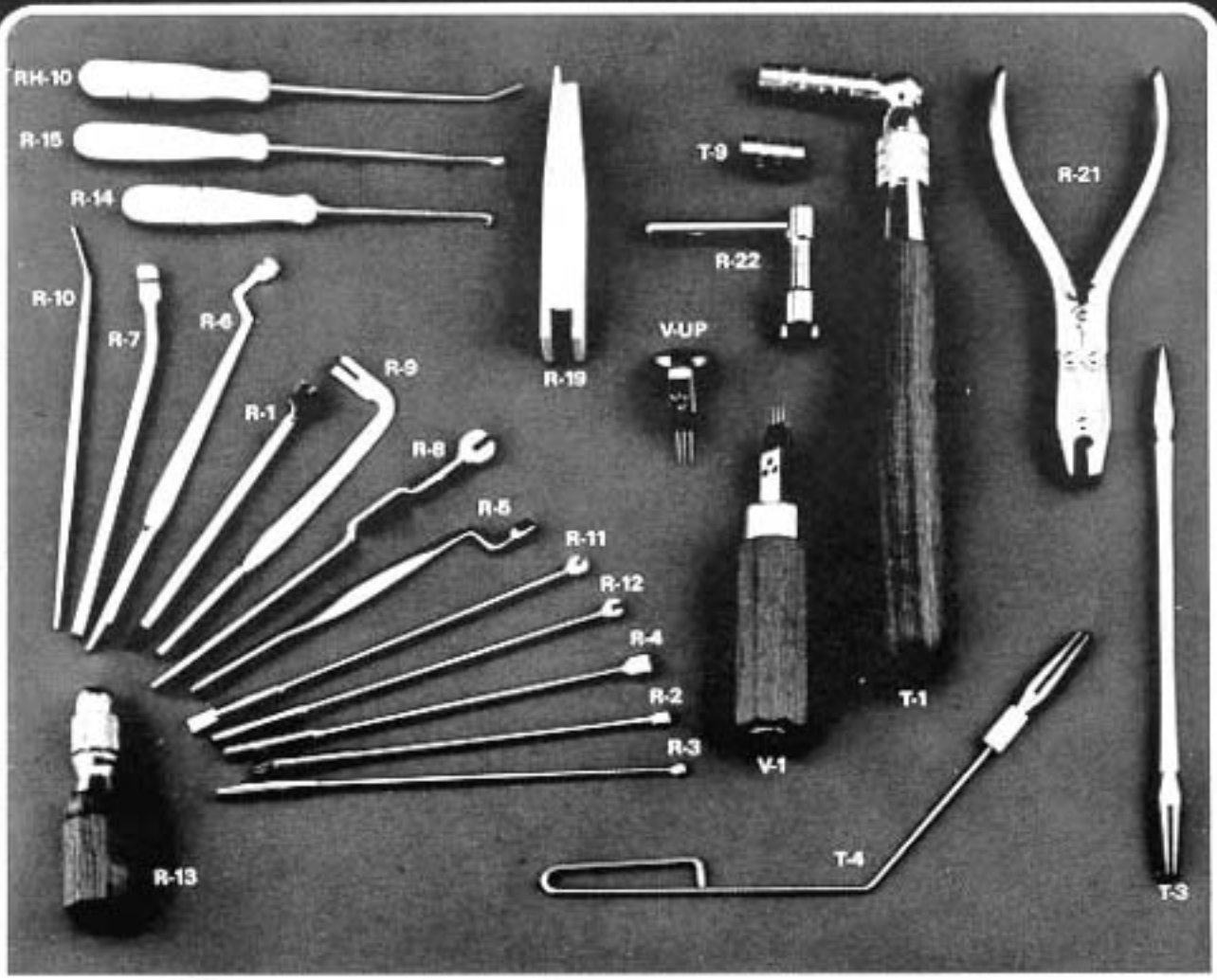
Piano Technicians Journal

July 1985

Schaff now has available...

YAMAHA TOOLS



Through an agreement with Yamaha International Corporation, Schaff is now a Distributor for tools imported by Yamaha International Corporation

STOCK NO.	TOOL DESCRIPTION
R-1	SPACER
R-2	JACK SCREWDRIVER
R-3	STOP RAIL SCREWDRIVER
R-4	REGULATING SCREWDRIVER
R-5	DAMPER REGULATOR (UP)
R-6	DAMPER REGULATOR (SP)
R-7	POST WIRE BENDER (UP)
R-8	OFFSET KEY SPACER
R-9	SPOON BENDER (UP)
R-10	CAPSTAN SCREW WRENCH
R-11	DAMPER REGULATOR
R-12	DAMPER REGULATOR

STOCK NO.	TOOL DESCRIPTION
R-13	COMBINATION HANDLE
R-14	SPRING REGULATOR
R-15	DROP SCREWDRIVER (DP)
R-19	BACK CHECK REGULATOR
R-21	WIRE PLIERS
R-22	KEYFRAME SCREW REGULATOR
RH-10	CAPSTAN SCREW WRENCH
T-1	TUNING HAMMER
T-3	WOODEN MUTE
T-4	WOODEN MUTE
T-9	TAP
V-1	FELT PICKER (LARGE)
V-UP	FELT PICKER (SMALL)

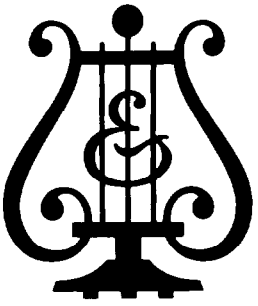
THE HOUSE DEDICATED TO SERVICE

Schaff PIANO SUPPLY COMPANY

451 OAKWOOD ROAD, LAKE ZURICH, IL 60047

(312) 438-4556

When in Kansas City attending the National P.T.G. Convention you are cordially invited to visit



STEINWAY & SONS

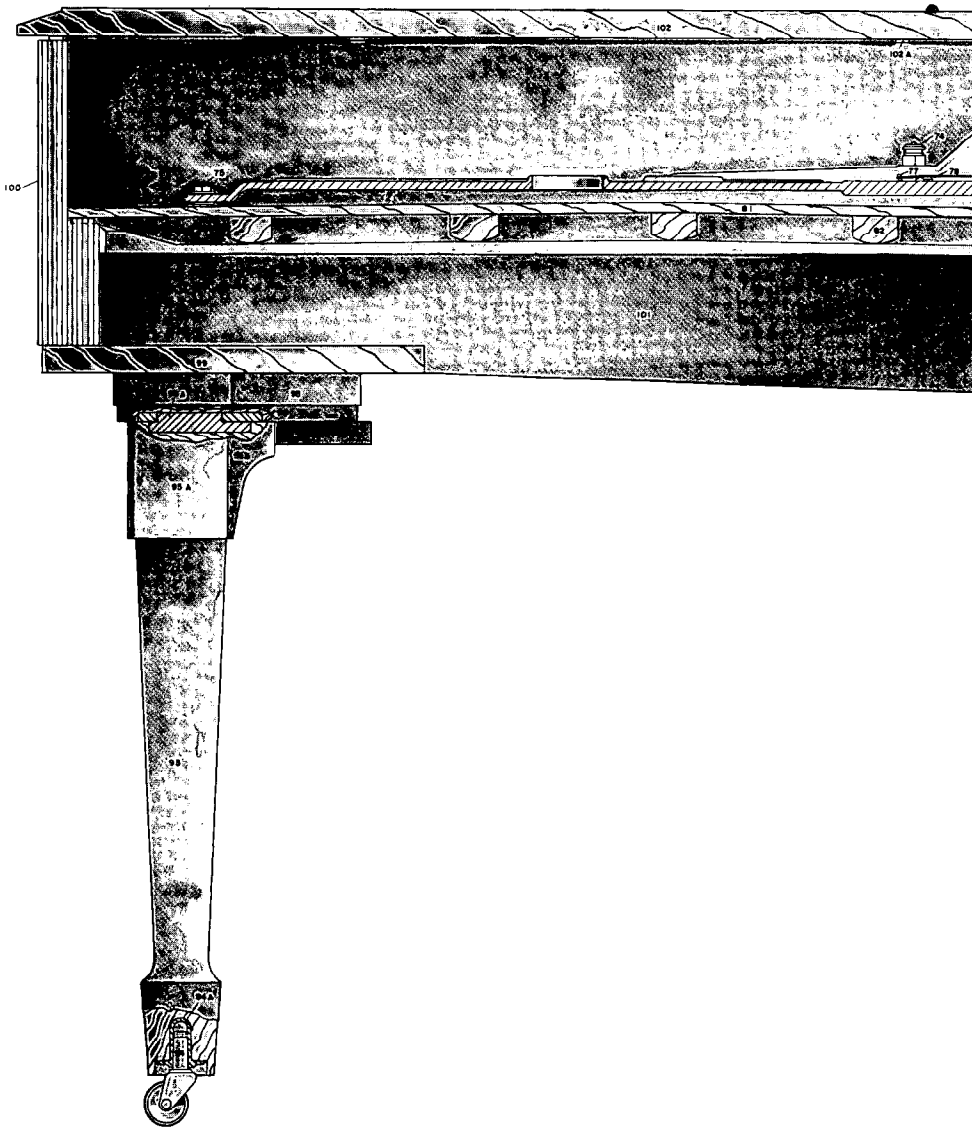
at their exhibit and attend a cocktail reception prior to the convention banquet on Wednesday evening, July 17, from 6:30 to 7:30 PM.

Hyatt Regency Hotel

There to greet you will be

Peter Goodrich
Bob Beck
Bill Garlick
Fred Drasche
Joe Bisceglie
Mike Glazebrook

and other members of the Steinway Staff.



WE'VE DONE OUR PARTS.

Now that we've worked the wood, joined the joints, shaped the soundboard, built the bridges and the action—

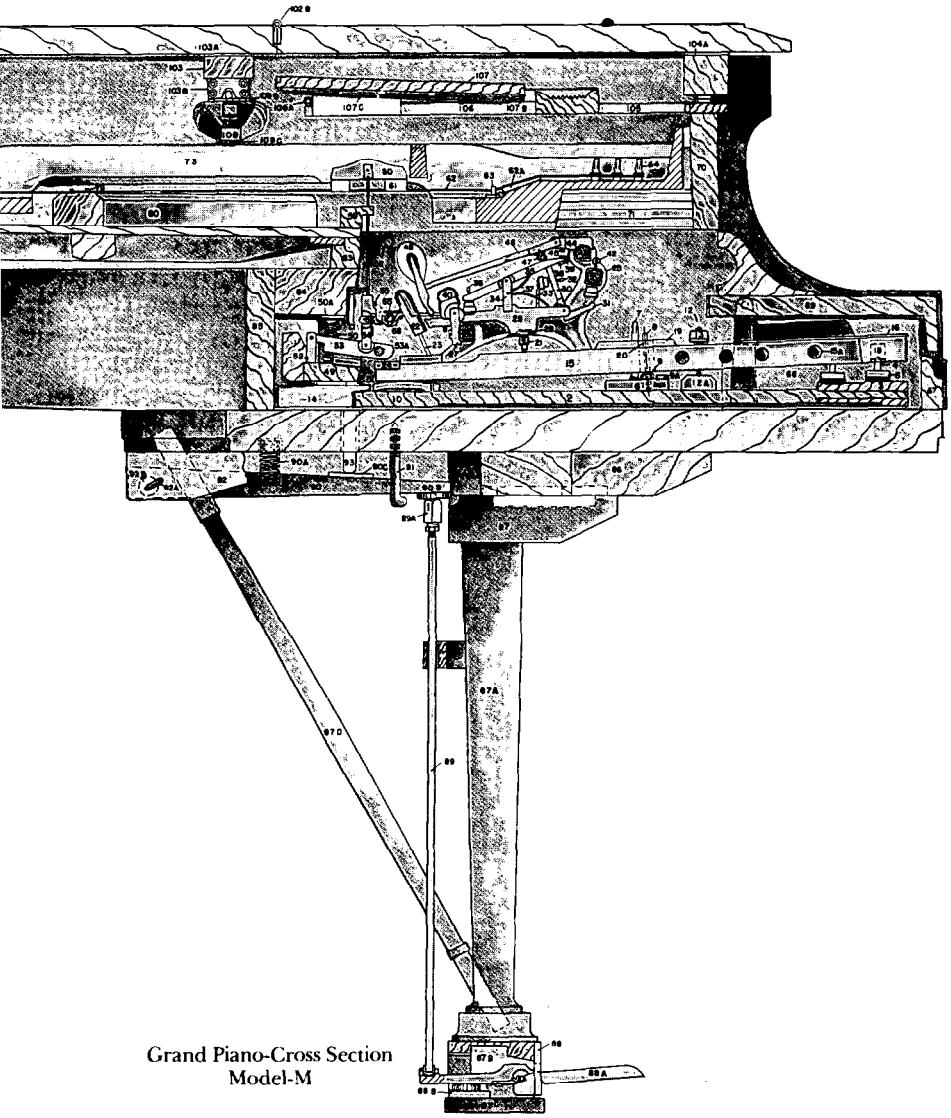
Now that we've spent more than a year doing all we could to make this the finest piano in the world—

Now it's your turn.

The technician.

Whose art and whose science take over where ours leave off.

For a Steinway® piano is more than the sum of its parts.



Grand Piano-Cross Section
Model-M

NOW IT'S YOUR TURN.

It is also the dedicated piano technicians who understand how to keep it performing as only a Steinway piano can.

Technicians who know they can call on us for parts and support—from the big picture down to the smallest detail.

For your free, detailed poster of the view behind the sound, contact Mr. Peter Goodrich, Steinway & Sons, Steinway Place, Long Island City, NY 11105 (718) 721-2600.

STEINWAY & SONS

Piano Technicians Journal **July 1985**

Official Publication of The Piano Technicians Guild, Inc.
Volume 28, Number 7

1984/85 Executive Board

CHARLES P. HUETHER, RTT
President
34 Jacklin Court
Clifton, NJ 07012
(201) 473-1341

MARSHALL B. HAWKINS, RTT
Vice President
PO Box 10386
Oxon Hill, MD 20745
(301) 567-2757

RONALD L. BERRY, RTT
Secretary/Treasurer
6520 Parker Lane
Indianapolis, IN 46220
(317) 255-8213

ERNEST S. PREUITT, RTT
Immediate Past President
4022 S. Fuller
Independence, MO 64052
(816) 252-2885

WILLIAM J. MOONAN, RTT
Northeast Regional Vice President
811 Amherst Drive
Rome, NY 13440
(315) 337-4193

JAMES F. ELLIS, RTT
Southeast Regional Vice President
Skyland Drive, Box 248, RFD 2
Powell, TN 37849
(615) 945-2639

NOLAN P. ZERINGUE, RTT
South Central Regional Vice President
619 Barbier Avenue
Thibodaux, LA 70301
(504) 446-6812

DEAN G. THOMAS, RTT
Central East Regional Vice President
Rd. 1, Box 210A
Edinburg, PA 16116
(412) 652-3352

WILLEM BLEES, RTT
Central West Regional Vice President
515 Poplar
Webster Groves, MO 63119
(314) 991-4290 (S)
(314) 961-5203 (H)

JAMES G. BRYANT, RTT
Western Regional Vice President
1012 Dunburton Circle
Sacramento, CA 95825
(916) 454-4748

Staff

BARBARA PARKS
Executive Director

LARRY GOLDSMITH
Journal Editor

JACK KREFTING, RTT
Technical Editor

GEORGE DEFEBAUGH, RTT
Recorded Journal Reader

CHRIS PALMAY
Subscriptions/Advertising/Update Editor

9140 Ward Parkway
Kansas City, MO 64114
(816) 444-3500

On The Cover:
Detail from Bosendorfer upright. Piano courtesy Jenkins Music Co., Kansas City, MO.

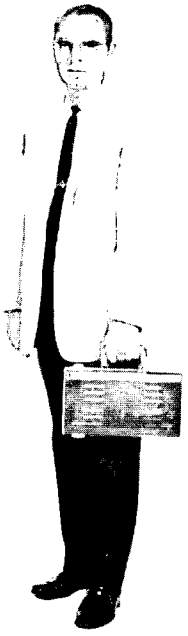
Copyright July 1985 *Piano Technicians Journal*. All rights reserved. No part of this publication may be copied or reproduced in any form, by mimeograph or by any other means, without written permission from the publisher, The Piano Technicians Guild, Inc. The words "The Piano Technicians Guild, Inc.," and the logo are registered with the U.S. Patent and Trademark Office — Unauthorized use is strictly prohibited.

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

Professional Piano Service Tool Case

—Newly redesigned—

- **Handiest**
- **Efficient**
- **Lightweight**



Will carry all tools necessary for servicing the fairly well maintained piano.

Tools NOT included.

NOW IN STOCK

$73.00

Net Price—Continental USA Plus Delivery

(212) 569-9200

FORD

PIANO SUPPLY CO.
4898 Broadway
New York, N.Y. 10034.
(212)569-9200

IT'S NOT TOO LATE

Don't miss the Piano Technicians Guild's
Annual Convention & Institute
July 15-19, 1985
at the Hyatt Regency Kansas City.
Join us as we "Focus On The Future"

Thanks to our Friends in the Music Industry on the Occasion of our

100th ANNIVERSARY

Tuners Supply Company would like to extend a sincere thank you to our many friends/technicians in the music industry.

