Angeles, Mr. Meyer is a graduate of the McPhail College of Music of the University of Minnesota. Subsequently, he studied advanced management at the Harvard School of Business.

Steinway & Sons was founded in New York City in 1853. It makes pianos exclusively at its headquarters in Long Island City, N.Y., and at a branch factory in Hamburg, Germany. Its pianos are marketed through company-owned sales rooms in Manhattan, London, Hamburg and Berlin as well as by a world-wide network of independent dealers.

Robert F. Dove, who has been appointed vice-president of sales and marketing for Steinway & Sons.

NEW YORK — Steinway & Sons has appointed Robert F. Dove vice-president of sales and marketing. He succeeds Richard Gigax, who has resigned.

Mr. Dove will be responsible for sales and marketing activities of the 129-year-old piano manufacturing firm, serving as principal liaison with the Steinway dealer organization. He will maintain his office at the Steinway factory and administrative headquarters in Long Island City, N.Y.

Mr. Dove previously was with Yamaha International Corp. and was national sales manager of its Everett Piano Co. since 1980. He joined Yamaha in 1969 as a sales trainer and product specialist, advancing to product manager and then to market development manager, at which time he headed the keyboard division education programs.

Earlier, Mr. Dove was a principal of Pianos, Inc., Washington, D.C., piano and organ merchants.

Born in Washington, D.C., on August 29, 1943, he attended California State University at San Diego, majoring in music with a specialization in organ performance. He and his wife, Laurel, have two sons and two daughters. They will reside in the New York area.

PRATT-READ COMPLETES ACQUISITION

Ivoryton, CT. — Pratt-Read Corporation today announced consummation of the agreement to acquire Sohmer & Co., Inc. of Long Island City, New York, manufacturer of Sohmer pianos. Also acquired was a related realty corporation which owns the Sohmer factory. The transaction, which brings together two old-line companies in the piano industry, was valued at more than $3 million, payable over a ten year period.

"Now that we have completed the formalities," said Peter Comstock, Chairman of Pratt-Read, "we can get on with manufacturing the prestige pianos for which Sohmer has always been noted. It's an exciting time for us and we are looking forward to our continuing association with Harry and Robert Sohmer."

Pratt-Read plans to move the operation to its Ivoryton, Connecticut plant facility when restoration work to repair recent flood damage is complete. It is estimated that the addition of Sohmer will increase employment at the plant by 100 jobs.

The Sohmer brothers, for their part, expressed delight that the union could be arranged. "It will make Sohmer a stronger company and assure its future", said Harry Sohmer in an interview. "Pratt-Read, with its history of almost two hundred years, is well suited to carry on our family tradition."

Pratt-Read, now in its 184th year, is a diversified manufacturing company with leading positions in such product lines as piano keys and actions, organ keys and switches, small tools and turned and shaped wood products. It also manufactures and markets an extensive line of small motors, timers and other electro-mechanical items. Its securities are traded on the American Stock Exchange.

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Yamaha Introduces First Musical Instrument With Music Printing Capability

Buena Park, CA . . . Yamaha International Corporation's Specialty Products Division has announced a significant breakthrough in the development of small lightweight, portable electronic keyboards with the introduction of a new keyboard instrument that can print out the music played on the instruments 44 keys. The music printer is an integral part of the new instrument called The Yamaha PortaSound MP-1.

The MP-1 is the first musical instrument of its kind. As the world leader in the production of pianos and electronic keyboard instruments, Yamaha has years of experience and extensive research and development capabilities. From these resources has come this "breakthrough instrument" that is expected to prove invaluable as a composing and music training aid for both the amateur and professional musician.

The MP-1 incorporates the latest advanced micro-computer technology for its music printer system. The compact printer, which makes use of a 2¼" wide paper roll and a miniature ballpoint pen, clearly prints out melody lines in a variety of keys (including up to three sharps or flats), as well as the staff, time signature, rhythm and chord names, flats, sharps, and so on. One of the printer's functions, EASY PRINT, is especially valuable since it enables anyone to obtain a printed musical score at the touch of a button — there are no complicated procedures involved. And, a very important technological breakthrough enables the MP-1 to automatically compensate for the player's irregular note lengths by "rounding-off", resulting in perfect music score print-outs.

The new keyboard also features a melody and chord sequence memory function which allows two-channel recording and playback. For example, the player/composer can first lay down the chord track, then record the melody line while listening to the chord tract being played back. When he's satisfied with his performance, he just presses a button for the score to be printed out. The player can also perform an ensemble with the memorized music.

Other features of this innovative instrument include 10 realistic instrument voices, 10 automatic rhythms, easy-play Auto Bass Chord, arpeggio, a convenient transposer and pitch control for tuning in with other instruments and vocalists, and a newly developed "Duet" function which causes a harmonizing note to be played with each melody note.

The PortaSound MP-1 is very light and compact (1¾" height, 27¾" width, 6½" depth), and can be powered off household current, batteries, or it can plug into an automobile cigarette lighter.

After Touch
Continued from page 31

will not repeat as fast, since there is now more weight at the front of the key. Be careful not to get trapped into adding or removing leads to make an action "lighter" or "heavier".

Notice how the down and upweight figures for keys four and five differ from key 1. More weight resistance can be seen with both the down and the upweight measurements increasing relative to key number 1. Less weight resistance can be seen with both the down and the upweights decreasing. If you can't remember the formulas for frictional and weight resistance, try to remember which way the figures go for what problems:

	Down	Up
More friction	⌓	⌔
Less friction	⌔	⌓
More weight	⌓	⌓
Less weight	⌔	⌔

Assuming that the weight resistance has not been changed in the action, or if it has been changed, the technician has restored it back to the original specs, he will now only have to deal with frictional resistance. Possible places in the action to cause wrong frictional readings are limited, and therefore fairly easy to troubleshoot and correct.

