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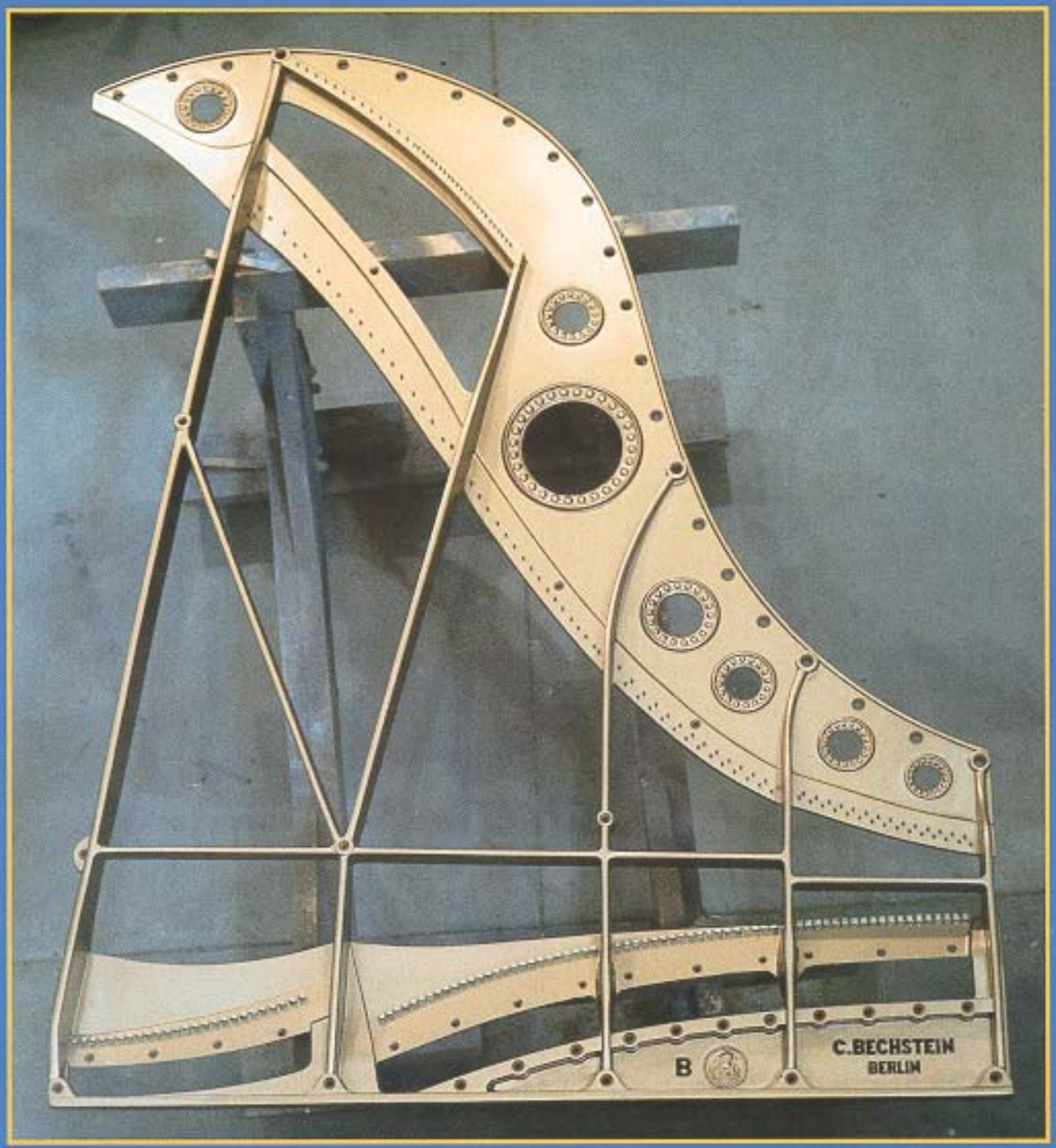

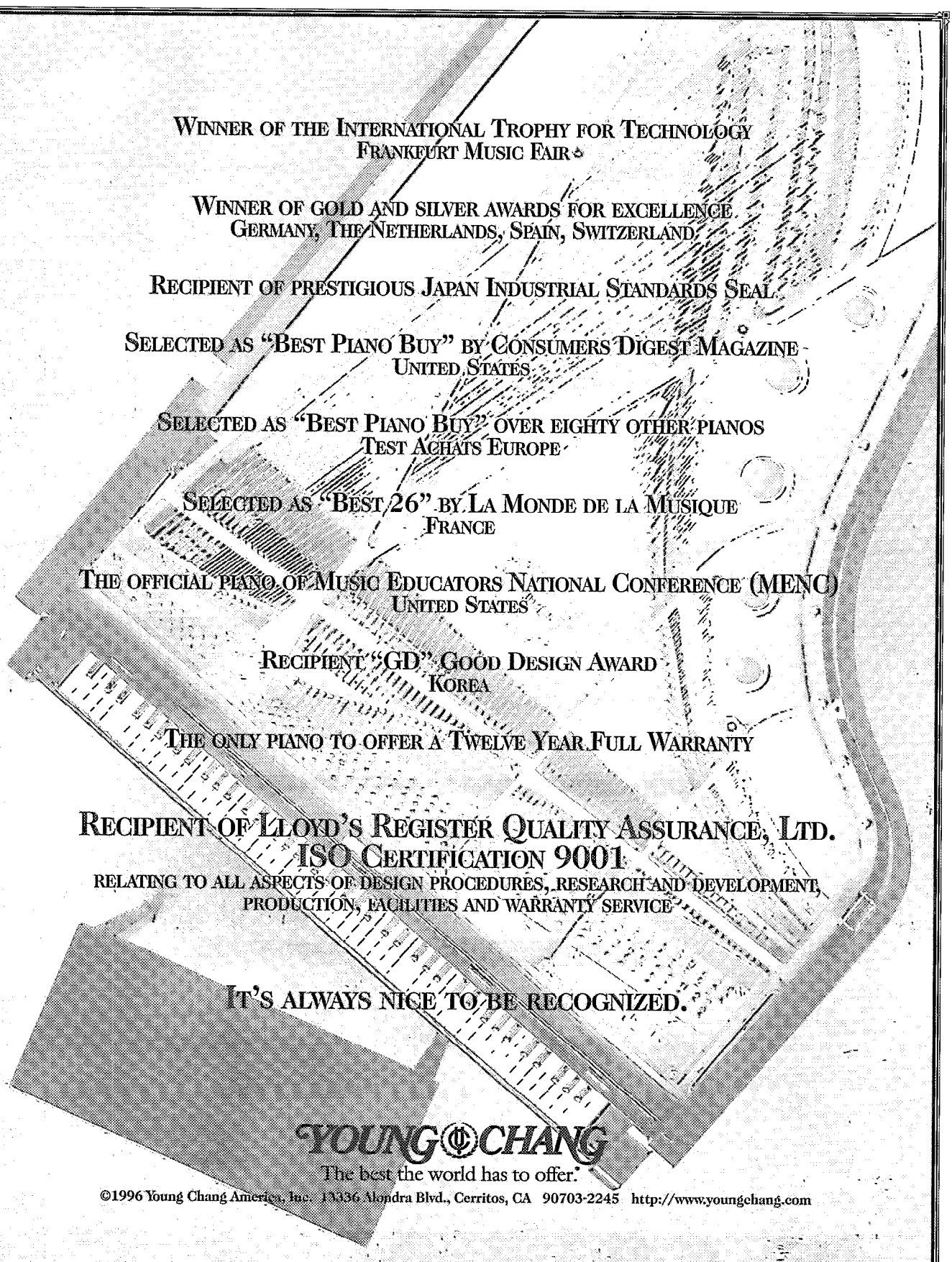

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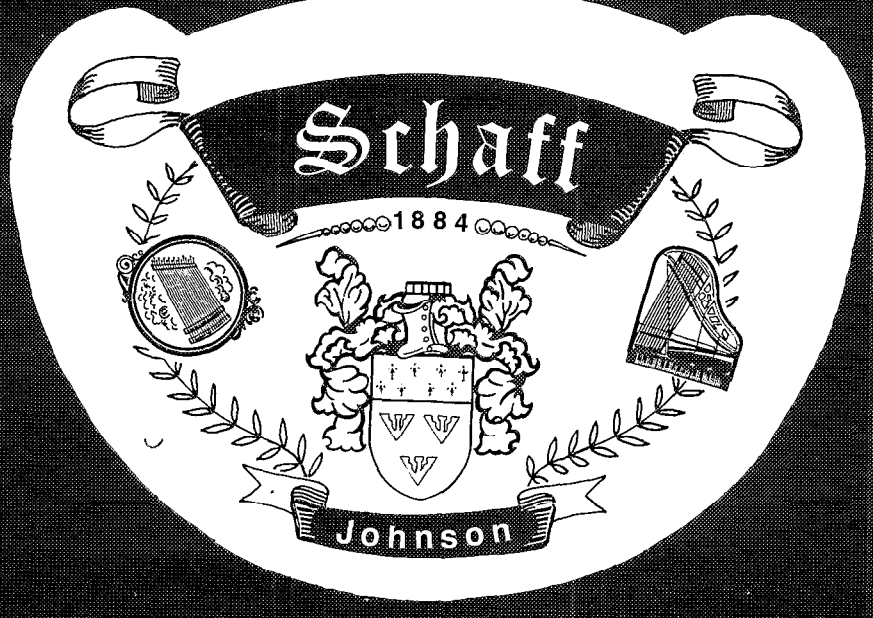

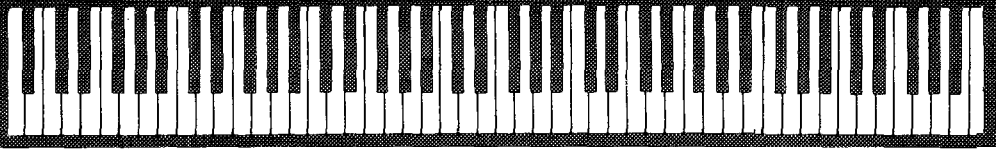

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PIANO TECHNICIANS
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Editorial Perspective

So, Ya Wanna Be a Writer

Steve Brady, RPT
***Journal* Editor**

Many aspiring writers stop me at conventions or call me at home to inquire about writing articles for the *Journal*. I'm more than happy to talk to them because — let's face it — the *Journal* depends on writers, and, like all editors, I'm always looking for new talent. Often, these individuals assume that there's no way they could ever write something that would be selected for publication, but in most cases that assumption is wrong. If you have a story to tell, there's a good chance we can find a way to put it in print. I'd like to address how to write your *Journal* article and how to prepare it for publication.

First, get organized. That means you need to get a clear idea of the main point of your story or article. If my topic were rebushing keys, I might put down my main point as being that, when finished, the keys need to look great and function well. I could further define this statement by giving criteria for appearance (cloth cut flush to the key buttons and front rail bushings glued neatly over), and function (bushings not too deep in mortises, a small but perceptible amount of side play in each key). I could then build the article out from these points, i.e., how do I arrive at these results, what steps are required? In how-to articles, the organization is really straightforward — just a chronological description of the process. In any article, a few minutes spent creating a logical outline will make the actual writing much easier.

Second, write the article. Flesh out the outline with actual sentences. Give examples to illustrate points which may otherwise seem dry and abstract. For instance, if I were describing an idea like weighing-off a key, sure, I would include the simple formula used to separate friction resistance from weight resistance, but I might also try to create an analogy with a teeter-totter. Analogies, examples and anecdotes can all make your writing more interesting to read.

Third, prepare the article for submission and publication. Your chances for publication in the *Journal* — or any other publication — will increase substantially if you make your final copy as neat and error-free as possible. Have friends and family members read it and give their input. If you are writing on a word processor, use the spell checker! Of course, all magazines nowadays prefer submissions to arrive in electronic form — either on a disk or by e-mail. But if you are submitting typewritten copy, be sure to put your name at the top of each page, and number the pages. The reason for these precautions is that someone will have to retype your article, and the pages, even if you staple them together, will be disassembled for the typing process. Finally, handwritten submissions are likely to sink to the bottom of any editor's pile because of the difficulty of even reading, let alone retyping them.

Finally, how do we illustrate articles? Many authors take their own photos. Just about any photo can be reproduced in the *Journal* as long as the focus is good and the contrast is reasonable. Color snapshots work just fine, as do black & white photos and slides. Many authors also do their own drawings using computer-assisted drawing programs. Some articles require no illustrations, and other authors don't feel comfortable with drawing pictures or taking photos. For these folks, we have a fall-back option in our *Journal* illustrator. If you would like to have a drawing appear in your article, but don't have the wherewithal to do the final drawing yourself, send a thumbnail sketch and a description, and we can probably have a good drawing made.

I hope these brief suggestions will help all would-be *Journal* writers to take the plunge and become published authors.

FEATURES

COVER ART

This portrait of a Bechstein plate was taken by RPT Bob Hohf. See his article on Page 18.

COLUMNS & COMMENTS

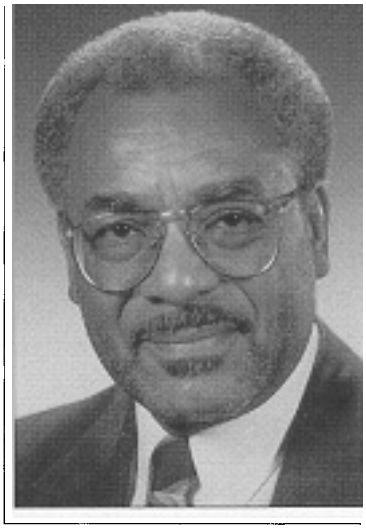
DEPARTMENTS

IN ADDITION

PIANO TECHNICIANS **Journal**

Volume 39 • Number 12 • December 1996

Holiday Wishes



PTG President
Marshall B. Hawkins, RPT

Each year as Thanksgiving passes it seems as if all thoughts begin to focus on the next holiday season. As a matter of fact, even prior to Thanksgiving some stores' wares are already displayed so they can get the jump on the competition. When the season gets into full swing, there is no place on earth that misses the point. The "mother" of holiday seasons has arrived!

For those not at home, thoughts automatically turn to home. All types of arrangements are made in order to be with family and friends. The transportation industry works extra hard to accommodate all of the many travelers. Likewise, the many companies involved with delivering all those special packages and mail are never as busy as they are around this time of the year.

Schools prepare plays, musical organizations prepare concerts, choirs are involved in special programs, and everyone gets caught up in the pace of excitement no matter what it is they do. *People even have their pianos tuned for the season who would otherwise not think of it.*

This scenario could be drawn out a long, long way and still something would probably not get mentioned. With all of this activity, however, I believe that most of the focus is not on oneself. The emphasis seems to be for the most part on others. And further, rarely is the focus negative (other than Scrooge, that is).

We just do not hear folks saying "I hope you have a *bad* season" ... instead we hear and see such comments as "we wish you every happiness this holiday season and throughout the coming year!" Sometimes we are greeted with a cheery "Happy Holidays" or "Seasons Greetings." Others take the time out of their busy schedules to send a pretty card with the message "May your days be merry and bright" or expressing the hope that we all let Christmas come into our world and bring us all together in joy at this special time of the year.

For the editors, writers, staff, board of directors and myself, allow me to send to our readership the warmest thoughts and best wishes for a wonderful holiday. I would implore each of us to make it a point to carry the peace and harmony of this season with us in all our endeavors throughout the coming year.

The 2nd GPA
Dublin International
Piano Competition
Dublin, Ireland
All Six Prize Winners selected Kawai.

The 42nd ARD International
Music Competition
Munich, Germany
First Prize Winner selected Kawai.

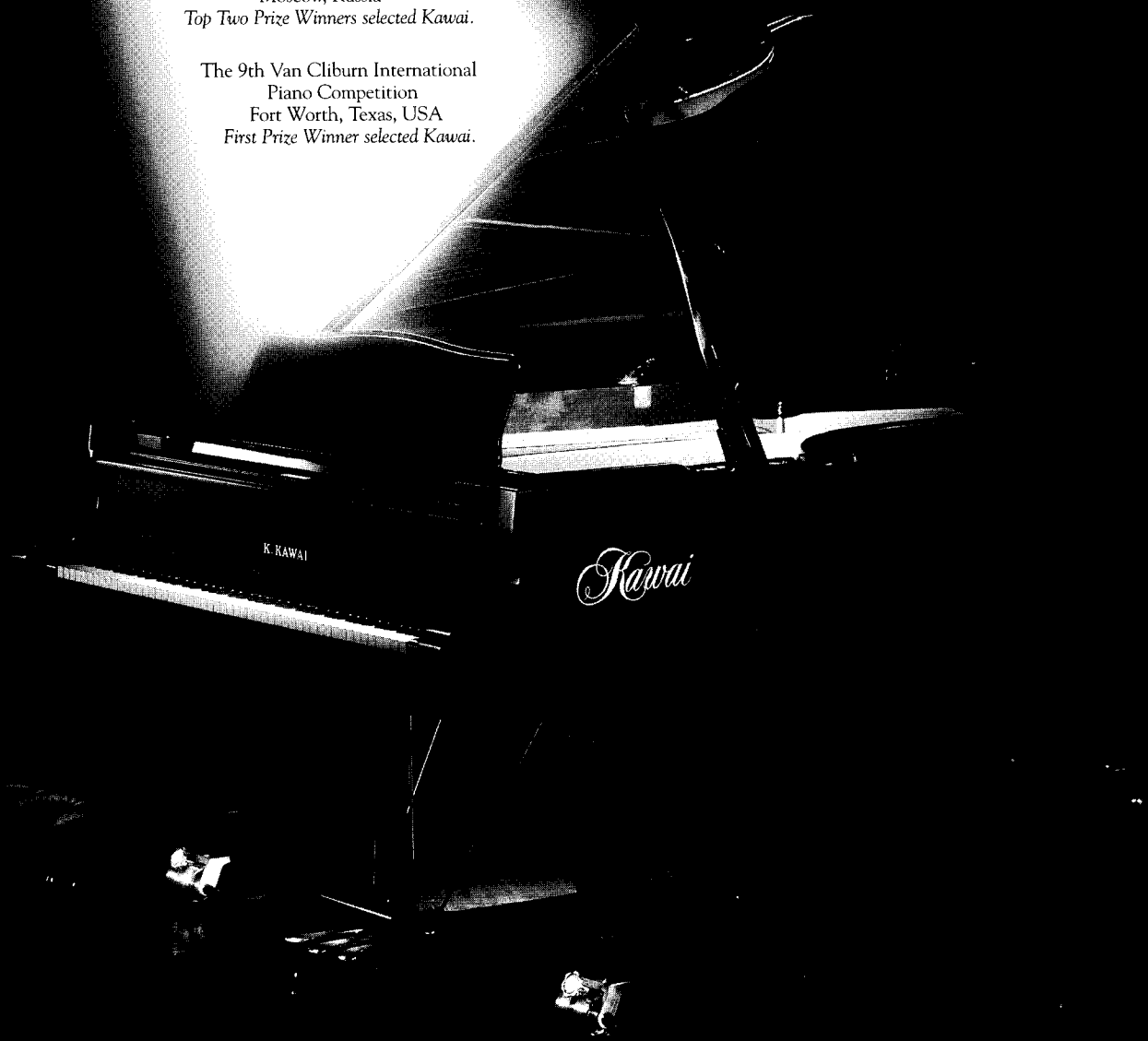
The 45th Ferruccio Busoni
International Piano Competition
Bolzano, Italy
First Prize Winner selected Kawai.

The 11th Santander
International Piano Competition
Santander, Spain
First Prize Winner selected Kawai.

The 2nd Hamamatsu
International Piano Competition
Hamamatsu, Japan
First Prize Winner selected Kawai.

The 10th International
Tchaikovsky Competition
Moscow, Russia
Top Two Prize Winners selected Kawai.

The 9th Van Cliburn International
Piano Competition
Fort Worth, Texas, USA
First Prize Winner selected Kawai.



It's becoming a familiar refrain.

TT&T Repair for Broken, Oversized Agraffe

For all of the years I have been rebuilding pianos I had not (until recently) come across the following problem. In our general procedure of agraffe cleaning, preparation and reinstalling, I found the need to replace two agraffes where the heads were pulling away from the stems. While this is a rather common occurrence caused by over tightening and metal fatigue, etc., the real challenge came with the discovery that the threaded stem part of the agraffe was a 9/32" size. As we know, replacement agraffes come in both 7/32" and 1/4" sizes. Since the piano with these oversized agraffes was a Mason & Hamlin grand made in the early 1950s, the chances are that there will be a good number of these instruments still used and tuned regularly. I would be interested in knowing if anyone else has had a similar problem and how they solved it.

I made the repairs by turning the threaded stem portion back into the plate, but doing so upside down so that I would have a clean, perfectly flat surface to work with. I then applied "Loctite®" thread locker. After 24 hours, I redrilled to the proper-sized hole and tapped for the American thread 7/32" agraffe. I found equipping the drill with the plumb and leveling bubble to be a great aid, but had to be sure to check the plate level and the agraffe angle before drilling.

To aid the turning of the stem into the plate, I ground the broken portion level and cut a small slot into it so that I could use a small but short screwdriver. The thread locker solution permeated well throughout (does not loosen from heat). With the use of a fine set punch to mark the position for the new hole, I was able to drill at the precise location for the new agraffe. Tapping was the next step, and then setting the new agraffe. The counterbore I purchased at the Dearborn convention made accurate setting of the agraffe an easy job.

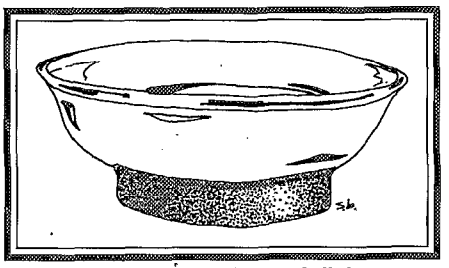
Loctite® is a registered trade mark name for a product used in automotive repair that can be purchased at your local automotive supply store. A release agent is also available should one need to use it.

Agraffe counterbores come in two sizes, 23/32" and 31/32", for 7/32" and 1/4" agraffes, respectively. They can be purchased from Pianotek at 401 Marshall Ave., Ferndale MI 48270.

—James M. Reeder, RPT

TT&T Magnet Dish

I've found many uses for this magnetic stainless steel dish (see illustration). It's great for keeping flange screws together, holding screws while you shine up the heads on a wire wheel or grinder, and for carrying and storing screws in order when repairing music desk hinges, lid hinges, etc. The magnet is at the bottom of the tray, and is coated with rubber to prevent marring. The tray will hold itself up on the side of a metal surface such as a file cabinet, and even works upside down. The dish is called "Magne-Tray," and is available from Orchard Hardware Supply in Southern California.



'Magne-Tray' magnetic steel dish

For other jobs (such as collecting the cut beckets from the plate and keybed after removing the strings), the powerful magnet from a discarded loudspeaker works very well, too.

—Isaac Sadigursky, RPT

TT&T Sniffing Out the Solution

Many times, being in the right place at the right time lends itself a clue to the solution of a current problem. Recently, after pondering for weeks, looking for a solution to correct the excessive key flex associated with actions from nine-foot grands, I stumbled upon the answer during a curious event. After a day of service calls I returned to the shop to review the progress of the various projects being worked on by the shop technicians. I walked up to the workbench, picked up one of the problem keys and once again tried to visualize some simple solution to stiffen the keys when I smelled the odor of fiberglass resin the shopmen had used earlier in the day. The problem and the solution came together at that moment. I'm sure you have by now put the two together and found the simple solution to this problem as I did. Applying fiberglass resins to the sides of the keys reduced flex by 75 percent. The job is simple, taking about four to five hours. ***(Editor's Note: For a detailed treatise on determining when a procedure such as this one might be appropriate, see Del Fandrich's article "Action Power, Part II, in this issue. — SB)***

To test the viability of this technique, I established a test key by drawing a straight line on the side and measured the amount of flex in the key when cantilevered from the balance hole and 10 pounds suspended at the capstan. The difference in flex before and after application was about 50 percent. Later experiments proved that flex could be reduced to nearly zero percent if one could afford the added weight of the many layers of resins. Because mass plays an important role in the inertia equation, unlimited application is not practical. But careful distribution of the resins can limit the overall mass increase when the following points are taken into consideration.