We are proud to have originated many of the tools that are now in use in the music industry. We pledge to continue to develop innovative quality tools, continue our policy of prompt, friendly service, and maintain the realistic prices that the industry has enjoyed these past 100 years.

Again, thanks for your help in enabling us to reach this significant milestone.

Write for catalog.

Piano Tools Hale and Supplies

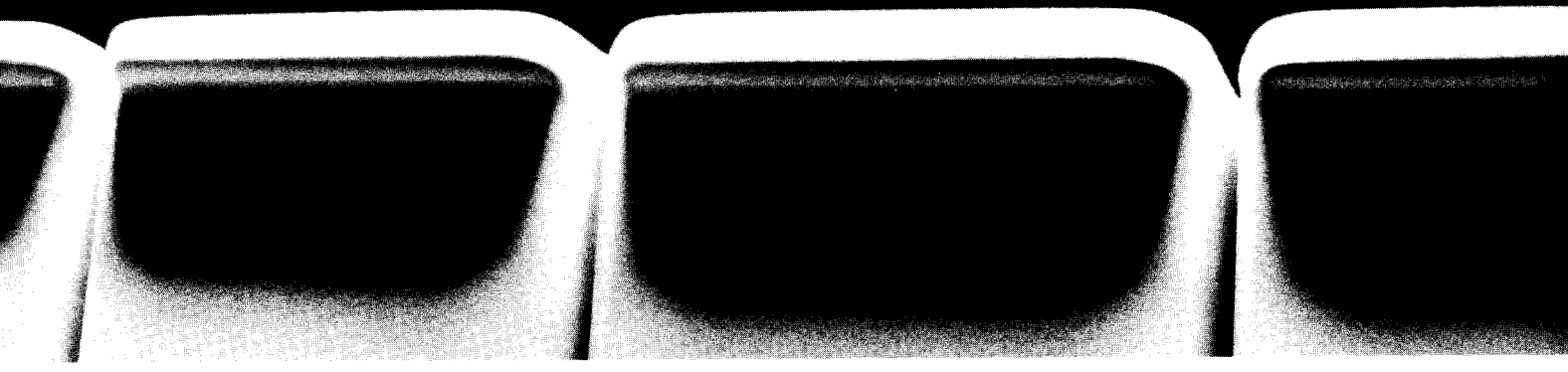
Make it a Rule — Use a Hale Tool

TUNERS SUPPLY COMPANY

Serving the music industry since 1884

EASTERN BRANCH: 94 Wheatland Street, Somerville, MA 02154 (617) 666-4550
WESTERN BRANCH: 190 South Murphy Ave., Sunnyvale, CA 94086 (408) 736-2355

Bald



Our reputation has be

Many tuners tend to think of a Baldwin piano as something of a challenge. They sometimes find Baldwin tuning pins physically demanding to turn. And so they may be. But we would never sacrifice the integrity of our pianos to make them easier to tune.

And we think we've built a strong case for our instruments.

Our grand inner and outer rims are formed in a single press to reduce flexing. This in turn helps minimize back-tracking when tuning.

Of course, our 19 and 41 ply pinblocks retain their tuning pin torque years longer than any of the others available. And though you may have to expend a little more energy to move the pins, you know they will stay where you set them, making your job a little easier the next time around. In fact, at the end of our 10 year warranty period, we expect our pin torque to still be higher than many competitive new pianos.

There's also a fundamental difference throughout the bass range due to our patented SynchroTone™ strings. We've found a way to control the placement of longitudinal mode vibrations to improve clarity. This also helps you hear the flexural mode vibrations

en greatly exaggerated.

more accurately. And more quickly. In this respect, we think you'll agree that a Baldwin piano is actually easier to tune than other pianos.

And because we vertically laminate them, our bridges are dimensionally more stable. These plies virtually eliminate the splitting and cracking that often plague single piece bridges.

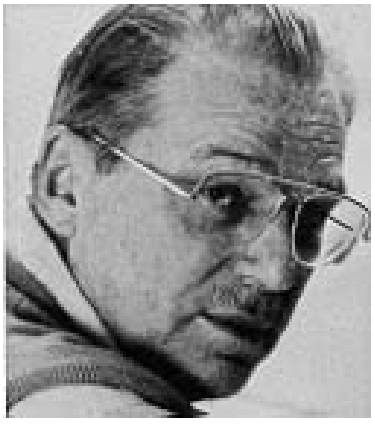
Like you, many of our efforts go unnoticed. But our greatest satisfaction comes from laying the foundation for great performances. Together we can provide instruments that fire the human imagination and spirit.

In schools, studios, churches, homes and on the concert stage, every Baldwin piano holds this promise. And that's why we'll never compromise the quality of our pianos. That's also how we've built our fine reputation.

And it's a reputation that's richly deserved.

For technical information on Baldwin pianos, please write to us at our new address: Baldwin Piano Technical Services, P.O. Box 27, Highway 63 South, Trumann, Arkansas 72472. Or call 501/483-6116.

The President's Perspective



Charles P. Huether
President

The Old Year Ends; A New One Begins

This message coincides with the completion of my year in office. I would like to thank all of you who have taken time to express your reactions to these monthly articles. Fortunately (for me) most of them have been complimentary. I take that, not as a reason to feel proud, but as a reason to feel humble and an additional responsibility to try to live up to your expectations.

The year has been busy and rewarding. Besides phone calls, reading newsletters, reading mail and responding to it, there has been the satisfaction of traveling to meet and speak with as many members as possible. These many contacts have given me some very positive feelings about our members.

They conveyed such an inspiring air of optimism and willingness to work that it is impossible not to be excited about the future of the Piano Technicians Guild. There are new generations of members out there reacting positively to what has been done in the past to establish our organization, and reacting positively to what might be done to continue our growth in numbers, skill and prestige.

One has the tendency not to recognize change, especially when in the midst of such change. Adjustments are made in small increments, as we well know. Small increments are not readily noticeable, but when taken as a whole, they mean the difference between a klunker and an inspired instrument. They mean the difference between an organization which becomes stodgy and rooted in the past and one which accepts change and growth.

Sitting on the podium at the Council meeting, one sees the faces of the delegates: oldtimers, our contact with a proud, substantial past; and new faces, our bridge to the future. The lesson learned from observing them for many years is that although the constituency changes by face, by voice and by demeanor, it retains a strong line of identification and dedication. As debate goes on, the words of wisdom, the resolution of sticky problems will, as often as not, come from a new face, a new voice, a voice of reason, good sense and progress.

It is always inspiring to note that when the confusion of debate, amendment and vote has subsided, we reach a reasonable and workable decision. Faith in the democratic process is restored over and over again. The Romans had the words for it: "Vox Populi, Vox Dei." As trying as these sessions may sometimes be, they do manage to reach worthwhile decisions. Make sure you do your share for the future of the Piano Technicians Guild.

This is the end of a year, in one sense, for it begins a new term of service for our elected officers. The new year begins as we leave the Council chamber July 15 and so does the excitement. It begins, appropriately for those who attend our Convention and Institute, with the excitement of a wonderful week of study, socializing and renewal. We meet to learn. We meet to reestablish old friendships and make new ones. We meet to discuss organizational needs and goals and what can be done to help resolve and meet them. We return home with a charge that affects positively all we do for the rest of the year and beyond.

In Kansas City, besides our normal activity, we are honored to host the biannual meeting of the International Association of Piano Builders and Technicians, an international umbrella organization of tuner-technician groups. It is fitting that we should be hosting this meeting, for we are co-founders with the Japanese Association of Piano Tuners. We met six years ago at our annual

Continued on next page

convention in Minneapolis and hammered out the original agreement.

I would like to encourage all our members to participate in the IAPBT, at least to the extent of supporting our membership in a tangible way by making contributions. A $15 contribution will make you a "Friend of the IAPBT" for a year and enable the Piano Technicians Guild better to support its role in this international organization.

The 1985 Annual Convention and Institute will have a special international emphasis by having instructors from all over the world. It will be an extraordinary opportunity to see and hear the best in our field. It will be an opportunity which will not be repeated for a long time. If you receive this message in time to get to Kansas City and you have not already decided to come, do so. Come and be a part of a world-wide contact which is made possible by your support as a member of the Piano Technicians Guild.

PIANO DEALERS WANTED

Wholesale Piano Company
6934 Woodland Avenue
Philadelphia, PA 19142

We have a large selection of used grand pianos-spinets-uprights. All in excellent condition at discount prices. For more information contact:

William Rowell
(215) 726-8817

Please note:
NEW address & phone–

Pianotek

(313) 583-1234
2825 Vinsetta, Royal Oak, MI 48073

. . . . . .

featuring: IMADEGAWA hammerheads

–we specialize in EXACT duplication for all custom boring specifications

–FAST, PERSONAL SERVICE; you talk directly with technicians, not desk clerks

we also carry: Dampp-Chaser®, shanks & flanges, etc.–free catalogue on request–

YOU and the PIANO LIFE SAVER® SYSTEM...

UNBEATABLE

NOW you can offer permanent solutions to these seven major piano problems

- Rattling keys
- Slipping pins
- Cracked sound boards
- Sluggish action
- Sticking keys
- Rusting strings and pins
- Pitch and tuning instability

Join the FULL-SERVICE technicians who are earning $1,000 - $5,000 in additional income each year by installing PIANO LIFE SAVER® SYSTEMS.

Available through 40 world-wide distributors

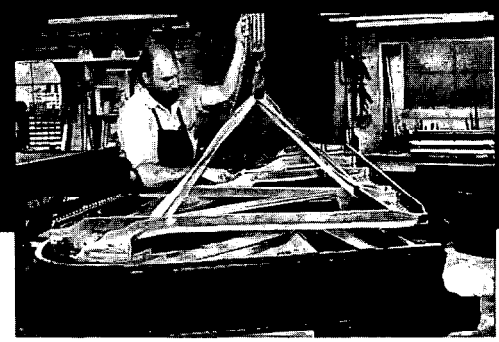
For information and **FREE Business Building Kit**
CALL 1-800-438-1524

Manufactured since 1947 by
DAMPP-CHASER® ELECTRONICS, INC.
BOX 1610, HENDERSONVILLE, NC 28793

UL CSA LISTED

PIANO REBUILDING & REFINISHING
BY NATIONALLY KNOWN, MASTER CRAFTSMAN C.A. GEERS

- COMPLETE OR PARTIAL REBUILDING SERVICE
- FALCONWOOD PINBLOCKS



TONY GEERS POSITIONS A REFINISHED PLATE.

- REPLACE PINBLOCK
- REPLACE SOUND BOARD
- RESTRING
- REFINISHING
- COMPLETE OR PARTIAL SERVICE PER DEALER/ TECHNICIAN SPECS.

AVAILABLE —
Step-by-step pinblock installation booklet, an invaluable tool at only **$5.00.**

FALCONWOOD PINBLOCKS
Celebrating 25 yrs.; after tens of thousands installed and used; Falconwood is still the very best pinblock available. Put pride and quality into your piano—use a Falconwood Pinblock.

WEST COAST SUPPLIER OF PINBLOCKS
SUPERIOR IMPORTS
2152 W. Washington Blvd.
Los Angeles, CA 90018
213-735-4595

EAST COAST SUPPLIER OF PINBLOCKS
A&C PIANO CRAFT CO.
149 Wooster St.
New York, NY 10012
212-254-1840

FOR MORE INFORMATION & PRICES CALL OR WRITE –

c.a. Geers **PIANO COMPANY INC.**

PHONE: 513-941-7666
691 N. MIAMI AVE.
CLEVES (CIN'TI), OH 45002

From The Executive Director

Barbara Parks
Executive Director

Convention Update

Everyone, no matter how humble and unassuming he or she may be, likes to show off a little. Most of us enjoy inviting our friends into our corner of the world and giving them the grand tour.

That's why this year's convention is so exciting for us here in Kansas City. It gives us a chance to show off our hometown, to share with you some of our favorite things. I know the members of the Kansas City Chapter are looking forward to this as much as the staff in the Home Office.

The people who hosted last year's successful convention in Indianapolis were justly proud of their city, and I'm sure those who live in Las Vegas will do their share of bragging next year. But this year it's Kansas City's turn in the spotlight and those who live here feel that it couldn't happen to a nicer place.

You could say that Kansas City is like any other large American city — it has its good points and bad. We here think Kansas City is different because it has more of the good and less of the bad. It has grand old neighborhoods and sparkling new hotels like the Hyatt. It does not have the crime problems many of its urban sisters face. It does have a strong tradition of support for the arts. It does not cost as much to work, live or play here as some other areas. It does have an ethnically diverse population that brings all types of foods and cultures to the mixture.

When you come to a convention, it's always difficult to really sample the flavor of a host city. There are always meetings and classes to keep you near the hotel and old friends to see rather than new sights. If you don't know the city, it's hard to explore — you don't know what's out there or how to get to it.

Even so, you should take the time to see KC. Ask for information and directions from the host chapter booth in the exhibition hall or the registration table in the hotel lobby. You won't be disappointed.

* * *

There are people who quietly and selflessly give of themselves year after year. They are leaders with vision, who put the welfare of the group ahead of their own. They share their knowledge and their strength even with those who might be in competition with them. They are the people who are always called when the fair-weather types decide a job is too tough.

One of the nice things about conventions is that we have an opportunity to publicly honor our heroes. Our highest honor, the "Golden Hammer," goes each year to such a person. Each year we also induct a giant from among us into our Hall of Fame. Awards such as the "Member of Note" show our appreciation for others who help us along the way. It is ironic that when the names are announced, the deserving winners are usually more surprised than anyone else in the audience. That's the kind of people they are.

I know the Awards Committee chaired by Jeanne Pendergast and composed of William Stegeman, James Hayes, Doug Wurz and Olan Atherton, has worked very hard in gathering this year's nominations. And when the winners' names are announced, I'm sure you will agree that they all are most deserving. I hope you can be there to help honor them. Look for a full report in next month's *Journal*.

* * *

As this is written, more than a month before the convention begins, advance registrations stand at more than 600. That's more than the total attendance at some past conventions, and it promises a very good attendance this year. I think you can see that our 1985 gathering will indeed be unique.

A high attendance means more than just an opportunity to enjoy old friends and make new ones. This year's Institute has many fine instructors, but learning opportunities are not limited to the classrooms. Each technician brings his or her own set of experiences — each is a potential instructor if you only take advantage of the opportunity.

Dateline Kansas City:

It's Not Too Late To Invest In Your Future!

Ernest S. Preuitt
Chairman, Host Committee

Well, what do you know? Here it is, July, just a few days until the opening of the convention of the Piano Technicians Guild. By now, you have seen the lineup of classes and the extra frills. If you haven't made up your mind to attend, there is still time. Send in that registration now, or just come to Kansas City and register when you arrive.

There is not much that hasn't been said through this column in the last few months, but I can assure you through past experience that your attendance at a national convention will be the best investment you can make for your future.

It always is a pleasure to attend a class taught by someone you have heard in the past, but just as rewarding is attending one where a total stranger is in charge. Being worldwide this year, there are several people on the faculty who are first-timers to most of us. That in itself will be another plus for attending.

The major manufacturers will be here showing their products, teaching new and different techniques and providing all with good fellowship and generous handouts. Many Guild members have been spending an inordinate amount of time doing their best to make things interesting and profitable for you.

The Hyatt Regency Hotel is among the best for our use in the entire country. You say it's expensive? My first convention in 1963 in New York City cost me six tunings for one night in the hotel. I can't say the same now, in spite of inflation. It looks as if we are getting a good deal this year.

We are shooting for 1,000 in attendance this year, and nothing would please us more than if you were one of them. If you are not too busy attending classes, looking at the exhibits or just talking to friends and new acquaintances, take a moment to stop in at the Kansas City Chapter booth and get acquainted with us. We will be in the exhibit area all week and would like to see you.

Even at this late date, we urge you to "Focus on the Future" here in Kansas City.

Index of Display Advertisers

The International Scene

Fred Odenheimer
Chairman, International Relations Committee

Planning Your Trip To Overseas Factories

There have been a number of inquiries lately by members who are taking an overseas trip and want to combine this with visits to piano factories.

While I try to answer all those letters to the best of my ability, one can sometimes deduce that not much thought has gone into planning such a trip, or that the visit to a factory came as a second thought. To really get the most out of a business vacation, plans have to be formulated well in advance and one has to have a definite goal of what he or she wants to see and to accomplish in the way of professional experience and learning.

It is impossible to see the whole Orient or Europe in two weeks and have time besides to visit a number of factories on the way. For one thing, the factory is probably away from your intended route, and for another, if you make a tour of an establishment, you do not want to look at your watch and say, "I have exactly one hour and 35 minutes to spend here. The tour bus (train or whatever) is leaving in two hours and I have to be there on time. What can you show me during that time?" You do a disservice to the manufacturer, you waste his time and you really do not get the benefits that were the reasons for your visit.

Now, how should you go about planning a trip? First, formulate some tentative plans and then go to a good travel agent to see how these plans can best be implemented. If you want to see factories, schools or museums that may be of interest and pertinent to your trade, find out the location of these places early enough to plan your itinerary intelligently.