1) The key bushings at the front and center rails
2) The key hole at the center rail
3) The hammershank center
4) The whippen center
5) The balancier/knuckle contact
6) The capstan/whippen felt contact

I have listed the possibilities in the order that I would troubleshoot the action. Most of the time we will be eliminating friction, especially if all needed repairs such as rebushing the keys, easing the key center hole, repinning loose action centers, polishing the capstans, regraphiting the balancier, and rounding the knuckles and whippen felt would have been performed prior to checking the gram weight resistance. What the technician will be doing in step #38 is finding those areas which were borderline and hard to pick up earlier in the checklist, or in the case of a new piano, just making sure that everything is playing as well as can be.

Overlooking too tight key bushings, which would give a gram weight reading for the downweight so high as to be impossible to measure, some ballpark figure can be given as how much the other areas of friction will affect the measurements. The hammershank center is in my opinion the most important aspect of performing this procedure. For each swing too tight or too loose of the hammershank center, we can expect about one gram of frictional resistance to show up. This center is very noticeable to a concert artist, and any unevenness here is sure to bring a complaint. For example, if the hammershank center is swinging two times instead of eight, the artist will experience six grams more downweight on that key than what he should!

The whippen center is a little less important, but should not be overlooked. A tight whippen center can give maybe 1-2 grams greater frictional resistance. Perhaps another 1-2 grams less frictional resistance can be obtained by polishing the capstans and burnishing the balancier/knuckle contact point if these were overlooked before. Notice that the jack center is not a part of this step. Although it definitely affects the way the action plays, the jack center is a performing part only during escapement and repetition, which are areas beyond where we can check with the gram weights. Likewise with the damper system.

A few words should be said concerning the auxiliary whippen springs found on some actions. I can not say that I like them. If they were so useful, more actions would have them, and the actions which do have them should have them on all 88 keys, which they do not! The idea here on why they exist is that the spring tension can be weakened or strengthened to help keep the downweight of the action uniform. In my opinion, this is just like adding or subtracting a small lead weight from the keys. The problem of each key not having the same downweight is caused by frictional changes. To try to correct unequal friction by adding or subtracting lead or by making a spring weaker or stronger is dead wrong.

In closing, when a customer still complains that the action is too heavy or too loose after performing step number 38, make sure that he/she is not used to a piano of a different size, type or make. Also check to see if the room acoustics have changed, or if the voicing needs to be different. I have even had complaints from older people that an action I thought to be a little light seemed to them to be too heavy. This I attributed to the age of the person, having weaker fingers! □

1982-1983 Membership Booster Club

MEMBERSHIP POINTS
Five (5) points will be credited for bringing in a new registered technician, four (4) for an apprentice, three (3) for an allied tradesman and one (1) for all other memberships.

PRESIDENT'S CLUB
Those who achieve 15 points will receive the President's Club ribbon. At the Awards Banquet each will be presented with the 1983 President's Club pin, and the member who had the most points will be announced and honored.

RESTORER'S CLUB
Those who bring in a former member will receive the Restorer's Club award ribbon in addition to the point credits.

BOOSTER CLUB
Everyone who brings in a new member will receive the Booster Club ribbon at the convention.

NOTE:
Your name and your own chapter should be shown IN PRINT on the candidate's application on the line "recommended by," for your guaranteed full point credit. (Sometimes credit cannot be applied because the sponsor's name cannot be deciphered).

CORRECTIONS
Should there be a need for correction on the Booster Club or other lists, please notify the Home Office promptly. We want you all to receive full credit at all times.

Booster Club	Pts.	Mbrs.
ALLEN, Jon	1	1
BANTA, Norman	5	1
BECK, Jacqueline	3	3
BITTINGER, Richard	6	2
BLANTON, Tom R	1	1
BOURDON, Donald W	1	1
BOYNTON, Richard B	1	1
BROWN, Glenn	1	1
CRABB, Larry	3	3
DENNIS, Robert R	4	1
FREIDIN, Irving	5	1
GARRETT, Joseph A	1	1
HALE, David	1	1
HALE, Robert	5	1
HARMON, Clayton	1	1
HOSTETLER, Robert	1	1
JORDAN, Wayne	1	1
LEARY, Janet	1	1
MASTAGNI, Angelo	3	1
MAYR, Vitus J	5	1
MEISSNER, Walter	1	1
MILLS, Fred	1	1
MOBERG, Jonathan	4	1
MOORE, Robert	1	1
PENNINGTON, David L	1	1
PHILLIPS, Webb	5	1
SANDERS, Charles	1	1
SILVA, E. Michael	4	1
SMITH, Sheldon P	3	1
SNYDER, Willis	5	1
STONE, Sidney O	1	1
THOMAS, H. Vince	4	2
THOMPSON, Treacey	1	1
VERHNJAK, Karl	6	2
WHALEY, Denzil	1	1
WILEY, John	5	5
WOLF, Bob	4	1

1982-83 Reclassifications

Registered Technicians

Knoxville Chapter
HEILIGER, Philip F.

Reading-Lancaster Chapter
BROWN, Ruth A.

Apprentice

Cleveland Chapter
NICKERSON, Patricia H.

New Members

Registered Technicians

Edmonton Chapter
MYKIWA, Daniel N.
12219 96th St.
Edmonton, AB T5G 1W2

SHARMAN, Leona P.
#103 11510-40 Ave.
Edmonton, AB T6J OR1

Reading-Lancaster Chapter
KOBLE, William M.
72 Orange St.
Northumberland, PA 17857

PECK, Shawn L.
351 North Charlotte St.
Pottstown, PA 19464

Syracuse Chapter
KNOWLTON, William D.
Brookview Drive
RD #2 Box 54
Hamilton, NY 13346

South Florida Chapter
MISHKIN, Robert L.
11980 NW 3rd Ave.
N. Miami, FL 33168

Allied Tradesman

El Paso Chapter
MORAWE, Robert B.
West Texas Pianos
11220 Rojas, Suite A-7
El Paso, TX 79935

Apprentice

Edmonton Chapter
PENDERGAST, William C.
15914 92nd Ave.
Edmonton, AB T5R 5O6

Long Island Suffolk Chapter
SERIGO, Robert R.
One East Drive
Woodbury, L.I., N.Y. 11797