The amount of resins applied from the balance hole to the front of the key is, for practical reasons, unlimited because the added weight of the resins can be subtracted by removing key leads. The amount of resin applied from the bal-

Continued on Page 10

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ance hole to the capstan is another factor. Weight applied to this region cannot be subtracted anywhere in the key or action, thus loading the system with added mass. This is where the art of compromise plays an important role. The greatest overall effect is realized when resin is applied at the balance hole . As we move closer to the capstan the same amount of resin will yield us less and less improvement. My final version consisted of one coat applied from the nameboard region to approximately two thirds the distance from the balance hole to the capstan. After 24 hours and a heavy sanding, another layer was applied, extending to approximately three quarters the distance to the capstan from the balance hole. Another light sanding and you're ready to reweigh the keys by removing the appropriate amount of lead.

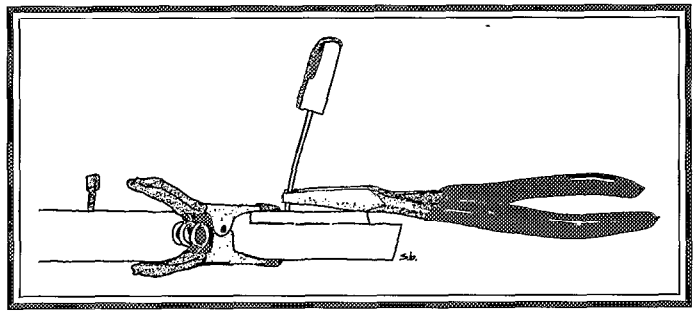
The reweighing of the keys is the single largest time-consuming element with this process, but the rewards are worth it. The action now has a crisp, clean feel with marked improvement in power and with it the ability to play in greater contrast with ease. I felt that the action had disappeared and I had direct control of the hammers at my fingertips.

— Roger Gable, RPT

TT&T

Removing Grand Backchecks

Removing grand backchecks from the keys for replacement can be a tedious and frustrating job. If you want to remove just the head, it's necessary to immobilize the wire with one tool (like Vise-Grips) while prying the head off with another. If you intend to remove the wire and all, it's easy to



tear up the keys or at least pop a number of the backcheck plates off the keys. For me, the quickest and easiest way to get the wires out with a minimum of damage to the keys is to clamp the forward end of the wire block with a spring clamp, then pry the wire upward while grasping it with a pair of duckbill pliers. I use the end of the key itself for leverage (see illustration). The spring clamp helps counteract the lifting force at the forward end of the wire block, thus helping to prevent the block from coming loose. This works well with the splined-end backcheck wires found on most grands except Steinways.

— Steve Brady, RPT

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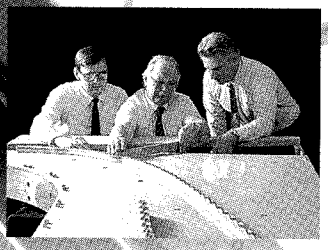

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Q: Partial Restringing

I have a college with a concert grand that seems to be breaking strings in the Capo section on a fairly regular basis. This instrument gets used a lot, and I'm not going to be able to have it out of service for any appreciable length of time.

If I get an okay to proceed with restringing the top two sections, do I need to remove all tension from all strings, or is it possible to just lower it to a certain point? I'm a little concerned with possible metal fatigue throughout the scale and don't want to be causing problems in the tenor and bass sections. (Maybe this worry is unnecessary since the Capo section is the only one where strings are breaking.)

Also, how best does one dress the V-bar? Do I just sand it with emery cloth, or does anyone have a more precise method? Thanks in advance for any responses.

— Gordon Large, RPT
Mt. Vernon, Maine

A: Ed Foote

My school had this problem, and I restrung the top two sections of the piano with the original pins. If you are comfortable decreasing the coil to plate clearance by 50 percent, a given pin size will often do double duty, but consistency is important. Using a dummy pin to make coils on, and backing out the original pins only a half turn before putting on the new string, the school should be able to get five treble restringings out of one pinblock (that is "one" career, by my estimation). The factory stringing often has a large amount of space between the plate and coil, so a given pin size can serve two stringings if its second life is spent lower in the block.

I find that restringing one size at a time doesn't require any lowering of tension. The V-bar is easily restored by some 240-grit wet or dry paper, "shoe-shined" lightly back and forth over the bar. If the string spacing was right to begin with, it takes very little metal removal for the strings to establish their own new seating in what is left of the grooves.

A: Tom McNeil, RPT

My experience indicates that it is a common need to restring the trebles of performance pianos, perhaps after five or seven years, depending on the amount of use, etc. It's time for it whenever string breakage becomes too frequent for the technician's convenience, or (preferably just before) breakage during use is encountered. (I consider it the technician's job to "find," i.e., break, and replace weak strings before the performance.)

Do not mess with the tension in the sections you will not be restringing. The other sections will go horribly out of tune during the restringing process; but once the new strings are up to tension, the rest of the piano will be found to be nearly as well in tune as when you began. I have never encountered any problem from removing all the strings from the top two sections. You could considerably reduce any imagined hazard by doing only one section at a time. Undoubtedly, Ed Foote's advice to remove only one wire size at a time would reduce the imagined hazards even further, but at a corresponding price in terms of working efficiency.

Even though the restringing can be done in a day or two — depending on how many strings will be replaced, new tuning pins or not, efficiency of working conditions, experience of the technician — try not to embark on this with a performance piano unless you can find a two-week hole in its performance schedule. I like to have at least a half-dozen tunings, spaced a day apart, before the first performance. A few hours per day of hard rehearsal helps settle things, too. (It is good to have a sympathetic artist or student who won't panic over the initial instability of the new strings. It was always easy for me to find a student who was preparing for a recital and appreciated the extra concert hall time I could reserve for him/her "to assist me.")

As to dressing the Capo bar, I find that any serious reshaping is a mighty chore while the plate is in the piano. Perhaps there are others who have different experience on this. I do like to polish the bar with 240-wet/dry sandpaper and a few drops of motor oil; wipe off the excess oil. It will tune like a dream and may improve the tone a little.

Q: Easy-on-the-Back Piano Moving

Does anyone have a system for single-handedly moving a piano out from the wall for inspection that:

1. Doesn't involve heavy lifting with the back? (I am a back surgery survivor, and am hoping not to be a repeat customer).

2. Doesn't require expensive and heavy piano-moving dollies and jacks? (These would seem to be overkill for just moving the piano a few feet).

3. Protects carpeting and hardwood floors from damage in the case of a jammed caster?

I will be grateful for any suggestions.

— Raymond Johnson,
Kingston, NY

A: Gerry Hubka

After sustaining a slipped disc, I learned to lift pianos with my ankle. I can place my knee under the keybed where it joins the side of the piano and lift with my ankle. There is a lot of leverage there and by turning the ankle I can move a piano out an inch or two at a time with no strain whatever to my back. I also place my hand between the wall and the back because the piano wants to tip toward the wall. (see illustration) The secret to make this easy is to bring wood blocks of various sizes to "take up the lost motion" if needed. Books or a hard-shelled tool case can work in a pinch. The disadvantage is that if you lift too far away from the body of the piano,

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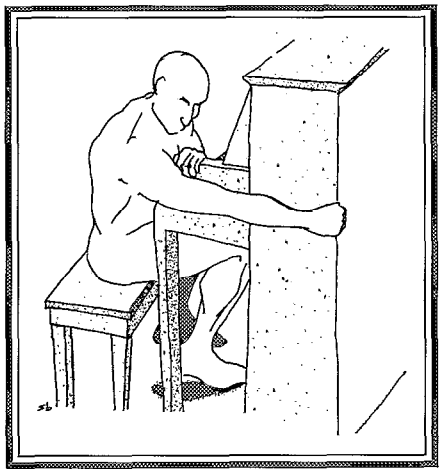
you can flex the keybed and cause the piano to go out of tune. Also, toe blocks can make it more difficult, but I was always able to manage. I have used this method to change legs on a grand, or to install caster cups. However, I also have a heavily constructed parts case I made to just slide under a grand and which can support the weight. Do not try this if you are not comfortable with it or can't handle the unexpected (like a leg falling off)! I can also get down on all fours and place the weight above my shoulders. There is tremendous leverage there and very little strain on the lower back.



Mysterious unclad tuner moves piano from wall.

Disclaimer: under no circumstances should you try the above without me being there to supervise.

A: Ron Shiflet, RPT

I have a couple of methods that I use myself. They probably don't answer all of this person's questions, but I'll pass them along anyway. In both cases I am rolling the piano on its wheels, so the carpet and bad wheel problem I can't speak for, other than I have never had a problem with this. Please keep in mind I am referring to vertical pianos. In doing this, I am letting my legs do the work so I don't tear up my back. They will work moving a piano far enough away for an estimate.

1. When I need to move a piano away from a wall, I sit on the bench and push up against the key bed with my legs (don't scratch the wall). Stretch out your arms and either grab both sides, or the legs of the piano. While the piano is up, I pull at one side and then the other alternating back and forth. Usually, the piano just rolls. I would not use this on a tall piano.

Away from a wall, it also will work (by scooting) and yes, you could tip one over. There are lots of "what-ifs" on this. Use common sense. All disclaimers apply.

This next one is hard to explain. Read it carefully and try it. It's great.

2. When pushing a piano back, I will go to one side of the piano, reach over the piano and rest my hand at the back, letting my fingers reach over the edge and grip the back. Which hand I use depends on whether or not that particular side is in a corner..

Lets say that the right side is in a corner. I will reach over (piano's right side) and grip with my left hand. I will take my right hand, palm toward the piano and put my hand against the leg at knee height. Then I push against my hand with my knee. The pushing slightly lifts the front and the piano just glides into place. In extreme cases, the other hand can push, but it usually isn't necessary.

I use method #1 when I cannot open the lid (picture above it or whatever). I use #2 when putting it back. In doing an estimate, I move the piano as little as possible.

These require a "feel" that you must develop, but they move so easily it literally amazes customers.

Q: Replacing Let-off Buttons

I'm just wondering if anyone has figured out an easier method of screwing on new let-off buttons without excessive turning of the screws. It is simple to hold the button and screw into it, but then the screw will become loose every time. On the other hand, holding the screw still and turning each button on by hand is very hard on the fingers, to say the least.

On my last job I decided to just cut off the punchings and replace the felt, but the new buttons are finished much better and really look nice.

—Dennis Johnson, RPT

A: Newton Hunt, RPT

I have a let-off driver made to fit in a power screwdriver like Webb Phillips sells. I turn the screws up until the button

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Letters

Darrell Fandrich Responds to Fred Sturm

In the October *Journal* letters, Fred Sturm points out several errors in my article "On Humidity-Related Tuning Instability" in the July issue of the *PTJ*. It appears that in the information transfer and printing process, several symbols (for ∠, °,π,√, and ÷) somehow dropped through the cracks and three exponents either gained or lost a point in value.

In Note 1, Br. should be **Br.∠**, for bridge angle, and the numbers below refer to the acute angle between the strings and the bridge and should have a degree symbol (°). The numbers in the adjacent column are the cosines of these angles, representing the fractional portion of longitudinal bridge movement effecting string length. The I (coif.) the Fred queries should be **I (coef.)** for Inharmonicity coefficient.

In Note 2, a division symbol dropped out — Young's Modulus is a ratio: unit stress ÷ unit deformation — and, as Fred noticed, the symbols for π dropped out of the formula for cross sectional area, and the exponent in the elongation formula lost a point. It should read: $\mathbf{E = 4.39 \times 10^{-8}\ T\ L\ /\ d}$ **(.0439 if d is in mils)**.

In Note 3, Fred noticed that in the plane wire elongation formula the length, L. should be cubed not squared. The text immediately below that equates plain wire elongation with the *third power* of the length should now make sense. Also, Fred arrives at a slightly different coefficient 1.01×10^{-10} which I like as it is consistent with putting Young's Modulus at 29 million. The formula should read: $\mathbf{E = 1.01 \times 10^{-10}\ F^2\ L^3}$.

In Note 4, several √ and ÷ symbols dropped out. In 1), $^{12}2^{(N-1)}$ should be: $^{12}\sqrt{2}^{(N-1)}$. In 2), mislabeled 3, $^{1200}2^{(\#cents)}$ should be $^{1200}\sqrt{2}^{(\#cents)}$. In 3), mislabeled 2, (N 1+2) should be **(N-1+.2).** And in 4), log (Hz.1) - log (Hz.2) $\log^{1200}2$ should be **log (Hz.1) - log (Hz.2) ÷ $^{1200}\sqrt{2}$.**

I appreciate this opportunity to correct these errors. But I'm concerned that the numbers seem to have distracted from the focus of the article, which in part was to point out two missing elements in the current discussion of tuning instability: 1) the effects of longitudinal bridge and soundboard expansion-contraction on pitch stability, and 2) that string elongation is the way to quantitatively relate bridge-soundboard movement to pitch movement.

And much more important, I believe, is dealing with the problem of tuning instability, especially *the poor day-to-day quality of piano sound* experienced by those who play pianos such as the Gulbransen spinet and the Steinway studio that Fred mentions having recently tuned. These two pianos were respectively 60 and 20 cents off pitch only three months after previous tuning. Much if not most of the *day-to-day quality of piano sound* in between these tunings must have been awful.

While there is almost nothing we as tuner-technicians can do to improve the basic tuning stability of the pianos we work on, there is a lot we can do to stabilize the immediate environment for a piano. From my experience, if the two pianos mentioned by Fred had been equipped with humidity control systems, even if only partial systems consisting of rod and switch, Fred's experience of tuning would not have been frustrating pitch alteration but pleasant touch-up tuning with time left over to improve voicing and regulation, and the players experience of the day-to-day quality of piano sound *in between the tunings* would have been far better.

Dramatically improving the *day to day* quality of sound for the *average* pianos is both possible and, I believe, crucially important for the Piano and our industry at this time.

— Darrell Fandrich, RPT

Q&A

Continued from Page 14

falls off and farther so that just the very tip protrudes from underneath the rail.

I have a Steinway hammer flange that has a hole drilled through the screw hole just large enough to accept a new let-off button.

I insert the new button and fit the flange to the underside of the rail so that the point of the screw is in the drilled hole. I then use the power screwdriver to drive the screw into the button until it spins against my finger pressure on the felt. I remove the alignment tool and drive the screw a little farther into the button.

This method will work for a regular let-off rail except the alignment tool needs to be flat instead of scalloped.

I have not had any trouble with loose screws yet. If I thought I would have trouble I would dab a ***tiny*** amount of CA glue on the threads and let it set, then screw the buttons on the slightly enlarged screws.

Bechstein Pinblocks

"Not for everybody" — Steppenwolf

By Bob Hohf, RPT
Milwaukee, WI Chapter

Where I come from, the word "Bechstein" conjures the exotic. A pianist reminisces lustily over her conservatory sessions at the keyboard of this magnificent instrument. She sways again with the cascades of velvet tone. She waxes rhapsodic over the bottomless wells of richness and power. No hush is great enough for its most exquisite inaudiblissimo. "Awe-some ... totally!" she concludes.

Across town, in the local piano shop, a technician is less than awe-inspired; carefully recording the thousand unfamiliar features of his first Bechstein rebuilding project has been vaguely disquieting. He holds his breath while lifting the plate for the first time. The plate clears the rim, and he is gripped by fear as his eyes scan the complex curved and faceted pinblock. Fear turns to dread as he surveys the apparent seamlessness of the case construction around the pinblock. For a moment piano, shop, and town dissolve into gray oblivion. Rebuilding proposals and airline schedules careen before his mind's eye. Regaining his composure, he sets down the plate. Impolite words spring unbidden on his exhaled breath as he accepts the latest challenge.

Of course, problem-solving is a big part of piano rebuilding. Few rebuilders have the luxury of working on the same type of piano all the time, and even familiar pianos frequently present new problems. Solving these problems often requires adapting old shop techniques to new circumstances, or developing new techniques entirely. Over a period of years a technician can collect quite a large "bag of tricks." The technician working on his first Bechstein can expect to dig deep into his bag, and come up empty handed more than once.

The intact Bechstein case appears to defy assembly. After all, assembly is a step-by-step process in which new pieces are fit and attached to those already assembled. However, Bechstein cases (and those of other fine German pianos) appear to have been born in one piece. The fit of the parts and the lack of visible joinery make it very unclear which part came before which. This is an illusion created by elegant design, careful craftsmanship and effective veneering. Rest assured that Bechstein pianos were assembled by human hands, and, therefore, they can be disassembled, repaired and reassembled.

In this series of articles we will walk through the repair of what might be considered a "worst case scenario": a pinblock replacement on a Bechstein with two cracked-plate bars. The piano is a 7' Model B built in 1903 and rebuilt in New York in the 1980s. This is a four-section piano with cracks in the plate bars at the front edge of the tuning pin fields between treble sections 2 and 3, and sections 3 and 4. These cracks occur in Bechstein pianos frequently enough that they may be considered a characteristic problem. Some technicians consider this characteristic problem to be evidence of "flawed" design and dismiss these pianos as unrepairable. In this article, we will compare "American" and "German" design and construction pertaining to the plate, pinblock and case. In the second article we will describe a routine Bechstein pinblock replacement, and in the third article we will discuss the cause of the plate cracking and what can be done about it.

Pinblock Physics

For better understanding of plates and pinblocks, and the relative advantages and disadvantages of the different types of design, we must first take a look at the forces which act on this area of the piano. Assuming that a plate is fit into an unstrung piano in a relaxed, stress-free state[1], all of the forces acting on the pinblock and plate are a result of string tension. The action of string tension on these parts of a piano is complex because the structures which must resist the string tension are not in direct line with the string itself.[2] For our purposes we will look only at the pinblock-plate assembly between the stretcher and the front termination point (agraffe or capo bar). What happens between the front termination and the hitch pin is not relevant to the issues we will be discussing here.[3]

The pinblock is the first structural member of the piano in the chain which

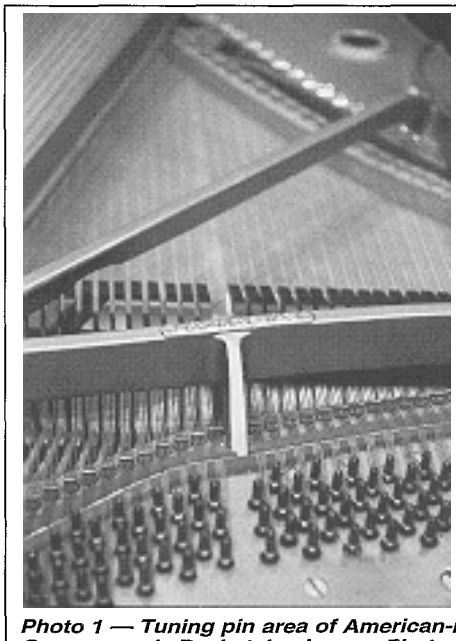

Photo 1 — Tuning pin area of American-made Piano, left; and the tuning pin area of German-made Bechstein piano — Photo 2.

The American System

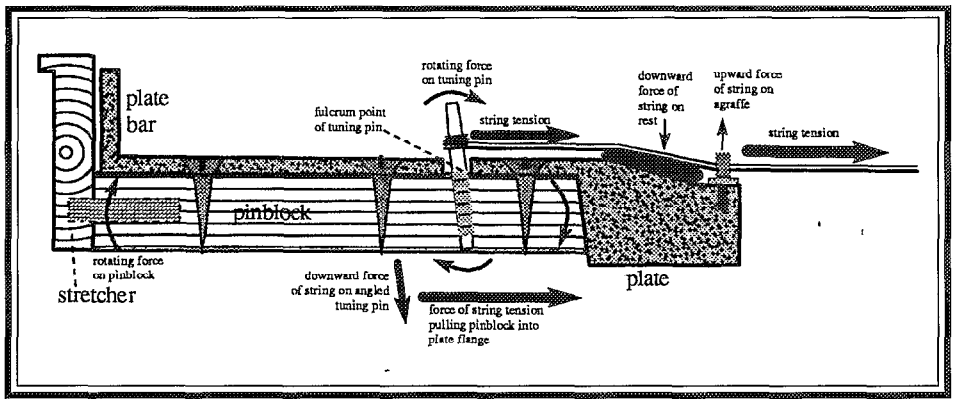

Figure 1

supports the string tension. Each string acts directly on its tuning pin, pulling along the line of the string at the point where the string unwinds from the pin. Each pin, in turn, acts as a lever on the pinblock with the fulcrum at the point on the front of the pin where the pin enters the block. This means that the effect of the string tension on the pinblock is to apply a *rotating* force component to the pinblock in such a way that the flange edge of the block is forced *downward* and the stretcher edge *upward.* This rotation is coupled with an approximately *straight downward* component on the entire pinblock resulting from the fact that the tuning pins are not perpendicular to the surface of the pinblock. The third and greatest component of force coming into play pulls the pinblock toward the plate flange.

The Two Systems

Piano plates must be designed to hold the pinblock immobile while it is being acted upon by these three forces, which obviously have great enough magnitude to cause cast iron to fail under some circumstances. There are primarily two pinblock-plate design systems for addressing these forces in modern pianos, the "American" system and the "German" system. The single design feature which accounts for the differences in the two systems lies in the tuning pin fields: the American system has a plate *webbing* with individual tuning pin holes in the cast iron (See Photo 1), and the German system has *open* tuning pin fields where the surface of the pinblock in the area of the pins is exposed (See Photo 2). These two types of tuning pin fields require very different pinblock designs and plate support systems, in spite of the fact that the forces being encountered are the same.

Figure 1 shows a cross-section view of the stretcher-pinblock-plate area of a typical American piano in a treble section looking toward the bass. The stability of the system requires that all parts remain immobile relative to each other as the forces are applied. The greatest of the forces, the one that tries to pull the pinblock toward the tail end of the piano, is resisted by the plate flange. The amount of pinblock surface, which is in direct contact to the plate flange, determines whether the pinblock can move when string tension is applied. The closer the fit between the front edge of the pinblock and the plate flange, the less chance of pinblock movement.

The rotating force imposed upon the pinblock by the lever action of the tuning pins is countered in several ways. The downward rotation at the front of the pinblock is resisted by screws through the cast iron webbing and the friction between the pinblock and the plate flange. This friction is substantial because of the enormous pressure between the block and flange. The upward force at the back of the pinblock is resisted by a heavy iron plate bar and the wooden stretcher which is glued and doweled to the pinblock. The downward force component introduced by the angled tuning pins is resisted by screws through the webbing.

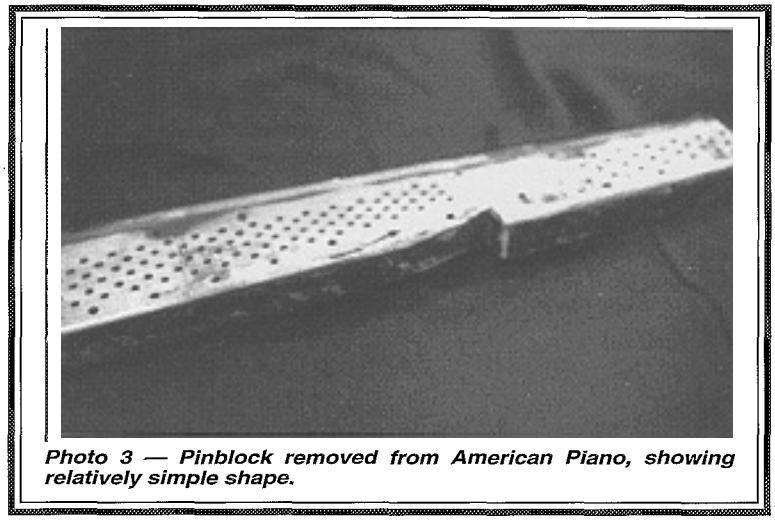

Photo 3 — Pinblock removed from American Piano, showing relatively simple shape.