While tours generally are well planned, they are designed to give the most to the average traveler, and chances for straying from a set course are limited. However, there is always time to visit a local piano store to take a look at the products they are displaying and to talk to salespeople or even the technician in charge if a mode of communication can be established. On a set tour where time is limited, this is probably the best way to gain experience and satisfy one's desire for learning. If you are interested in antique instruments, there are museums with good collections in many major cities.

By far the best way for a piano technician to travel abroad is to join one of Dan Evans' planned tours. He has lots of experience, knows how to mix serious business with pleasure and you can be sure that any tax angle has been worked out to your advantage.

But don't all write to Dan immediately. Because of our international meeting in Kansas City, there will not be a trip this year. Rumor has it that a very interesting 1986 tour is in the planning stages. Be sure to watch the *Journal* for early announcements and start saving so you will not have a last-minute excuse. Also become a member of "Friends of IAPBT." He will be able to contact you sooner, but even planning a trip involves expenses.

Economic Affairs

Bob Russell
Economic Affairs Committee

Cost Of Living Adjustment

The time of year is approaching when a tuner-technician begins to consider his or her tuning and repairing fees for the coming year. Some technicians have kept up with the cost of living, while others have been trying to "hang in there" with no increase in fees. They fear that any increase on their part might result in a loss of customers. This fear has some justification. I would like to relate my method of "cost of living adjustment" *without* customer loss.

Let me begin by saying that periodically it is important for every one of us to reevaluate our fees and compare them with our professional counterparts. When I decide it is time for an increase, I proceed in this manner. First, I establish a fee that is fair for all. I *never* raise prices for all customers at one time! I begin by offering the new price to all *new* customers while *maintaining* the price for all repeat customers for *one year. If questioned* about the two-tier pay scale, I simply and honestly explain that it is my way of thanking repeat customers for their business and they in turn will benefit from the same experience in years to come.

There is security in this method due to the repeat customer fee maintenance. You will retain your repeat customers and at the same time you will be able to monitor just how this new increase is affecting your new customer "call-ins" and referral customers. In other words, you are keeping one foot on solid ground while feeling the security of the new ground.

By the way, when talking to customers, I *never* talk about raising prices...however, I have been known to discuss *cost of living adjustment.*

The most important thing to remember is: *don't let fear stand in the way of providing a fair and honest living for yourself and your family.*

Pratt-Read, Baldwin Join In Manufacturing Venture

INDUSTRY NEWS

Pratt-Read Corp. and Baldwin Piano & Organ Co. announced May 15 the establishment of Pratt-Win Corp., a multimillion dollar joint venture for manufacturing keys and actions in Mexico. Terms of the agreement were not disclosed.

Harwood B. Comstock, president and chief executive officer of Pratt-Read Corp., said the joint venture involved phasing out all of his company's key and action manufacturing operations in Central, SC, and moving them to a 110,000-square-foot Baldwin plant in Juarez, Mexico, just across the border from El Paso, Texas. During the move the participants say they will continue shipping products to customers and providing normal service without delay or interruption. Sales and customer service operations will continue to be staffed by the Pratt-Read sales group operating from Ivoryton, CT.

Comstock said he expects the joint venture to provide substantial benefits to the piano industry. "What we are doing involves challenge and a considerable investment. We are stepping up to both as evidence of our commitment to the industry — our determination to maintain top quality while building in the kind of long-term price stability the piano business needs to prosper in the years ahead. Baldwin has been manufacturing actions in Mexico for 15 years and brings to the joint venture an experienced local workforce as well as the plant facility which will be utilized.

"As quickly as possible, all of our machinery, including some sophisticated, numerically controlled drilling and bandsawing equipment that mechanizes the most critical manufacturing operations, will be moved into the new Baldwin plant," Comstock said.

Pat Guptill, a 35-year Pratt-Read veteran, will be in charge of the facility. Guptill and a number of other Pratt-Read management personnel will move to Juarez.

THE TECHNICAL FORUM

Trapwork, Misaligned Wippens, The Multipurpose Tool Contest And Readers' Comments

Jack Krefting
Technical Editor

In response to several recent queries regarding trapwork, we will initiate and invite comment on that topic in the coming few issues. Other topics may, of course, also be addressed.

One question which has been brought up involves the way in which the bearing blocks are counterbored, a procedure that seems strange at first glance. All of us have no doubt wondered at one time or another why the wooden blocks which support the pedal pins or the trap lever pivot pins have to be counterbored at all, let alone at half their height. Anyone who has fished around in a deep counterbore with a cabinet screwdriver trying to engage the slot of an invisible screw, only to find that even when it is loose it cannot be removed without removing the entire block, has wondered why the bearing block could not have been installed with a longer screw, possibly countersunk just flush with the surface. Better yet, one wonders, why not eliminate the counterbore altogether and use a round-head screw?

The answer to that one is that while maintenance would appear to be simplified by such a change, there would actually be a greater maintenance requirement because of it. The long screw would be holding a tall cross-section of wood, and therefore every time the humidity level changed appreciably, the bearing block would expand or contract considerably, just as it would with a counterbore, but the long screw would get looser than the short one because of the greater amount of wood under the head of the screw.

Another question that arises now and then involves the stopping of pedal movement, both up and down, in all types of pianos. Let's consider the right pedal on the typical vertical as illustrated in *Figure 1*.

The pedal movement must be stopped firmly but noiselessly at both ends of its travel, but not entirely for the same reasons. The upstop felt could well be called the leveling felt, since its thickness determines the height of the pedal at rest. It is not considered necessary to regulate the pedals so they all dip the same amount, especially in view of the fact that no two are used at the same time with the same foot, but they certainly should be level when at rest, if only for reasons of appearance.

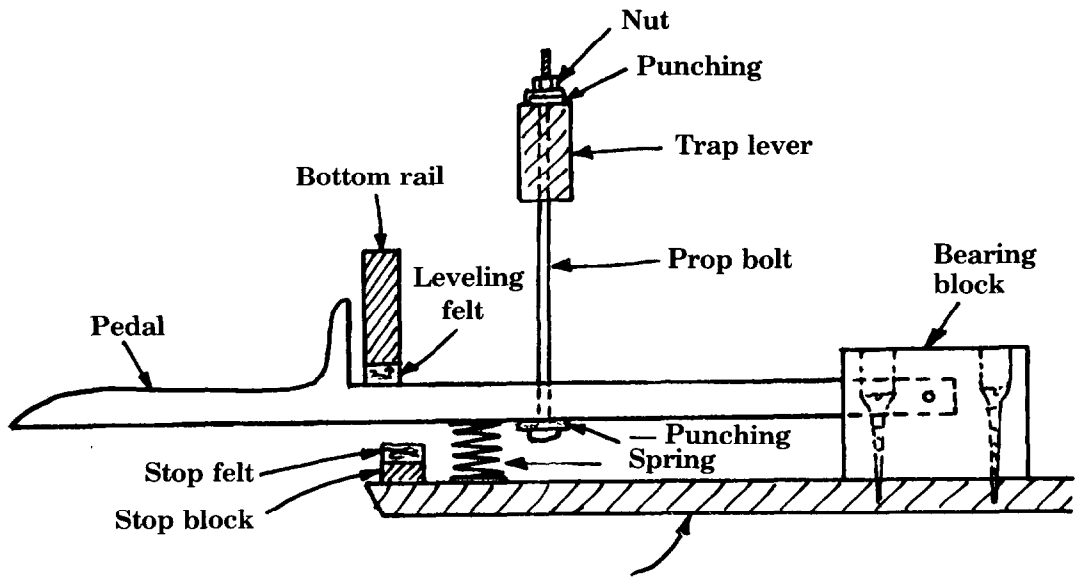


Figure 1

Shim or thin this felt, usually mounted in the top of the notch in the bottom rail, so that the pedals are level with one another. Be sure the return spring is strong enough to do its job before leveling pedals, because otherwise the job will have to be done over again when the stronger replacement spring forces the pedal higher by compressing more felt.

Similarly, the stop felt under the pedal must be shimmed or thinned, but in this case the purpose is to stop the movement when the trapwork and lift rod have moved to the optimum position. In this instance, that would be when the dampers have lifted to the same degree they would be lifted with the key.

All wedges must clear the strings, even at maximum excursion (when the strings are moving radically out of their at-rest line) but the damper wires should not be jammed tightly against the stop felt on the spring rail. If that condition exists, on hard pedaling the spring rail would tend to bow away from the strings under the pressure of the damper wires, except at the action brackets, where the wires would tend to be bent from the firm contact. Test for this condition by depressing the pedal fully and then pulling back on the damper heads to see whether there is a bit of further movement. Naturally the prop bolt must be adjusted so there is 1/8- to 1/4-inch lost motion at the front of the pedal *before* the pedal stop felt thickness is adjusted.

Misaligned Wippens

Q: *I have a client with a no-name five-foot grand which was rebuilt with new hammers, shanks and repetitions six years ago. He was having action problems the other day so I took a look. First thing that was obvious was that some keys were causing an adjacent hammer (to the right) to rise. I pulled the action and looked first at the offenders.*

Sure enough, the repetition was off to the right, catching the adjacent knuckle. I started fiddling with the whip flange screw, when I noticed that all *the repetitions seemed a little off-center towards the treble. I looked at it from the front and, lo and behold, all the jacks were centered more or less on the right-hand edge of the let-off button; whips to capstans, ditto. Seems everything about the repetitions was about 1/4 inch too far to the treble.*

*What to do? Move the whip flange rail! Now I must admit that my first contemplation of such a job conjured up visions of long, difficult hours of shop work fraught with unseen pitfalls, but after closer examination, I determined that it should be a fairly simple operation, given the right tools. So here's what I did (*See Figure 2...ed.*).*

Using a borrowed chisel (the client is a plastic surgeon), I gouged out a 1/4-inch continuation of the action-bracket notches in the flange rail. Then I removed the screws and tested the new position. It looked perfect! Then, replacing all the screws but one, I whittled a hammer shank to the size of the screw, dipped it in Tite-Bond, and plugged the hole right through the action bracket, cut the shank off,

whittled it again, and repeated the operation for each hole (Fig. 3). Then I went back and, with a small key-hole type hacksaw, cut the plugs flush. Then it was a simple matter to drill new holes and replace the screws. Now all the jacks were squarely under the bottons and the whips squarely atop the capstans. Of course I had to re-regulate the letoff and re-square the repetitions under the knuckles because of all the compromises previously made to compensate for the mis-alignment in the first place.

All of which leads to my technical question of the month: How did such a state of affairs occur in the first place? There was no evidence that the rail had ever been moved previously. The action brackets were firmly in place. Nothing else seemed out of place, except that the new hammers and shanks seemed to be slightly to the right of perpendicular to the hammer flange rail, presumably for alignment to the strings. Have you ever seen a similar situation? What could have caused this?

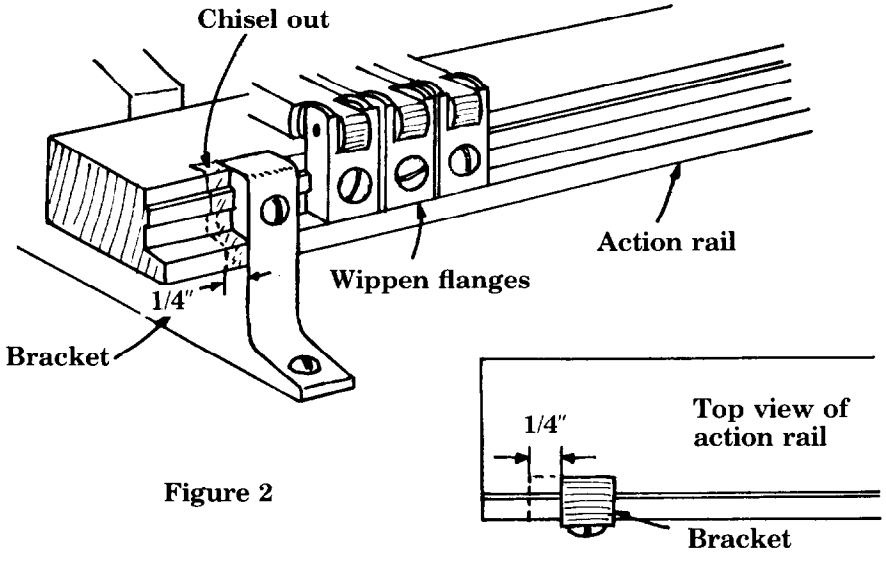


Figure 2

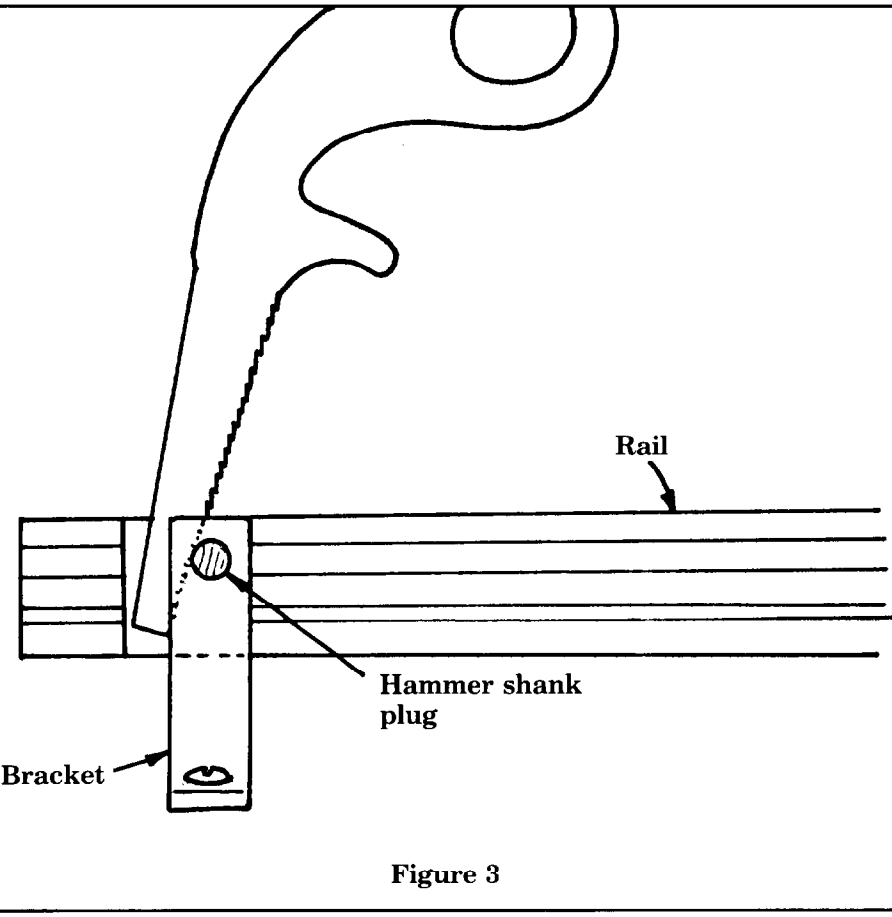


Figure 3

A: When the action was originally installed, it should have been rotated but obviously was not, and therefore the problem was built in. This is what our correspondent should have done instead of the above procedure, because it would have been quicker, easier and more consistent in terms of action spread.

For those readers who may be unfamiliar with the term "rotate" as used in this sense, let's back up a bit. When a piano is designed, a scale stick is made which locates the center of the strike point for each hammer. This stick is then used to locate each hole for capstans and action flange screws so that all parts will be lined up directly below the strike point of the unison in every case. If the scale stick is carefully made and there is no change in the relative positions of the unisons because of errant agraffe locations or something similar, and if the stick is faithfully followed in drilling the action rails, there should be no problem.

In the real world, however, things can and do go wrong. If the rails are fastened to the action brackets at some angle other than 90 degrees, the rails will still be parallel but the wippen screw holes will be slightly offset from the hammer flange screw holes. Thus, when the parts are installed, they will not line up without extensive spacing and traveling.

The alert factory worker will stand that action on end, tilt it so only one end of the end action bracket touches the floor, and push down on the upper end of the action. The brackets will twist slightly on the rails, or vice versa depending on how it is viewed. The worker then checks the knuckle-to-

repetition alignment, adjusting as necessary by the same simple process.

When the majority of the repetition levers are aligned to the majority of knuckles, with all shanks perpendicular to the hammer flange rail, the action has been properly rotated. Now, and only now, should the action be fitted to the keyframe. Minor misalignment of individual parts can then be corrected by the usual spacing and papering.

What our correspondent should have done was to rotate the action, plug and redrill the holes that mount the brackets to the keyframe and relocate the mounting screws. It goes without saying, or it should, anyway, that the capstan location and strike point be considered primarily when the stack is relocated, together with the other considerations such as fallboard and keyslip clearance, keyblock width, shift stop block thickness, and the centering of hammers on unisons.