Milwaukee Chapter
TERSKI, Chris G.
1002 HWY NN
Mukwona, WI 53149

Reno Chapter

DIEDERICHSEN, Ray P.
505 Lyyski Street
Sparks, NV 89431

San Francisco East Bay Chapter

BAILEY, Gary L.
1779 East Ave.
Hayward, CA 94541

South Florida Chapter

WETHINGTON, Patrick I.
3757 Shipping Ave.
C. Gables, FL 33134

Syracuse Chapter

SMITH, Arthur Nick W.
304 Elm Street
Fayetteville, NY 13066

Associate

Atlanta Chapter

AMBROSE, Kenneth
4729 Westhampton Dr.
Tucker, GA 30084

MARTIN, Myron G.
1283 Falling Water Court
Smyrna, GA 30080

Reading-Lancaster Chapter

CRABTREE, William D.
310 Eckman Road
Lancaster, PA 17603

Student

El Paso Chapter

McCULLOUGH, Kerry L.
11048 Sam Snead
El Paso, TX 79936

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CAROLILE, George G. Jr.
331 W. South St.
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3124 North 4th St.
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SMITH, Fred
739 S. Vineyard
Mesa, AZ 85202

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DUNSTAN, Donna L.
5105 NW 137th
Portland, OR 97229

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MILLS, William A.
1648 Cherry Ave.
San Jose, CA 95125

Texoma Chapter

PROBST, Dale E.
4447 Cunningham
Wichita Falls, TX 76308

Toronto Chapter

MASSE, Jessica A.
175 Shaughnessy Blvd., Apt. 502
Willowdale, ON M2J 1K1

Western North Carolina Chapter

TAYLOR, Hoyt L.
Rt. 4, Box 109 D
Waxhaw, NC 28173

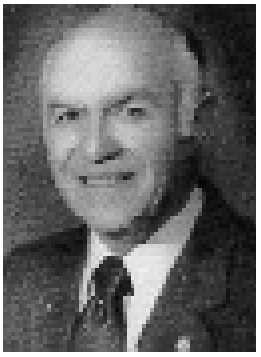
Member-At-Large

FRAILEY, Julia S.
711 Spraberry Drive
Midland, TX

Correction:
In the September, 1982 issue of the Piano Technicians Journal, Charles Gibson III is listed under "Reclassification To Apprentice". It should be listed as follows:

Reclassification to Registered Technician
West Michigan Chapter
Charles Gibson III

MEMBERSHIP IS EVERYBODY'S BUSINESS



Daniel A. Evans,
Western Regional Vice President

PIANO TECHNICIANS GUILD MEMBERSHIP BENEFITS EVERYONE

The Home Office has printed a list entitled, "Piano Technicians Guild Member Benefits." Some of the benefits mentioned are our group life insurance, accidental death insurance, tool and bailees' coverage, and health and dental options.

The Piano Technicians Journal is another supreme benefit. Tapes for the blind are included. Certain merchandise and business aids are offered to members.

The loan library is listed as a big plus. Films, tapes (reel and cassette), and books are available. These may be used as materials for meetings. Some can be purchased at a discount to members.

Membership printouts and mailing labels are included and available.

These are all fine adjuncts, but are really only a small part of the benefits of Piano Technicians Guild memberships. One of the greatest advantages is the association with topnotch colleagues. It is next to impossible to name another group of professional men and women who are so willing and anxious to share their knowledge and expertise to help others in their trade to improve their work — for the benefit of the entire industry.

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President's Message

Much of what I do as president of the Auxiliary relates to planning convention activities. By the time you read this I will have already flown to New Orleans to attend the planning meeting for the 1983 convention, and most of next summer's activities will have been scheduled already.

There is, however, another function of the president of the Auxiliary which is more comprehensive than planning activities at a convention. I feel I should represent and reflect the attitudes of the hundreds of people in this country who stand behind and beside piano technicians, encouraging their successes and supporting them when the pressures are overwhelming. In representing these encouragers and supporters I try to let people know we belong to the Auxiliary because we are interested in piano technicians, we share many of their goals, and we support their desires to be the best craftsmen in the marketplace.

I am proud to let people know there is an Auxiliary to the Piano Technicians Guild. The fact that there are several hundred people who care enough for piano technicians to belong to a piano technician's auxiliary is something to broadcast.

As we begin to emerge from the "me" generation people are realizing they need and enjoy each other's support. That support is expecially nice when it comes from your own home. Just as we hope our technicians will support each of us in our own endeavors, we are happy to show interest in them for having chosen to work with pianos.

Granted, the Auxiliary as it has evolved also spends time serving its own social and organizational needs. Nevertheless, we are initially drawn together through the technicians themselves, and we hope we never lose sight of our function as a support group.

Julie Berry

This month's column was contributed by Norma Lamb, the Auxiliary's Second Vice President. Norma offers some of her reflections on the Silver Anniversary convention just past:

My Impressions of the 1982 Washington, D.C. Convention — Silver Anniversary Piano Technicians Guild

First of all, I liked the slogan: "A CAPITOL VIEW IN '82". Incidentally, we (Lambs) belonged to this Organization a long time ago... before ever it was called Piano Technicians' Guild. It was then called A.S.P.T. and/or N.A.P.T. before the merger in 1957. We knew Willard Davis very well. He was one of those responsible for the merger. And we still visit our Auxiliary Life Member, his widow Edith Ann Davis, who still resides in Pasadena, California.

This Convention was, I feel, beautifully planned. It was so appropriate to have the setting in Washington D.C. — the place of the first Piano Technicians Guild Convention twenty-five years ago in July of 1958. Many of us still remember what our Auxiliary ladies wore. Ruth Pollard wore her piano skirt last year when she installed National Auxiliary Officers; Pauline Miller has worn hers on occasions, also. We are enjoying the beautiful Anniversary Books. Regrettable, we were unable to attend that memorable convention in 1958. We have know Ruth Pollard and others through the years. Happy to see Hannah Grover present, too.