The pinblock in the American system is, in most cases, relatively simple in shape and easy to fit (See Photo 3). It is rectangular in cross-section and the surfaces which contact the plate are generally flat and straight, or at least gently curving. The plate webbing insures that the entire top surface of the pinblock has positive support.

Figure 2 shows a similar view of a typical German piano. Exposing the pinblock in the open tuning pin fields necessitates design differences in the plate support system. Good, secure resistance to the downward rotation at the front of

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The German System

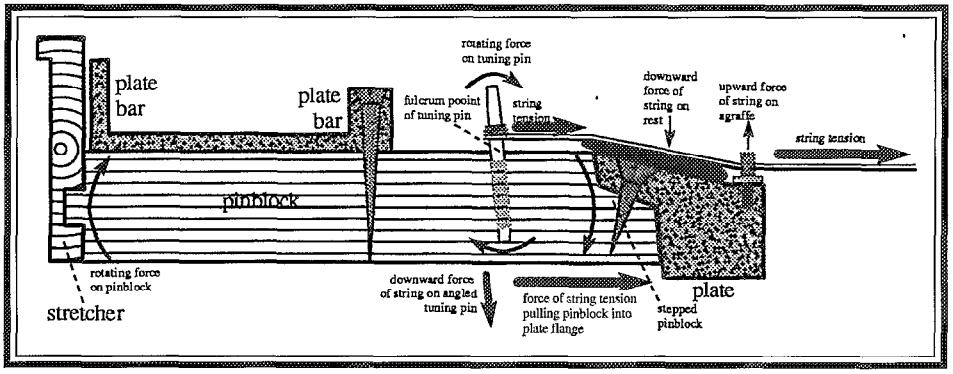

Figure 2

Bechstein Pinblocks

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The American Style

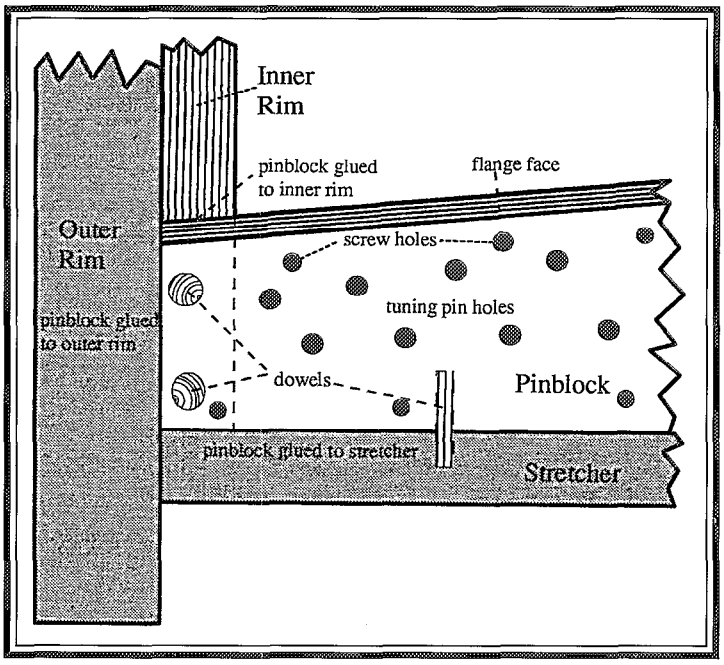

Figure 3

the pinblock requires some support other than the friction between the pinblock and the plate flange. This additional support is provided by screws threaded into the pinblock and countersunk into the plate. Given that the plate flange must butt against the front edge of the open tuning pin field, placement of support screws at the front of the block becomes somewhat problematic. Providing space for screws is accomplished by *stepping* the pinblock and shaping the plate to match. This step provides a surface into which screws may be inserted, holding the pinblock firmly against the plate flange. Some earlier German pianos[4] were made without stepped pinblocks and support screws. The failure of these pinblocks is a clear testament to the forces which come to play in this area of the piano.

The absence of plate webbing removes a substantial amount of support to the tuning pin area of the pinblock in the German style of construction. This decrease of support is compensated for by casting a heavy bar into the plate directly behind the tuning pin fields and inserting heavy screws. The upward rotation at the stretcher edge of the pinblock is resisted by the stretcher and a bar cast into the plate. The pinblock is generally tongue-and-grooved to the stretcher.

A Bechstein pinblock has a very complex shape which is difficult to make and fit (See Photo 4). The stepped front surface is actually three surfaces which bear against the plate flange. The treble flange edge has a convex curve. In the bass the upper step of the pinblock has a concave curve while the lower step is straight. To further complicate matters, the bass section is overlaid with additional pinblock material to provide extra height for the overstrung bass strings.

Most fine pianos are constructed with the pinblock as an integral part of the case. This provides structural support of the pinblock by the other case members, and, thereby, contributing to resisting the forces imposed by the string tension. In a properly constructed case, individual parts are not allowed to move relative to each other. This reduces the chance of the vibrating energy of the strings being sapped off by the case, increasing the overall resonance of the instrument. There are two primary methods of building a pinblock into a piano case, which we will again call "American" and "German".[5]

The American Style

Figure 3 shows the bass end of the pinblock-case construction from above with the plate removed for a fine American piano. The laminated inner rim provides a step upon which the underside of the pinblock is glued and doweled (or screwed). The outer rim is also laminated and covered with veneer. In some pianos the outer rim is glued together with the inner rim in one operation, while in others the outer rim is made separately and glued on to the inner rim later in the construction process. In either case the end of the pinblock butts against and is glued to the outer rim. The back edge of the pinblock is glued and blind doweled to the stretcher.

This style of assembly integrates the pinblock structurally with the rest of the case. The ends are immobilized by a substantial area of glued surfaces reinforced by dowels. The stretcher contributes considerably to the stiffness of the back edge of the pinblock which must resist the upward force imposed by the string tension. Once the plate is bedded to the pinblock and the plate screw holes drilled the final height and location of the plate within the case are positively fixed.

The German System

Figure 4 shows a German piano in the same view at the bass end of the

The German Style

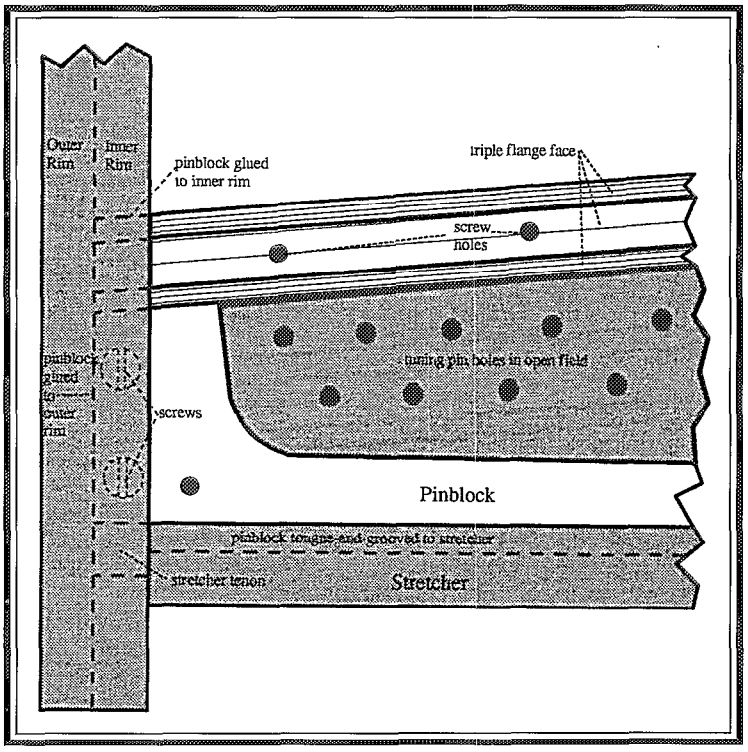

Figure 4

pinblock with the plate removed as it fits into the case. With the plate in place, the shaded *open tuning pin* area of the pinblock is exposed while the unshaded area contacts the underside of the plate. It may be a bit of a stretch to see the side of this piano as having *inner* and *outer* rim construction since there are no laminated members in this area of the rim.[6] The two boards corresponding to the inner and outer rim are indicated by the dotted line down the center of the side. In reality, the boards and the joint are covered with veneer. The outer board extends from the top to the bottom of the piano in width and runs the length of the piano spine. The inner board extends from the top of the rim to the step on which the bottom of the pinblock is glued and then runs beyond the belly rail where it stops. In the treble this inner board runs from the front of the piano to the treble corner where it butts into a bent-wood panel. In Bechsteins both inner and outer boards are about one inch thick and are made of spruce.

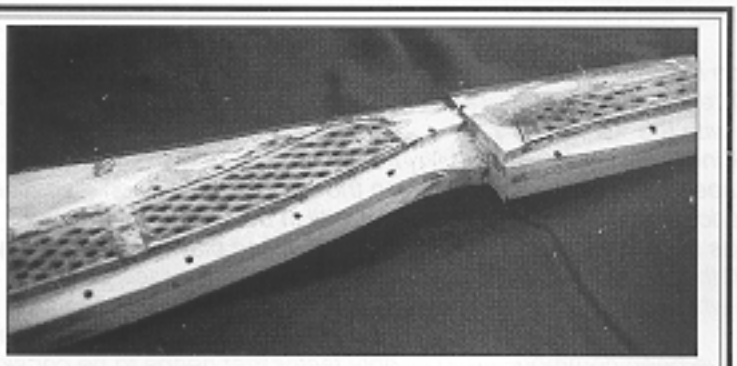

Photo 4— Pinblock removed from Bechstein piano, showing stepped and curved flange-bearing surfaces.

The fact that both ends of the pinblock are embedded in the sides of the case makes conventional methods of pinblock removal and replacement ineffective. With both sides of the case intact and veneer in place, it is difficult to visualize the construction process. The veneer covering gives the sides the appearance of being one piece. It is not until the top veneer is removed that the two-layer construction of the sides is exposed and the means of assembly revealed. One often hears this style of pinblock installation referred to as "mortised into the side of the case." This term is somewhat misleading. "Mortise and tenon" joinery refers to cutting sockets, or *mortises*, for the insertion of pins, or *tenons*, in wooden pieces to be joined. In the German style of case construction no mortise is cut and no tenon (the pinblock) inserted. First the pinblock and stretcher are installed in one piece with the bottom surface at the ends glued to the step formed by the solid wood "inner rim." Then the inner spruce board is cut out to fit over the pinblock/stretcher and glued to the inner step and the "outer rim" spruce board. The large glue area in this joint makes strong and stable construction. The only part in this system resembling a tenon is the rectangular end of the stretcher which extends into the side of the piano.

Advantages & Disadvantages of the Two Construction Styles

As mentioned above, all pianos have essentially the same force components imposed by the string tension, and, thus, all case/pinblock/plate systems must perform the same function in resisting these forces. There are several distinct advantages of the German system of open tuning pin fields over the American. The most notable stem from the fact that an exposed pinblock allows the tuning pins to be pounded further into the pinblock. This means the string coils, and, therefore, the actual point on the pin where the string tension is applied, can be closer to the surface of the block. Thinking again of the pin as a lever trying to rotate itself and the pinblock, force applied closer to the fulcrum *decreases the mechanical advantage.* This *reduces* the rotational component of the force which the system must resist. The shorter span between the application of the force and the support of the pinblock also *reduces* the flex (flagpoling) of the tuning pin itself. This allows the use of smaller diameter tuning pins without decreasing stability. In fact Bechsteins are originally strung with 1/0 tuning pins. These pins have less circumference than 2/0 pins and allow string adjustments in smaller increments per unit of pin rotation. In contrast, the plate webbing of American construction limits how close the string coils can be to the surface of the pinblock.[7]

The diagrams clearly show the relative complexity of the two systems. The German pinblock, with its stepped flange surface curved along its length, and its two-level top surface, is much more difficult to produce than its American counterpart with its straight, flat surfaces. One must not lose sight of the fact that pianos are not custom, one-of-a-kind creations, but, rather, are manufactured in relatively large numbers by many workers using factory techniques. More complex operations require more time to perform and a higher level of skill to perform successfully. This translates directly into higher production costs.[8]

The German style embodies elegance and a high degree of continuity with earlier traditions in keyboard instruments. German pianos are also hard to make and repair. In future articles we will discuss in more detail some of the pitfalls of their complexity. Perhaps the greatest accomplishment of the American style is its adoption of simple, easy-to-produce design without sacrificing quality and performance. American pianos may not be as directly linked to early keyboard traditions as German instruments, but certain design innovations have been so successful that they have been almost universally adopted by modern piano makers.

Notes

1. *There has been some debate in recent years over the practice of purposely stressing a piano plate either by the fit on the rim or by introducing stress with the nose bolts (see Nick Gravagne's article in the June 1991 issue of the Journal). It is beyond the scope of this article to try to settle this debate. There is no doubt that a piano plate can stand some twisting and bending stress without inhibiting its ability to support string tension; however, my policy is to install plates totally stress free when unstrung. This policy is based on the belief that the stresses on the various component parts of a piano have a profound effect on the ability of the instrument to resonate; controlling the necessary stresses and eliminating the unnecessary ones is fundamentally important in the success of a*

Continued on Next Page

Bechstein Pinblocks

Continued from Previous Page

rebuilding project. The freedom to install plates stress-free without compromising downbearing requires, among other things, new bridge caps.

2. *See Nick Gravagne's article in the March 1992 issue of the* Journal *for a more complete treatment of this topic.*
3. *Gravagne,* Journal, *June, 1991.*
4. *Blüthner pianos prior to about 1900 had open tuning pin fields and no step in the flange edge of the pinblock for support screws. The pinblocks were solid beech and, thus, more compressible than laminated blocks. Failure due to compression and downward rotation of the pinblock at the plate flange is very evident in these pianos. In spite of "poor engineering," these pinblocks can be effectively replaced using modern high-density pinblock material. But that is another story.*
5. *This distinction is somewhat arbitrary since there are American-made pianos with the "German" style pinblock incasement, however, I have never seen a German piano with the "American" style. My experience has been with Bechstein, Blüthner, and Bösendorfer, which is certainly not inclusive.*
6. *It seems to have been common practice in turn-of-the-century German pianos to apply bent-wood panels as an outer rim to an inner glued-up frame. These frames were constructed of solid wood members and were by no means inherently weaker than the one-piece bent inner rims already common in American pianos. A glued-up frame is, of course, less practical to produce.*
7. *We have been considering American pianos without tuning pin bushings. The effects of bushings on the system have been discussed in detail in other* Journal *articles.*
8. *Makers of fine pianos undoubtedly know how to make their pianos better. Unfortunately making the finest possible instrument is not the only factor that needs to be considered in real-world production. It seems that technicians often forget about the constraints of the marketplace in their late-night discussions of the failings of the makers.*

James Coleman Sr. taught a "Visual Tuning" class at the 1961 convention in Los Angeles' Hotel Statler

Schwander-type Hammer Butts

EDITOR'S ROUNDTABLE

By Steve Brady, RPT
Journal Editor

This cyberspace "meeting of the minds" explores a problem many of us have had to face, and virtually all of us will encounter before we're through. I've seen examples of broken spring cords on quite a few different makes of pianos, including Chickering, Kranich & Bach, Kimball, Yamaha, Kawai and others. Although the present discussion centers around a Yamaha piano, this in no way reflects disparagement of that brand, as will be seen in the discussion itself.

Bob Simmons: I've got a Yamaha console (about 13-years-old) that has suddenly developed a problem with the loops, which hold the hammer return springs, starting to break (See Figure 1). Why would these be breaking? I'm wondering if the material of the loops is not treated with moth repellent, and if so may have been weakened by little critters? Would some type of corrosion on the springs have begun to act as an abrasive?

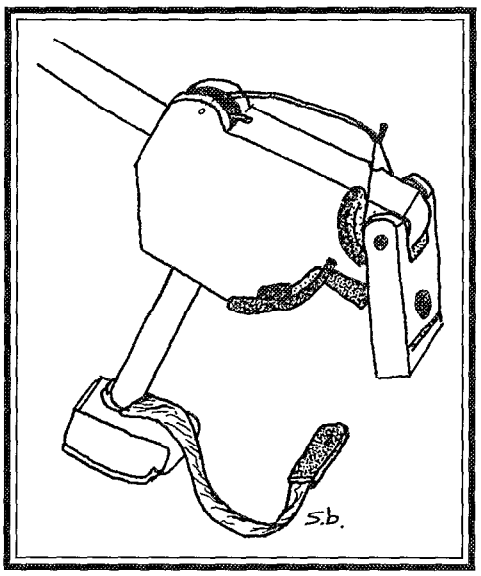

Figure 1 — Schwander-type hammer butt.

Jim Harvey: Bob, it sounds like the spring material has experienced corrosive effects — not moth damage to the loops. Although San Berdoo is inland, could the piano have been nearer the ocean during a portion of its life? Either that, or desert rats from Sidewinder road have "lubricated" the springs. Either way, sounds like the spring cords are being "sawed" in half.

You can get "silk" cord from the supply houses. Or, if the butts are the type with butt plates (See Figure 2), you may just want to buy replacement flanges (with the cords) from Yamaha or Schaff. It might be less labor intensive. Either way, try to identify/eliminate the cause while working on the effect.

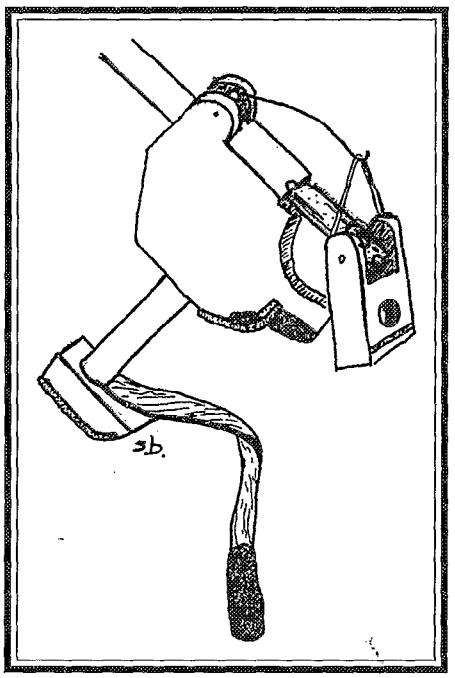

Figure 2 — Hammer butt with Schwander-type spring and metal butt plate.

Simmons: By the way, what material should I replace these with? I've used dental floss for repairs, but I'm sure that's not the appropriate material (actually I'm not sure, but I'm guessing). But first I want to have at least a theory of what has caused the problem so it doesn't come back as soon as I'm done.

Keith McGavern: Can't help with the why, but APSCO carries Silk Cord, page 83, part #494 1/2 that I have been using. Quality fishing line would probably suffice, though I have no practical experience with such.

Jim Harvey: Bob, this comes under judgment calls. Thoughts ...

- "Soon" is a relative term. Consider, in years, how long the current springs have lasted without causing a problem to the loops.
- Has anything other than the recommended bacteriostat agent been used? If so, it could accelerate the corrosive effects on the brass wire. (For argument, we could include the room swamp cooler in this area of discussion).
- I've seen a couple cases, and heard of others, where (presumably) salt or other mineral matter got into a piano. As long as the "matter" was dry — no problem. Once it became moistened, problems resulted. San Berdoo, being a desert area, is essentially a sand-based environment. As such, there is lots of mineral matter around, and probably in the water as well. Think about what happens in a swamp cooler. As the water is dispersed, it takes particulates of

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Schwander-type Hammer Butts

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mineral matter with it. These then settle in the form of dust on any and everything. Hey, I'm guessing here!

- After the detective chores are finished, check one or two springs for corrosion. This will tell you whether the "sawing" phenomenon is correct or not. Clean these sample springs with a brass cleaner or other metal polish, depending on what is required to remove any pitting. Depending on how much metal you have remaining after cleaning will help make the decision on replacement. Either way, I'd plan on cleaning all the springs before repairing or replacing the spring loops.

Good luck.

David Stanwood: The fishing line is synthetic and they get brittle with age. I believe a good source for cord would be Renner.

In Stanwood & Co. wippen spring conversions we use pure linen cord which used to be used for radio dial cords. We have a limited supply, but it's no longer made so I'm hoarding what I've got.

Bob, you might consider replacing the flange. It might be less work, especially if it's the type of butt with a plate and screw.

Tom Seay: After repairing two complete sets by replacing the material, I'd suggest that you order a replacement set of flanges from Yamaha. It's easier, believe me. Even figuring in the time for pinning and traveling hammers, I believe it is much quicker to simply replace the flanges. Good luck.

Avery Todd: I agree with Keith's response about the fishing line. I've used it a couple of times for repairs when I had nothing else available and it seems to work well. Just be sure the glue joint is good. It's appreciably stiffer than the silk cord. But I would think it would last a long time.

If anyone knows a reason why this is not a good material to use, such as squeaking noises with the spring, interaction with the spring, etc., I would like to hear about it.

I have 20-plus Yamaha Studio pianos here and just about all of them have some broken cords. I've even thought about trying to get someone (or two) and pay them a few dollars to make those repairs for me. I have so many old grands to work on, those silk cords are kind of low on my priority list. Thanks.

John Musselwhite: One of my customers is a weaver who works with silk a fair amount. She gave me enough silk cord left over from her projects to do about a dozen pianos. Apparently, pieces under 18 inches or so just go into the garbage.

Perhaps there's a source there which could be mined for some people. Local craft stores may carry something similar as well.

Newton Hunt: Yamaha used silk cord, which is prone to the travails of any organic material. Dental floss is a man-made material that is more durable.

I have had this problem in the past and have ordered a complete replacement set of flanges. Replacing the flanges is faster than rethreading them.

Four years ago they were about $75 a set, which is cheap considering the cost of your time putzing with string.

McGavern: I got to thinking about this "which is more efficient" process, replacing flanges vs. replacing cords. Now, I'm not claiming to have covered all the bases here, but here's what came to me.

1) The action has to be removed and reinstalled for both processes.

2) The hammer assemblies (hammer head, shank, butt, flange) have to be removed and reinstalled for both processes. (So far, same effort.)

At this point, replacing the broken cord doesn't require any further disassembly or reassembly, replacing the flanges does (two labor steps saved). Also, the cost of replacement flanges is saved.

Reinstalling hammer assemblies with new flanges would require (professionally speaking) traveling, filing, spacing, fitting, and voicing the hammers to the strings, not so with replacing the cord (five more labor steps saved).

Replacing the cord requires cutting 88 pieces of correct length, cleaning the grooves where the old cord is, a little dab of glue in the correct place on the flange, putting cord in place, letting glue set, a little dab of glue on the other correct place on the flange, putting cord in place, letting glue set, and then reinstall hammer assemblies with minor spacing of hammers to the strings.

Since I have never done a complete replacement of either process, I can't say which is faster. But based on what I have just extrapolated, I would have to go with replacing the cord first, hands down, before replacing the flanges. If there are some missing details, please let me know. *(EDITOR'S NOTE: Keith now reports that although the foregoing statements might make for good reading, he no longer agrees with them.)*

Harvey: Excellent points, Keith. However, I was counting on Yamaha's parts consistency, coupled with their "straight-edge" mentality of restoring action performance, when offering this suggestion.

Discounting any problems with hammer butt spring loops, I find myself as the "new" technician in schools where only tuning has been done in the past. I'm now faced with repeating cases of hammer flange pinning problems on earlier Yamaha studios (those with butt plates). With time and neglect (not tightening butt plate screws), the pins are now "walking" out of the flanges. Obviously, this causes both a predictable and an undesirable chain of events.