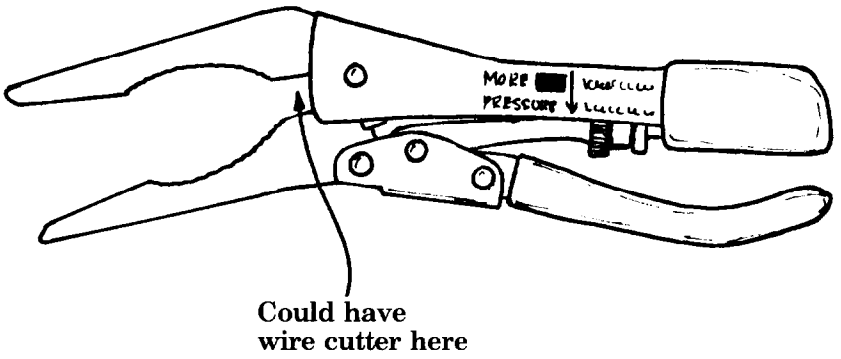


Figure 4

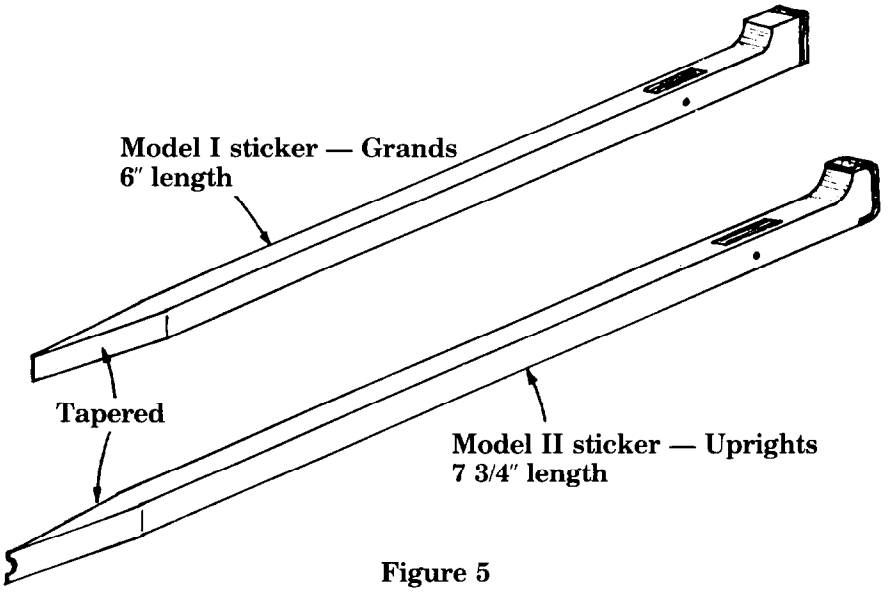


Figure 5

The Multipurpose Tool Contest

We have two entries this month, beginning with Don Farrar's tool which is illustrated in *Figure 4.* Here's Don:

My nomination for the multipurpose tool contest: a long-nosed self-adjusting vise-grip wrench. It can be used as a needle-nose plier; bass string twister; clamp for gluing; hitch-pin holder for string installation; in a pinch, a wire-cutter in conjunction with a file; and a wrench.

The great thing about this wrench is that you don't have to turn a screw in the end of the handle every time you grip something of a different size. You merely set the amount of pressure you wish to exert, which can be done with one hand, and the jaws automatically adjust to whatever size object they encounter.

They were made by Leverwrench, but unfortunately, Ric Leichtung of Cleveland, where I got them, tells me they are no longer being manufactured. Possibly some other company still makes similar tools. I hope so, because this is one of the most- used tools in my kit. The only improvement I would make is to include a wire-cutter in the jaws where indicated. I should add that one of its best applications in the needle-nose category is the shaping of beckets and recalcitrant coils on the larger gauge bass strings. It is also a great help in loop-making, holding wire ends firmly.

Don Farrar, RTT
New York

I would like to submit an entry to your Multipurpose Tool Contest. I do not claim originality, but do admit reluctance to throw anything away which may, sometime, prove of some value. I have in my toolkit two recycled upright stickers from defunct pianos, altered slightly to become very useful. Enclosed is an illustration of Models I and II (See Figure 5*...ed.)*

Uses for Models I and II:
Temperament strip insertion tool
- *Scratchless tip*
- *Less wear on strip than screwdriver tip*

Front key bushing easing tool
- *Key removal not necessary*
- *Will not scratch key covering*

String stretcher
- *For plain wire only*
- *Allows for stretching close to bridge and capo/agraffe*

Straightedge
- *Key leveling*
- *Grand hammer leveling — light, space-saving; just set sample:*

Enclosed is a picture of a method for clamping loose ribs when gluing ribs to boards. As you can see, it consists of a pipe clamp and two wedges. I don't recall seeing this arrangement before. Perhaps it's just too simple. It works (if you use glue, too).

Jim Donelson, RTT
Pleasant Hill, CA

Reader Comment

Regarding Gerald Foye's "Tightening Plate Bolts" in the March 1985 issue, P. 15: as long as he's using 3/8-inch drive socket tools for everything else, why not use the Proto #5244 bit for slotted plate screws? It is a 3/8-inch size and can be ground down to whatever width and thickness is desired.

Model I, every 10; Model II, every 14

Church tuning assistant
- *Will hold tuning note at organ without grumbling*

Emergency swizzle stick/chop sticks/toothpick (not recommended)

Model I: — a chipping tool for restrung pianos or a very firm guitar pick

Model II: Hammer butt spring positioning tool
- *For pianos with super heavy-duty pressure bars*
- *No need to tilt or remove action*

Chipping tool: not recommended, except for conversion to a model Ic (concert size)

Almost Sincerely,
Conrad W. Hoffsommer, RTT
Decorah, IA

If our readers will forgive a personal note, I should mention that after careful thought, I have reconsidered my decision to move with Baldwin Tech Service to Arkansas, and will instead remain in the Cincinnati area. My mailing address, to which all technical correspondence should be mailed, is:

Jack Krefting,
P.O. Box 16066
Ludlow, KY 41016

$10 each **$10 each**

The Piano Technician's

Guide

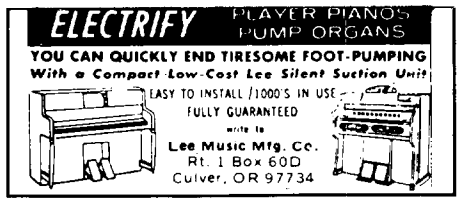
A job, time and work reference guide

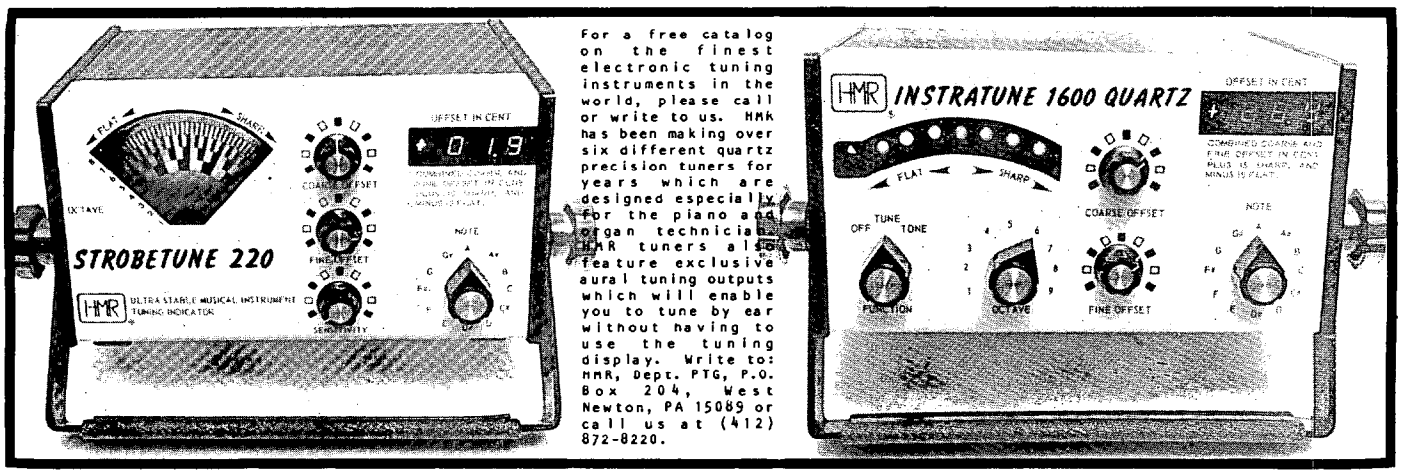
Revised and expanded — Printed to fit your pocket

Available from Ford Piano Supply at Convention

Or from Newton J. Hunt — 3253 Lockmoor — Dallas, TX 75220

Texas residents add appropriate sales tax





Backchecks

Susan Graham
San Francisco Chapter

Since the backcheck is fixed on the back of the key, it gets a free ride up and down, and doesn't do much to signal need for replacement. There isn't a distinct mechanical or tonal misfunction which can be attributed solely to the backcheck.

The hammer demonstrates the problem, striking the string and rebounding — to strike it again. This bouncing around interferes with the repetition system. Since this is more directly felt, the hammer and repetition lever may be blamed for multiple problems arising from the simple condition of worn backchecks. Replacement or recovering of backchecks should always be considered for any actions worn enough to be a candidate for other remanufacturing.

If the backchecks are worn, they can be replaced or recovered. Recovering backchecks takes approximately as much time as replacing, and yields practically the same result. The difference is the wire. Backcheck wires don't just hold the head up. The wire has a spring to it, flexing as the head engages the hammer tail and kicking the hammer up as the key is released, assisting repetition. It's hard to say when wire loses this spring, but any action with breaking, mangled, or loose backcheck wires should have them replaced. Beyond that, it is a matter of judgement and preference.

Although some technicians do, I don't put new backcheck heads on old wires. It is as time-consuming as replacing the entire unit. The inevitable lateral stress of turning heads off and on loosens the wire in the key. The same stress tends to change the bevel of the head, so it is erroneous to assume that saving the old wire eliminates the need to correct bevel. The new head may be a different shape, or bored at a different angle, or the length may require it to be placed higher or lower on the old wire. Solid contact between all these parts is important and may be difficult to assure when putting new heads on old wires.

"Backcheck wires don't just hold the head up. The wire has a spring to it, flexing as the head engages the hammer tail and kicking the hammer up as the key is released, assisting repetition."

It also is important to provide enough contact area for the hammer tail. This can be a factor in the selection and boring of new hammers. While the bore distance from strike point to shank is more critical, there must be enough of the tail below the shank to provide good backcheck contact and allow a gradual curve to the tail so it doesn't dig in or bounce off the leather. (Usually about the top third of the backcheck contacts the tail.) If an action requires an extremely long strike point bore distance, this may restrict the choice of new hammer in order to have this length and still have sufficient "tail bore" distance. Some hammers do not have very much molding available for a tail, partly since there is — ahem — not a lot of felt covering the striking point, adding length.

Compromises in bore length are unavoidable. If the inner curve of the tail (the side toward the shank) is already shaped, this will restrict boring location as well. If the tails are too long and

have too much contact with the backcheck, slowing release, the shaping can be altered to reduce contact area. I'm not recommending for or against a particular hammer. This all comes up because putting on new backchecks (with wires) at a slightly higher level may allow shorter tails and a boring distance which will result in a better-functioning action.

Another factor in the replace/recover decision is the size of the backcheck head. To a degree, weight is a consideration — replacing a very small backcheck head with a much larger or denser one could result in a noticeable weight change. It's more likely, though, that change in size will create mechanical interference with parts of the damper system. If in doubt, try samples before replacing an entire set.

When I recover old heads, I replace the underfelt as well as the leather. Let's not kid ourselves — that felt takes a beating and compresses and hardens, and there's no better time to replace it. Don't, however, increase the thickness or amount of this felt or, again, it may slow release.

Remove everything from the wood with a soaking agent (hot water and wallpaper remover) which improves the cleanness as well as the ease of removal.

The cardinal rule of action rebuilding applies: prepare all new parts before removing any old ones. When cutting felt and leather for backchecks, the question arises: is it better to completely cut to final dimension before gluing, or cut as the part is glued, individually, or in gang fashion? Since backcheck edges are not flush with the sides of the keys, they don't "gang" well. I find it cumbersome to try to slice along the side of a backcheck, since it is attached to the key. Therefore, I cut the underfelt into long strips of the final width, and slice it off at the end as it is glued to the individual heads.

> "...putting on new backchecks (with wires) at a slightly higher level may allow shorter tails and a boring distance which will result in a better-functioning action."

Support for the leather overfelt is very unstable. The leather is also glued around a sharp bend, and usually glued only at the ends. Cutting the leather to final-size rectangles makes for a simpler, neater job. It is important to get the width correct — on many actions, there isn't a lot of clearance between backchecks, or between a check and a neighboring tail. Although the leather may pull in to a slightly narrower size as it is stretched over the felt, it is better to have it a shade too narrow than too wide, and the uniformity that precutting allows makes a very good-looking job. I use a straightedge and an Olfa rotary cutter (looks like a pizza cutter, is found at sewing, leather or crafts stores and comes with a pad to cut on. It is a wonderful tool, but dangerous if you slip — watch where you rest your free hand).

Several of our supply houses carry good buckskin, and in large urban areas, there are leather wholesalers who can provide supplies as well as tools and advice. Buckskin has a nap with a grain direction — I put it so the grain runs down, smoothing toward the bottom of the check so the against-grain roughness helps to catch the tail and prevent it from rising toward the string (as with knuckles, this can undoubtedly be argued the other way).

Use a thickish hot hide glue which will set up quickly and not wick through the leather. Glue on the felt and trim it off. Glue on one end of the leather — the top part which curves sharply. Let that dry completely and then glue the leather to the lower end of the head, duplicating the original gluing area and stretching the leather slightly so it is taut. Clean up glue from the sides as you go, and trim off the lower edge of the buckskin after it is dry.

Removing the entire backcheck and wire assembly usually isn't difficult — the wire is press-fitted into the key and will pull out. If there is a "step" — a small block at the back of the key where the wire is inserted — it may break loose as the wire is pulled out. To prevent this, clamp the keys, one at a time, in a vise. If the bottom of the key is not parallel to the top of the block, shim one jaw of the vise with a wedge so the whole surface of the block is firmly held. The key is hanging down, perpendicular to the floor, with only the backcheck wire and the small section of the key behind it above the jaws of the vise. The backcheck sticks out over one side of the vise.

Simply applying leverage to the head may pull it off the wire, rather than pulling the wire out of the key. Prevent this by clamping a vise-grips on the wire just under the head. I use a rather large crowbar to pry the wire free, levering against the top of the vise. This may sound cumbersome, but once a rhythm is established, it goes quickly (and takes a lot less time than regluing all the blocks). Clamp the key in the vise, clamp the vise-grips on the wire, pry the backcheck loose and

New England Conservatory

DEPARTMENT OF PIANO TECHNOLOGY
FRANK HANSON, Chairman

The nation's oldest independent conservatory of music offers an outstanding program in the maintenance, tuning, and reconstruction of pianos. Program graduates are qualified for independent professional practice upon completion of course.

For application and/or brochure, write:
New England Conservatory
Department of Piano Technology
Frank Hanson, chairman
290 Huntington Avenue
Boston, Massachusetts 02115
Tel. (617) 262-1120, ext. 365

open the vise 1/2 turn — just enough to free the key and allow insertion of the next.

Rather than pounding directly onto the new backcheck heads, cut a backcheck-shaped aperture in a block of wood so it holds the head snugly and pound on that to drive in the wire. Start easy with light taps until the wire finds the hole. Cut a slot in a piece of wood the correct height for a thickness gauge so the wire is simply driven down until the head contacts the wood. Caution: if the new wires are too long, they will splinter out the bottom of the key — trim them with wire-cutters first.

Replace the keys on the frame, reinstall the stack, and space the backchecks from side to side to match the tails. This takes two bends, one just above the key to move the head over, another just below the head to square it to the tail. Push up on the back of the key, causing the hammer to rise and fall into check. This will yield better spacing than aligning the parts at rest. (Hammers should already be spaced to the strings.)

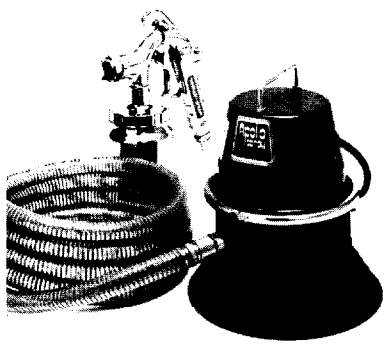
Set samples for bevel at the ends of each section. The bevel of a backcheck should be set so that, when the hammer is in check and the key held down, the hammer can just be forced down past the backcheck, meeting increasing resistance as it goes. If the hammer won't go down at all, the backcheck is tilted too far back. If it slides past easily, the head is too vertical. The bevel is corrected by bending the wire just under the head, using the pliers benders if they will fit, or the slotted backcheck wire tool if not. Once samples are set, remove the stack and set the remainder to match by eye or with a straightedge. Also use the straightedge to align the back (wood) surfaces so all the heads are square to the keys and to each other. Some actions have backchecks angled to match angled hammers. Others have shaped the tails in these sections so the backchecks still all face directly forward. Do whichever is appropriate to your method of tail shaping.