I believe everyone in attendance enjoyed the fireworks on July 4th, our Nation's Birthday. It was rumored that the cost of this display was $27,000. Our spirit of patriotism was aroused as we watched this celebration... a memorable display out near the Washington Monument. We walked to the scene. How great that our Capital Hilton Hotel was so conveniently near to the White House and other important Washington scenes. However, it

was reported that the evening Bus Tour around the city and to the fireworks was not as anticipated.

The sight of the Marching Color-Bearers (Opening Session, Monday evening) was, in my humble opinion, so appropriate, fitting and thrilling! I must say that those who arranged for this convention did a great planning job. Everything for ladies, and things in conjunction with Piano Technicians Guild was conveniently located on the second floor, including our Hospitality Room.

I think I speak for all when I say that we liked the gifts and tokens we received in our Registration envelopes and at the special luncheon tables. The little "Silver" Anniversary coin purses are such lovely souvenirs. We purchased several more later and some other Guild items to bring back as gifts. I brought one little purse to Pauline Miller, L.A. Chapter, a former Auxiliary National President, who this year was unable to attend. I also brought an Anniversary Booklet to Pauline, who is our L.A. Chapter President, for the third time this year.

How glad we were to see old friends and to meet new members. It was just great to see new Auxiliary members, young ladies, joining in and really participating with genuine enthusiasm and earnestness.

Everyone was friendly, helpful and enjoyable. Of course we missed those who could not be present this time: The Preuitts, Stegemans, Norman Millers (from the L.A. Chapter) and many others.

Because we arrived on July Fourth in the late afternoon we had to miss the beautiful worship service on Sunday morning led by Sid Stone and Harry Berg.

Julie Berry and Sid Stone, National Presidents, did great jobs presiding, planning and coordinating. Others too... especially Ruth Ann Jordan, Convention Hostess, from the Washington D.C. Chapter.

Because this was our very first visit to our Capitol City and there was so much to see in so short a time, I urged my husband, Mr. Lamb, to take the all-day Auxiliary Bus Tour with the ladies on Tuesday. This tour, I felt, was nicely planned and well managed. It afforded a panoramic view of the city and the important statues, Federal Buildings and places of special interest: The Washington and Jefferson Memorials, the Lincoln Memorial, the White House, the Nation's Capitol, The Smithsonian Institute. Glad to note the much-needed tight security at the White House. Though on this trip they did rush us past the different White House rooms, we had other special tickets for another day. Because this was our busiest day for Auxiliary (Wednesday the 7th) I couldn't take advantage of these opportunities, but Mr. Lamb could and did. He brought back some interesting stories, bits of information and comments. We were able to take many pictures of those we see once a year. This bus tour was well-handled and I felt the girls in charge there (Julie, Ginny and Belva and others) were most courteous and generous to all.

We all enjoyed the classical music, expecially at the banquest on Wednesday evening. We loved the Grand Piano Cake at the President's Tea. Ron Berry, Julie's husband, sang some lovely ballads, and gave a word of history about each song. It was then and there that the Keynotes made their Debut, a national appearance at our Installation. Belva was the Director and Ginny played. Very, very fine. The Barbershoppers at the closing luncheon were a source of enjoyment for all, and we understand that they will be an annual affair. We hope to see them again, and also the Keynotes. Sarah Lampiasi certainly did herself proud at the Auxiliary Installation service... very original and beautiful.

We were all glad Sarah won the money prize. Francis Mehaffey (California) was awarded the Golden Hammer, Bea Drago won the Afghan.

Bert Sierota's Needlepoint Banner with the Auxiliary Emblem vividly portrayed was beautiful, and wonderful.

Sylvia Symington (the charming wife of Senator Symington) related interesting and exciting experiences in the White House. At the Smithsonian on Friday afternoon, we listened to a lecture on the gorgeous antique pianos displayed there.

We did enjoy our Anniversary Convention very much due to great and careful planning, even though the July weather was very hot in Washington D.C. There was much careful planning in evidence, the city was beautiful and memorable, the music was superb, and all the entertainment was good.

We certainly did get a CAPITOL VIEW in '82!

Thank You
Norma Lamb

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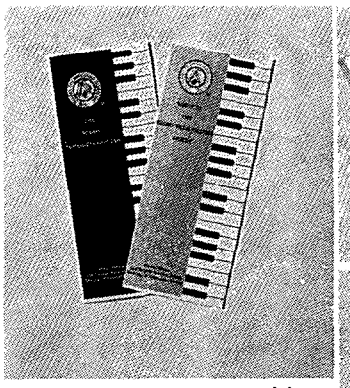

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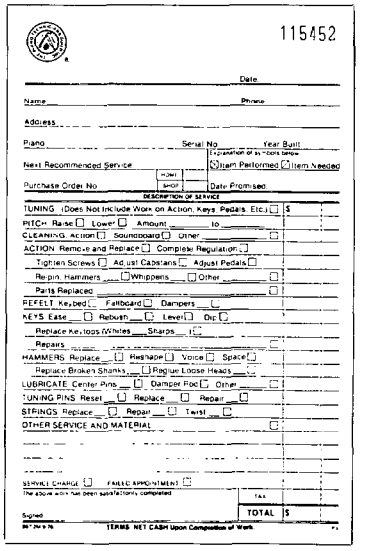
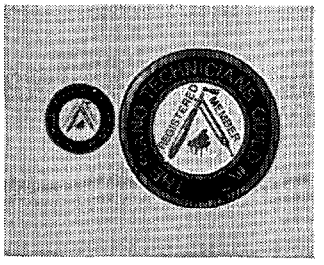


Billing Pads



Logo Stickers

Metal Cuts — Rubber Stamps

All items below are available free from the Home Office.					
Lending Library List					
List of Manufacturers & Suppliers					
Magic Kingdom Club Application					
Members Benefit List					
Reader's Digest Reprint: "The Other Masters of the Keyboard" — limit 10 per order					
"The Piano Tuner - Technician"					
What is The Piano Technicians Guild?					