Under duress, in one instance I gently pressed all the pins back through the opposite side of the flange, then tightened the butt plate screws. I did this knowing that the pin no longer had a point on the end. Regardless of any additional damage I may have caused, this was a cost-effective, expedient fix under the circumstances — just to make the piano work. The side effects, among many other things, was the accelerated wear to the (only) bushing being used, compared to the opposite side's bushing now being too tight.

I don't like resolving problems in this manner. I'm confident that mine is not a unique "find," especially in school environments. I'm aware that I could replace all the flanges (convenient place to tie back to this thread), then keep the butt plate screws tightened. However, budgets (and technicians) do change.

My question then becomes, is there a cost-effective or, at least efficient method of dealing with this situation? Is retrofitting with new butts (without plates) and flanges in order? What about welding, pin dope, c/a glue ... just kidding! I'm simply in pursuit of the most realistic method of coping. Thanks for your thoughts.

Allen Gilreath: My personal experience has been that replacing the flanges is much more time efficient (especially on butts with butt plates.) Plus this gives the added advantage of new bushings to improve action performance. However, if someone ever has to replace the strings, the Kimball service manual that was given away several years ago includes a neat little jig for holding the flange and strings in place during work and drying. This might be a handy item to show in the *Journal* for those who don't have that particular manual. (See Figure 3)

Seay: I have done this repair both ways and (trust me on this one), it's faster to replace the old flanges with new ones. Yamaha parts are manufactured to such close tolerances that traveling is minimal and you are going to have to do all the other steps you mentioned anyway. It really is quicker to replace flanges in this particular situation.

Paul Dempsey: I definitely have to go with Tom here. We have many Yamaha U1D's and U1J's at Marshall. Years ago, when the budget was fat and the price of the flanges was cheap I bought a dozen sets. It is so much faster to replace the flange when a broken loop or wobbly flange is encountered. I save the replaced flanges for another day (usually these frigid winter evenings when the TV is as mind numbing as the cold) and rebush, pin and re-loop them — recycling, so to speak. (It is a good job to give bored kids, too). The supply is self- perpetuating. Tom is right. The tolerances are so good that I rarely need to travel.

By the way, keeping the small screws on the back side of the butt/plate snugged down will minimize the "walking" of center pins. Also, I use 30-pound braided casting line (fishing) for the loops (monofilament won't do) and glue them to the flange with a dot of medium viscosity CA glue spritzed with accelerator.

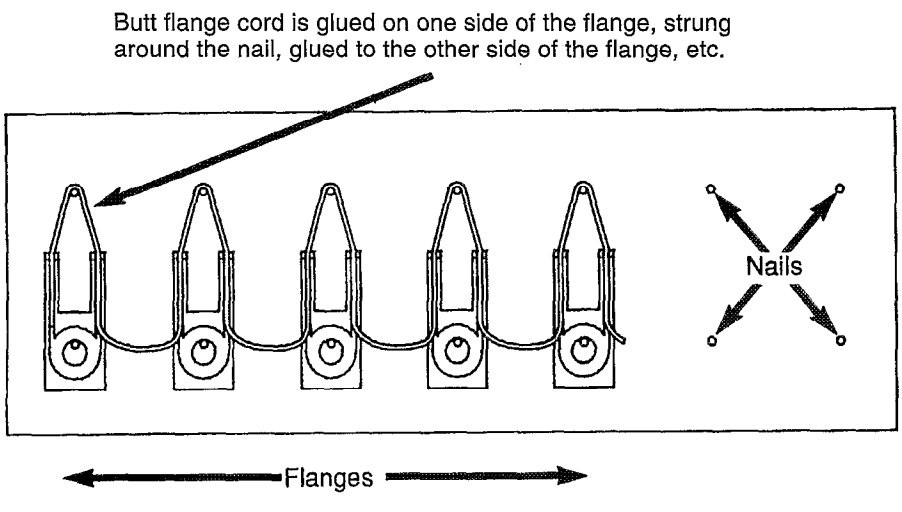
Barbara Richmond: What? You actually tightened those butt plate screws? I thought I was the only piano technician who did that! At least that's what it seemed like when I was back home in Bloomington, Ill.

When I first started at IWU, I had 30 to 35 P2s (mostly in practice rooms and 20-plus-years-old) — all with loose screws, plates, parts wobbling all over the place. Repinning all the flanges was out of the question, even though in the ideal world it would have been preferable. On these pianos, I moved the pins back, tightened all the action screws, shaped and softened the hammers, spaced them (using the Japanese electric shank bending pliers sold by Pianotek — they're great!), touched each jack flange with high viscosity CA glue and then replaced the worst flanges that didn't make it through the torture. (Doing this to each piano still took plenty of time, but when the students came at the start of the semester I overheard one say, "I think they got different pianos.") Then as I serviced the pianos throughout the year, I would repin flanges if needed. But, to tell the truth, not too many fell by the wayside. Fortunately, I was in the position that I would have ready access to the instruments. But, out in the real world where time and money are limited, one has to make choices and I think you did the best thing possible under the circumstances.

Hunt: Get yourself one of the tools called a butt spacer from APSCO or Schaff. It looks like a super thin very broad screw driver blade. With a flashlight determine if a pin has walked out, and if so, toward which side. Gently move the adjacent flange aside to get the blade on the end of the pin and then gently push it back into position. Continue until all pins have been centered in their flanges. This is all done before tightening screws and without removing any flanges except that one that the pin has shoved out the bushing.

I have had to do this on about 50 Yamahas here at Rutgers. I think I ruined about four flanges which I replaced with new ones and some I rebushed. This is not an easy operation for me; I have to hold a flashlight, telescope and butt spacer in one hand and scratch my head with the other.

This concludes another look into some of the most warped (and talented) minds in cyberspace. This edition was taken completely from the Internet listserv "pianotech," and was edited for flow and clarity by your Journal *Editor. I hope it will, at some point, make your work easier and more rewarding.*

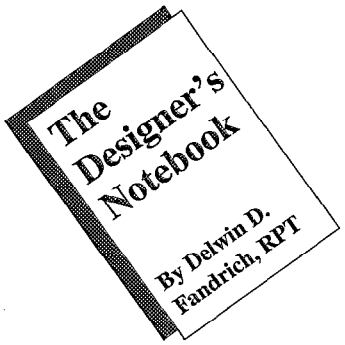


If the hammer butt flange string breaks, remove the center pin and flange. Pull the broken string out of the flange (it usually pulls out easily) and measure it's length. Cut a new piece of flange string to match the length of the old one, and glue the new string into the flange.

If several or all of the flanges need new string, a simple jig can be made as pictured above that will save a lot of time. Drive a nail into a board and place a flange over the nail that *does not have broken string.* Drive another nail inside the string when it is pulled to it's full length.

Drive a series of nails the same distance apart as the first two nails to complete the jig. Then, after removing the string from the old flanges, place them on the nails in one row. Finally, take a long piece of string and link the flanges together, gluing the string onto each flange as you go. After the glue has dried, simply cut the string flush with the flanges.

Figure 3 — Kimball's jig for replacing hammer butt flange string.



Action Power

Part II

Improving Piano Action Efficiency & Power

By Delwin D. Fandrich, RPT
Contributing Editor

Introduction

In Part I of this article we looked at the relationship of key movement vs. hammer movement under varying levels of key velocity. We saw that key and hammer velocity are directly proportional only at very low key velocities — that the traditionally accepted ratio of approximately 5:1 between hammer and key movement exists in reality for only very light blows. We introduced the concept of piano action saturation and demonstrated that it is the energy losses taking place in the key and action mechanism itself that actually limits the power output of the piano. Many pianos are actually capable of generating considerably higher power output levels if the energy transfer efficiency could be improved and the hammer velocity increased with a hard blow to the key.

In Part II we'll look further into where all of the energy put into the key goes if not into accelerating the hammer. Much of what follows in Part II is simply a discussion of principles that it seems were fairly well understood by piano builders of an earlier age — certainly many built their actions and keys in ways that indicate this. Unfortunately, it also seems that at least some of this knowledge has apparently been forgotten, lost or simply ignored over the years. We'll look at those parts of the action that are responsible for most of the energy loses. Well, okay, the energy doesn't actually get lost. Some of it is stored in the various parts that bend — as in a spring — and is actually used later in the cycle. Of course, some of that stored energy ends up being wasted because it doesn't get released until well after the hammer has struck the string. And some of it simply gets converted into heat and never makes it all the way to the hammer. We'll also consider what, if anything, can be done to improve the energy transfer efficiency of the various components of the action.

Action Slack

Usually about the time we take our first class in grand action regulating we learn that one of the basic advantages the grand action has over the vertical action is that there is *no lost motion* in the grand action like there is in the conventional vertical action.[1] In actual fact, of course, this is only partially true. While, in a properly regulated grand action, there will be no static lost motion as such, there can be considerable *dynamic lost motion* and under medium to hard key blows there will be varying amounts of *dynamic action slack* which, while it doesn't result in the sloppy feel of dynamic lost motion, it certainly does limit the power potential of the piano.

When a piano key is depressed with anything more than the most moderate force a significant fraction of the available energy goes into compressing and/or bending the various components in the action circuit. The key displacement vs. time plots (shown in Part I of this article, August, 1996 *PTJ*) indicate fairly rapid acceleration at the front of the key before the hammer begins to move, then the key slows slightly (the "knee" shown in the key velocity plot) as the effect of accelerating the hammer mass is felt back through the action chain and ultimately to the end of the key. This rapid initial key acceleration is due to "*action slack.*" During this time some or all of the following reactions will take place:

- The key lever will bend a little — or a lot, depending on how hard the key is struck.
- If the key is one with a dog-leg — and most bass keys have enough offset to be a significant factor — it will twist.
- The key balance pin felt will compress.
- The key balance pin rail may bend.
- The wippen capstan felt will compress.
- The bushing felt in the wippen flange, the jack flange and the hammershank flange will compress.
- The wippen lever will bend.
- The leather and felt components of the hammershank knuckle will compress and distort.
- The wippen flange rail and the hammershank flange rail may noticeably bend depending on their stiffness and the proximity of the note being played to an action bracket.

And — finally —

- The hammershank will bend.
- As the hammer begins to accelerate it will also begin to oscillate from side to side and from front to back.

All these things must take place before — and as — the hammer finally begins to move toward the strings. And they will occur under both hard and soft blows, it's just a question of how much.

Action Compliance

In theory, if it were possible to remove all of the action's felt and leather cushions and all of the elasticity from the various wood components of the action making each part completely rigid, it should be possible to significantly increase the potential output sound pressure level of any given piano. Alas, while "art [may be] uncompromising ... life is full of compromises."[2] We must be always aware of introducing possible side effects that may be undesirable. We can certainly increase the power output of the piano, but it may well become unplayable as a result. As we make the action components stiffer and less yielding, the shock load felt by the rapidly moving

human finger striking the key to initiate movement becomes greater. Some pianists are more sensitive to this effect than others but all are affected to some degree. It is entirely possible to make an action so stiff that it can become difficult — even painful — to play for extended periods of time.

As a part of my study into action dynamics I made a key for my model that was — for all practical purposes — perfectly rigid. Never mind how. I replaced the key balance punching with one of a very rigid material. I replaced the wippen capstan felt with a wood spacer of similar contour and thickness and replaced the standard knuckle with one of the same size but made of hard maple with only a thin, very firm leather covering. I reinforced the hammershank by laminating strips of carbon fiber ribbon to the top and bottom surfaces to increase its rigidity. I even replaced the action center bushing felt with an unyielding filled Teflon® material. With all of the modifications in place I had indeed managed to increase the hammer velocity by a considerable amount. Unfortunately, it also didn't take very many hard blows to set up a very definite tingle in the ends of one's finger tips. It would not have been possible to play an actual piano with this action for more than a few minutes at a time without some painful side effects.

Obviously, not everything mentioned above will affect an action's energy transfer ratio to the same extent. In nearly all actions, for example, the greatest losses occur within the keys themselves while a good laminated maple or beech action rail may bend hardly at all even under the hardest of blows. So, with the above caveat in mind, let's take a look at the various points of action compliance and then consider what, if anything, we can do about them. We'll begin with the key and work our way through to the hammer:

Key Flex — In most grand piano actions, by far the biggest contributor to action slack is key flex. This becomes more of a problem as the keys get longer. It is more of a problem in a concert grand than it is in a small 5'2" grand. And in a concert grand it is more of a problem in the bass section than it is in the treble section — the keys are both longer and they have a dog-leg in them. It may take twice the force to bottom out a certain key — that is, to fully depress the front of a key while the capstan is blocked, unable to move — in the scale of a 5'8" grand piano as it takes to bottom out the same key in the scale of a 9-foot concert grand. This is why the keys in most well designed 7- and 9-foot grands are stiffened in some way through the use of hardwood (and, no, I don't mean something made from the ever-more-popular "select hardwood" either) bottom and/or top plates.[3] These plates stiffen the keys — by the simple expedient of making them taller — through their mid-sections across and on either side of the balance rail pin where most of the actual bending would otherwise take place.[4] (See Figure 1.)

This, of course, is what was wrong with the piano I described in the introduction of Part I of this article. The keys were of uniform height — about 24 mm — and not stiffened in any way. As a result, they were simply too flexible to transfer any appreciable amount of energy from finger to action. With the capstan blocked, only 15 to 17 pounds of force was required to bottom the fronts of the keys through the bass section. Through the same area it would require up to 40 or 50 pounds of force to bottom the same keys in a 5'-2" to 5'-8" piano — assuming, of course, that they didn't break first.

Action performance was considerably improved by stiffening the keys in this piano. In the case of the Steinway keys found in pianos built with the Accelerated Action feature (See Figure 1-B), the half-round balance rail blocks can be removed and replaced with conventional balance rail punchings. Maple bottom

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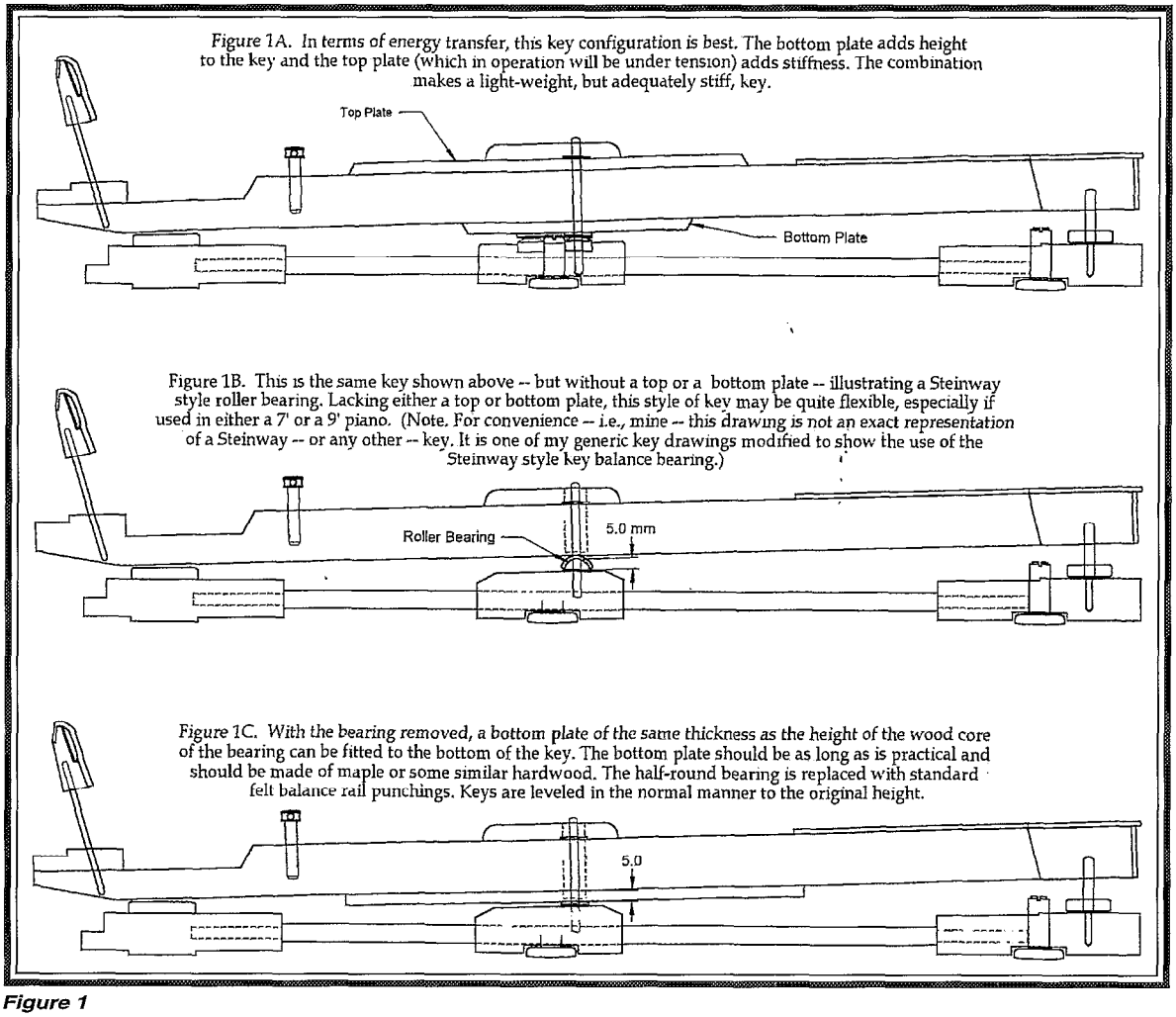


Figure 1A. In terms of energy transfer, this key configuration is best. The bottom plate adds height to the key and the top plate (which in operation will be under tension) adds stiffness. The combination makes a light-weight, but adequately stiff, key.

Figure 1B. This is the same key shown above -- but without a top or a bottom plate -- illustrating a Steinway style roller bearing. Lacking either a top or bottom plate, this style of key may be quite flexible, especially if used in either a 7' or a 9' piano. (Note. For convenience -- i.e., mine -- this drawing is not an exact representation of a Steinway -- or any other -- key. It is one of my generic key drawings modified to show the use of the Steinway style key balance bearing.)

Figure 1C. With the bearing removed, a bottom plate of the same thickness as the height of the wood core of the bearing can be fitted to the bottom of the key. The bottom plate should be as long as is practical and should be made of maple or some similar hardwood. The half-round bearing is replaced with standard felt balance rail punchings. Keys are leveled in the normal manner to the original height.

Figure 1

Continued from Previous Page

plates of the same thickness as the wood half-rounds can be glued to the keys and fitted to the balance pins — they must be drilled and the keys must be mortised appropriately, of course (See Figure 1-C). This does remove the last remaining *Accelerated Action* feature of any significance from the Steinway keyset, but when you're dealing with a set of keys as flexible as these were, the trade-off is well worth it.

In more conventional actions some advantage can usually still be gained even though the potential bottom plate thickness is somewhat more limited. By removing all but a minimum number of paper punching at the balance rail, fitting the thinnest available felt punching and possibly raising the overall key height slightly it is usually possible to make room for a 2.5 mm to 4.0 mm bottom plate. In some cases it may be necessary to mill down the balance rail slightly to provide the necessary clearance. Even this small thickness is capable of increasing the stiffness of the key significantly — remember, the stiffness of a beam increases with the cube of its height.

Note: *These are not intended to be "how-to" articles, so many of the details pertaining to exactly how these modifications are done are intentionally left out. It is assumed that to someone "skilled in the art" — a phrase the Patent Office is very fond of — once the problem is diagnosed and the appropriate fix for a specific action is decided on, the exact procedures to follow in carrying out the work will become obvious. In all cases, this work must be done with care and precision. You must have a thorough knowledge and understanding of action geometry and you must be a skilled woodworker to accomplish any of these modifications. Even if you understand the action geometry part, if you are not a skilled woodworker with access to the appropriate tools and equipment, it will be best if you farm this work out. This is not a project to tackle while you're just learning how to use your brand new table saw. In nearly every case, doing the job poorly will probably result in more problems created than solved. Done correctly and done well, significant improvements in action performance are possible.*

Key Offset Distortion— Through those sections of the scale that have more than a minor amount of key offset or "flare," distortion due to this offset is also a significant source of action slack. Relative to the balance rail, the key ends will rotate in opposite directions. For example in the bass section, the capstan will rotate counter-clockwise and the key front will rotate clockwise. (See Figure 2.)

Once the piano is designed and built, there is not much that can be done to reduce the negative effect of excessive key offset. When I was conducting my experiments and tests on action power, I tried several methods of stiffening the keys to reduce or control this tendency to twist. On one particularly troublesome piano I even laminated the sides of the keys with a carbon fiber/epoxy matrix. I did succeed in stiffening the keys somewhat as straight beams, but still they twisted just about as much as they did originally. There was some improvement, but considering the amount of time and work I invested in doing this — not to mention the mess I made in the process — the results were fairly disappointing. The best solution, of course, is to not design pianos with this much offset to begin with.

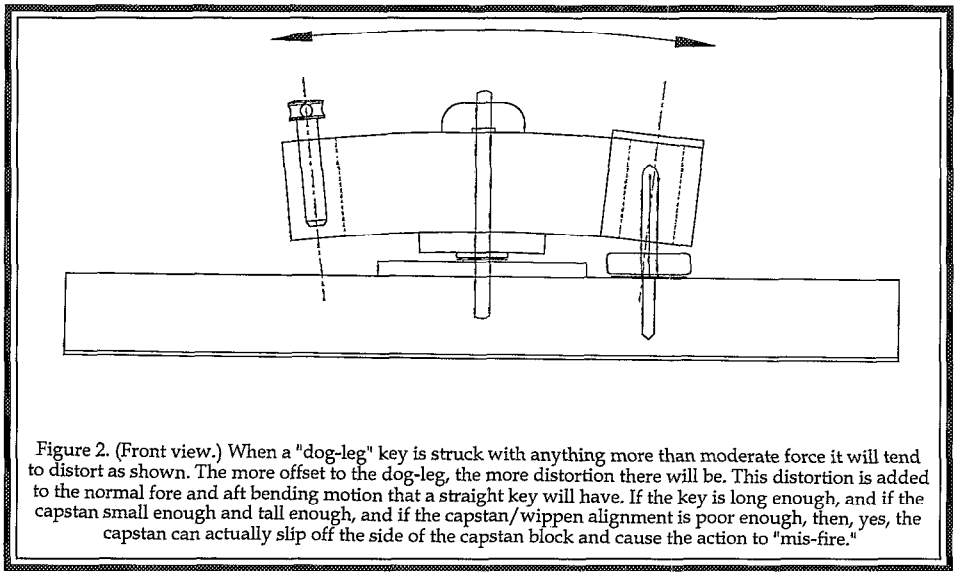


Figure 2. (Front view.) When a "dog-leg" key is struck with anything more than moderate force it will tend to distort as shown. The more offset to the dog-leg, the more distortion there will be. This distortion is added to the normal fore and aft bending motion that a straight key will have. If the key is long enough, and if the capstan small enough and tall enough, and if the capstan/wippen alignment is poor enough, then, yes, the capstan can actually slip off the side of the capstan block and cause the action to "mis-fire."

Figure 2

Before leaving this subject, I should mention that key offset is usually much greater in small pianos — both grands and verticals — than it is in larger instruments. When the scale designer draws in an excessively long — excessive as related to the piano's height or length — string length, one of the undesirable side effects will be a key set with a lot of key flare, especially in the bass section. Fortunately, the keys are also fairly short in short pianos which means that they will be somewhat stiffer by nature, but still ....

Balance Rail Punchings — With the key at rest there is relatively little pressure on the felt balance rail punchings. Once a key starts to move, the felt balance rail punching — being highly compliant — begins to compress. How much it compresses depends on its density, its thickness and its diameter. Since the paper punchings beneath the felt punching do not always lie perfectly flat there will also be some packing and compression taking place there.