The correct checking distance from the string is set by pushing or pulling on the backcheck head by hand — this does not change the bevel since it bends the wire at the key. After the distance is set and checked in the piano, put the action back on the bench and use one hand to retard the hammer travel as you depress the key. "Rock" the key up and down and be sure the tail isn't brushing the backcheck as it rises. On a very hard blow, the key can accelerate so quickly the backcheck "passes" the tail and catches it as it rises. The backcheck needs to be moved slightly back if this is happening.

A final word about "roughing" the tails: don't. We all love those gun-checkering files and the lovely grooves they produce, but don't get carried away. The tail should not resemble a newly ploughed field, but should merely have the slickness of the wood broken up with shallow lines. Shape of the tail is important: a gradual taper, with an increased curve to round off the lower end. There shouldn't be block-like corners or sharp points. Study old hammers for sample shape, and experiment to find a minimal but effective degree of tail "roughing". Both conditions of the tail should have attention, or you'll find yourself doing more than your share of repeat backcheck jobs.

Spray Paint Without . . .

MESS OR OVERSPRAY



With the incredible
APOLLOSPRAY
(As featured at the Indianapolis Show)

- Completley portable
- Virtually no overspray
- Easy to use
- No contamination of paint/material
- No compressor needed
  (110V Electrical Turbo Unit)

SPRAY: lacquers - stains - enamels - varnishes - etc.
Complete control of spray — 1/4" line to 15" fan
Turbo unit blows warm-dry air at 2 P.S.I. — 40 C.F.M.
Tens of thousands in daily use worldwide since 1966
Call for free color brochure

Manufacturers:
APOLLOSPRAYERS, INC.
Fountain Valley, California
(714) 546-6217

Exclusive Piano Industry Distributor
PACIFIC PIANO SUPPLY
North Hollywood, California
(213) 877-0674

Piano Tuning and Repair

— a 1,400 contact-hour program, usually completed in one year
— hands-on, one-to-one instruction by master craftsmen
— beautiful community college near one of Texas' largest lakes
— specialized training for the blind and other handicapped students

Your success is our goal!

GRAYSON COUNTY COLLEGE
Piano Tuning & Repair
6101 Grayson Drive
Denison, Texas 75020
Call: (214) 465-6030

ALL ABOUT
ADHESIVES

Part III: The Mechanics Of Adhesive Bonding

Del Fandrich, RTT
Sacramento Valley Chapter

In the first article of this series, I discussed some of the basic principles of bonding theory. It is necessary to understand a few of these concepts in order to see the importance of some of the guidelines of the mechanical preparation of the adherends. So, let's take a little time for some review.

The bond between two materials (in these articles, the adherends are assumed to be wood) results from the chemical attachment due to the molecular forces between the adhesive and the adherend surface, i.e., specific adhesion. Mechanical adhesion, or the interlocking of minute tentacles of hardened adhesive in the porous cell structure of the wood surface is insignificant by comparison.

The typical adhesive joint consists of five distinct phases. Phases one and five are the adherends. Phases two and four are the interpenetrating areas consisting of wood fiber saturated with adhesive. Phase three consists of the adhesive itself — the glue line.

The interpenetrating areas are formed as the adhesive is applied (usually it is spread on) to the wood surface. The adhesive "wets" the wood surface sufficiently to establish the molecular closeness necessary for specific adhesion. The adhesive forming the glueline is held together by cohesion.

No matter which combination of wood and adhesive we choose, our adhesive joint must contain all of these phases. Therefore, in order to make sure that our glue joints will be strong and long-lasting, we should do everything we can to ensure their formation.

Wood Properties That Affect Bonding

The ability of the wood to absorb the glue you spread on it is determined by several factors including the permeability of the wood's surface and the viscosity — the "wetness" — of the glue. When the amount and type of adhesive you apply is properly balanced with the permeability of the wood surface, the interpenetrating areas will be formed automatically. The ability of the wood surface to accept enough adhesive to form the necessary interpenetrating area is affected by (among other things) the following factors.

1. Grain orientation. Adhesives form their strongest chemical attachment with the cellulose portion of the wood which is primarily found in the walls of the wood cells. Due to the arrangement of cells within wood the amount of reactive cellulose available for bonding varies with the grain orientation. Adhesive bonding strength is maximum at side-grain surfaces (the tangential face — edge-glued, quarter sawn soundboard panels for example) and minimum at end-grain surfaces.

2. Wood density. In general, hardwoods require more care in the gluing procedure than do softwoods. Mostly, the problem is one of forming those interpenetrating areas. Some adhesives (resorcinol resins, for example — usually the manufacturer's instruction will tell you) work best when the joints are kept open for a brief time (up to 10 or 15 minutes) after the glue is spread on both surfaces of hardwood adherends. This allows the adhesive to penetrate the wood surface enough to form the interpenetrating area. If this "pre-soak" is not allowed, too much of the glue can escape once clamping pressure is applied and there won't be enough left to penetrate the surface without starving the joint.

There can be a considerable variation of density within any given piece of wood. Earlywood, the layer formed in the spring when the tree is growing rapidly, is usually not as dense as the latewood formed later in the growing season. Test this with a piece of flat-sawn common pine. Press your thumbnail into the lighter-colored portion of the wood (the earlywood) and the darker portion (the latewood) and compare the hardness of the two surfaces. Most adhesive products have difficulty bonding to the dense latewood layers. Paint, for example, usually peels from the hard latewood portion of a board first.

3. Extractives, resins or natural oils. Some of the hardwoods that

are used in pianos contain substances that can cause gluing problems. Teak and rosewood are probably the best known. They contain natural oils which can prevent, or at least impair, the chemical attachment of the adhesive molecules with the wood fibers. These problems can be overcome in several ways. First, choose adhesives that are known to work well with oily woods. Casein glue, in particular, forms strong bonds with these woods. Some of the wood's oils can be removed just prior to bonding by wiping the surfaces with lacquer thinner or acetone. Speed is important — this will clean only the surface and the natural oils will immediately begin migrating to the surface.

4. Moisture content. The moisture content of the wood will also affect its "glue-ability." Both too much and too little moisture in the wood can cause problems. If the moisture content of the wood is too high when gluing is attempted, the adhesive may not penetrate enough to form those familiar old interpenetrating areas. If it's too low, enough moisture can be pulled from the adhesive too quickly to carry the adhesive molecules into the wood surface. The preferred moisture content limits are from five to seven percent.

Now, before all the cards and letters start coming in telling me about how soundboards are glued to ribs immediately after being taken from a hotbox with moisture contents much lower than five to seven percent, let me assure you that I am aware of this practice. This is one common method which piano builders use to induce crown into a soundboard/rib assembly. It comes at a price, however, since it is a contributing factor to the pressure ridges and subsequent cracks that form at or near the glueline.

5. Quality of machining. All machining should be done as smoothly and cleanly as possible. The cell walls of the wood must be severed rather than torn. This requires the sharpest possible cutting edges on your blades. Dull blades (especially on power tools) tend to pound the wood surface which will heat and glaze the surface. This glazed surface will be extremely hard and the cell structure will be pounded closed, making it difficult or impossible for the adhesive to penetrate.

"

The best possible glue surface is that left by a very sharp hand plane. Sanding tends to fill up the pores of the wood and inhibits glue penetration — the glue tends to bond to the sanding dust, not the adherend.

"

Preparing Wood For Bonding

All wood surfaces which are to be bonded must first be machined. This simply means that they must be made to fit together in whatever shape or fashion they need to be in to make them do the job you want them to do. This can be a simple edge-glued panel, such as a soundboard, or a more complex structure, such as a grand piano's bent rim. In all applications, the preparation principles remain the same.

Basically, we are after two things: flatness (or tightly fitting parts if they are curved) and a chemically reactive cell structure on the wood surface.

A close fit is obtained by careful machining. The condition of the machine tool elements will contribute both to the fit of the parts and the condition of the surface. As already mentioned, all cutting tools must be *sharp.* "Close enough for government work" is not close enough for piano work! This applies to all tools, hand and power alike. Especially power tools — since there is always a powerful motor to push the blade on through, they are easier to ignore as they get dull. "I'll just finish up this one last project, then I'll pull the blade and get it sharpened." Of course, I know that no one reading (or writing) this would ever say that. Right?

Anyway, the goal is to have closely fitting parts with cleanly severed cell walls.

The glue-up should take place as soon as possible after machining, since the wood surfaces begin to oxidize and collect dirt rather quickly after being machined. Manufacturers in the woodworking industry usually have a glue-up schedule that calls for assembly and gluing on the same day as machining. If this is not possible for some reason there are several things you can and should do to ensure a good bond.

The surfaces should be thoroughly cleaned and lightly sanded with a fairly fine (about 220- to 280-grit) sandpaper. Use sanding blocks if possible — remember you're trying to keep the glue surface absolutely flat. After sanding, the surfaces should be carefully dusted and, if possible, blown off thoroughly with compressed air. Cleanliness may not be next to Godliness, but it certainly is next to a good glue joint.

Incidentally, this is the only time a glue surface should be sanded. The best possible glue surface is that left by a very sharp hand plane. Sanding tends to fill up the pores of the wood and inhibits glue penetration — the glue tends to bond to the sanding dust, not the adherend. It is not necessary to "rough up" the surface with coarse sandpaper prior to gluing. In fact, it is detrimental to the bonding process.

Adhesive Properties That Affect Bonding

In addition to the wood surface, there are several things about the adhesive itself that can affect the quality of the bond. First and most important, *read the directions!* Unfortunately, the directions and information given on most adhesive containers is pretty skimpy. Such vital information as the date of manufacture, chemical or adhesive type, and even working characteristics are frequently missing. But one thing that is almost always given

Fresh Is Best

Although the manufacture date does not appear on the packages, you should do what you can to avoid buying or using out-of-date adhesives. Most adhesives have a maximum shelf life beyond which they begin to lose strength or become unstable. Some precautions you can take are:

1. Buy only the freshest-looking adhesive. Generally that will be the one with the most modern packaging. (Also, perhaps, the one with the wildest performance claims.)

2. Buy the one with the highest price. It will probably be the one most recently put on the shelf.

3. Buy your adhesives from a source that has a high turnover of merchandise.

4. Date all adhesives as soon as you purchase them.

5. Store bulk adhesives in a cool, dark area if possible.

6. If you have any doubts about a product, test it before committing your whole project.

are precise mixing directions for those products that come in two parts (or one part that is to be mixed with water). These instructions must be followed precisely.

Once you have begun the gluing process, there are a couple more characteristics you need to keep in mind. Most adhesives have a maximum pot (or working) life. This is the amount of time that the adhesive remains workable after being mixed or exposed to open air. Some even have a minimum pot life, or a specified time period between mixing and first use.

Then, once the adhesive has been spread on the work piece, there is a maximum amount of time that the joint can remain open — the open assembly time — without the danger of a dried joint, i.e., the adhesive no longer has the ability to "wet" the wood surface and form the interpenetrating area.

Once the glued joint has been closed (the pieces brought into contact), there is a maximum amount of time that can elapse prior to clamping. This is called the closed assembly time. If too much time elapses at this stage, the adhesive can begin to set up and prevent the pieces coming into close contact when the clamps are applied. Since most woodworking adhesives are only fair gap fillers at best, this can substantially weaken the joint.

There is also a minimum required clamp time. The adhesive must be held completely stationary while the adhesive is setting up, or curing. Any disturbance during this time will also substantially weaken the bond strength.

The primary rule to remember through all this is that if all else fails, read the directions — skimpy as they may be.

The Bonding Or Gluing Operation

There are fairly precise spread specifications available for most industrial adhesives. This is usually given in terms of pounds per thousand square feet of single glue line (glue spread on one adherend only), or lbs/MSGL. We probably will never use glue in quantities large enough to cover one thousand square feet at a time so some other terms might be more useful. These specifications can be converted to grams per square foot of single glue line by dividing the quantity given in lbs/MSGL by 2.2. A typical spread for resorcinol glue is 50 lbs/MSGL, or about 23 grams per square foot.

Since it is generally not practical (or desirable) to measure the exact size of the pieces we are about to glue and then weigh out the precise amount of glue needed, it may be helpful to actually weigh out 23 grams of Titebond and spread it over one square foot of wood surface to see what it looks like. Doing this once will give you an excellent feel for the proper amount of adhesive for any application — combined, of course, with a little common sense.

The above specifications are given for a "single glue line" or "single spread." This is generally adequate; however, a double spread — glue is spread on both surfaces — is preferable. When spreading glue on both surfaces, use a little less glue on each surface. This will help wet out the surfaces and will help prevent starved areas in the joint.

A starved joint is one in which the adhesive, for whatever reason, was not able to penetrate the wood surface sufficiently to form the interpenetrating areas. This can be due to several factors:

1. Not enough glue was applied to the surfaces.

2. The glue was not "wet" enough to penetrate wood surface.

3. The glue was not able to penetrate wood surface:

— Wood surface not properly prepared
— Glazed by dull tools
— Dirty surface
— Oily surface

4. The adhesive was outdated.

5. Too much clamping pressure was used.

6. The clamps were improperly applied or too much clamping pressure was used.

When spreading glue, just remember that it is better to err on the side of too much glue than not enough. If you put on just a little too much the worst thing that usually happens is that you make quite a mess when the clamp-up and the excess squeezes out all over everything and everybody, everywhere. Except as noted later, it will not adversely affect the strength of the glue bond. Too little, though, will result in a starved joint which will fail when put into use.

Spreading the glue can be done with any appropriate tool. The most readily available one is the index finger, but that is not always the best. If the project is large, it can become pretty awkward trying to keep the glue where it belongs and not getting spread all over the entire project. In other words, you need your fingers to work with. Short, stiff, acid brushes work pretty well for most applications. For hot glue I prefer a fairly high-quality artist's brush. They spread the glue well, don't let too much drip out and are easy to clean, though usually I just leave it in the glue pot all the time and only clean it when I change glue.

Clamping

Generally, the joint must be closed as soon as possible after the glue has been applied. There are only a couple of exceptions to this rule. Some applications using epoxies and resorcinol resins must be allowed to stand for a brief period of time prior to being closed and clamped — specifically when used with closed-pore hardwoods. This allows the adhesive time to penetrate and/or saturate the wood surface. Clamping too soon would squeeze out too much of the adhesive and result in a starved joint.

For most other applications, the joint should be closed and clamped just as soon as possible after the glue has been applied. If the pieces to be joined fit together properly, not much clamping pressure is needed, and if they don't, more pressure won't help anyway. There is some disagreement among the experts as to the exact amount, but the recommendations range between 10 and 300 pounds per square inch. It's best to use no more than necessary. The lower pressures are used with softwoods and the higher pressures are used on hardwoods. The greatest pressure (up to 300 psi) is needed only when clamping dense tropical hardwoods.

Clamps should never be used to close a joint which does not fit properly to begin with. To do so is an invitation to failure. You may get the joint closed for now, but the constant strain on the adhesive will undoubtedly cause premature failure. Earlier, I wrote that it was better to apply a little too much glue than not enough. This was assuming a close-fitting joint. Using a heavy glue spread to fill a poorly fitting joint and hoping that the gap-filling properties of the glue will hold it together is just asking for trouble later on. Most adhesives are very poor gap fillers and a too-thick glue line will soon fail.

There is usually a clamping sequence that will work best for any project. This should be worked out before applying any glue. All projects of any size or complication should be dry-assembled and clamped prior to gluing. This way, any snags in assembly procedures can be worked out calmly and reasonably instead of in a state of excitement and/or near panic once the glue has begun to set up.

Never try to clamp a large surface with just one clamp in the middle. Picture what would happen if the pieces being clamped were sponges. In fact, try it, at least mentally. Place two damp sponges together as if they were two boards already glued and ready to be clamped. Now apply clamping pressure (pretend your thumb and index fingers are clamps) just in the middle as if only one clamp were being used. See what happens to the ends of the sponges? They curl up and away from each other. This is called the "sponge effect" and is exactly what happens when wood pieces are clamped together in this fashion, although you can't see the effect as clearly. In fact, sometimes you can't see it happening at all, even though it is.

In general, the clamping sequence should begin in the middle and work out. This gives any excess adhesive a chance to escape out the ends and sides. "Cover boards" or "clamping blocks" should be used whenever necessary to distribute the clamping pressure over a wide area rather than having it all localized in a few small areas. Many smaller clamps are usually better than a few large ones.

Process Variables

Process variables are those variables in the gluing process over which you have some control and which will affect the completed bond performance, strength and longevity. Some we have control over and some are dictated by the nature of the joint with which we have to work. A few of the more critical factors are listed below. These have already been discussed, so this is just a mini-review.

1. Storage time and storage conditions.

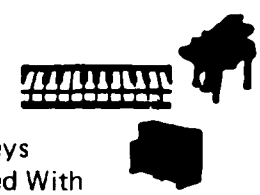
2. Type of wood — special considerations based on needs of wood species. Grain orientation of the wood.

3. Moisture content of the wood.

4. Quality of the wood surface. Machining quality.

5. Mixing variables and/or adhesive consistency. Consistency is not much of a problem these days. Our adhesives are pretty much the same from batch to batch, but if you notice anything out of the ordinary at least try to find out why.