PAGE ONE TOTAL _____

PAGE TWO TOTAL _____

SUBTOTAL _____

Washington State residents only add 6.5% sales tax
TAX

ADD SHIPPING AND HANDLING
***Actual shipping and handling charges will be billed on orders from Canada and overseas.*

If Order totals:	Below $5.00	$5 to $9.99	$10 to $14.99	$15 to $24.99	$25 or more
Add:	$2.00	$2.50	$3.00	$3.50	$4.00

Enclose check or money order for this amount
U.S. FUNDS TOTAL

Registered Technician YES☐ NO☐

Name _____

Address _____

City/State or Province _____

Zip/Postal Code _____ Phone _____

Chapter _____ Non-member _____

Member's Number _____

Mail to: PIANO TECHNICIANS GUILD
1515 DEXTER NORTH
SEATTLE, WA 98109

PLEASE FEEL FREE TO PHOTOCOPY THIS ORDER FORM

OVER

SALES ORDER FORM

BUSINESS AIDS

★ For use by Registered Technicians ONLY

	Quantity Ordered	Total Price
★ **Logo Emblem Patches** — colorful 3″ sew-on patches, all are priced the same: 1/$1.75 —3/$3 — 6/$4.50. Indicate colors: blue/white, blue/gold, black/gold		
★ **Pocket Protectors** — white vinyl with blue logo — 3/$1.25 — 6/$2		
★ **Bumper Stickers** — yellow/blue/white — $1 each.		
★ **Deluxe Portfolio/Briefcase** — 11″x14″ with clip board, dark brown — 1/$10.00		
★ **Meeting & Sales Portfolio** — 16″x12″ — Navy — $1.75		
★ **PTG Notebooks** — 9″x5½″ — 1/$ 2.50		

JEWELRY and MISCELLANEOUS

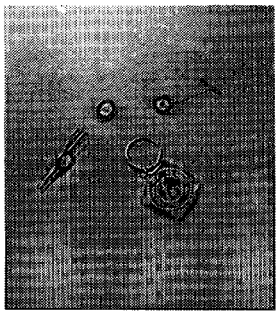
★ **Membership Pin** — lapel-type, gold with blue and white logo — 1/$4		
★ **Tie Clasp** — bar type, gold with blue and white logo — 1/$3 — 3/$6 — 12/$18		
★ **Tie Tack** — gold with blue and white logo — 1/$3 — 3/$6 — 12/$18		
Coffee Mugs — white pedestal/blue logo 1/$4 — 2/$7.50 — 4/$12 — 6/$16.50.		
Dash Cash — emergency coin dispenser, white with blue logo — $1.00 each		
Key Ring — heavy plastic with laminated blue/gold — 1/$2.00		
Ballpoint Pens — gold, writes blue & red — 1/$3.50 — 2/$6		
Flashlight Pens — gold, comes with battery — 1/$4.50 — 2/$8		

PUBLICATIONS

Index of Journal Articles — 1/$25.00		
Piano Action Handbook — by Merle Mason — $2.50 each		
★ **Tape Measure** — 6′ metal — 1/$3.00		
JOURNAL Binders — $6.50 Brown - fits 9″ x 12″ Blue - fits 9¼″ x 12¾″		
★ **Chapter Publicity Manual** — $5 each		

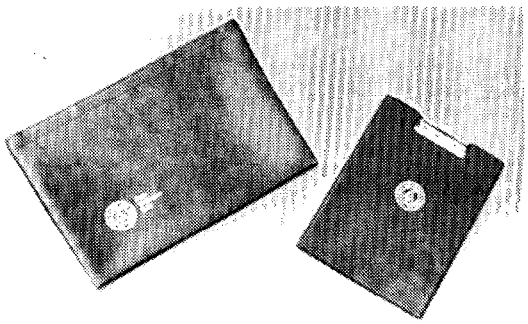
PAGE 2 TOTAL AMOUNT DUE _____

TRANSFER TOTAL AMOUNT DUE ON PAGE 2 TO FRONT PAGE.