The obvious solution here is to replace the felt and paper punchings with some harder material. So I did. I used the phenolic punchings that were available some years ago — perhaps they are still? — that were intended to be used as inserts to repair badly worn balance pin holes on the bottom of keys. In this case I simply used them in place of the normal felt punching. In terms of energy transfer, some improvement was apparent, however there were some problems. Even though hard maple inserts were used in the bottoms of the keys, they quickly became indented by the hard surface of the punching and in operation the keyset was quite noisy. It seems that keys bounce off the balance rail punching just a bit during hard playing. So, it was back to felt ...

Felt punchings—For best energy transfer, the felt balance rail punchings should be the thinnest and firmest you can find. I can think of no use — in the action at least — for the so-called medium to thick "balance rail" punchings. They do make good spacers on pedal pins, trapwork pins, etc. They certainly have no business being found under piano keys.

Paper punchings — The leveling punchings — usually card or paper — also should be the firmest, or hardest,

available. Generally, fewer, but thicker, punchings work better than a stack of many thin punchings.

Balance Rail

Balance rail support — The balance rail is really supported at only those specific points along its length where bedding screws are installed. Even then, it is only going to be supported if those bedding screws that are actually present (yes, I have seen actions in which they had been removed; who knows why) are properly adjusted. Remembering that the deflection of a beam under a given load — the balance rail can be thought of as a series of connected end-supported beams with varying loads being applied at varying points along them — increases with the cube of its length, you can see the importance of ensuring that all of the bedding screws are in actual contact with the keybed.

Occasionally you'll find an action which has an inadequate number of bedding screws. In these cases it is okay to locate and install additional screws as needed. Even if you aren't able to modify the keybed to provide a hardwood contact point for the new screw, the resulting increase in balance rail rigidity will be worth the effort.

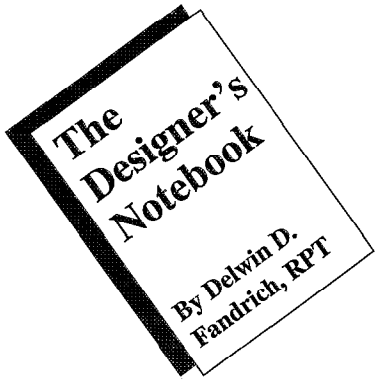
Balance rail stiffness — Between the bedding screws, the balance rail is free to flex under the stress of the key being played. Obviously, a stiff maple, beech or birch balance rail will flex less than one made of fir, spruce or pine even if the latter has hardwood inserts along the balance pin centerlines. (I've not had enough experience with aluminum rails in actual use to comment on their stiffness although it certainly should be possible to make aluminum rails adequately stiff — whether or not they actually are in practice you will have to determine for yourself.) It is fairly easy to tell if the balance rail is adequately stiff. With the action in the piano, simply locate a couple of balance pins about mid-way between two properly adjusted bedding screws and — using a piece of wood to protect your fingers — press down firmly on the tops of these pins while watching the fronts of the keys in that area. They should not deflect appreciably. Try this on a few different actions and you'll soon develop a "feel" for just how much key deflection is appropriate on different styles and sizes of actions.

Wippen Assemblies — Once the wippen has been made, there is not much that can be done to alter either its construction or its design. Fortunately, there is rarely a problem with either.

Wippen levers — Like the key, the wippen lever is subject to bending stresses. But, unlike the key, the wippen lever is relatively short and is nearly always stiffened in the middle by the capstan shoe. In addition, it is nearly always made of maple or hornbeam, although these days, *select hardwood* seems to be showing up here with disturbing frequency also. It is rarely necessary — or, for that matter, possible — to do much of anything to the wippen body.

Capstan felts — At rest the capstan felts — like the balance rail felts — are only lightly loaded. As energy moves through the key driving the capstan up toward the wippen lever, the capstan felt will compress. Again, how much it compresses will depend on the density and thickness of the felt. It will also depend on the leverage ratio of the action, the mass of the hammer and the related action parts, the force of the blow, etc. In other words, how much inertia there is in the system to accelerate and how much force is available to set things in motion.

The density of the capstan felt must be a balance between the need to efficiently transfer energy from the capstan to the wippen body and the need for a quiet action — wippens also bounce. I am not a fan of the "cushioned" capstan



felt arrangement as popularized by Steinway, et al. The additional cushion found under the center of the main capstan felt strip may provide a nice contour for the capstan/wippen interface and it may quiet the action somewhat, but it also makes for a highly compliant interface between the capstan and the wippen body. Especially under hard blows it absorbs a lot of energy before setting the wippen in motion.

Before leaving this subject, I should point out that the capstan head should be as large (in diameter) and have as large a radius as is practical. The larger head will be better able to distribute the shock load from the key over a broader area.

Action centers — Action centers in general will be dealt with later. Suffice it to say here that the center pins must be properly fit with no free play in either the bushed forks or the wood tongue.

Jacks — Excepting an occasionally loose fit of the jack center pin to its bushing, there is little energy loss within the jack itself. If the tip angle of the jack is not correct, rather than mating solidly against the knuckle, it can slide around a bit on the knuckle resulting in some loss of energy. And, if the tip of the jack is too small it will cause abnormal compression of the knuckle as well as prematurely wearing out the knuckle leather. This has been a problem with one particular action maker on and off for many years. If you encounter one of these actions, it will probably be best to replace either the jacks or the entire wippen assemblies rather than to attempt any modification of the original jacks.

Hammershank Assemblies — The hammershank assembly can be a source of significant energy losses. Just how much depends on the design and construction of the part as well as on the material from which it is made.

Knuckles — As with the capstan felts, the knuckle is under very little compression when the action is at rest. There is little additional deformation of the knuckle under light to medium blows, but as the jack slams into the knuckle under a hard blow, considerable deformation — which takes some finite and measurable amount of time — does occur. The amount of deformation that takes place in the knuckle and the resulting time lost both increase somewhat if there is even a slight amount of free space — lost motion — between the tip of the jack and the knuckle when the action is at rest.[5] Also, there will be more knuckle deformation at the bass end of the scale than at the treble end due to the increased mass of the hammers.

Hammershank design — There is a discernible time lag between the instant the jack starts to force the knuckle up and the point at which the hammer starts to move. In addition to the compression that takes place in the felt and leather components of the knuckle and the hammershank action centers, the hammershank itself will bend somewhat.

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How much it bends depends (among other things) on the amount of force the jack applies to the knuckle, the stiffness of the material the hammershank is made from, the cross-sectional shape of the hammershank and the mass of the hammer head. The shape of many hammershank shafts is less than optimal. (See Figure 3) Neither the traditional round shank nor the Renner octagonal shape are the stiffest cross-sectional shapes available for their mass. The rectangular shapes used by Pratt-Read and others were somewhat better in this regard. They were slightly heavier, but from the knuckle out toward the hammer for roughly the first half of the hammershanks length, mass is not a particularly great problem in any hammershank design: stiffness is — or, more accurately — the lack of stiffness is.[6]

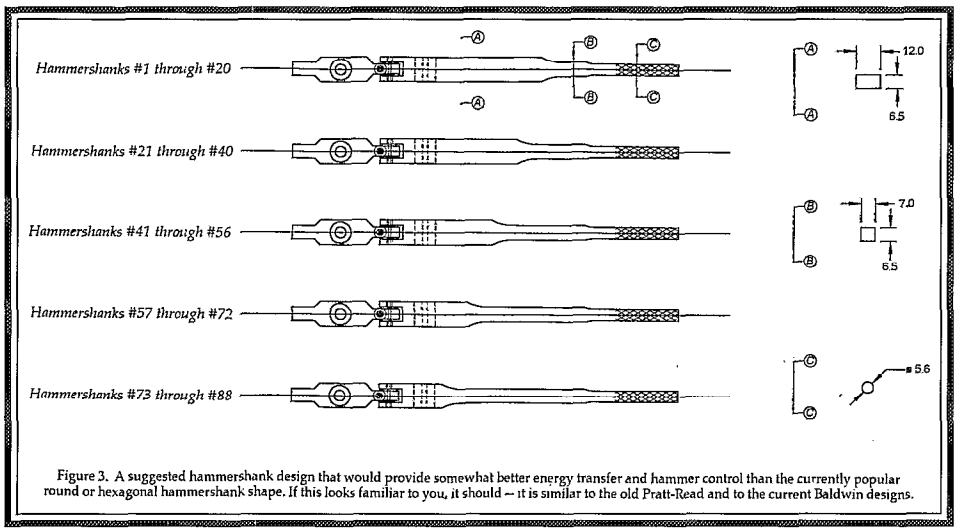


Figure 3. A suggested hammershank design that would provide somewhat better energy transfer and hammer control than the currently popular round or hexagonal hammershank shape. If this looks familiar to you, it should -- it is similar to the old Pratt-Read and to the current Baldwin designs.

Figure 3

Material—Perhaps I'm just overly traditional, but I remain convinced that close-grain hard maple is the best wood available for hammershanks. I've used and tested hammershanks made from hard maple, hornbeam and select hardwood and have consistently had the best results from those made of tight grain hard maple. I point this out just in case you're ever offered a choice. For the most part we're going to be stuck with whatever the action maker has decided to make their parts from — decisions which are made based on a wide variety of criteria of which action performance is only one.

Action Rails — Energy is lost to the action rails in two different ways. As the jacks slam into the knuckles the mass of the hammers resists being moved and the hammershank flanges — and with them the rail they are attached to — are forced up slightly. So far I have tested no material for action rails that performs even close to the dense laminated birch rails furnished with the current production Renner actions. The material is similar to Delignit pinblock stock and it makes excellent action rails. They are rigid, stable and easily repairable in the unlikely event that you should ever strip out a screw hole — it would have to be through negligence; these things are tough. Other than replacing the rails — in some cases the entire action frame — there is not much that can be done if you suspect excessive flexibility in the action rails to be a problem.

Action Centers — All action flange bushing felt will compress slightly under a load. What effect this has on action slack depends on just how much compression actually takes place in the felt used to bush the center, on the type of lever and the lever ratio involved, and, again, how much inertia and force are involved. For example, excessive compliance in the bushing felt used in the hammershank action center will have more effect on action slack than will the same felt used in the wippen flange center. A carefully fit action center with firm bushing cloth will have less give than one fit with loose cloth even though their bench friction measurements may read the same. Checking the friction of an action center is not a good indicator of how well a center pin is fit to a newly installed bushing. An action center with a pin "properly" fit to loose bushing cloth can test with an appropriate amount of friction but still have quite a lot of compliance. If all you have to work with is a fairly loose action center cloth, fit the center pin *very* tight and shrink the bushing to fit. This will have the effect of "densifying" the cloth and will provide a much more solid support for the pin. With properly fit pins in firm bushing felt there is normally not much energy lost due to bushing compression. However, it can

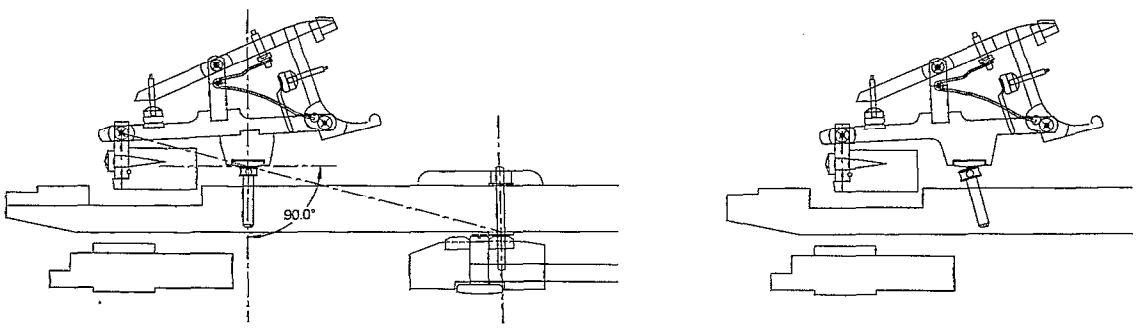


Figure 4. The top of the capstan should contact the felted surface of the capstan block at a 90 degree angle when the key and wippen are at half-stroke. If the capstan is angled (as in the illustration on the right) the contact area at the capstan/wippen capstan block interface will be greatly reduced. This results in considerably higher unit pressure against the capstan block felt which, in turn, compresses and wears the capstan felt much more than with the configuration at left. (Note. These drawings are generic. They are not intended to represent any particular manufacturers design. DDF)

Figure 4

be a factor if the bushing cloth is not adequately dense so it does pay to spend the little extra time and effort necessary to be sure that all action center bushings use good firm bushing cloth, that the cloth is installed correctly and that the center pins are fit precisely. The two most important action centers in terms of action slack are the jack bushing and the hammershank bushing.

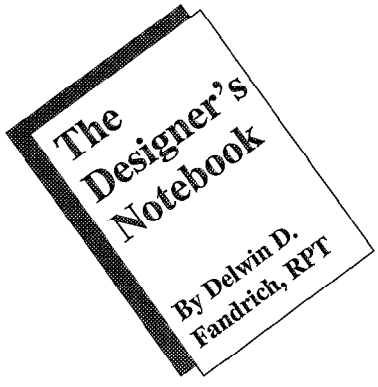
Action Alignment — Several alignment parameters can affect the transfer efficiency of an action. Among them are:

Capstan to wippen alignment — This includes both the side-to-side alignment as well as the angular relationship of the capstan to the wippen lever whether or not a capstan block or shoe is used. If the capstan is not reasonably well centered under the wippen — i.e., side-to-side alignment — a certain amount of energy will be wasted as the capstan tries to slide off to the side of the wippen. The back of the key will be trying to twist one way while the wippen is trying to twist the other way. The angular relationship of the capstan to the wippen should be such that the centerline of the capstan forms a 90-degree angle to the centerline of the wippen lever at half stroke.[7] (See Figure 4) If the top of the capstan does not mate squarely to the capstan felt, the contact area will be reduced and there will be a loss due to the resulting increase in the compression of the capstan felt.

Jack to knuckle — The fit of the jack to the knuckle. If the jack tip is not square to the knuckle, or if it is not adjusted properly fore and aft, energy transfer efficiency will be reduced, again due to the increased compliance at the transfer point.

Action Regulation — Obviously, a well regulated action will perform better than one which is poorly regulated. However, most of the performance deficiencies resulting from a poorly regulated action will show up primarily when the piano is being played softly or at medium volume levels, not when it is being played hard. The obvious exceptions are the adjustment of the jack and the repetition lever. If there is any gap at all between the tip of the jack and the knuckle — i.e., "lost motion" — under a hard blow, it will take some measurable amount of key travel to take up that slack. At rest, the weight of the hammershank knuckle should be supported equally by the two sides of the repetition lever and the tip of the jack. If there is even a slight amount of space between the tip of the jack and the knuckle at rest, this interface will become a significant source of action slack. And if the jack is adjusted too far foreword — toward the hammershank flange — it can slip off the knuckle completely under a hard blow even though it may function adequately under a lighter blow.

Tools — *"When the only tool you possess is a hammer, every problem begins to look like a nail."* The foregoing is certainly not a completely exhaustive study of action design and function. It has not been my intention to turn loose on the industry a bunch of new action designers out modifying all of the actions they run across. The things discussed in this article are only possibilities. Most problems of poor tone performance can be traced to fairly common sources: worn hammers, poor basic action regulation, soundboard problems, etc. What I've presented in this article should be simply one more diagnostic tool to add to your bag of tricks. Once again, your comments, experiences and suggestions on this topic will be appreciated.



Notes

1. *One of the major improvements that the Fandrich Vertical Action brought to the vertical piano was the effective control of both the static and dynamic lost motion inherent in the conventional vertical piano action design.*
2. *Günther Grass (b. 1927), German author. Quoted by Arthur Miller in:* Paris Review *(Flushing, NY, Summer 1966).*
3. ***Select Hardwood:*** *A species of wood that meets the legal requirements to be classified as a hardwood, but one having such poor strength or other physical qualities that the manufacturer is ashamed to either name it or admit to actually using it.*
4. *To learn more about the strength characteristics of piano keys, look at the discussion on the strength of simple beams — keys are, after all, fairly simple, more or less centrally-supported, end-loaded beams — please review the article* The Mechanics & Strength of Wood & Wood Structures *that appeared in the April and June (1996) issues of the* Piano Technicians Journal.
5. *The belief that there is no lost motion in the grand action is true only if the action is well regulated. Unfortunately, there is usually some amount of lost motion — varying from barely noticeable to significant — in most real-world piano actions. Also keep in mind that there is both static and dynamic lost motion to deal with. Static lost motion can be regulated out. Dynamic lost motion results from the action parts bouncing around during aggressive play. Not much can be done to eliminate dynamic lost motion.*
6. *It is debatable just how stiff a hammershank can be made and still be usable. A significant increase in the stiffness of the hammershank shaft would inevitably increase the shock loading of the hammershank action centers and the wood from which the fork and tongue are made, both of which are already fairly highly stressed if we consider longevity to be important. And we generally do. Having said that, though, it would seem still that some increase in the stiffness of the hammershank shaft could be tolerated without too many adverse side effects. This change would definitely improve the energy transfer efficiency of most actions by some measurable amount.*
7. *This assumes a modern wippen design and does not apply to the involute geometry used in early Steinway actions. There is also a relationship that should be adhered to in those actions. Unfortunately, this excellent design seems destined to rarely be executed correctly. Many of these actions still have angled capstans but use squared wippen shoes.*

An Essay on the History of Tuning - Part I

By Skip Becker, RPT
Northeast Florida Chapter

Introduction

Professional keyboard tuners, as distinct from musicians, began to emerge only about 200 years ago. The technological advances in pianos, such as high tension strings and trichord unisons, made the formerly "easy" task of keyboard tuning both difficult and daunting. Before then, musicians tuned their own instruments, and keyboard teachers were expected to tune and maintain the instruments of their students. In regards to the origins of tuning, its history turns out to be, for the most part, the history of music. And, surprisingly, the history of music is, in large part, the history of tuning.

Pythagoras, the First Tuner

It is necessary to begin the history of tuning with the ancient Greeks. This is most convenient because they left piles of books for us to study. We can be even more exact about the origins of tuning, and begin with Pythagoras, a 6th-Century B.C. philosopher, a term he coined. Before then, wise people had been known as sages, meaning "one who knows." Pythagoras took philosopher to mean "one who is trying to find out." This is not to say that before Pythagoras there was no tuning. Multi-stringed instruments, such as the lyre, were tuned in just intonation. Traditional folk instruments are tuned that way today. The Ionian scale was already ancient by the time of Pythagoras, known as the scale of Homer. Yet of all the ancients, only the Egyptians had elevated music to a "divine science," and in order to study music on that level, one had to be initiated into their religious mysteries — something generally reserved for the Egyptian aristocracy. They did, however, initiate Pythagoras. He was the first non-Egyptian so initiated, but he did have to spend 20 years living in Egypt, studying with priests, in preparation. The sacred lyre of the Egyptian priests had only three strings, one to represent each of their seasons (tuned justly C, E and F). Yet the priests delighted in being able to play every note which the "entertainers," the court or street musicians in Egypt, were able to play on their seven-, 12-, or 17-string lyres. This implies they knew about string harmonics.

From Egypt, Pythagoras traveled to Chaldean Babylon, and was initiated into their mysteries as well. The sacred lyre of the Babylonians had four strings. Once again, each note represented a season. We recognize the tuning of this lyre as the tetrachord (C, D, E and F). This is the base for our diatonic scale, which is composed of two tetrachords, separated by a whole step.

After his traveling days were over, Pythagoras settled in Crotona, Italy, where he established his university, the first acknowledged school of higher learning. Prospective students were examined for their knowledge of music, mathematics, and what we might call astronomy. If they were found lacking in these areas, they were summarily dismissed. Never addressed by name, Pythagoras was referred to as "the Master," or "that Man." "Because he said so" was sufficient to answer any and all questions. Pythagoras is often credited with being the founder of the sciences of acoustics, mathematics, and astronomy, but in reality he was the founder of science.

For Pythagoreans, this comma was not the troublesome obstacle it is for us. Instead, it was good news. The twelfth 5th in the cycle does not complete, but rather exceeds the octave. This implies not just completion, but a new beginning: renewal and rebirth.

Astronomy in those days was the "study of the heavens," including not only the observations of planetary bodies, but also cosmology, theology, philosophy, the calendar, astrology, and meteorology. What we call acoustics was, of course, music. His work in mathematics, geometry in particular, remains the foundation of that science to this day. His genius was in noting the interrelatedness of these sciences, with numbers being the basis for everything. These three sciences, collectively known as the "Trivium," were to be the core of classical education for the next 2,000 years.

Music is Proportion

Pythagoras was the first to quantify that dividing a string length in half produced an octave, a ratio of 2:1. A 5th was produced by a ratio of 3:2, and a 4th by a ratio of 4:3. He thus proved that musical tones were based in numbers. Leibnitz may have said it best: "Music is mathematics for souls who don't know they are calculating." As tuners, we work every day with the Pythagorean comma, which is commonly expressed mathematically by the ratio 81:80.[1] For Pythagoreans, this comma was not the troublesome obstacle it is for us. Instead, it was good news. The twelfth 5th in the cycle does not complete, but rather exceeds the octave. This implies not just completion, but a new beginning: renewal and rebirth.

The idea that sound was composed of vibrations also comes from "the Master." These vibrations "originate from a source and travel through a medium (the air), and affect the sensory organs (ears) as acute or grave, depending upon if the vibrations are fast or slow." (Iamblichus) Pythagoras was the first to advance the notion of heliocentricity (planets orbiting the sun), and was also the earliest advocate of the solar calendar, which he thought to be more rational, and better able to gauge the passage of a year than the lunar calendar in use throughout the Mediterranean region.[2] He saw the Sun traveling through the twelve houses of the Zodiac as a musical journey — the cycling of twelve 5ths in the chro-

matic scale, associating an ascending 5th with each house. He also found the ratio of the solar year to the lunar year to be the same: 81:80 (it's more than just a little close).

Three Kinds of Music

Pythagoras conceived of three kinds of music: 1. *Musica Instrumentalis,* or music made by people playing instruments or singing; 2. *Musica Humana,* or the music which human beings are, (he likened people's bodies to the body of a guitar, and our nervous systems to the strings); 3. *Musica Mundana,* or the Music of the Spheres. Pythagoras reasoned that if one rolls a ball on the earth, it will make a noise. Therefore, a large ball, such as the moon, or sun, or the planets cannot fail to make a large noise. The planets each produce a musical tone, and their orbits were laid out in proportion like the notes in a musical scale. Together they create a celestial harmony. And the trouble with people is that the music which they are (musica humana) gets out of harmony with the Music of the Spheres. This is the root cause of disease, anger, depression, anxiety — in short all human ills. Therefore he composed "musical remedies," tunes which affected the human organism (musica humana) in such a way as to bring it back into "harmony" with the Music of the Spheres.

The Noble Purpose of Music

Pythagoras added the eighth string to the seven-stringed "Lyre of Terpander," supplying the octave and creating the diatonic scale. This work remains with us today in the form of the white notes on our keyboards. Although he certainly knew about chromatic tones, he excluded them from his scale. The eight notes in the diatonic scale were all that was needed for the "purposes of Music," i.e., ennobling humanity. He named the Ionian mode for his native area (Pythagoras was known as the Ionian teacher). He also named the other modes: Dorian, Phrygian, etc., named for peoples and places of the ancient Greek world, who presumably sang and played in those modes.

Each mode ("mode" is a derivative of "mood") had a distinct masculine or feminine character, depending upon whether the third step was major or minor. Masculine modes had a major third (C, F, and G). Feminine modes had a minor 3rd, and were considered to be very emotional. It is interesting to note that early Christian music was restricted to the masculine modes, until the time of Gregory (6th Century C.E.), who opened church music to all modes, which gave rise to the Gregorian chants.