6. Pot life. Some adhesives have a minimum pot life after which they are unusable.



Piano Keys
Recovered With

ART IVORY

Over 50 years of continuous service to dealers and tuners

WRITE FOR COMPLETE PRICE LIST

O. E. SHULER CO., Inc.

149 E. HARRISON ST.
PARAGON, INDIANA 46166

THE AMERICAN INSTITUTE OF PIANO TECHNOLOGY

An excellent school of Piano Technology & Tuning, providing "hands-on" workshop experience, as well as introductory and advanced classes in every aspect of this profession.

650 Moulton Ave.
Los Angeles, CA 90031

Please mail inquiries to:

AIPT
P.O. Box 4418
Chatsworth, CA 91313-4418
(818)348-1530
(213) 223-2010

Visitors Welcome

A non-profit, non-discriminatory organization

7. Glue spread.

8. Working conditions, including humidity, temperature, assembly time and conditions.

9. Clamp cycle. Pressure, distribution, etc.

There is one other factor which is difficult to classify. That is your condition at the time of final assembly and gluing of your project. Often it seems that the time for gluing up a project comes at the end of a long day. You have been working hard to get the job done and all that is left is to glue it all together. And, since it is a known fact that glue only dries "overnight" when the moon is out, there seems to be a greater-than-normal pressure to glue everything together and clamp it up in the evening when you are tired and want to finish up and go home. It is never a good idea to try to push yourself beyond your limits — trying to do "just a little bit more, then I'll quit," — because that's when you're most likely to make those "dumb" mistakes that can be so difficult to repair later.

Performance Of the Glue Bond

Once we have carefully worked all the procedures and done all we can to ensure a good bond, just what can we expect for our efforts? "Quality" of the glue bond means different things in different applications. A glue joint that would be considered inadequate in a laminated pinblock might work just fine for holding a decorative molding in place.

Why Didn't It Stick?

When a glued joint fails, it is usually the glue that gets blamed — "the glue didn't hold." Joint failure is rarely the fault of the glue itself, however. The adhesives that are available today are of such generally high quality that if we have taken care to obtain (and use) a fresh product from a reliable manufacturer, we can just about rule out failure within the adhesive itself — except when misused.

There are four primary reasons for the failure of a glued joint:

1. The wrong adhesive was selected for the needs of the particular application.

2. The moisture content of the wood was too high or too low.

3. The wood surface was improperly prepared— improper or inadequate machining, lack of cleanliness, instability of one or more joint members, etc.

4. The joint was incorrectly clamped, resulting in a starved joint — the sponge effect — or too wide a gap from not enough pressure, etc. Clamps may not have been applied soon enough or left on long enough.

In general, we would like the finished bond to be as strong or stronger than the wood we are joining. It needs to be compatible with the wood we are using and with the conditions and needs of the finished product. It also needs to be compatible with the environment of the finished product. Fortunately, pianos are usually fairly well protected from environmental extremes.

Conclusion

This concludes my discussion of general adhesives and gluing techniques. Much more could be written about this subject, but much more could get real boring, too. I've tried to present enough information so that you can logically choose from the common adhesives currently on the market an appropriate product for most of the common applications encountered during piano repairs and rebuilding procedures without giving specific "use this ... for that" recommendations. My hope is that you will find it easier to analyze the requirements of any specific application and match an adhesive to those requirements.

Next will be a discussion of epoxies and some of their applications and uses in the repair and rebuilding of pianos. These adhesives, though they have been around for many years, still are not well received by many technicians. Much of the reluctance to accept epoxy adhesives comes, I think, from not understanding just what they are and how they work, as well as a general lack of experience with them. They are very versatile products and can make many of our jobs easier and better as well. So till next time, let's stick together, okay?

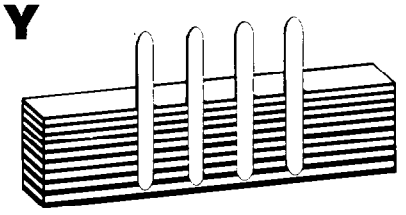
PINBLOCKS REPAIRED BY EPOXY

EPO-TEK 301 and 301-2 epoxies have the low viscosity and excellent drilling characteristics needed to repair loose pinblocks.

Both are two part epoxy systems and cure at room temperature. When cured, they become extremely strong, hard, clear plastics. A pinblock hole filled with the epoxy and re-drilled now has the extra strength needed to prevent cracking as the pin is torqued.

Other potential applications include (but are not limited to) filling in cracks on soundboards, strengthening of deteriorating wood surrounding bridge pins, bolting ribs back to the soundboard, and filling in bridge pin holes that need to be changed or repaired. Try these epoxies for yourself, and see how they enhance the restoration process.

For complete specifications, pricing and availability, contact Epoxy Technology Inc., Box 567, Billerica, MA 01821, USA – Tel. (617) 667-3805 in Massachusetts, Telex 94-7140.



epoxy technology inc

(800) 227-2201

Tuning Instability

Gerald F. Foye
San Diego Chapter

Sometime ago, I was questioned as to why a piano might go out of tune shortly after being tuned. In this case, the tuner had tightened the plate bolts on a rather elderly grand and wondered if that operation may have been connected with an unstable tuning.

Reasons for instability could result in a textbook-length compilation; however, for a column of this length I think it wise to hit upon just a few initial points. Specifically, this situation occured in a college where the tuner had tuned the grand and received a complaint from the music professor within a couple of days.

There are standard reasons for instability that we deal with over and over — pianos that do not receive maintenance at proper intervals, weather changes, poor environment, improper location, and a multitude of other factors.

The list of the unusual can also be lengthy, but those are the ones I will hit upon. First off, if a piano does not hold your recent tuning, serious thought has to be given in order to try to determine why. Let's first be honest with ourselves — are my tunings normally stable, did I do my best to tune and stabilize this instrument, was my thinking and physical being up to par that day?

Depending on whether you win or lose that argument, you may want to continue to some other issues. Examine the environment to determine what changes might have taken place. For example, is there a time of day when the sun shines on the instrument? Is there a heating or cooling duct behind the piano? Is there a swimming pool just outside the patio door? Are there lots of plants on or near the instrument? These are the more common clues.

Now for some of the more unusual problems. Animal hair inside the grand might indicate the housecat sleeps on the strings (the owner will tell you how cute that is). Pianos sometimes get moved for carpet installation or outside on the patio for a party — and get left there all night. I was asked to retune a college piano shortly after I had tuned it because it didn't hold tune. Of course, I had to find out for myself that after being tuned, it was unprofessionally moved to the football field for a graduation exercise. I probably would not have known except for the fact that it had fallen off the truck on the return trip.

Is that student of piano tuning via correspondence course, going to tell you he has been testing himself by retuning the piano you just tuned? This can happen in the home but is more common in institutional areas like colleges. In at least one case I found the one who did the complaining to be the culprit. A technician can make a lot of free retunings trying to figure that one out. Unfortunately, we must be very careful of accusations.

Rock music is loud, which means the piano gets pounded on. Well-meaning friends like to display their musical ear by advising the piano owner that his or her piano is out of tune, even though it may just have been tuned. The tuner gets to make a free trip to see what's taking place.

Humidity control units serve their purpose, but unfortunately they get unplugged. Homeowners unplug to cut the electric bill. In schools, students, teachers and maintenance people unplug them. Just because it might be plugged in when you see the instrument does not mean it has been in operation right along.

In homes where climatic conditions are moderate, it is quite common to have doors and windows open, allowing breezes to waft throughout. Often the piano sits in a hallway where it is subjected to these nice breezes which we well know is unfavorable to the instrument. But try to convince the owner of that.

The point of all this is to offer just a beginning of possibilities that the inexperienced technician may not have considered and to show that the reasons for tuning instability are numerous. Sometimes, though, it takes some real detective work to track down the offender. Don't be afraid to bring this question up at your next Guild meeting, sit back and enjoy the ensuing (and probably heated) discussion. You may learn a lot from the results.

Cristofori Builds The First Piano; Scarlatti And Handel In Florence

Jack Greenfield
Chicago Chapter

Older Keyboard Instruments In Medici Collection

Bartolomeo Cristofori's work included care of the collection of keyboard instruments acquired by the generations of Medicis before his arrival. Some of these instruments are listed in inventories recorded in 1700 and 1716. The 1700 inventory found in the Medici files was disclosed by Vinicio Gai in *Gli strumenti musicali della corte Medicea e il museo del Conservatorio "Luigi Cherubini" di Firence* (Florence; Licosa 1969), a catalog of musical instruments from the court of the Medicis in a Florence museum. The 1716 inventory, also from the Medici files, published over 100 years ago in *Cenni storici della vita del Serenissimo Ferdinando dei Medici* (Florence, 1874) by Leto Puliti, appears in English translation in Appendix I, *The Harpsichord and Clavichord* (London, 1959) by Raymond Russell.

> "Some of the lesser repairs for which Cristofori billed Prince Ferdinando included: remaking keyboards, building new music desks, case repairs and replacing bridges, strings, quills and felts. There are no entries for tuning any instruments."

Besides those built by Cristofori himself, the 1716 inventory shows five instruments by Domenico of Pesaro, a builder active in Venice during the second half of the 16th century, and four by Girolamo Zenti, who was born in the vicinity of Rome. During his career in the middle decades of the 17th century, he worked in Sweden, France, and England, as well as Italy.

The 1700 inventory shows six instruments made by Zenti and two by Mendini Mondini, a builder who lived in Florence during the second half of the 17th century. The inventories also show small numbers of single instruments from 16th and 17th century builders in Venice, Rome and elsewhere. Cristofori therefore had the opportunity to

become thoroughly familiar with the work of representative Italian builders.

Appendix I in Russell's book gives examples of Christofori's service on old instruments ranging from complete rebuilding to minor repairs. The accompanying table lists some of the instruments he rebuilt completely and charges for his work and material.

In addition to the cost of materials and Cristofori's fee, the total costs included entries for the labor of an assistant, an apprentice and a cabinet maker when they were needed.

Some of the lesser repairs for which Cristofori billed Prince Ferdinando included: remaking keyboards, building new music desks, case repairs and replacing bridges, strings, quills and felts. There are no entries for tuning any instruments.

The instruments must have required extra care in handling since there are frequent entries for packing, loading and moving them between Cristofori's house, the Pitti Palace in Florence and Ferdinando's private theater in the Medici villa at Pratolino. The accounts show Cristofori occasionally worked on organs, some with wood pipes, some with metal.

Other Musical Activities in Florence

It is not known whether or not Cristofori worked in Florence exclusively for the Medicis. In spite of the growing economic deterioration of Tuscany, considerable musical activity requiring use of keyboard instruments continued. Regular professional opera performances were given in several theaters. Learned academies presented regular chamber concerts for their members, and following the example of the Medicis, some wealthy aristocratic families presented private recitals of vocal and instrumental music in their palaces.

Personal Troubles Of The Medici Family

While there was satisfactory progress in the musical projects of

Neupert Collection

Date	*Instrument*	*Cristofori's Fee — L.*	*Total Cost — L.*
November 1693	Cembalo with ivory, ebony, and marble inlay	420	603
June 1694	Cembalo by Celestini	252	405

Prince Ferdinando, his personal life and that of the Medici family was filled with misfortune. His marriage to Princess Violante was a complete failure. He ignored her most of the time.

Fearing that the prospects for a Medici heir from this marriage were very dim, Grand Duke Cosimo III began to worry about extinction of the family. The 1691 marriage of his daughter Anna Maria Luisa to Prince Johann Wilhelm of the Palatinate did not appear likely to produce any offspring either. In addition, he had grief from the death of his mother, Grand Duchess Vittorio in March 1694.

Cosimo began to look for a suitable match for his younger son Gian Gastone, 23 years old and no more interested in marriage than Ferdinando had been. Desiring a daughter-in-law with a title and wealth, Cosimo arranged a match between Gian Gastone and Princess Anna Maria Francesca of Saxe-Lauenburg. The marriage agreement stipulated that the couple would reside at the bride's residence in Reichstadt. This was in an ugly castle in a small rural village in Bohemia near Prague.

The marriage, which took place in July 1697, was also doomed to failure. The princess was a large, plain, quarrelsome woman with little more culture than her rustic neighbors. The isolated life at Reichstadt proved intolerable for Gian Gastone, who had been brought up in the sophisticated social world of Florence. To escape the unpleasantness of his wife, he often roamed incognito in the wildest local taverns. Occasionally he made longer excursions to the taverns of nearby Prague or even further. Finally, after 11 years, Gian Gastone separated from his wife permanently and returned to Florence.

Except for another trip in 1694 to enjoy the opera and social life of Venice, Ferdinando remained active in Florence. In 1695, he began to show symptoms of a lingering disease which had no immediate serious effects but eventually led to his death at an early age.

"

The personal misfortunes of the Medicis did not halt Cristofori's progress. There is now evidence that his work on a hammer action instrument was begun in 1698, years earlier than credited by 18th- and 19th-century historians.

"

Cristofori's First Piano

The personal misfortunes of the Medicis did not halt Cristofori's progress. There is now evidence that his work on a hammer action instrument was begun in 1698, years earlier than credited by 18th- and 19th-century historians. An essay on music by Carli published in Milan in 1784-1787 gave 1718 as the year of Cristofori's invention. This left room for debate over his priority versus the claims for credit for invention by the French harpsichord builder Marius or the German music writer and theorist Schroter, who had presented plans for hammer action instruments around the same time. During the next century, most music historians agreed on 1709 as the date of invention, accepting the authenticity of the article by Scipione Maffei in his 1711 *Gironale* reporting on the instruments seen on his visit to Florence in 1709.

Now, later research has placed the invention of the piano still earlier. This has been established by at least two documents. The first is an entry in a diary kept in 1711 by a Florentine musician and composer, Francesco Manucci, stating that in 1698 Cristofori had begun work on an "arpicembalo che fa il piano e il forte." Information on Manucci's diary appeared in the journal *Chigiano*, Vol. XXI, Florence 1964, pages 162-172. The second reference, confirming the earlier date, is the listing of such an instrument in the 1700 inventory of Medici instruments shown in the catalog for the Florence museum by Gai mentioned previously.

"

Both Scarlattis spent the summer and early fall of 1702 in Tuscany, very likely meeting Cristofori and becoming familiar with the piano during this period. There is strong evidence that later in his career, Domenico may have again played and composed for the piano.

"

The Scarlattis And Handel Visit Florence

In addition to the operas and other compositions received from composers residing in Florence, Prince Ferdinando obtained works of important composers, including Alessandro Scarlatti, in other cities. Initially, Ferdinando communicated with Scarlatti only by correspondence. After a few years, however, circumstances resulting from major political changes led to Scarlatti's traveling to Florence to see Ferdinando.

In 1700, the death of Charles II, King of Spain, created a conflict between other European countries who disagreed on who should succeed Charles II, who had no direct heir. The two closest claimants by reason of geneology were Philip, the Bourbon grandson of Louis XIV, and Archduke Charles, the younger son of the Hapsburg Emperor Leopold I.

The hostilities produced uneas-

iness in the kingdom of Naples, which was involved because it was a dominion of Spain ruled by a viceroy. Scarlatti, who had held the post of musical director to the the viceroy for 15 years, now felt his position threatened and decided to look for more secure posts for himself and his son, Domenico. However, they could not obtain a leave of absence until June 1702 after the state visit of Philip V, who took over the Spanish throne earlier in the year. In the meantime, before his 16th birthday in September 1701, Domenico had received his first professional appointment. He became organist and composer in the royal chapel.

Alessandro believed the best opportunity for him and his son would be found in Florence in the employ of Prince Ferdinando. Ferdinando had already produced several of Alessandro's operas and was preparing another. Both Scarlattis spent the summer and early fall of 1702 in Tuscany, very likely meeting Cristofori and becoming familiar with the piano during this period. There is strong evidence that later in his career, Domenico may have again played and composed for the piano.

While Prince Ferdinando had great respect for Alessandro, he did not appreciate his operas fully because he considered them too complex and not as tuneful as he preferred. He did not offer Alessandro a permanent post. Domenico returned to Naples in November 1702 while Alessandro remained in Florence through 1703 and then left for a position in Rome. Domenico made another trip to Florence after finally giving up his post in Naples in 1705. He stopped to deliver a letter from his father and then continued on his way to Venice where he expected to find other employment.

It is of historical interest to note that George Frideric Handel also visited Florence and probably also saw the piano in its infancy. According to Kirkpatrick in his biography *Domenico Scarlatti*, Handel came to Florence on the invitation of Gian Gastone after their meeting in Hamburg in 1703-1704. Handel was in Hamburg working as a violinist in the opera house. Gian Gastone was there on one of his trips for recreation away from the unpleasant married life he led at Reichstadt. Handel left Germany for Italy in 1706 and wrote and produced operas in several different Italian cities, including Florence.

Early 18th Century Cristofori Instruments

There are no authentic Cristofori instruments dating from the first two decades of the 1700s now in existence. Three harpsichords dated 1702 or 1703 now in collections at Munich, Nuremberg and the University of Michigan in Ann Arbor, are not considered genuine. Each of these has three manuals and contains a Latin inscription with Cristofori's complete name, but signs of alteration and other indications make their origin doubtful.