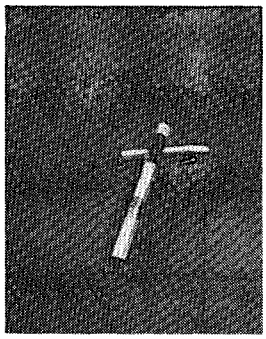


JEWELRY

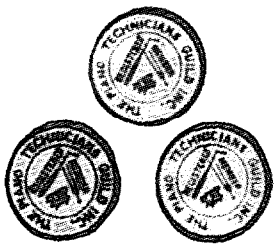
Bumper Stickers



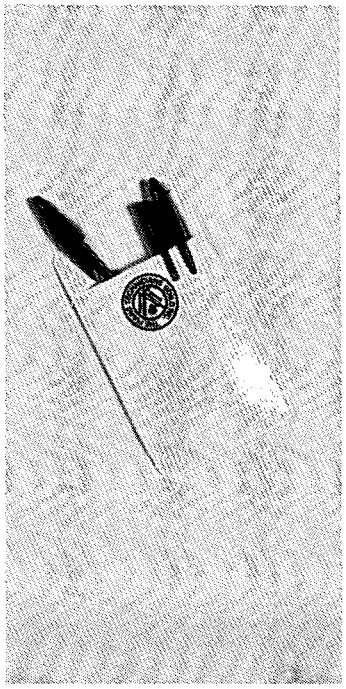
Deluxe Portfolio/Briefcase



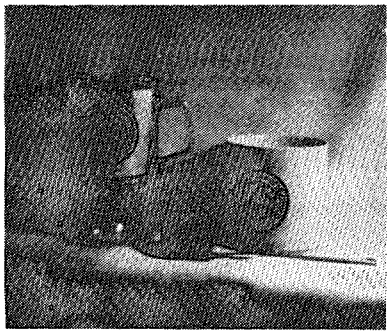
Flashlight Pen



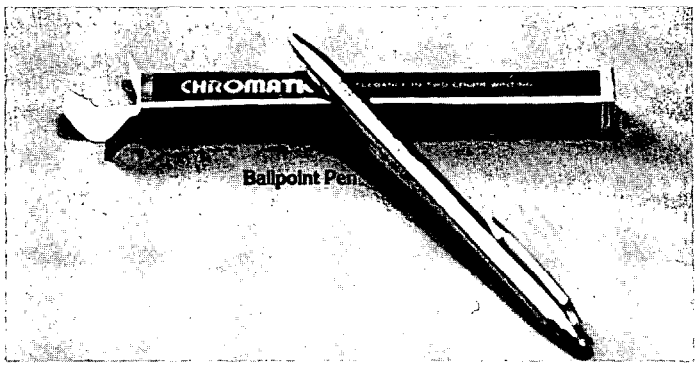
Logo Emblem Patches



Pocket Protectors



Coffee Mugs

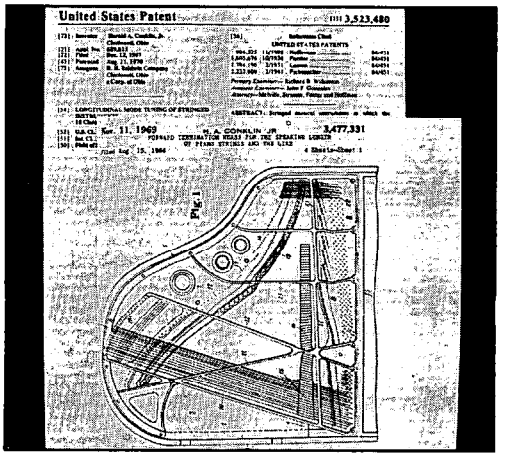


The Baldwin Piano...
You can see why it sounds better

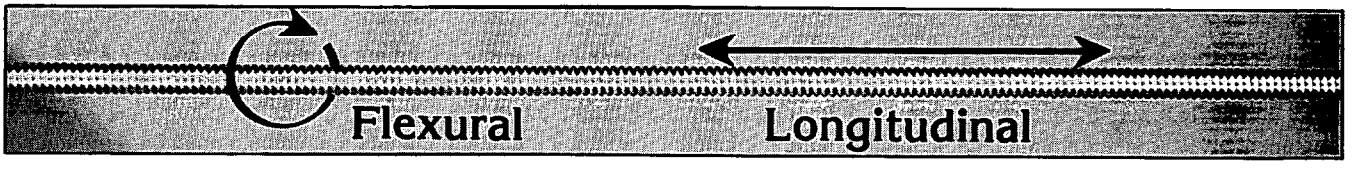
Exceptionally rich, clear tone with note-to-note consistency is a characteristic of the bass of a Baldwin piano. Our exclusive SynchroTone™ Strings are one of the main reasons why.

When a string is set in motion, two distinct groups of tone components are produced. The predominant group involves the flexural mode, which has always been the basis for stringed instrument design. The longitudinal mode is less audible but still present in every vibrating string.

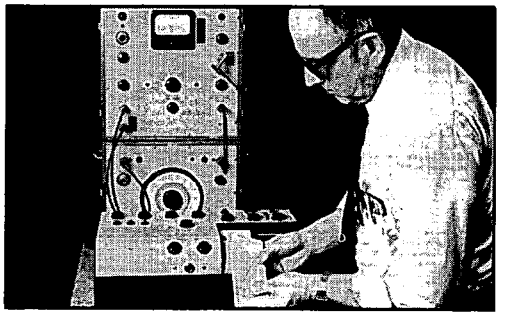
Several years ago, our research staff, seeking a way to improve the traditional string, invented a way to tune the longitudinal mode in addition to the flexural mode of the string. By isolating and "pre-tuning" this mode (usually 4000 to 5200 cents above the fundamental frequency of the flexural mode), Baldwin has devised the SynchroTone String principle — a significant breakthrough in scale design (U.S. Pat. No. 3,523,480).



To take full advantage of this SynchroTone principle, we even invented a precision string winding machine, so different from the ordinary winding machines that it, too, is patented (U.S. Pat. No. 4,055,038).



Precision SynchroTone Strings were first introduced in Baldwin grand pianos. Similar SynchroTone Strings are now found in every Baldwin piano built. This is just one more example of how we build incomparable tone quality and consistency into every Baldwin piano... from the concert grand to the smallest vertical.



Fourth in a series of informative ads on piano tone published by Baldwin Piano & Organ Company exclusively for the benefit of piano technicians.

Baldwin® - *Leading the way through research*

BALDWIN SPECIAL SERVICE—You may order Baldwin replacement parts at any time our office is closed—nights, weekends, and holidays—by dialing direct (513) 852-7913. Your verbal order will be recorded on our automatic answering service and processed the next working day.

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

Piano Technicians Journal
UPDATE
November 1982

1983 GUILD DUES

1983 Guild dues remain the same as for 1982 dues. Billings for 1983 dues will be sent end of November. Students' dues are due on the anniversary date of entry into the Guild.

DUES

Registered Technicians, Apprentices, and Allied Tradesmen	$114.00
Associate Members and Affiliate Members	$ 57.00
Chapter Sustaining Members and Chapter Dues Waivers	$ 38.00
Membership Insurance Pledged to the Guild	$ 57.00

REMEMBER: Annual dues must be paid in one sum as the partial payment method was cancelled by the delegates in council session in 1981.

Please pay the full amount shown on your annual billing.

CHAPTER DUES If your chapter has requested the Home Office to collect your chapter dues the amount of the chapter dues will be clearly indicated on your annual Guild Dues Billing. Please pay the total shown as the chapter dues are automatically credited first on receipt of payment.

NOTE: Do not send chapter dues *unless* your chapter has already signed the official collection notice.

PTG Calendar

NOVEMBER 15	Send agenda items for next PTG Board meeting through your RVP.
NOVEMBER 15	Final date for December Journal copy.
DECEMBER 1	Deadline for Home Office receipt of committee reports for typing.
DECEMBER 1	Last date for Home Office receipt of Board agenda items.
DECEMBER 15	Final date for January Journal copy.
DECEMBER 31	Closing date for Hall of Fame nominations to Dick Bittinger, Committee Chairman.
NOVEMBER 15	Last date to mail Sustaining Membership Applications to the Home Office for presentation to the Piano Technicians Guild Board.