It is said that of all people, Pythagoras alone heard the Music of the Spheres — music with us from birth, so omnipresent that we are no longer aware of it. So for him, the purpose of music was to ennoble, and to heal. Ancient Greek texts are full of anecdotes which tell of the amazing power and potency of his music. Unfortunately, we have no examples today. But we do know how he tuned his lyre, and he was very strict about tuning, because otherwise the musical medicine wouldn't work.

Pythagorean Tuning

Pythagoras was concerned with only three intervals. The octave, (his favorite), the 5th, and the 4th. He called the octave the diapason, which means through all the chords (strings on the lyre). The intervals 4th and 5th get their names from the number of strings they encompass.

These intervals had to be perfect, or pure. The interval of the 2nd was derived from dropping a pure 4th from the perfect 5th. The 6th was achieved by a perfect 5th above the 2nd. The 3rd came a 4th down from the 6th, and the final 7th was a perfect 5th above the 3rd. It should be noted that this is a tuning system, and not a temperament, as not a single note is tempered.

Pythagorean intervals are noted for being very large. In terms of beats per second, the major 3rd from C3 (C below middle C) to E3, beats about eight bps in Pythagorean intonation. That's about three bps faster than the same third in equal temperament. Equal temperament cents (100 to a semi-tone) provide an excellent gauge for comparison to today's standard. The cents deviation from equal temperament for Pythagorean tuning is: C = 0, D = +4, E = +8, F = -2, G = +2, A = +6, B = +10. The 3rd, for example, is over eight cents larger than equal temperament's already very large major 3rds (13.7 cents above the just 5:4 ratio). Compared to the just intonation of his time, Pythagorean 3rds sounded like a discordant jangle (22 cents wider than just).

> So entrenched was Pythagorean tuning that Grammateus (Heinrich Schreiber) actually risked excommunication when, as late as 1518, he suggested tempering a single 5th.

Musicians of other schools of music, known as the Harmonics, railed against this tuning, claiming it sounded awful. Pythagoras replied that they were using poor sensory organs to judge his music. They were using their ears. He employed a much finer organ to devise his tuning system: his reason. His harmony is perceived directly by the mind. This school of tuning became known as the Canonics. The music of the Harmonics might sound good, but in Pythagorean music one heard the Good. This was the beginning of the argument which has lasted for millennia: Senses vs. Reason (*sensus versus ratio*).

Ideas that Won't Die

Another remarkable feature of "the Master" seems to be that he didn't age like the rest of us. As he got older, he got healthier — stronger, more vital, more energetic. However, his politics must have been as "offensive" as his large major 3rds. He was assassinated (they were apparently unwilling to wait for him to die — he was in his 90s!). The reports of his death vary, but they all include fire, and the destruction of his university. For a short while after his death, his work was repressed. Pythagoras wrote nothing, but after his death most of his disciples wrote tracts of what they remembered. These tracts were handed down through generations, and all we know of the teachings of "that Man" comes from them.

Although his philosophy of "music to ennoble," to "harmonize with the Music of the Spheres" has

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since been branded "superstition" and relegated to the dust-bins of history, it endures as an apt description of the effect of "great music." His tuning system endured for over 2,000 years after his death, and was in exclusive use as keyboards developed. So entrenched was Pythagorean tuning that Grammateus (Heinrich Schreiber) actually risked excommunication when, as late as 1518, he suggested tempering a single 5th. (Bill Garlick)

Music in Ancient Greece

It should be pointed out that "music" in Ancient Greece had not been separated from poetry (musical programs are still known as "recitals").[3] The great orators of ancient Greece always spoke with lyre accompaniment. Poetry, when recited, was given what the poets call "feet and meter," and "with no more ado, a poem became a song." (Roger North) The Greek plays were sung, and the Greek choruses were real choruses. Lyre playing (instrumental music) didn't become a separate Olympic event until the time of Aristotle (all the philosophers railed at this development). Even Pythagoras was suspicious of instrumental music because without words to guide its effects, music was too unpredictable. He read excerpts from Pindar and Homer while his melodies were played on the lyre. When evaluating the reports of the miraculous powers attributed to Pythagorean music (healing the sick, even the suppression of mutiny), modern scholars conclude that "the demon was in the poetry." (North)

Today, we cannot help wondering how seriously they took this philosophy of music. We know that in Sparta, music lessons were mandatory! Men were restricted to singing songs in the masculine modes (stirring and invigorating, perfect for the military), and women were restricted to the feminine modes. The diatonic scale was sacred, as was Pythagorean tuning. Any attempt to change or introduce new notes was regarded as high treason, threatening the very "foundations of the State." (Plato) For example, when Timotheus, one of the most celebrated poets of antiquity, entered Sparta with his 12-string lyre he was arrested and brought to trial before the high council. The arrest warrant is extant:

"Whereas Timotheus, the Milesean, coming to our city, has deformed the ancient Music; and laying aside the use of the eight-string lyre, and introducing a multiplicity of notes, endeavors to corrupt our youth by means of these novel and complicated conceits, which he calls chromatic; by him employed in the room of our established, orderly, and simple music ... It therefore seemed good to us, the King and Council, after having cut off the superfluous strings of his lyre, to banish said Timotheus out of our dominions, that everyone beholding the wholesome severity of this city, may be deterred from bringing among us any unbecoming customs."

Athenaeus, a historian, adds that when the public executioner (!) was on the verge of fulfilling the sentence by cutting off the new strings, Timotheus noticed, in the council chamber, a statue with a lyre in its hand. It had as many strings as that which had given offense. After showing this to the judges, he was acquitted.

Footnotes

1. *The actual Pythagorean comma is 531441:524288. The comma of Didymus is 81:80. The difference between the two is 0.00114326.*
2. *Pythagoras' ideas about heliocentricity were early on misunderstood, and corrupted into the Aristotelian dogma that the Earth was the center of "Creation." When the Polish astronomer Copernicus advanced heliocentricity in the 14th century, it was dogmatically unacceptable. An interim "politically correct" solution was found in the work of Dutch astronomer Tycho Brahe. Brahe theorized that the planets revolved around the sun, as demanded by the new astronomers, but the sun and attendant solar system revolved around Earth.*
3. *Liszt revived the term "recital" in modern times. He used to leave the stage between selections, and interact with the audience "talk show host" style.*

Watch Out For Those Elbows!

By Jim Ellis, RPT
Knoxville, TN Chapter

If there is such a thing as *"Lessons learned the hard way"* section in the *Journal,* that's where this short article needs to go. If there is not, then perhaps one should be started. If you think I am writing about those funny little parts made of wood or plastic that go between the inverted abstracts and the wippens of spinets, let me assure you, I am not! I am writing about the kind of elbows made of flesh and bone that go between the shoulders and the wrists of human beings.

Why am I doing this? I'll tell you. I'm sitting here at my typewriter today because the doctor took the cast off my right arm yesterday, and I can use my right hand again. A little mini-computer-controlled, battery-powered pump is hanging from a strap over my shoulder. It has a little tube coming from it that leads to a needle stuck into a vein in my arm so that it can give me a squirt of high-powered antibiotic on a pre-programmed basis. I have been hooked up to it ever since I got out of the hospital four days ago. The reason I am wearing this thing is that there is no way to develop the required concentration of antibiotic when taking it by mouth — it has to go straight into the vein. If this article prevents just one *Journal* reader from going through what I did, then it will have been well worth it!

The Tuner's Life

This all began when I was called to tune a beautiful concert grand at a local church. The piano needed a lot more than just tuning. The action was sticking, but the keys were loose enough to slap one another from side to side. The key level was all over the map, and some of the dampers were hanging up in the air. They weren't binding. They were hanging up from some condition down below, and they would go up and down as the pedal was used, but never touch the strings.

When I pulled the action, I could see what the problems were. The sticking was caused by tight action centers. The keys were loose and slapping because the bushings were worn out from much use — apparently some very hard use as well. The dampers were hanging up because some of the lead weights had fallen out of the underlevers, and were lodged in the tray, causing the underlevers to ride up on them. Some other weights were half-in and half-out. This caused those underlevers to snag their neighbors, which for the most part had already lost their weights. The key bushings would not be a warranty item, but the underlever weights would, if the piano were still under warranty.

I called the manufacturer to see if the piano was still under warranty. It was; I described the problem to the technical representative. He told me that they certainly did not want one of their concert grands out there in that condition — to just pull the entire damper action, fix it, and send them the bill. He didn't ask a bunch of questions. He just said he knew I would do the job right, and to send them the bill. I appreciated that, because that is what I would do whether he said it or not.

I told the Minister of Music that I would start work on the piano on a Monday morning, and have it all done in time for church service the following Sunday. Except for a few additional problems that I found and fixed, everything went as expected. It wasn't that a few weights had fallen out of the underlevers — only a few weights were still in them, and they were ready to fall out. I was not pleased with the way the wippens had been traveled at the factory, so I did that job over and added it to the bill. By late Friday the shop work was all done. The keys were bushed, squared, spaced, and leveled as well as they could be without actually being in the piano. I was pleased with the job.

By Saturday afternoon, I had the piano all back together and the dampers regulated, but the sostenuto was giving me a fit! It was marginal before I started the job, and it was marginal afterwards. The rod was down as far as it would go, and in as far as it would go, but it was still too high and too far out. I would have to modify the mounting of the brackets (hangers) before I could regulate it. I did, and then it worked just fine. I was ready to slide the action in when I noticed a spot of blood on the keybed. I found the source. It was my right elbow. I had abraded it against the keybed without even noticing that I had done it. Back home that evening, I applied some Bacitracin® ointment, and put a Band-aid® on it. It was a very minor abrasion.

On Thursday evening of the following week, Colleen (my wife) noticed that my elbow was swollen, and suggested that I see my doctor the next day. But I didn't. I would just wait until Monday, and then see the doctor if it wasn't better. By Saturday afternoon (just a week after I hurt it), the swelling was much worse, and it was hot to the touch. Colleen *told* me that she was taking me to the hospital emergency room, and that time I agreed to let her do it!

The emergency room doctor took one look at my elbow, and said he would have to lance it, pack it with some medicine, give me a tetanus shot, and write me a prescription for a strong antibiotic. When that was all done and my elbow was bandaged, Colleen and I went to an all-night pharmacy to get my prescription filled. Back home, I took the first dose of antibiotic and a pain pill, and went to bed. My elbow hurt all night. Early the next morning, I took the second dose of antibiotic and another pain pill. Two hours after that, I was getting dizzy. An hour or two later, I had a chill. I started taking my temperature and quickly saw that it was going up almost a degree an hour, and my elbow was really hurting.

We ate a quick lunch, and Colleen took me back to the

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emergency room. The same doctor who treated me the evening before was back on duty. Now this was Sunday afternoon. He took the bandage off and — oh, my! What a mess! He said he needed to call in an orthopedic doctor. Colleen works as a volunteer at the hospital one day a week. She asked if Dr. McKellar were available. Answer: "Yes, he happens to be on call this afternoon!" Very soon, Dr. McKellar arrived. He took one look. "Oh, my!" I'm going to have to take you to surgery and open that all up from here to here and wash it out to get as much of that infection out as possible, and then put you in the hospital for a few days — and I mean as soon as I can get you scheduled for the O.R., *not* tomorrow. If we wait until tomorrow, it is going to be a lot worse than it is now. The worst thing you can do for something like this is to under-treat it."

Dr. McKellar explained it to me. A tiny bit of bacteria had somehow gotten into the sack surrounding the joint. That way, it was somewhat isolated, and there was so little of it at first that my body didn't recognize that it had been invaded. The bacteria was nice and cozy in the sack of fluid surrounding the joint. After being undetected by the body for a few days, it multiplied to such a level that its growth then took off like a house on fire. The solution: open it all up; clean it out; and then soak me with antibiotics by I.V.

By early evening I was in the O.R. The anesthesiologist was reluctant to put me under a general because I had eaten just a few hours earlier, and a local was out of the question because of danger of spreading the infection. He would try a nerve block in the upper arm, but if that didn't work, he would go ahead and put me to sleep. That made sense to me, and I agreed.

The nerve block was no fun. My fingers went numb as numb could be, but there was still feeling at the elbow. We decided to go ahead. The surface incision didn't hurt much, but when Dr. McKellar got into the joint, it really smarted! At one point the anesthesiologist offered to put me under. I asked how much longer it would take. Dr. McKellar said it would be only about 10 or 15 minutes more. I said, "Go ahead, I'll tell you if I can't handle it." But the worst was over, and before long my arm was all bandaged up and in a cast with a drainage tube coming out into a little pouch. I was in the recovery room just long enough to satisfy the hospital's procedure. A nurse asked me what kind of music I would like to hear, and I said "Bach, Mozart, or Beethoven." That got their attention! That's not what most people wanted to hear, she told me. My preference wasn't available so I said just shut it off and leave it quiet. (It was Sunday evening; I was the only emergency; so I got to pick and choose about any music. Had it been Monday morning, it would have been a different story).

I was back in my room very soon. The nurse came in to offer me morphine for pain. I turned it down because I wasn't in pain. She came back later. Had the feeling come back into my hand and arm? Yes. Was I in pain? No. She couldn't believe I wasn't hurting, and I couldn't either, but there was no pain. I was very uncomfortable, but nothing I would call pain. From there on, I was on I.V. antibiotics around the clock. Recovery was rapid. I was out of the hospital by Tuesday afternoon, and set up with Home Care to keep me on I.V. antibiotics by this little mini-computer-operated machine. The nurse comes once a day to change the cartridge in it. I can get rid of it Monday morning and go to a week's worth of oral antibiotics to finish off the treatment.

I'm very pleased with the treatment I received at our local facility. That includes the doctor, the nurses, the lab that identified which bug it was and tested the antibiotic on that particular strain of it. It's one of those tricky bugs that can mutate and change form to something the antibiotic won't kill. That's why they have to hit it hard and be sure it is completely wiped out before they quit. Otherwise, they end up with bugs that are immune to the antibiotic. It is also one of those that can live indefinitely on a dry surface until it comes in contact with live flesh. Then it can go to work. The doctor told me that he sees more of this sort of thing than I might suspect.

Comments

This is my way of running up a warning flag to you. This is an accident up ahead just waiting to happen. This is my account of what happened, and how it happened. How it could have been prevented should be obvious! The sequence of events leading up to my trip to the hospital emergency room was so absurd — so ridiculous — when you stop to think about it!

We all get little cuts, sticks and abrasions from time to time, and nothing bad develops from them because our bodies get rid of the "bugs" as fast as we come in contact with them. Then without warning, one of us picks up the wrong micro-organism with some vulnerable part of our body at the wrong place and the wrong time, and then it hides out, unrecognized by the body until its population has increased until it can do real damage. By the time the body knows it has been invaded, things are out of control. Before the days of antibiotics, something like this could have cost me my right arm (my tuning arm) at best, or my life at worst. It's a sobering thought!

I was proud of the job I did on that piano. I sorted out the warranty items from the non-warranty items, and sent the appropriate bills. Now I am thinking about what my combined medical bill is going to be, and that spoils the whole thing! My fees for fixing that particular piano won't even make a dent in my combined medical bill. Don't get me wrong — I'm pleased with the medical skills I received. My recovery after the emergency surgery was rapid. My doctor obviously knew what he was talking about when he told me he needed to go in and clean out the elbow ASAP! It worked! I hate to think how it would have been if I had waited "until Monday" to see the doctor as I had first intended!

It disturbs me to think of the complications that developed from such a minor little scuff on my elbow, and how much worse it would have been if I had waited another 36 hours to see a doctor. It also makes me realize how fortunate I have been over the years. I have cleaned mouse droppings out of a lot of pianos in rural churches, but never contracted any of those dreadful diseases that are sometimes carried by that stuff. At various times (years ago — never recently), I cleaned a strange-looking whitish powder from a few pianos, and was never poisoned by it (and I don't mean talcum powder either — see next paragraph). Some 45 to 50 years ago, I found myself replacing a lot of keybed felt that had been badly eaten and infested by moths. I don't see much of that now, but I did then. I would strip out all of the old egg-

infested felt, bag it, and burn it. I bought key-rail felt rolls by the dozen, and punchings by the thousand. Most of it ended up in pianos in rural churches. The problem was, what to use to treat the pianos to make them unattractive to next year's moths. Tuner's Supply Company sold some stuff in glass jugs that worked fairly well, but it smelled like the local dry cleaner's plant. Otto R. Trefz, Jr. & Co., Inc. sold a liquid in metal cans that had less of an odor. These were to be brushed on to the bare wood of the keybed, not sprayed. One elderly technician I knew used turpentine brushed on the keybed (not the new felt). The stuff worked, but the piano smelled like turpentine for the next five years or so. Another elderly technician told me he used arsenic dissolved in "white" gasoline. Yes, you read that right! It worked! *Nothing* could eat that stuff and live! I knew then that white powder was what I was seeing from time to time, and my internal "red flag" went up big time! Would I ever use that mixture? *No Way!*

The Tuner's Life

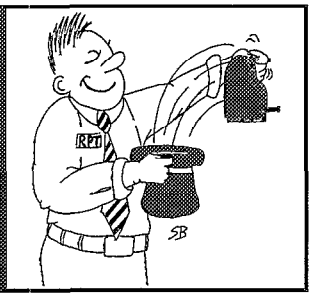
Conclusion

The moral of this article is, "We live and learn," or else, let's hope we do! My suggestion to you is: protect yourselves from injury by whatever means the occasion warrants. You readers are smart; you can figure it out. If you do get an injury, however slight, just remember that it could be the time and place when and where some micro-organism invades your body, hides for a while, and then causes real problems! Go ahead; be a "sissy" and treat it right then and there! That's what I am going to do from now on!

And lastly, Colleen has a bit of advice for you men out there. Here it is: "Husbands, listen to your wives! Believe it or not, we know when things aren't right. When we tell you to see a doctor, don't procrastinate; do it immediately."

Grand Illusions ...

The Page for Serious Cases



Beethoven Vs. The Dinosaurs!

By Doug McKay

What if the great composers were alive in the days of the dinosaurs? We all know that Johann Sebastian Bach was a master of counterpoint; but how would he do, armed only with a sharpened tree limb, against a Tyrannosaurus Rex?

Live the drama with Valley Hi Great Composer Action Figure Sets. Each set features a great composer paired with a dinosaur: Beethoven and a Velociraptor, Debussy and an Allosaurus, and Bach versus the mighty Tyrannosaurus. Pull off Beethoven's right arm to see a realistic Dino-Bite!

■■■

You've probably noticed that many owners of Toyota pickups paint over some of the letters on the back of the truck, turning the word *Toyota* to *Toy* or *Yo*. Did you realize that you can do the same thing to a piano? Using one of Valley Hi's Finish Touch-Up kits, you can turn *Yamaha* to *Ya Ha*, *Schimmel* to *Hi Mel*, and so on. Come by the store and we'll give you a free list of suggestions.

■■■

Never leave your customer's home without selling something extra. Like our Piano Cologne, to maintain that new-piano smell. And never forget McKay's Second Law of Selling: *Promise everything; Give something — at a reasonable price.*

Vintage Water

By Murray Sosnick

I am gratified, and at the same time, deeply humbled by the letters I've received from technicians using Murray's Piano Water. Perhaps now some of you are ready to try a *vintage* water.

Just last week I was in a client's home and announced that I had brought something special. I placed a small oak crate on their dining room table, opened it with a crow-bar, and pulled out a bottle of 1969 Folsom Lake. Of course, I had to decant it to remove the sediment. My client was amazed.

Call for our free catalog. Remember, if you want to grow your business, try a little vintage water.

Doug McKay, Murray Sosnick and Joe Mehaffey may be contacted c/o Mark Stivers, RPT, of Sacramento, CA

I Give Full Service

By Joe Mehaffey

For years now, I've been telling you knuckleheads to give *full piano service.* Don't just tune for an hour and then leave, dancing a jig and waving your customer's check in the air.

You have to service the whole piano *environment.* Start by cleaning the rug around the piano. (And don't just vacuum; use a heavy-duty steam cleaner). If any of the pictures on the wall are askew, straighten them. Dust around the knick-knacks. If the drapes are utterly wrong, suggest new ones. (You don't have to install them yourself.) Dust the shelves, wipe the counters, and mop the linoleum.

If you want to do the windows too, that's great. But you should charge extra.

And now the question of piano odor. People tell me, "Piano cologne? Joe, you're nuts!" Yes, in a perfect world, the smell of your piano wouldn't matter. But let's be honest—it does. Arthur Rubenstein used to say, "When I play the piano, I make love. It's the same thing." And when your partner in love smells like a compost heap, it's hard to maintain your interest.

"What do you mean you're all booked up? My party starts in an hour and I want it tuned now!!

PTG Review
PIANO TECHNICIANS GUILD
Dedicated To PTG News • Interests & Organizational Activities

On A Roll To Orlando — July 23-27, 1997

The 40th Annual PTG Convention and Technical Institute is more than half a year in the future, but plans are already underway for the Orlando Convention. Not two months after the 1996 convention ended, the 1997 Convention Planning Committee was meeting at the Radisson Twin Towers, the site of next year's convention.

The 1997 Technical Institute will feature nine class hours on wood technology, presented by Professor Bruce Hoadley. Professor Hoadley grew up in Naugatuck, Conn., in the 1940s. His boyhood fascination with the woodlands surrounding his home and his experiments in cabinetmaking, carpentry and whittling led first to a degree in forestry from the University of Connecticut, and later to a doctorate in wood technology from Yale. Today, in addition to teaching and research at the University of Massachusetts at Amherst, Hoadley also leads frequent workshops in carving and in wood identification. He is a contributing editor to *Fine Woodworking* magazine, and has written articles for the *International Wood Collectors Society Bulletin, Forest Products Journal* and *Chip Chats.* He is the author of two highly respected books; *Understanding Wood* and a second book, *Identifying Wood;* both published by The Taunton Press.

Professor Hoadley's first two class periods — 3 hours — will be open to anyone registered for classes. The second two class periods on Saturday and the two class periods on Sunday — a total of 6 hours — will require preregistration with a $40 charge for this special presentation.

Unlike years past, there will only be four classes — each three-hours — on Sunday. These classes will feature Hoadley's wood technology classes, a Business Seminar, a Tuning Seminar, and Applied Skills class.

Applied Skills will also be offered in a special time slot Friday evening. Work stations will be featured in topics from traveling hammers to bridge notching.

Looking to the business end of tuning, Evelyn Smith is working on plans for a Business Seminar that, like the Applied Skills class, will feature a number of stations concentrating on a variety of business related topics for technicians.

With more plans in the works for the 40th Annual PTG Convention and Technical Institute in Orlando, the time to start your own planning is now! Early planning will save PTG members $55 in registration fees by registering for the convention before June 30, 1997, when registration will be $170. After June 30 the fee will be $225.

Registration fees for the 1997 Convention:

	Before June 30	*After June 30*
Member	$170	$225
Non-Member	250	305
Auxiliary Member	65	85
Non-Auxiliary	80	100
Banquet Ticket	35	45
Tutoring classes	25	25

The Mini-Techs Are Back!

The expanded mini-technical format, introduced at last year's Institute, will return to Orlando in 1997. The 40-minute sessions were so popular in Dearborn that they will once again be given their unique time frame, to avoid conflicting with regular classes.

Thirty mini-technicals are planned for PTG's 40th Anniversary Institute. If you weren't able to attend all the mini's you wanted to last year, you'll get another chance. If you missed Dearborn last year, you'll be in for an educational treat in Orlando.

By the time you read this, most classes will have already been scheduled. However, we are always searching for the classes and instructors that you want to see. The class evaluations so many of you patiently filled out in Dearborn have helped us to understand your desires and needs. Thank you for taking the time and interest.

If you have topics and/or instructors you would like to see, or present, please contact me at (520) 326-4048. If your wishes can't be implemented in the 1997 Institute, they will be considered for the years ahead.