USED PIANOS = BIG PROFITS

GRANDS, UPRIGHTS, PLAYERS

All in good restorable condition. Five floor selection of reconditioned & as-is pianos.

CUNNINGHAM PIANO CO.

215-438-3200
5427 GERMANTOWN AVE.
Philadelphia, PA 19144

P · I · A · N · O TECHNOLOGY

FIRST YEAR: Tuning, regulation, repairs and maintenance on grands, uprights and spinets. General study of acoustics, history, business practice and promotion.
SECOND ADVANCED ELECTIVE YEAR: Comprehensive piano rebuilding to include case refinishing, sound board repairs, bridge, wrestplank, action replacement and scaling. Advanced tuning, regulating and voicing.
Instructors: David C. Betts, Christine Lovgren

Non-profit School
Accredited Member NATTS
Financial Aid Available

For Free Catalogue
Write or Call
617/227-0155

North Bennet Street School
39 North Bennet Street • Boston, Massachusetts 02113

PIANO DECALS

Make your job easy with dry transfer decals! NO solvents needed

Hundreds of fallboard names
6 Steinway & Sons Soundboard decals available.

CUSTOM DECALS

send tracing of old decals for price quote

DECALS UNLIMITED, INC.
9333 96th Street No.
Mahtomedi, Minn. 55115

WRITE FOR BROCHURE

Plate Suspension Systems And Downbearing Analysis

Tom Lowell
Rogue Valley, OR, Chapter

Recently I had reason to raise the plate height on a grand piano, where the pinblock was glued into the case. By converting it from its existing lag screw-plate feet-dowel system to a Baldwin-type plate suspension system, I more easily completed a job which otherwise would have required removing the pins, pin bushings and strings from the piano.

The Baldwin plate suspension system, invented by Samuel W. Goodlander, was patented April 8, 1969. The patent abstract reads "A string plate mounted in predetermined spaced relation to a supporting frame by means of bolts which are in threaded engagement both with the string plate and the supporting frame, temporary supports being employed to initially establish the predetermined spaced relation of the string plate relative to the supporting frame, whereupon the bolts are set and thereafter serve to support the string plate in fixed spaced relation to the supporting frame."

The basic idea here is that the threaded bolt will maintain exactly any desired space between two threaded fixtures when all three threaded surfaces (see *Figure 1*) are engaged and the two fixtures are prevented from rotating. Once the head of the bolt is engaged with the top of the plate, the bolt will then permanently maintain the existing space between the inner-rim/soundboard and the bottom of the plate.

In some of the previous-type plate shim systems, we needed to remove and replace the plate while trying to determine the exact thickness shim (of whatever type) needed to achieve and stabilize the desired plate height; and then maintain this height without creating plate stress points when the perimeter lag screws were tightened down. This procedure might have to be repeated a number of times to ensure that each plate-shim contact point was properly treated.

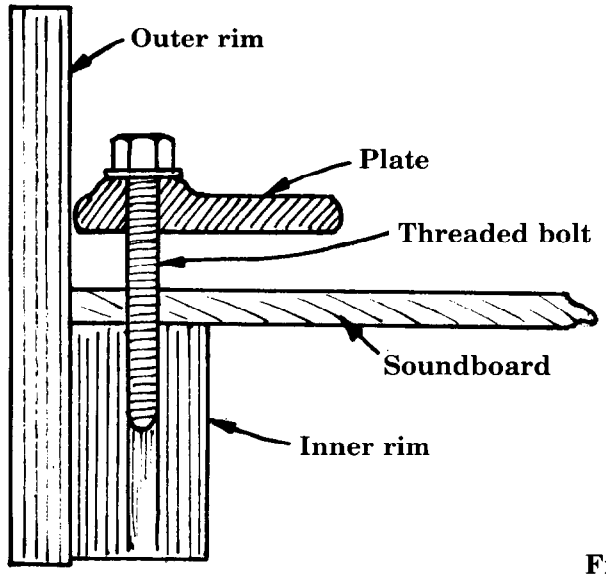


Figure 1

With the Baldwin plate suspension type system, we can locate the plate height with relative ease, and then maintain it quickly and easily by engaging the bolt threads into both the plate and the soundboard/inner rim.

Following is an account of the procedure used to convert from a lag-screw dowel-shim plate system to a machine bolt suspended plate system on a five-foot Lester grand owned by the author.

The nine original 3/8- by 4-inch plate perimeter lag screws fit through half-inch diameter holes. The specially threaded machine screw bolts provided by Baldwin (*Figure 1, #10*) were 3/8- by three-inch NF or four inch (three inch for maple inner rims, four inch for softer inner rims). I arranged for a local machine shop to build nine 9/16-inch OD NC 3/8-inch ID NF inserts which could be threaded into the existing half-inch plate holes after those holes were tapped to 9/16-inch NC (*Figure 2*).

The old inner rim lag screw holes were then drilled out to 3/8 inch and a depth of four inches and glued with hardwood plugs. An 18-inch electrician's drill allows one to avoid interference from the outer rim.

The plate was then tapped (a crescent wrench works fine to turn the tap in), cuttings vacuumed, and an insert assembled on a bolt with locknut as shown in *Figure 3*. The insert was then sprayed with Pro-lock cleaner and primer and the Pro-lock thread locking compound was applied to both insert and plate threads. Then the bolt-locknut-insert assembly was threaded into the plate until the locknut engaged the top of the plate. The bolt and locknut were backed out, leaving

the insert in the plate. Next, 21/64-inch pilot holes were drilled into the inner rim using the inserts as a guide, leaving a 3/64-inch engagement area for the new 24/64-inch (3/8) machine bolts.

The rear plug was left undrilled and a machine bolt inserted with which to raise and lower the plate. A large C clamp provided positive downward pressure to help lock in the proper plate position when located (*Figure 4*). Next, sample strings were raised to tension and downbearing checked on them while the plate height was changed as needed. Upon locating the proper plate height, the remaining bolts (with lock and flat washers) were threaded into the plate and rim (machine bolts cutting new threads in the inner rim for themselves). At this point, the piano was raised to pitch and the downbearing checked. Should further plate height adjustment be needed, it would be relatively easy to lower the string tension, back out the bolts, and repeat the procedure from that point on.

As one of the purposes of adjusting plate height is to affect downbearing, a discussion on that subject is in order. Prior to making any such adjustment, one needs to determine the existing amounts of front and rear downbearing. For the purposes of this discussion we will postulate that we have bellied the soundboard, that it has good crown and the ribs are properly intact.

Any time the string rest top surface (or rear of wire loop on Acu-just hitch pins) loop is lower (compared to a straight line between the front terminator and the bridge) than some point on top of the bridge, some type of bearing will exist. Most rocker gauges and dial indicators can show this condition quite easily. However, this does not tell us what we need to know (as Chris Robinson's article quite correctly pointed out — see page 16 of the September 1983 *Journal*), which is, among other things, whether or not the front edge of the bridge is higher, the same or lower than a theoretical straight line between the rear bridge edge and the front terminator (a fishing line works quite well — see Susan Graham's article on page 15 of the January 1985 *Journal*).

This point is crucial because front bearing is not correctable by simply changing rear bearing. As front bearing is critical to tone production, it is important that we be able to measure it without

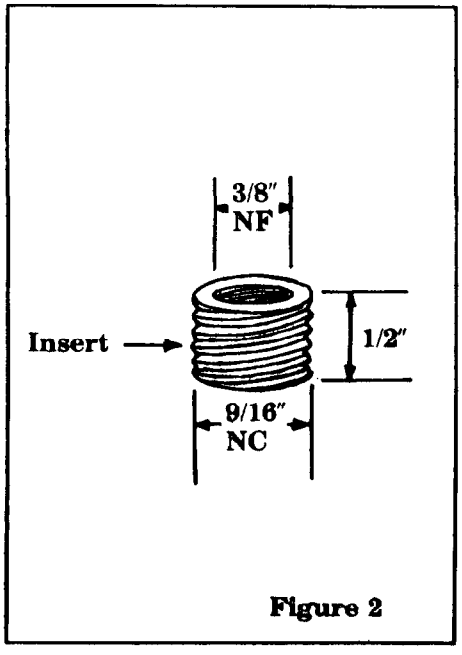


Figure 2

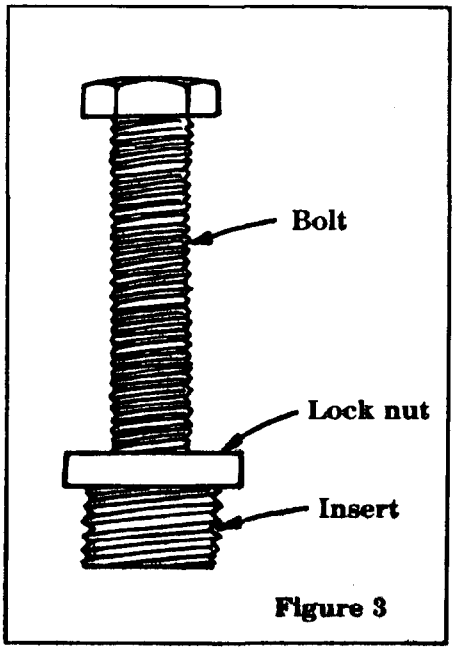


Figure 3

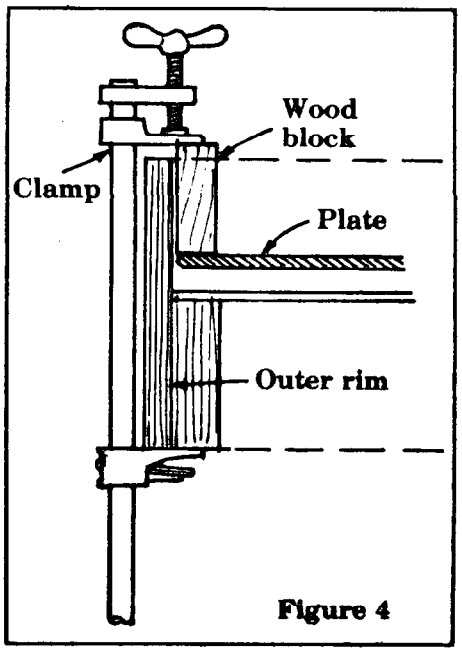


Figure 4

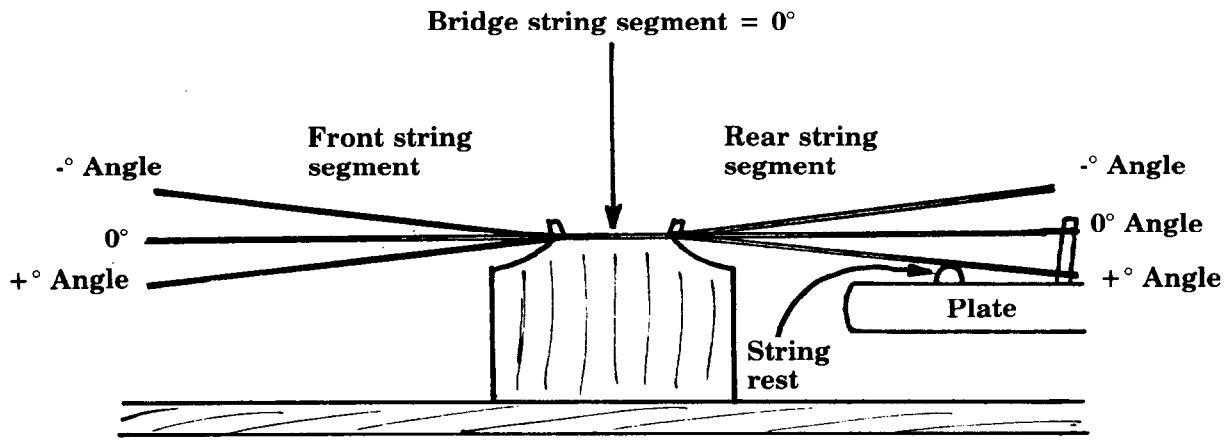
being influenced by the existing rear bearing in any way. Unfortunately, the exact amount of front bearing may be more difficult to measure than you might expect! This is because the measurement of front downbearing and rear downbearing *must* be done *separately* in order to provide accurate information.

This means you cannot be rocking the feet of your rocker-type gauge from front string segment to rear string segment alternatingly just to feel if there is some rock. (An article by Jack Krefting on page 10 of the August 1982 *Journal* correctly explains how a wide center foot type gauge *can* give separate indicators for front and rear bearings). *Nor* can you place the feet of your typical dial indicator-type measuring device on both the front and rear string segments simultaneously and obtain separate front and rear bearing readings. The above types of devices have a tendency to give some *combination* instead of *separate* front and rear bearing measurements. The wide center foot type rocker gauge can give independent readings if the wide foot is leveled to the bridge string segment first, and then rocked. However, I believe small amounts of bearing are difficult to measure using these two approaches. Others no doubt may legitimately disagree on this point.

In newly manufactured pianos we may be able to profitably make certain assumptions regarding the string segment angles (front and rear bearing) to the bridge. However, in older pianos, we need to determine what both of these angles are. We may need to define and understand the relationship between bearing and string angles to fully comprehend this point. Please examine *Figure 5*, as in this case a picture may indeed be worth a thousand words. For those who are verbally inclined, read on.

For the purpose of this discussion, I am designating that plane which is parallel and directly adjacent to the top of the bridge as the horizontal plane, and that plane which bisects the string along its length over the bridge, *and* is perpendicular to the horizontal plane as the vertical plane (*Figure 5*).

Downbearing is indicated by the angle which the string makes upon crossing the bridge in the vertical plane, using the horizon-



All angles measured in the vertical plane perpendicular to the horizontal plane

Figure 5

tal plane as a reference point zero degrees (*Fig. 5*). The technique and formulas for calculating string segment angles will be described later in a section on tools.

Sidebearing is indicated by the angle which the string makes upon leaving the bridge in the horizontal plane, using the vertical plane as reference point zero degrees.

Bubble-style bearing gauges have been described in the past as a way to prevent being deceived by rocker gauges. In fact, the front string segment angle *cannot* be determined by leveling a bubble gauge on it and then transferring the gauge to the rear string segment, or vice versa, or some combination of the two.

For example one, (*Fig. 6*), let's say we have a -1 degree front string segment angle (remember all angles are from the horizontal plane which is defined as the top bridge surface plane) and a +2 degree rear string segment angle. According to one procedure, we would level the bubble on the front string segment. The bubble will move *towards* the bridge, yet we have -1 degree front bearing!

For example 2, (*Fig. 7*). Let's say we have a +1° front string segment angle and -2° rear string segment angle. We level the bubble on the front string segment, then place the gauge on the rear string segment. The bubble will move away from the bridge, yet we have +1° front bearing!

Are we to conclude from these two examples, then, that bubble gauges are unusable for down-bearing measurements? *No!* Only that they be used in accordance with the following principle which I am in the process of patenting, along with an accompanying combination bubble-rocker gauge device and a specialized dial indicator (*Figures 8 and 9*). For the combination bubble-rocker gauge the principle relies on leveling the bubble to the *bridge string segment*, then placing the device on front or rear string segments; a bubble movement towards the bridge will indicate that a string segment has a plus bearing angle and the amount of movement of the bubble will give an indication of how much.

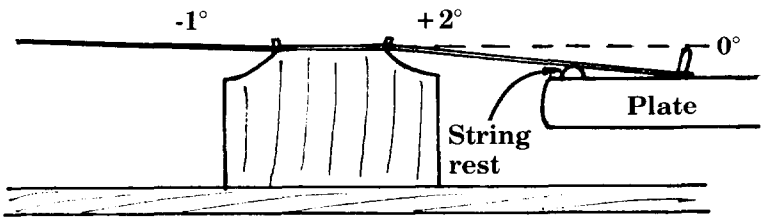


Figure 6

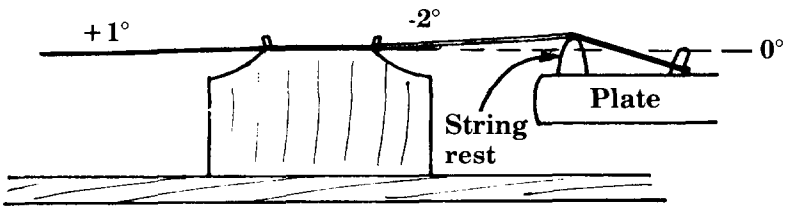
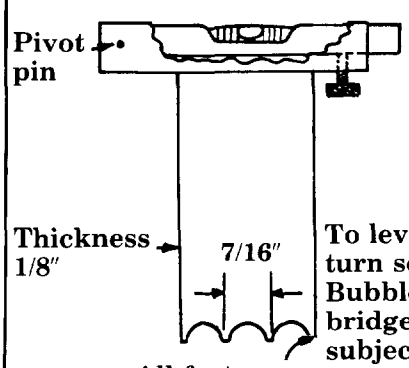


Figure 7

Combination bubble-rocker indicator



To level bubble, turn screw up or down. Bubble is either on bridge surface near subject string or bridge string segment as needed. To use as rocker, place center two feet flush to bridge string segment. Rock gauge toward desired string segment.