CHAPTER NOTES

The August program at the meeting of the **Southwest Florida Chapter** featured Ed Wood and his latest creation — The Ed Wood Key Leveler, Model No. 1. This version of the leveler has a straightedge, supported by the keyblocks and easily adjusted and locked to the desired height. Next, a spring-loaded square tube is adjusted between the sides of the piano so that it sits just above the key buttons. The tube is locked securely in place and a dial indicator slides along the tube so it can be placed directly over each key button. Each note in turn can then be raised to the straightedge and as the dial indicator is slid along each key a reading is easily taken. The proper rail punching is set on each balance rail pin as the technician moves along.

Ed put the key leveler in place and demonstrated its use in about fifteen minutes and we all felt that we understood the intent and use of this simple device. A reading of one thousandth was easy to see with very little strain so that one could move along rapidly.

In the question period that followed, it became obvious that Ed had thought out each detail carefully and optimized the design for the least cost. Our chapter is most fortunate to have Ed Wood to inspire and instruct our members. This presentation was excellent and those interested in the Ed Wood Key Leveler can contact Ed who will make them available on a first-come basis. **John Lynch, Secretary**

The **Suffolk, New York Chapter** is grooming four new prospective members in preparation for the tuning exams and upgrading of positions. The Technical was presented by Joel Englesberg on the Steinway sustenudo. Some of us have had very little experience with repairing and regulating sustenudo problems. We thank Joel for his expertise! **Sam Schorr**

At the **Los Angeles Chapter's** August meeting, our new president, Elvah Brown presided over an evening of great value to every technician present. An inspirational message concerning the top bass bridge was given by Ernie Dege. If it is loose, reglue with #10 flat head screws at lease one inch long. Drive bridge pins into pin block to help hold the bridge. One may also not use the top tuning pin and thus reduce the angle from bridge pin to tuning pin, then drill a new hole for string #1 tuning pin. By reducing the string angle it reduces the side pressure on the bridge. It was noted that no one should try tuning a piano if a ceiling fan is turning in the same room because it causes a beat or Doppler Effect in every note. Other slow fans might cause the same effect.

Our Technical Session was given by Randy Woltz of the Orange Chapter on the subject of Bridge Making or Repairing. Space does not permit details here, but see the August 1982 Journal pages 22-27. After his demonstration, Randy showed the excellent movie, *Bridge Rebuilding* by Ernie Juhn and Bob Hartz. This film was absolutely TOPS on this subject, ALL chapters should use it.

The **Atlanta Chapter** wound up the year with a bang, what with the NAMM Convention, the monthly meeting at the new Baldwin Family Music Center and the Piano Technical Institute at Emory all taking place within a 10-day period in June.

It was most enjoyable to spend some time with Bob Russell, past National President and Marshall Hawkins, Regional Vice-President of the PTG as they tended the Guild booth at the NAMM Convention. Not only did they promote some interest in PTG at the National level, but also they were able to do considerable public relations work with some of the manufacturers. Everyone was most favorably impressed with the new Baldwin Family Music Center. In addition to the usual sales and service facilities, they offer a good sized concert hall complete with sound system and audio visual equipment. We were given a thorough "from the ground up" presentation by Mr. Bob Cutshall, Engineer with the factory in Cincinnati on how the Baldwin Grands are manufactured. There were over thirty people in attendance, including Ted Schneider representing the Washington, D.C. Chapter. Of course, the presence of Bob Russell and Marshall Hawkins helped bring out the crowd. The Piano Technical Institute at Emory University attracted approximately 80 technicians from the Southeast Region. This was the second annual institute, headed by Marion Robinson as part of the Emory University Summer Continuing Education Program. The instructors were of excellent quality and broad appeal.

The National Piano Technicians Guild Convention in Washington, D.C., was attended by Larry Crabb, Alton Greenway and Charlie Pritchett. Larry Crabb's recount of the convention was glowing. I'm sure he got more out of it than the thrill of conducting his "Barbershop Workshop," but you wouldn't know it to hear him tell it.

During September the Technical Session was presented by Philip Bashaw of the **Orange County Chapter.** His subject was Business Building. He gave a tremendous talk under six headings: 1. Salesmanship — We must be excited about our business. The phone is our best tool. We choose our customers from our clientele and a few others choose us. Be positive on the phone and listen to our customers. 2. Motivation — Emphasize whatever turns you on best. Set approachable goals each year and break them down into shorter periods. 3. Ways of Getting Clients — a. Door to door solicitation. b. Referrals. c. Telephone people within your area. d. Advertise in newspapers, yellow pages, circulars, musical programs, church directories, club directories, etc. e. Distribute business cards. f. Join music clubs — the referrals are great from choirs, orchestras and music associations. 4. In The Home — Dress *neatly.* Be on time within 5 minutes. If raining, bring slippers and leave shoes at the door. Carry a good looking tool kit. Be cheerful and clean. Never smoke in the home. Use the best possible language always. Compliment something. Be honest. Tell about charges *ahead* of time. Do a quick free cleaning. Don't charge for little things. Tighten the bench legs and adjust pedals. Set the next date. 5. When Telephoning — look in a mirror to keep a smile on your face as the phone transmits the smile. Talk to the decision-maker. Don't cut prices for shoppers. 6. Set up a good bookkeeping system listing income and expenses. List customers by alphabet or by the month. The car is your biggest expense. **Harry Berg**

The August picnic meeting of the **Connecticut Chapter** was a fun time! About 60 members and guests attended the gathering at Wally and Vivian Brooks' place. Scotty Welton showed slides he had taken at the National Convention in Washington, D.C. (some of them looked like blackmail material to me!). The brief business meeting covered finalized plans for the October 23, One Day Seminar featuring Norman Neblett. It was noted that the August issue of the **Atlantic Monthly** magazine has a very readable article following the building of a Steinway "D" concert grand piano. If you find that this is no longer available at the newsstands, check your local library.