Plan now to join us in Orlando to celebrate PTG's 40th Anniversary.

— Bob Anderson, RPT
Institute Committee

Yamaha Honors its Jewel of the South

Georgia Piano Manufacturing Plant Profiled in New Video

INDUSTRY NEWS

Thomaston, GA — Hand-crafted, American-made Yamaha pianos bring music to life each day in concert halls, homes and schools across the country. These pianos are produced by Yamaha Music Manufacturing, Inc. (YMM) in Thomaston, Georgia — a factory that is as fascinating as it is efficient. Starting this month, music stores, piano technicians, musicians and teachers nationwide can tour the facility without even leaving their hometown.

Yamaha recently produced a video, entitled "Crafted With Care In America," that shares the story of YMM, the only manufacturer of Yamaha pianos in the United States. Following a widespread distribution this month to more than 400 key music instrument retailers, Piano Technicians Guild (PTG) presidents and Music Teachers National Association (MTNA) presidents, this comprehensive and informative look at Yamaha's "jewel of the south" is a remote-control button away from being enjoyed by members of the piano community.

In an industry that demands a combination of time-honored, expert craftsmanship and innovative technology, YMM is a

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Helping Chapters Help Themselves

What is the function of the Chapter Services Committee? This has been a small debate since the inception of this committee several years ago when three other committees were combined, those being: Newsletter, Chapter Achievement and Chapter Management. The charges implied by the first two are relatively straight forward. They basically involve recognition for outstanding activity in chapters and newsletters. The third involves doing whatever it takes to help the local chapters with their management or put another way, to help chapters with the day to day business of being a chapter.

What does a local chapter do? What should it do? A lot depends on the location, size and needs of the membership. A western chapter may be really far flung and it would not make sense for them to meet as often as an eastern chapter in a densely populated area. A chapter with nine members may not have the technical or financial resources of one with 90 members. How to cope? What's a mom to do? Well, one of the ways is to see how similarly situated chapters manage. Committee members are (even as we speak) collecting information from the chapters in their regions to share not only within their regions, but through these articles, to pass along to everybody who gets the *Journal*. It all starts at the chapter level. You, the chapters, need to be sure you are passing the information to your committee member via newsletters or meeting minutes to get the proverbial ball rolling. Be sure these people are on your newsletter mailing lists!

I apologize for not getting these articles started sooner, but time and institutional tuning marches on, especially in August and September. I'll always remember the advise my Western Iowa Tech class got from guest lecturer Bob Schoppert, "You just have to do the best you can and learn to live with it." Karma is karma. Next month I'll review our chapter charges and (hopefully) be sharing some chapter news from around the globe, across the continent and up your street.

The Chapter Services Committee has several charges which I will put in a nutshell (and on paper).

- *Evaluate the effectiveness of the committee. Solicit information from chapters and previous committee members. Report to mid-year Board the Committee findings and recommendations.*

Our first charge is to assess this committee and we're doing this two ways. First, the committee members from your region would like input from you. Second, I have submitted several questions for the upcoming member survey. Please let your opinions be known.

- *Work with Marketing Committee to design a program specifically for chapters to utilize our marketing literature, e.g., a "how-to" class.*

Again, your committee members are soliciting advice and ideas (and as far as I know, nothing else) from chapters on ways to do this. We will pass this information to Marketing.

- *Each committee member will be assigned a specific list of chapters, and will be the recipient of newsletters, activity and news items and other chapter information from those chapters. If any chapter does not communicate this chapter information, committee members may make telephone contact.*
- *Evaluate chapter newsletters, news items*

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Chapter Services Committee

Northeast:
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Beacon, NY 12508

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5239 Guilford Ave
Indianapolis, IN 46220

Pacific Northwest:
Chris Gregg
11444 Coventry Blvd., NE
Calgary, AB T3K 4B1
Canada

Southeast:
Robert Mishkin
1240 NE 153 St.
Miami Beach, FL 33162

Central West:
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Sioux City, IA 51106

South Central:
Charlotte Eschman
#52 Oaklawn Dr.
Metairie, LA 70005

Western:
Sid Stone
2419 St. Helena Dr. #2
Hayward, CA 94542

Yamaha

Continued from Previous Page

respected manufacturer of world-class pianos. Yet, it remains a secret to many music industry representatives. In fact, many officials would be impressed to learn that YMM has consistently met the highest standards of design and performance excellence in the piano industry for more than 15 years.

In additional to being a virtual plant tour, the YMM video provides insight into Yamaha Corporation of America's four building blocks of piano quality.

- *Design Engineering*— the high quality of Yamaha pianos is the result of an earnest desire to build the best possible pianos for many situations ranging from homes to the concert stage.
- *Material*— material control is an essential ingredient to building fine quality pianos.
- *Factory Facilities*— advanced technology and machinery enables YMM to meet the requirements for producing the accurate parts that comprise a piano of unmatched quality.
- *Workmanship*— quality workmanship is an integral component of building fine pianos.

The piano production process at the 260,000 square-foot Thomaston plant embodies Yamaha's commitment to providing high-quality instruments to today's discriminating musicians. From the precision production of woodworkers and cabinetmakers who work to within thousandth-of-an-inch specifications, to the trained ears of expert tuners who define and redefine a piano's sound at four points along the production line, the piano manufacturing process at YMM exemplifies a relentless dedication to quality.

"Measure for measure and dollar for dollar, there is no better value and reflection of musical integrity than that of an American-built Yamaha piano," said Raymond Reuter, piano marketing manager, Yamaha Corporation of America. "We are proud to offer this intimate video as a testament to the enduring qualities of a YMM piano."

Marketing Options

The Registered Piano Technician has more than one consideration for his or her primary income.

ECOMOMIC AFFAIRS COMMITTEE

Determine whether tuning, regulating, repair and rebuilding, could be your main considerations. You might use your high skill as a Registered Piano Technician to apply to sales or even teaching. Even though these vocations take additional skills and training, the Registered Piano Technician's thorough background and knowledge is a very significant accent.

If you are a novice, or even a tried professional, you can examine or re-examine the areas in which you are most comfortable or areas where your expertise lies.

As a novice you probably would, or should, start in association with a dealer in pianos and tune, tune, tune. This sometimes challenging dealer alignment offers the RPT opportunity to both progress and interact with present owners of pianos in addition to future clientele.

If unsatisfied with present income the professional may also ponder whether to expand to another area, i.e., informing piano owners of the maintenance requirements for their instrument, or planting the seed for future jobs, namely, regulation, hammer work, restringing, bridle straps, etc. — all jobs to be lined up for the future.

Do take the time to pull the action from a grand or ask the owner to step up to the vertical, and show them the grooves in the hammers. Strike two or more keys or play a chromatic scale and have them listen to hear certain notes blurting out. Demonstrate that their piano will not play piano. Display lost motion in a vertical or perhaps bobbling hammers. A quite revealing flaw in a grand is to press on the keys and show that the hammers are not even hitting strings. Explain that most pianos with proper maintenance will sound better. The owners, your clients, will greatly appreciate your work.

One more important consideration — the importance of piano teachers with their recommendations. Here, your social skills along with your Registered Piano Technician's skills are invaluable.

In Summary

Through accrual you will categorically build your reputation along with your income. The Registered Piano Technician's task of acquiring clientele is sometimes a slow and discouraging job. It is not the same as being hired fresh from school by a company with a starting salary and benefits.

If you keep in mind that pianos have changed very little in the last hundred years, you can feel secure about this profession. Learn and earn.

— By Lee Santo, RPT
Economic Affairs Committee

Steinway Income Up

Waltham, Mass. — Steinway Musical Instruments Inc. (NYSE: LVB) recently announced results for the third quarter of 1996. Net income before extraordinary items increased twelve fold to $1.2 million or $0.14 per share versus $0.1 million or $0.01 per share on a pro forma basis in the third quarter of 1995. (Amounts presented for 1995 are pro forma as if the company's acquisition of its Steinway subsidiary had occurred as of Jan. 1, 1995). Overall sales for the quarter increased 4 percent and operating profit increased 6 percent.

Steinway Pianos — Overall sales for Steinway pianos for the quarter were essentially unchanged from the previous year. While unit volume in the United States increased by 10 percent in the third quarter, continued sluggishness in Europe, a strong U.S. dollar and a slight change in product mix combined to offset this increase. On a year-to-date basis worldwide sales have increased by 10 percent over the prior year.

Selmer Instruments — Led by strong sales

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Helping Chapters Help Themselves

Continued from Previous Page

and other chapter activities information, and forward all appropriate materials to committee chair. The chairman will use this input to assist in providing articles each month to be included in the LeaderLetter and the Journal. *The goal is to provide a consistent flow of ideas to all chapter officers to inspire high levels of activity and to publicize innovative and successful chapter programs and events. Committee members will also provide regional chapter presidents with semi-annual compilations of chapter activity in the region (e.g., programs, technicals, projects, etc.).*

This is the most clear charge as far as I am concerned. The committee members need to receive newsletters or meeting minutes/notices to find out what your chapter is doing and pass that along to other chapters in your region, and also to PTG in general through the *Journal.* Ever hit a brick wall trying to think up some new meeting technical or chapter project idea? Find out what is working for

CHAPTER SERVICES NEWS

others by staying in contact with your committee representative.

- *Each committee member shall monitor chapter activity to provide data for making the annual Chapter Achievement awards.*

A pretty cut and dried charge, but it only works if you take the five to 10 minutes every couple of months to write your rep.

- *Work with the RVP to identify personnel who are willing to teach classes at other chapters within their region. Compile a list of those persons and circulate it to all chapters within the region.*

See comments on the previous two charges, in other words, ***write your rep.***

Tip O'Neal said, "All politics are local" and I would ad, "All PTG goals are local." If the local chapters don't contribute, don't want to do anything, all the fine work of the Bill Spurlocks and Nick Gravagnes and Vivian Brooks really is pointless. The biggest chapter management goal any chapter can have is to be able to provide motivation and information to its members so they can do a better job. Get involved. And if you want some help to do that, contact your chapter services rep.

Next month, I'll start printing some of the things chapters are doing around the US and Canada. If your chapter has done something different or that worked really well (or for that matter didn't and you want to spare your fellow chapters the agony of defeat) write your rep and we'll get it in here. For your inspiration this month, check out the details of the Quad Cities Chapter's "Piano Celebration" which I believe Laura Kunsky, CERVP has submitted for the *Journal.*

— Kim Fippin, RPT
Chairman Chapter Services

Passages

George Wheeler

It is my sad duty to announce the death of our colleague George Wheeler, RPT, of Springfield, Vermont. He died Sunday, September 29 after a half-year struggle with cancer. His final months demonstrated great courage and spirit, certainly an inspiration for any who knew him. George managed to accomplish over 300 tunings in his last summer; all this between various chemo- and radiation-therapy treatments, and working with an arm recently rebuilt surgically. George was a mainstay of the Vermont chapter of PTG and a fine friend. We will miss him very much.

— Tom McNeil, RPT
President, Vermont Chapter

Born in Poultney, George grew up with the dual influences of music and piano technology. His grandfather played all instruments and started the first school band in Vermont. His father, Howard, was both a sought after concert tuner and an accomplished musician as well.

As George prepared for his career, his love of music pressed him into pursuing a music degree at Hart college. His skill at motivating people led to success as a band teacher in many elementary and high schools in Southern Vermont. George left his position with the school intending to get a master's degree in education in order to teach music at the college level, but decided the opportunities weren't there. So, capitulating to his father's influence George redirected his career to piano technology and from 1972 to 1974 he worked as a piano technician for Baldwin in Boston. George worked for various dealerships in Massachusetts and Vermont until 1979 when he established his own business.

On my office wall hangs a print of the Norman Rockwell 1947 Saturday Evening Post's painting of the "tuner." George's father, Howard was to model for it but couldn't make it. However, his tools did make it into the painting along with a neighborhood boy. George used that tool box you can see so clearly on the floor in front of the piano.

I'm sure George has passed that tool box on to his son, Bay, so he can use some of that good fortune that emanated from the box all these years.

In Memory ...

Fred Rice, Sr., RPT
Indianapolis, IN

Bernie Richards, RPT
Northwest, FL

NPF Launches School Music Program

Dallas, TX—The National Piano Foundation has launched a major three-year program to place a music learning module in every elementary school in the country. Working in cooperation with Lifetime Learning Systems of Fairfield, Connecticut, the National Piano Foundation designed and developed the *Let's Play* Program to bring a positive piano learning experience to third grade students in every public, private and Catholic school in the United States.

Let's Play is a series of four learning activities centered on the piano that can be integrated into the teacher's lesson plans and regular classroom activities. The program started this school year when teacher kits were mailed to interested teachers in 20,000 elementary schools in 30 selected market areas. The teacher kit included a teacher's guide, a series of four student activity sheets, a take-home letter to parents with a coupon for three free piano lessons at participating piano retailers, a list of those participating retailers, and a *Let's Play* poster.

The National Piano Foundation anticipates the program will be placed in another 20,000 elementary schools in the fall of 1997 and again at the beginning of the 1998 school year. NPF expects to reach between 3 and 4 million children by the completion of the three-year *Let's Play* Program.

The Music Teachers National Association (MTNA) has endorsed *Let's Play*, and worked with NPF to develop a *Piano Lesson Guide* for use by retailers. This guide provides a teaching outline for each lesson with tried and true teaching techniques, and includes musical examples so the teacher can accompany simple keyboard patterns performed by the student. The guide is designed to guarantee a successful and fun musical experience for the child.

For more information on the *Let's Play* Program or other NPF services, contact the National Piano Foundation at 4020 McEwen, Suite 105, Dallas, TX 75244-5019, (972) 233-9107, or Jim Gass, Director of Market Development, 24680 Golf View Drive, Valencia, CA 91355, (805) 255-3765.

Steinway Income Up Continued from Previous Page

growth of 8 percent in the quarter, Selmer continues on pace to achieve record results in 1996. Unit sales year-to-date have increased 4 percent and, with a favorable mix of higher priced instruments, overall sales increased 13 percent.

Initial Public Offering — Steinway completed an initial public offering which raised over $63 million. The net proceeds from the offering were primarily used to repay $54.6 million in long term debt. Prepayment fees and other charges related to the early extinguishment of the debt amounted to $4.4 million, net of tax, or $0.52 per share. The overall reduction in debt will decrease annual interest expense by over $6.0 million. The company intends to use its increased cash flow to expand production capacity and to pursue strategic acquisitions.

Year-to-Date Performance — For the first nine months of 1996, overall sales totaled $195 million, a $20 million or 11 percent increase compared to the comparable 1995 period. Net income before extraordinary items increased more than ten fold to $4.5 million, or $0.67 per share, from $0.4 million or $0.07 per share in 1995.

Adjusting 1996 and 1995 earnings to reflect results as if the company's initial public offering had occurred on Jan. 1, 1995, supplementary net income for the third quarter increased 58 percent, to $0.19 per share from $0.12 per share in 1995. For the nine month period, supplementary net income before extraordinary items doubled to $0.76 per share from $0.38 for the comparable period in 1995.

NEW MEMBERS IN OCTOBER

REGION 1

021 BOSTON, MA

MARC P.POULIN
192 ATHENS STREET
SOUTH BOSTON, MA 02127

ROBERT C.VIATOR
33 FLAGG SWAMP ROAD
E. FREETOWN, MA 02717

101 NEW YORK CITY

KENNETH A. FARNUM
P. O. BOX 211
CITY ISLAND, NY 10464

118 LONG ISLAND-CHRISTOFORI, NY

HEINRICH A. GROSS
50 WOODFIELD ROAD
STONY BROOK, NY 11790

122 CAPITOL AREA, NY

KEVIN R. ALDRICH
11 24TH STREET
TROY, NY 12180

WALLACE H. STOCK
BOX 113
BRAINARD STATION, NY
12024

131 SYRACUSE, NY

THOMAS F. REAGHARD
177 TRYON ROAD, APT. 2W
PULASKI, NY 13142

REGION 3

771 HOUSTON, TX

JAMES L.BROTHERTON
P. O. BOX 148
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2426 NW 62ND STREET, #3
SEATTLE, WA 98107

EVENTS CALENDAR

January 3-4, 1997
ARIZONA STATE SEMINAR
Tempe, Arizona
Contact: Rick Florence, (602)926-4328
119 W. San Angelo Ave, Gilbert, AZ 85234

February 21-23, 1997
CALIFORNIA STATE CONVENTION
Radisson Hotel, Sacramento, CA
Contact: Yvonne Ashmore, (916)273-8800
12700 La Barr Meadows Rd, Grass Valley, CA 95949
Website address: www.dcalcoda.com/ptg/

March 14-16, 1997
PACIFIC NORTHWEST
West Coast Tyee Hotel, Olympia, WA
Contact: Mitch Kiel (360)264-5112
11326 Patsy Drive, SE, Olympia, WA 98501

April 3-6, 1997
PENNSYLVANIA STATE CONVENTION
Days Inn, State College, PA
Contact: Fred Fornwalt, (814)942-1489
1333 Logan Blvd., Altoona, PA 16602

May 1-4, 1997
NEW ENGLAND / EASTERN CANADA REGIONAL
Ramada Inn, Portland, ME
Contact: Joseph Bacica (207)846-0966

May 9 & 10, 1997
UTAH INTERMOUNTAIN SEMINAR
Snowbird Resort, Salt Lake City, UT
Contact: Judy Rapp, (801)298-7875
1151 West 400 North, W. Bountiful, UT 84087
P.O. Box 1575, Portland, ME 04104

July 23-27, 1997
PTG ANNUAL CONVENTION & TECHNICAL INSTITUTE
Twin Towers Hotel & Convention Center, Orlando, FL
Contact: PTG Home Office (816)753-7747
3930 Washington, Kansas City, MO 64111

All seminars, conferences, conventions and events listed here are approved PTG activities.

Chapters and regions wishing to have their function listed must complete a seminar request form. To obtain one of these forms, contact the PTG Home Office or your Regional Vice President.

Once approval is given and your request form reaches Home Office, your event will be listed through the month in which it is to take place.

Deadline to be included in the Events Calendar is at least 45 days before the publication date; however, once the request is approved, it will automatically be included in the next available issue.

AUXILIARY
EXCHANGE
Dedicated To Auxiliary News and Interests

Winter Perfect for Summer Planning

Greetings and best wishes for a wonderful and happy holiday time of the year. It's awfully hard to think about snow and sleet when I am sitting out on my back porch admiring all of the beautiful colors that this fall season brings forth. The trees are especially colorful this year. It must be because of all of the rain we had earlier. Anyway, this planning ahead for the family holiday dinner and all of the shopping reminds me of the planning we must do far ahead of time for the summer convention so that you have an enjoyable time while there each year. It doesn't just happen!

I suggest that the whole family sit around the table after the dishes are cleared and write down what it is that each one wants to see and do while in Orlando next summer. There is so much there that you will never be able to cover it in several weeks let alone one or two days. So it takes planning! I will be telling you more about the backstage tour that you read about in the November *Journal,* but I will not be having one big Auxiliary tour this year. Anyone over 16 is welcome to take the backstage tour in the afternoon of Friday, July 25; however, you will have the morning free to go where you like. Remember, on all of this complex of land called Disney World, there are eight parks of which MGM Studios, Magic Kingdom, and EPCOT are the most famous. They all have a monorail to them for a fee. Each has a separate entrance fee of around $40 per person. There are package tours of two to four days which are the better bargain if you have the time. I suggest that you decide how much time you have to spend and then call Sharlene Pitts at (407) 397-4946. She works for Orlando Discount Guide, and she will be able to prepare a package for you and your family and it would be better if several families or a small group could go together. So planning is of the utmost importance this year.

Phyllis Tremper
PTGA President

Ms. Pitts will be calling me back soon about the transportation from the airport to the hotel and return as I found the fare is rather expensive. If four or five could take a taxi together it would be the best price provided you get all of your luggage in the trunk. The fare for the buses from the airport is one set price but taxis can be divided among you. She also is going to arrange transportation early Friday morning to the parks and back that afternoon. We usually don't have an affair at the hotel until around 9 p.m., so you could even eat dinner out there.

I have thought of one more item which you should know. The dress code down there in the summer is — *very* — casual. Everyone wears T-shirts, which you can buy there but you could save more money if you bought them at your local department store. Be sure they are of Disney characters, however, then you will be right at home.

I don't think you need but one dress outfit this trip and that would be for the Award Banquet on Saturday night at the hotel. Florida is the land of sunshine and it's very hot out of doors so dress in layers. Something cool for the early hours of the day which you can remove at noon. And don't forget that water bottle!

Now, isn't this fun, planning this hot trip in the cold, cold winter. Makes the short days go faster as this month has the shortest day of the year in it. Don't forget to place a couple more dollars in that cookie jar this month for convention as the prices will be up there, but you will have the time of your life, and in the meantime, don't forget — ***Put a Little Music in Your Life! ... Happy New Year, too!***

FOR SALE

SANDERSON ACCU-TUNERS from Authorized distributor. Consignment sale of used Accu-Tuners and Sight-O-Tuners or new Accu-Tuner customers. Call for details. Rick Baldassin, 801-292-4441.

FOR SALE: 40 years accumulated piano tuning tools and special items. Mrs. Arnold Brewe, 1035 County Road, Sidney, ILL 61877. 217-688-2400.

ACTION PARTS AND HAMMERS for the rebuilder. Highest quality Encore, (by Abel) and Nu-Tone (Knight) piano hammers. Try the new refined Tokiwa Action Parts (now some of the finest action parts made today). For the classic American piano sound, we recommend Encore hammers on walnut moldings. Encore hammers are made to the strictest specifications of Wally Brooks by the Abel Piano Hammer Company of Germany. Quality boring and shaping. We also specialize in pre-hanging grand hammers on new shanks for a $109.00 pre-hanging fee. Write or call: Brooks, Ltd., 376 Shore Road, Old Lyme, CT 06371, Phone: 800-326-2440, FAX 860-434-8089.

A NEW BOOK FROM DOCTOR PIANO! "TUNER TALES—Funny and Amazing Stories From Piano Technicians" $11.95 plus $3.50 shipping. Also available: "DIFFERENT STROKES—Hammer Techniques For Piano Technicians" $13.95 plus $3.50 and "DEAR DOCTOR PIANO—A Guide To Piano Care For Owners" (Illustrated) $14.95 plus $3.50. Quantity discounts available. Write Ken Burton, 1 Willow Cr SW, Calgary, AB, T3C 3B8. Phone 403-242-0799. Email Kwburton@freenet.calgary.ab.ca

SANDERSON ACCU-TUNERS NEW & USED. BOB CONRAD 800-776-4342.

KORG AT120 CHROMATIC TUNER. $249 postpaid. Large needle meter. Shows pitch, octave, note. Plays C2-B6. Hears C0-B8. Adjustable volume, pitch. Calibrates A=380-480 Hz. Batteries, adaptor. SONG OF THE SEA. 47 West Street; Bar Harbor, ME 04609; (207) 288-5653. Brochure.

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Classified Advertising rates are 35 cents per word with a $7.50 minimum. Full payment must accompany each insertion request.

Closing date for placing ads is six weeks prior to the month of publication.

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

Send check or money order (U.S. funds, please) made payable to Piano Technicians Journal, 3930 Washington, Kansas City, MO 64111-2963.

ENCORE GERMAN SHANKS & FLANGES—now available for replacement on New York STEINWAY grands. 'The Finest Quality Workmanship Available. The value of a Steinway is determined by its final tone and action. "When you're striving for excellence—begin with quality." Encore Hammers and Actions Parts available only through Wally Brooks, Brooks, LTD., 376 Shore Rd., Old Lyme, CT 06371; 1-800-326-2440, FAX 860-434-8089.