September Chapter Mailing

The September mailing to each chapter president contained important papers of interest to every member:

1. A full computer printout showing name and address of each member and another printout giving the names of the chapter officers.
   PLEASE CHECK THE PRINTOUT COPIES and make any corrections onto the printout.
   RETURN the printouts to the home office as quickly as possible.

   The home office needs the returned printouts for checking the officer and member records.
   PLEASE ACT NOW — AND MANY THANKS.
2. The newest Sales Order Form.
3. A second copy of the pink form for chapters to use in requesting the home office to collect chapter dues.
4. Updated Steve Jellen Memorial Library list of available films, videotapes and slides.
5. Current list of 1982-83 Piano Technicians Guild committees.
6. List of dropped, delinquent and transferred members sent to appropriate chapters.

NEWS FROM YOUR HOME OFFICE

New For Chapter Programs!

27 color slide show with sound describing how members can improve business techniques through use of Piano Technicians Guild business aids.

By Vice President Charlie Huether and Charles Willis of the New Jersey Chapter.

* * *

THE PIANO — a new 16mm film made in Canada and featuring some of our well known members.

* * *

Order these early to be sure of a copy for your next chapter meeting.

* * *

And For Members . . .

"YOUR PIANO AND YOUR PIANO TECHNICIAN"

A new book by Virgil Smith RTT. Written for piano owners and teachers the book explains "what to ask for and how to secure the piano service necessary to keep the instrument functioning at full potential year after year.

The Piano Technicians Foundation

A most generous donation has been received in memory of PERCY SPROULE, from his relatives in Canada.

Mrs. M. Whitehouse Mrs. F.A. Wilson Mrs. G.E. Rouatt Mrs. N.G. Wilson Mr. Keith Sproule Mr. Merle Sproule	Saskatoon, SK
Miss Madalene Cutler Mrs. Mabel Quinn	Vancouver, B.C.
Mrs. R.D. Nelson	Red Deer, AB
Mrs. Moira Vine	Burns Lake, B.C.

Registered Technician Certificates

The engraved certificates for new Registered Technicians and those reclassified have been mailed covering the period from Spring through Summer of 1982.

The next issue will be made in December.

1983 Hall of Fame Award

Chapters are invited to submit names and resumes, of nominees for the 1983 Hall of Fame Award. You must fill out the form sent to each President in the Chapter Mailing. Please include as complete a resume of your nominee as possible, such as: birthdate, when entered the piano trade, joined the Guild (and/or parent organization(s)). To be eligible for the Hall of Fame, a member must have demonstrated:

1. Long-term dedication to the causes, ideals, and purposes of the Piano Technicians Guild.
2. Outstanding personal and professional integrity to the point of being an inspiration to others.
3. Outstanding contributor and implementor of ideas, programs, etc., resulting in a definite improvement and upgrading of the piano industry as a whole.

If photo of a nominee can be made available for the Hall of Fame Record Book, please send with the resume.

Nomination and resume must be sent to: Dick Bittinger, Chairman, no later than December 31, 1982.

ADDITION . . .

In the Committees — 1982-1983 list in the October 1982 Update, please add the following name under CHAPTER ACHIEVEMENT AND MANAGEMENT:

Dale Heikkinen
1514 Wayne
Ann Arbor, MI 48104
(313) 665-0583

MOVING? CHANGING YOUR ADDRESS?

Be sure of your regular Journal delivery by asking the Post Office to forward your **Journal** to your new address. **Journals** that cannot be delivered because the addressee has moved are not returned to us. We are sent a notice only and must pay 25¢ for each non-delivery notice.

To mail a duplicate copy means double **Journal** costs plus around 60¢ remailing charges plus office overhead. The Home Office has done this whenever possible but we are finding that it is becoming more difficult to do so now that we no longer have so large an overrun of the Journal printing each month.

BECAUSE WE WANT TO BE SURE YOU RECEIVE YOUR REGULAR JOURNAL EACH MONTH!

1. Please ask the Post Office to forward your **Journal** to you when you move. You must guarantee payment of excess delivery charge to the Post Office.
2. Please notify the Home Office as soon as possible, 5-6 weeks before you change your address.
3. Should you not receive a **Journal,** please advise us immediately. On such prompt notification we can usually send a duplicate. When notified after any delay, we are not able to promise a duplicate **Journal.**

The Board of Directors has adopted a new policy:

"The Home Office is to charge a postage and handling fee for mailing duplicate **Journal** issues to replace missing issues due to a change of address."

Do You Know How To Handle Reclassification & Upgrades?

Do not complete a *new member application* form for a reclassification or upgrade of an *existing member.*

There is a special RECLASSIFICATION FORM.

If your chapter does not have this form request a supply from the Home Office.

Student Dues Are $60.00

Yes, student dues are $60.00 total payable to the Home Office for one full year of annual Guild dues. The chapter may assess chapter dues or fees in addition up to $20 dollars additional.

Piano Technicians Guild Booster Pointers

We want to add YOUR NAME to the list of Booster Club Members in the Journal each month. But sometimes we are disappointed! Why?

If you write your name on the application form as the one who recommended the new member and we cannot read your signature, then your name is missing and you lose the booster points.

PLEASE PRINT YOUR NAME as well as signing the form if you wish to receive the important booster and president's club points.

Unless the name is printed we cannot promise that you will receive recognition. Thank you for helping us to help you.

New Design Application Forms

A new design for application forms is to be printed. In the meantime, please be sure to complete the grey area at top right of the current application form to show:

1. Classification approved by chapter.
2. Signature of chapter officer showing chapter approval and acceptance of the new member.

The Home Office MUST have this information on all new members.

CHAPTER EXAMINATIONS FOR APPRENTICES

New members can join the Guild at the Apprentice level without taking the new tuning test.

The chapter can give the usual written and bench tests and also the regular chapter tuning test. If the applicant passes these chapter tests at 50% or better the chapter can accept the new member as an apprentice and send the application form and entry fee to the Home Office.

A student may be reclassified to Apprentice by taking the same chapter examinations and passing at 50% or more.

Only those who wish to be classified as registered technicians are required to pass the new tuning test. This test is only given at an approved tuning test site under the direction of a certified tuning examiner.