GRAND PIANO STRING covers. Are you ready for an item that can keep the piano clean, prevent corrosion, improve tuning stability, make your clients happy and make you money besides? Custom made, it rests above the strings, covering soundboard, tuning pins and plate for complete protection inside the piano. Made from finest quality woven wool, available in black, light brown, brown, burgundy, and white. Personalized name applique also available. No inventory or investment required. For free brochure and samples call: Edwards String Covers, 240 Old River Lane, Box 646, Brookdale, CA 95007, phone (or fax) 408-338-1828

FOR SALE— ACCUTUNER - 2 years old, like new - Unit #2624, less than 50 tunings total. $950.00 without case or $1,000.00 with case. (314) 561-1741.

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BÖSENDORFER: Model 200 Parlor Grand. 88 keys - L: 6'7" W: 4'9", high polished ebony. Mint condition, $35,000. Phone/Fax (704) 556-9945.

TUNING HAMMER BALL — ergonomically designed to lessen repetitive motion injuries and wrist stress. Made to order, it slips on and off most tuning levers. $14.95 includes shipping. Mayer Gluzman, 6062 Anne Dr., West Bloomfield, MI 48322. (810) 661-4869.

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WONDERWAND: Try the Tuning Lever you read and hear about. Enjoy Less Stress; Better and Faster Tunings: $65.00 p.p. Charles P. Huether, RPT, 34 Jacklin Court, Clifton, NJ 07012

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PIANO SCALING SOFTWARE for WIN & DOS. Plot inharmonicity, Tension, Break %, and more. Automatic Bass Rescaling, String Winding Sheets, Detailed Manual, and much more. Decimal & Metric. $80.00. Tremaine Parsons, Box 241, Georgetown, CA 95634, 916-333-9299

DOING YOUR OWN KEYTOPS? For resurfacing your keys, the newly re-designed PETERSON Router Guide is now the finest, fastest and most accurate system going. Also, removes fronts slick as a whistle. $125 plus $7.50 S&H. Peterson Piano Service, 11530 North 6000 West, Highland, UT 84003. (801) 756-9786.

PTOOLS - COMPUTER TOOLBOX FOR TECHNICIANS. WIN & DOS Client Management, Mailmerge, Correspondence, Import/Export, Labels, Envelopes, Autodial and more. Measurement Conversions. Trade Specifications, Zipcode, Supplies, and Resource Databases. Conversions, Specifications, Calculations, Repair Formulas, and more. User: $30.00. http://ourworld.compuserve.com/homepages/ptools. Tremaine Parsons, RPT; 916-333-9299.

PIANO COVER CUSTOM MADE to your specifications. Rehearsal covers now available. Specializing in custom colors and fabrics. Call or write for brochure. JM FABRICations; 10516 Ohop Valley Extension Road, Eatonville, WA 98328, 360-832-6009.

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New from PROTEK: Pro*lube* Spray Lubricant. Protek Pro*lube* is an advanced state polymer lubricant. Designed around the successful CLP formula, Pro*lube* is for higher friction areas like the keybed and frame, shift and sostenuto mechanisms. Great for front and balance rail keypins and anywhere you would use a spray lubricant. Provides long lasting durable lubrication with virtually NO ODOR! With the addition of Pro*lube* along with CLP and MPL-1, Protek offers safe, high tech task specific tools for every lubricating need. Ask for Pro*lube* at the supply house you do business with.

REPAIR CHIPPED IVORY IN 20 MINUTES. "AcryliKey" ivory restoration system produces a strong, color-matched, nearly invisible repair. Kit contains material enough for 50+ repairs plus pigments, mixing utensils, sanding pads, and complete instructions. $39.95 ppd. Richard Wagner, RPT; P.O. Box 1952 Lake Oswego, OR 97035 (503) 697-9254.

FOR SALE: Sanderson Accutuner. Completely updated w/New mem. and osc. boards, FAC, nicad batt. w/charger, 32 piano memory, manuals. $800.00 firm. (818) 506-3034 or email: buddy@amyjmusic.com

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FULL SERVICE PIANO SHOP seeking qualified piano tuner to help with a growing business. Pay will be determined on applicant's qualifications. Send resume to: Sells Piano Craftsmen, Inc. P.O. Box 216, Sussex, Wisconsin 53089.

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Experienced Technician-Tuner for large shop/store in Chicago suburbs. Call Don: 630-894-2992.

SERVICES

STRAIGHT SIDES, SQUARE FRONTS and crisp notches are the benchmarks of our quality key recovering. Tops with fronts $115 plus return shipping and insurance. Call or write for free price list of our key restoration services. Yvonne Ashmore, RPT and Associates, 12700 La Barr Meadows Road, Grass Valley, CA 95949, 916-273-8800

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KEY BUSHING: We use over 20 different sizes of Spurlock Precision Cauls. Send the micrometer measurement of the key pins and we will give you a perfect fit. Both rails high quality felt $85.00 or leather $95.00 plus return shipping and insurance. Write or call for free price list of our key restoration services. Yvonne Ashmore, RPT and Associates, 12700 La Barr Meadows Road, Grass Valley, CA 95949, 916-273-8800

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SOUNDBOARD S INSTALLED, topsides rebuilt. Bridge-conformed, scale-diaphragmized boards with truly quartersawn ribs (sitka, eastern, or sugar pine). You send us the case, we'll return you a piano. Quality's the bottom line. David G. Hughes, RPT. 410-429-5060. Baltimore.

KEYBUSHING: Precision keybushing with high quality felt using Spurlock system. Both rails $85.00, return shipping included with prepaid order. Include key pin measurements for precise fit. Debra Legg Piano Service, 327 Rowena Lane, Dunedin, FL 34698, (813)734-3353.

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THE RANDY POTTER SCHOOL OF PIANO TECHNOLOGY — Home Study programs for beginning students, associate members studying to upgrade to Registered Piano Technician, and RPT's wanting to continue their education. Tuning, repairing, regulating, voicing, apprentice training, business practices. Top instructors and materials. Call or write for information: RANDY POTTER, RPT; 61592 ORION DRIVE; BEND, OR 97702; 541-382-5411. See our ad on page 3.

VIDEOS

INSTRUCTIONAL VIDEO TAPES. Victor A. Benvenuto. Piano tuning, $50.00*; Grand Regulating, $50.00*; Grand Rebuilding, $100.00 (2)*; Key Making, $50.00*; Soundboard Replacement, $29.95*. (*Plus S/H). The Piano Shoppe, Inc., 6825 Germantown Avenue, Philadelphia, PA 19119-2113; Ph. 215-438-7038, Fax, 215-848-7426

SUPERIOR INSTRUCTIONAL TAPES ** All videos at one price, $50 @ ** Beginning Tuning, Upright Regulation, Aural and Visual Tuning, Grand Action Rebuilding, Exploring the Accu-Tuner, Grand Action Regulation, Voicing, Pinblock Installation, A to A Temperament, Baldassin-Sanderson Temperament, Bass Tuning - 3-Ways. Superior Instructional Tapes; 4 W. Del Rio Drive; Tempe, AZ 85282; Ph. 602-966-9159.

PIANO TECHNOLOGY EDUCATIONAL MATERIALS. $49.95 each reel— Vertical Piano Regulation, presented by Doug Neal. Presented by Cliff Geers: Plate & Pinblock Installation Part I, Plate & Pinblock Installation Part II, Wood Repairs, Soundboard Repair, and Grand Hammer Replacement. Add $5 per order for shipping and handling. Questions? Call 712-277-2187. Mail orders to PTEM, 3133 Summit, Sioux City, IA 51104 .

WANTED

CANYOU HELP? Would like to contact the Tuner-Technician who worked on the Piano for the Bill Grahams Fillmore East Theatre, Greenwich Village, NY in the 60's and 70's. Please write to: J. Kirsch, 4485 Baintree, University Heights, OH 44118.

WANTED!! DEAD OR ALIVE: "Steinway *uprights and grands."* Call collect, Ben Knauer, 818-343-7744.

PIANOS! PIANOS! PIANOS! !!!Free phone appraisal!!! Buying all types of usable pianos. Cash or bank check on pick up. Won't hesitate on price. Call us first for fast professional service. "Steinway, Mason-Hamlin command specialty prices." Jay-Mart Wholesale, P.O. Box 21148, Cleveland, OH 44121. Call Irv Jacoby 1-800-411-2363, or collect 216-382-7600/FAX 216-382-3249.

WANTED: TINY PIANOS such as the Wurlitzer Student Butterfly or other small types. Call collect: Doug Taylor, 607-895-6278. I'll pay shipping!

DISPLAY AD INDEX

Piano Discussions™

December 1996

News From The World of MSR/PianoDisc, Knabe, Mason & Hamlin

New Release

Artist Series: Steve Allen gets enthusiastic reviews

The latest release in the PianoDisc Music Library Artist Series has had nothing but rave reviews. Not at all surprising, since the disk is ***Artist Series: Steve Allen***. Critical acclaim has followed Mr. Allen in virtually every artistic project he's undertaken since he created and starred in *The Tonight Show* in the early '50s. Included are playwriting, starring in movies, television and the theatre, authoring 48 books, recording 42 albums and writing over 6,000 songs.

Among those 6,000 songs are the 23 he selected for his first PianoDisc recording. As he explained in his liner notes, "I was asked by PianoDisc to present a package consisting entirely of my own compositions. Inasmuch as I had the good fortune to be brainwashed, as a very young fellow, by the best popular music ever written — that of the truly golden age — I tend, to the present moment, to write in that general style, though I am not limited to it ... As regards to the style of playing, it's what used to be called, in the 1950s, 'candlelight and wine.' Fortunately there will always be a market for romantic melodies, simply played."

Highlights of the disk include such Allen hits as *The Start Of Something Big, Gravy Waltz* and *Picnic.*

Meet us on the Internet at www.pianodisc.com

TECH TRAINING SCHEDULE

• January 20-25, 1997 • March 17-22
• April 14-19

CONTINUING EDUCATION

• March 24-26, 1997 • April 21-23, 1997

MSR/PianoDisc
4111 North Freeway Blvd.
Sacramento, CA 95834
Phone: (916) 567-9999 • Fax: (916) 567-1941
Tech Support: (619) 258-1460 or (916) 567-9999

Tuition for the Installation and Continuing Education seminars is **free**, but a $50.00 refundable deposit is required for confirmation. The PianoDisc Continuing Education Series seminars are restricted to PianoDisc certified technicians in good standing. For more information about attending a PianoDisc Installation Training seminar or a Continuing Education seminar, call PianoDisc during our office hours.

PianoDisc, Cal PTG team for '97 state convention

Mark your calendars and start making your travel arrangements for the California State PTG Convention in February, 1997. The location is Sacramento and convention organizers have classes and special events planned that guarantee it will be the year's best state gathering.

MSR/PianoDisc/Mason & Hamlin will play a large part in the planned festivities. In addition to conducting our popular Piano/Disc and QuietTime classes, we'll also be offering a "History of Mason & Hamlin" class, given by our official historian, Paul Monachino.

On Friday and Saturday, we'll also be conducting PianoDisc factory tours. Friday night we'll host a reception in Ballroom A of the hotel with desserts and open bar. Attendees will have an opportunity to see some of our newest products in action.

Pianist/entertainer Paul Smith will be the featured performer at the Saturday night banquet. His appearance, sponsored by PianoDisc, promises to be the highlight of the convention.

For information about the convention, contact Yvonne Ashmore at (916) 273-8800.

MSR develops Pedal Adapter System for handicapped pianists

The Pedal Adapter System is the newest product developed for Music System Research. The system allows a handicapped person (with little or no leg mobility) to control the piano sustain pedal by the use of a simple switch. The design utilizes technology developed for use in the PianoDisc player system: a power supply, pedal driver board and special adapter cable.

The system is activated by a switch which can take many forms, depending on the player's abilities. If the player can move his/her leg to some degree, then a simple push-button switch under the keybed can be used. In other cases, a headband with a mercury switch, or a contact switch under the chin, will allow the pedal to be activated by tilting the head down slightly. Other possibilities include a "leaf" contact switch near the wrist or elbow, activated by bending the wrist or elbow in a unique direction, or a pressure switch on or near the seat, which would be activated by moving the hips or leaning slightly to one side. There are still other possibilities, and the type of switch used will depend on the installer and the preferences of the player.

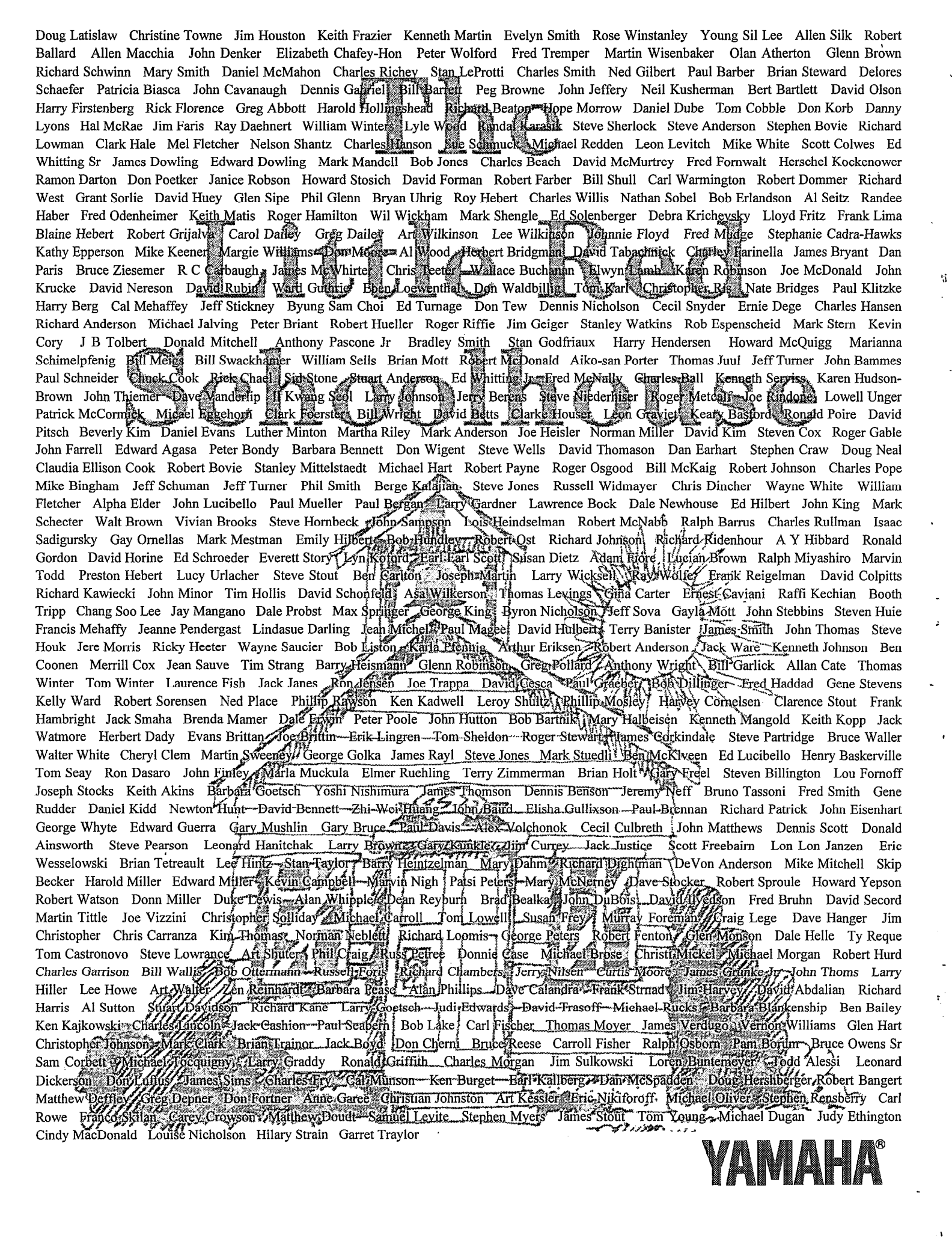
The new system has been tested extensively and found to be both eminently workable and artistically invaluable for its end user.

"This system has changed my life," commented Susan Etter, a Vacaville, CA resident who helped test the product. "Any pianist would understand what it means to me and what it will do for others."

"We're pleased to be able to offer this very special system. Although the market for it is small, we believe that the worth of a product may not always be determined by its profitability," concluded Gary Burgett, MSR's President/Marketing.

Music is the universal language of mankind.

—Henry Wadsworth Longfellow


Doug Latislaw Christine Towne Jim Houston Keith Frazier Kenneth Martin Evelyn Smith Rose Winstanley Young Sil Lee Allen Silk Robert Ballard Allen Macchia John Denker Elizabeth Chafey-Hon Peter Wolford Fred Tremper Martin Wisenbaker Olan Atherton Glenn Brown Richard Schwinn Mary Smith Daniel McMahon Charles Richey Stan LeProtti Charles Smith Ned Gilbert Paul Barber Brian Steward Delores Schaefer Patricia Biasca John Cavanaugh Dennis Gabriel Bill Barrett Peg Browne John Jeffery Neil Kusherman Bert Bartlett David Olson Harry Firstenberg Rick Florence Greg Abbott Harold Hollingshead Richard Beaton Hope Morrow Daniel Dube Tom Cobble Don Korb Danny Lyons Hal McRae Jim Faris Ray Daehnert William Winter Lyle Wood Randal Karasik Steve Sherlock Steve Anderson Stephen Bovie Richard Lowman Clark Hale Mel Fletcher Nelson Shantz Charles Hanson Sue Schmuck Michael Redden Leon Levitch Mike White Scott Colwes Ed Whitting Sr James Dowling Edward Dowling Mark Mandell Bob Jones Charles Beach David McMurtrey Fred Fornwalt Herschel Kockenower Ramon Darton Don Poetker Janice Robson Howard Stosich David Forman Robert Farber Bill Shull Carl Warmington Robert Dommer Richard West Grant Sorlie David Huey Glen Sipe Phil Glenn Bryan Uhrig Roy Hebert Charles Willis Nathan Sobel Bob Erlandson Al Seitz Randee Haber Fred Odenheimer Keith Matis Roger Hamilton Wil Wickham Mark Shengle Ed Solenberger Debra Krichevsky Lloyd Fritz Frank Lima Blaine Hebert Robert Grijalva Carol Dailey Greg Dailey Art Wilkinson Lee Wilkinson Johnnie Floyd Fred Mudge Stephanie Cadra-Hawks Kathy Epperson Mike Keener Margie Williams Don Moore Al Wood Herbert Bridgman David Tabachnick Charley Tarinella James Bryant Dan Paris Bruce Ziesemer R C Carbaugh James McWhirter Chris Teeter Wallace Buchanan Elwyn Lamb Karen Robinson Joe McDonald John Krucke David Nereson David Rubin Ward Guthrie Eben Loewenthal Don Waldbillig Tom Karl Christopher Rus Nate Bridges Paul Klitzke Harry Berg Cal Mehaffey Jeff Stickney Byung Sam Choi Ed Turnage Don Tew Dennis Nicholson Cecil Snyder Ernie Dege Charles Hansen Richard Anderson Michael Jalving Peter Briant Robert Hueller Roger Riffie Jim Geiger Stanley Watkins Rob Espenscheid Mark Stern Kevin Cory J B Tolbert Donald Mitchell Anthony Pascone Jr Bradley Smith Stan Godfriaux Harry Hendersen Howard McQuigg Marianna Schimelpfenig Bill Meigs Bill Swackhamer William Sells Brian Mott Robert McDonald Aiko-san Porter Thomas Juul Jeff Turner John Bammes Paul Schneider Chuck Cook Rick Chael Sid Stone Stuart Anderson Ed Whitting Jr Fred McNally Charles Ball Kenneth Serviss Karen Hudson-Brown John Thiemer Dave Vanderlip Il Kwang Seol Larry Johnson Jerry Berens Steve Niederhiser Roger Metcalf Joe Rindone Lowell Unger Patrick McCormick Micael Eggehorn Clark Foerster Bill Wright David Betts Clarke Houser Leon Gravier Keary Basford Ronald Poire David Pitsch Beverly Kim Daniel Evans Luther Minton Martha Riley Mark Anderson Joe Heisler Norman Miller David Kim Steven Cox Roger Gable John Farrell Edward Agasa Peter Bondy Barbara Bennett Don Wigent Steve Wells David Thomason Dan Earhart Stephen Craw Doug Neal Claudia Ellison Cook Robert Bovie Stanley Mittelstaedt Michael Hart Robert Payne Roger Osgood Bill McKaig Robert Johnson Charles Pope Mike Bingham Jeff Schuman Jeff Turner Phil Smith Berge Kalajian Steve Jones Russell Widmayer Chris Dincher Wayne White William Fletcher Alpha Elder John Lucibello Paul Mueller Paul Bergan Larry Gardner Lawrence Bock Dale Newhouse Ed Hilbert John King Mark Schecter Walt Brown Vivian Brooks Steve Hornbeck John Sampson Lois Heindselman Robert McNabb Ralph Barrus Charles Rullman Isaac Sadigursky Gay Ornellas Mark Mestman Emily Hilbert Bob Hundley Robert Ost Richard Johnson Richard Ridenhour A Y Hibbard Ronald Gordon David Horine Ed Schroeder Everett Story Lyn Koford Earl Earl Scott Susan Dietz Adam Fiore Lucian Brown Ralph Miyashiro Marvin Todd Preston Hebert Lucy Urlacher Steve Stout Ben Carlton Joseph Martin Larry Wicksell Ray Wolfe Frank Reigelman David Colpitts Richard Kawiecki John Minor Tim Hollis David Schonfeld Asa Wilkerson Thomas Levings Gina Carter Ernest Caviani Raffi Kechian Booth Tripp Chang Soo Lee Jay Mangano Dale Probst Max Springer George King Byron Nicholson Jeff Sova Gayla Mott John Stebbins Steven Huie Francis Mehaffy Jeanne Pendergast Lindasue Darling Jean Michel Paul Magee David Hulbert Terry Banister James Smith John Thomas Steve Houk Jere Morris Ricky Heeter Wayne Saucier Bob Liston Karla Pfennig Arthur Eriksen Robert Anderson Jack Ware Kenneth Johnson Ben Coonen Merrill Cox Jean Sauve Tim Strang Barry Heismann Glenn Robinson Greg Pollard Anthony Wright Bill Garlick Allan Cate Thomas Winter Tom Winter Laurence Fish Jack Janes Ron Jensen Joe Trappa David Cesca Paul Graeber Bob Dillinger Fred Haddad Gene Stevens Kelly Ward Robert Sorensen Ned Place Phillip Rawson Ken Kadwell Leroy Shultz Phillip Mosley Harvey Cornelsen Clarence Stout Frank Hambright Jack Smaha Brenda Mamer Dale Erwin Peter 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Abdalian Richard Harris Al Sutton Stuart Davidson Richard Kane Larry Goetsch Judi Edwards David Trasoff Michael Rucks Barbara Blankenship Ben Bailey Ken Kajkowski Charles Lincoln Jack Cashion Paul Seabern Bob Lake Carl Fischer Thomas Moyer James Verdugo Vernon Williams Glen Hart Christopher Johnson Mark Clark Brian Trainor Jack Boyd Don Cherni Bruce Reese Carroll Fisher Ralph Osborn Pam Borum Bruce Owens Sr Sam Corbett Michael Tocquigny Larry Graddy Ronald Griffith Charles Morgan Jim Sulkowski Loren Buntemeyer Todd Alessi Leonard Dickerson Don Lufkus James Sims Charles Fry Cal Munson Ken Burget Earl Kallberg Dan McSpadden Doug Hershberger Robert Bangert Matthew Deffley Greg Depner Don Fortner Anne Garee Christian Johnston Art Kessler Eric Nikiforoff Michael Oliver Stephen Rensberry Carl Rowe Franco Skilan Carey Crowson Matthew Doudt Samuel Levite Stephen Myers James Stout Tom Young Michael Dugan Judy Ethington Cindy MacDonald Louise Nicholson Hilary Strain Garret Traylor
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