Figure 8

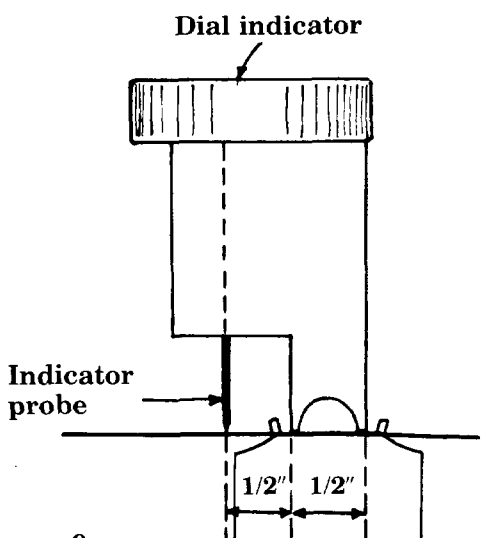
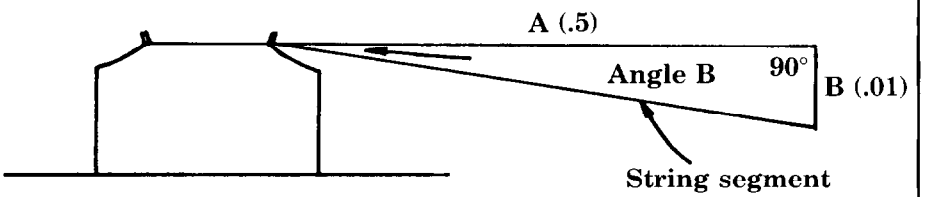


Figure 9



TANG ∠ B = B/A

COS ∠ B = A/C

$\sqrt[2]{A^2 + B^2} = C$

C = .5001

COS ∠B = .5 / .5001 = .9998 = 1°

Figure 10

For the dial indicator the principle of leveling the indicator to the top of the bridge is the same. After the indicator foot is flush to the bridge string segment, simply touch the indicator probe to the desired string segment and observe the indicator reading. The indicator reading measures the vertical distance from the horizontal plane of the chosen front or rear string segment at that distance (approximately half an inch) from the edge of the bridge. Always place the foot of the indicator (on either style) flush to the subject string segment's bridge pin.

To calculate string segment angles, see *Fig 10*. Angle B is the string segment angle. Distance A is fixed (the distance between the dial indicator's probe and its front foot). Distance B is taken from the dial indicator reading. I have a cosine table so I calculated C, then my cosine decimal, and then looked it up in my table. Cosine .9998 = 1.

Once we have determined our front and rear bearings the following are some of the possibilities for adjusting them. Some or all of the following may or may not be appropriate depending on the particular circumstances.

I. Adjustments for rear bearing
   - A. Adjust plate height
   - B.* Cast-in string rest
     1. No duplex
     2. Least expensive system
     3. Adjustable by grinding for more bearing
     4. Not adjustable for less bearing
   - C.* Gang string rests
     1. Easier to string piano with gang rests
     2. Turnable as a group by moving gang rest forward or back
     3. Bearing adjustable by changing thickness of gang rests
        - a. Factory selects thick and thin
        - b. Fiber or brass shimstock
        - c. Grinding the underside
   - D.* Individual string rests
     1. Movable type
        - a. Infinitely tunable
        - b. Assembly difficulties
        - c. Adjustable by shimming, grinding or selection
     2. Immobile type
        - a. Easier to manufacture
        - b. Assembly difficulties
        - c. Adjustable only by grinding or selection
   - E.* Other systems
     1. Rod on plate
        - a. No duplex
        - b. Adjustable by diameter
   - F.* Baldwin Acu-just system
     1. Machinist's roll pin
     2. Bearing infinitely adjustable *after* piano is strung
     3. Duplex requires no tuning

** From a handout prepared by Jack Krefting and the Baldwin Piano & Organ Co.*

II. Adjustments for insufficient front bearing
   - A. Should the soundboard have no crown, repair or replace it so that it does.
   - B. Shim the bridge higher should it have been manufactured too low.
   - C. If the bridge has sufficient height, the soundboard sufficient crown and the bridge hasn't rolled to the point of distorting the soundboard into an S shape and separating the ribs from it, we can plane the bridge to make the front edge higher than the rear edge in relation to a theoretical straight line between the front terminator and the rear bridge edge (remember our fishing line from page 15 of the January 1985 *Journal*).

STEVE FAIRCHILD
Factory Scale Designer
Complete Piano Rescaling Service
11 Norman Ave.
Amityville, N.Y. 11701
(516) 541-5915

Pianos
Across the Street—Across the Sea—
We Wholesale At Real Wholesale
Home Piano Center
216-291-3838 4281 Mayfield
Cleveland Ohio 44121

The Piano Workshop
3166 West 33 St.
Cleveland, Ohio 44109
Phone (216) 631-1777 or 631-1991
PIANO KEYS RECOVERED

NOW AVAILABLE....after an absence of over half a century!
(Varnish-Apply Duplex Paper)
SOUNDBOARD DECALS
Available at piano supply houses worldwide....OR:
PRO PIANO 3916 18th Street
San Francisco, CA 94114
Telephone: 415/621-1210

PIANO SERVICING
TUNING & REBUILDING
By ARTHUR A. REBLITZ, RTT
The Technicians' Bible
$19.50
+$2 mail or $3 UPS
THE VESTAL PRESS
Box 97 • Vestal 62, NY 13850
(N.Y. Res. Add 7% Sales Tax)

Why Do I Belong?

M.B. Hawkins
Vice President

Ever ask yourself that question? If not, you should. Otherwise, you're just taking membership for granted, which is bad for you and bad for the association. The best thing that could happen to any group would be for all members to take time out, every now and then, to ask themselves, "Why am I a dues-paying member?" The thoughts that come to mind would be revealing, some affirmative, perhaps some negative — and both could lead to a better, more effective organization.

One man who asked that question came up with these reasons:

1. I owe it to myself and my company to help our industry move forward.

2. It takes strength in numbers and concerted action to accomplish anything worthwhile.

3. Only through membership in my association can I obtain reports and publications prepared with my needs in mind. Everything else put out is general in nature, aimed at a wider audience and hence diluted.

4. The meetings I attend bring me ideas and information that I could obtain in no other way, and which are put to the test of experience before they are passed to me.

5. I have many true friends among the members, people I enjoy being with for friendship's sake as well as for business reasons. My life is richer and more worth living through belonging.

6. Committee projects and other association activities enable me to contribute — to do my bit for the industry, the economy and the general good.

7. The cost of belonging is small compared to what I get in return, an extremely low rent for the space I occupy in the industry.

8. Even when other problems command my full attention, the officers, directors and headquarters keep working in my interest. In such times, maintaining my membership is a vote of confidence in them, which I am happy to bestow.

The above article was taken from the May 1978 issue of the *Journal*. It was not written by a Guild member, nor was it referring to the Guild at all. However, it could very well have been. Organizational spirit, as we have been discussing these past months, is the energy that keeps things happening in any organization. It is essential if we are to generate activity, teamwork, solve problems and establish goals. We are all team members — the ability to work together generates a group genius that is smarter and more productive than any one of us acting alone. That is why each member is important. Each team member has something to contribute.

The Piano Technicians Guild is truly a continuum. We just looked back to May 1978. Let us now give some thought to the present. The following article was taken from the May 1985 issue of *The Latest Pitch*, the Golden Gate Chapter newsletter, President's Message. Choice words we should hang onto:

"I often think how fortunate we are to have chosen piano technology as an occupation. Every way one looks at it, it offers benefits and opportunities not found elsewhere.

"Firstly, it is an art form. There are many excellent books explaining the how-tos of tuning, regulating, voicing, rebuilding, refinishing, etc., that are valuable to the student and experienced technician. These, however, cannot provide the skill that is developed over years of working with pianos. The knowledge and ability a craftsman member of the Guild has goes with him. These skills are in short supply and will continue to be so.

"Secondly, the work of a piano technician is challenging without being threatening. Whether we have chosen to work primarily with old klunkers or on fine concert grands, we can extend ourselves and do the best work that we are able to, given the time we have available. By extending ourselves to do our best quality work, we are continuously improving and honing our ability.

"Thirdly, we enjoy a special relationship with our clientele because we provide a service which increases the cultural well-being of their home. To be successful, a piano technician must "tune in" to the artistic requirements of the customer.

"When we stand back after a job has been completed and see and hear a fine piece of workmanship, there is a feeling of satisfaction and achievement that is not present in many professions. Good work not only satisfies, but also increases our earning potential. It is no wonder that piano technicians are such citizens, and so enjoyable to be with."

New Members

Registered Technician

Boston Chapter
Nadworny, David E.
119 Jewett Street
Newton, MA 02158

Golden Gate Chapter
Hagan, Michael C.
9 Hull Street
Santa Rosa, CA 95401

Hay, Randall E.
307 El Divisadero Ave.
Walnut Creek, CA 94598

Schaaf, John E.
3918 Everett Ave.
Oakland, CA 94602

Salt Lake City Chapter
Cox, Merrill C.
118 E. Marie Drive
Midvale, UT 84047

Hill, James E.
1468 Logan Ave.
Salt Lake City, UT 84105

Keen, Eileen L.
365 E. Coatsville Ave.
Salt Lake City, UT 84115

Western North Carolina Chapter
Owens, Jeffrey S.
P.O. Box 903
Shelby, NC 28150

Apprentice

Charlotte, NC, Chapter
Alexander, William F.
Route 2, Box 88-A
Harrisburg, NC 28075

Heart of Texas
Landis, Harry L.
Rt. 2, Box 274
Copperas Cove, TX 76522

North Central Louisiana Chapter
McCleskey, Gerald W.
9607 Birdwell Lane
Shreveport, LA 71118

North Central Wisconsin Chapter
Douglass, William R.
5121 St. Cyr
Middleton, WI 53562

Ottawa Chapter
Mack, Colin D.
93 King George St.
Ottawa, Ont., Canada K1K 1V4

Sacramento Valley Chapter
Giezentanner, Thomas A.
4484 Mary Lynn Lane #77
Carmichael, CA 95608

Affiliate

Member-At-Large
Cade, Leon Ray
23 Insoll Ave.
Hamilton, New Zealand

San Francisco Chapter
Siang, Ngor Tian
No. 6, JLN, Tangki Air
Kangkar Baru Yong Peng
Jo Hor
Malaysia

Associate

Charlotte, NC, Chapter
Duff, Bill V.
1936 Independence Blvd.
Charlotte, NC 28205

Twin Cities Chapter
Lindfors, Jason F.
1172 Highland Ave.
Northfield, MN 55057

Waukegan Chapter
Wyckoff, Peter T.
1 Court of Bucks County
Lincolnshire, IL 60015

Student

Charlotte, NC, Chapter
Parker, Robert S.
155 Waverly Hall Dr.
Charlotte, NC 28211

Cincinnati Chapter
Haynes, John D.
68 Sherwood Dr.
Independence, KY 41051

Hutchinson Chapter
Stoltzfus, F. Eugene
1505 Labrador
Garden City, KS 67846

Kansas City Chapter
Baker, Holly J.
412 Rockfence
Lawrence, KS 66044

Montgomery, Shirley W.
11443 Craig
Overland Park, KS 66210

Oklahoma Chapter
Cantrell, Norman R.
2251 N.W. 19th
Oklahoma City, OK 73107

Fox, Jeffrie K.
512 Glendale
Ponca City, OK 74601

Orange County Chapter
Whitaker, Cecil F.
8330 Buck Place
Riverside, CA 92504

Salt Lake City Chapter
Woodard-Hill, Bonnie R.
1468 Logan Ave.
Salt Lake City, UT 84105

Texoma Chapter
Schilken, Rev. Karl W.
421 Marconi
Wichita Falls, TX 76301

Twin Cities Chapter
Brandt, Craig L.
1909 8th St. So.
Moorhead, MN 56560

Hafdahl, Wm. H.
4018 East Robinson
Duluth, MN 55804

Wilmington Chapter
Boyd, Albert E.
137 Trimble
Brookhaven, PA 19015

Reclassifications

Registered Technician

Boston Chapter
Otten, Richard W.
3 Lampson St., Apt. 1
East Boston, MA 02128
(From Apprentice)

Golden Gate Chapter
Gibson, John W.
2457 Humboldt Ave.
Oakland, CA 94601
(From Apprentice)

New Jersey Chapter
Rex, Dewey T.
617 Townsend Place
North Plainfield, NJ 07063
(From Apprentice)

Northern Virginia Chapter
Reiner, Frederic M.
908 W. Braddock Rd.
Alexandria, VA 22302
(From Apprentice)

Ward, Thomas A.
4901 Seminary Rd. #520
Alexandria, VA 22311
(From Apprentice)

Orange County Chapter
Bell, Elizabeth T.
535 Bernard, No. B
Costa Mesa, CA 92627
(From Student)

St. Louis Chapter
Plitt, Edward A.
7359 Dartmouth
St. Louis, MO 63139
(From Apprentice)

Santa Clara Valley Chapter
Rodino, Richard C.
365 Western Dr., Apt. C
Santa Cruz, CA 95060
(From Apprentice)

Apprentice

Golden Gate Chapter
Townsend, Dennis L.
1372 Joan Court
Concord, CA 94521
(From Student)

New Orleans Chapter
Braud, Barry J.
1425 Himaleya
Thibodaux, LA 70301
(From Apprentice)

Associate
Boulder Chapter
Coltrara, Steven A.
2696 Juniper Ave.
Boulder, CO 80302
(From Registered Technician)

Twin Cities Chapter
Boehland, Lowell A.
5152 Luverne Ave.
Minneapolis, MN 55419
(From Student)

Focus On The Future

Piano Technicians Guild Annual International Convention And Institute

July 15-19, 1985 Hyatt Regency Kansas City

Member Recruitment Points — June 1, 1984 - June 1, 1985

	Pts.	Mbrs.
Ackman, W. Harold	1	1
Anderson, Richard E.	4	1
Anderson, Robert A.	4	1
Atkinson, Howard A.	5	1
Bailey, Benjamin N.	5	1
Barr, David J.	4	1
Barrus, Ralph M.	1	1
Becker, Sam	1	1
Bessette, Roland	5	1
Betts, David C.	4	1
Bittinger, Richard E.	4	2
Blacklock, David	1	1
Blanton, Tom R.	1	1
Blees, Willem	14	5
Boone, Danny L.	4	1
Bourdon, Donald W.	1	1
Bremner, Ernest B.	1	1
Bridges, Nate	2	2
Briley, James E.	1	1
Bryant, James G.	3	3
Bryant, Ken L.	7	3
Bullock, Wilbur W. Jr.	4	1
Burow, Burtis L.	4	1
Burton, James H.	1	1
Burton, Robert H.	4	5
Callahan, James J.	5	2
Cannon, James D.	5	1
Carter, Eugenia	2	2
Churchill, Kenneth R.	5	2
Coffey, Barbara L.	10	2
Coleman, James W. Sr.	5	1
Colwes, Scott W.	1	1
Connell, Walter K.	5	1
Conrad, Robert	5	1
Cooke, John W.	1	1
Cox, Merrill W.	1	1
Crabb, Larry B. Jr.	1	1
Curtis, Dennis	1	1
Dante, Richard	4	1
Davies, Clair L.	5	1
Davis, James C.	5	1
Delpit, John A.	4	1
Denham, Douglas G.	4	1
Dornfeld, Bruce G.	1	1
Doss, Harry W.	4	1
Draine, Patrick	1	1
Drost, Michael A.	1	1
Duncan, David R.	2	2
Eccardt, Paul E.	4	1
Erickson, Glenn	1	1
Fandrich, Delwin D.	1	1
Farley, Timothy M.	5	1
Ford, John P.	4	1
Foss, Mark E.	5	1
Fox, John D.	5	1
Fuller, Ralph E.	1	1
Garrett, Joseph A.	3	1
Geiger, James B.	2	2
Godfriaux, Stan R.	1	1
Gordy, Travis L.	1	1
Graham , Susan E.	4	1
Greenbrook, Reginald	1	1
Groot, Gerald W.	1	1
Grossman, Matt	2	2
Grossman, Michael S.	14	3
Hale, Robert R.	4	1
Hansen, Charles	2	2
Harding, Claude M .	1	1
Harmon, Clayton C.	10	3
Harris, Dale L.	1	1
Harteau, Daniel D.	1	1
Hazzard, Nancy M.	9	2
Heismann, Barry	1	1
Heneberry, Alan J.	4	1
Henry, Fern L.	4	1
Hess, James N.	5	1
Hess, Marty A.	6	2
Hines, David M.	5	1
Hitt, Henry L. Jr.	4	1
Holder, Leopold	5	1
Hornberger, Paul R.	1	1
Houston, James P., Jr.	9	2
Howell, W. Dean	1	1
Hudson-Brown, Karin	9	3
Jackson, Stephen S.	1	1
Johns, Barney J.	1	1
Jones, Henry L.	1	1
Jones, Thomas F.	2	2
Jorgenson, Les O.	1	1
Jorgenson, Owen	1	1
Junker, Donald F.	1	1
Kadwell, Kenneth A.	1	1
Keast, Lawrence J.	1	1
Kerber, K. Walter	1	1
Krause, Jack L.	1	1
Kreitz, Richard C.	1	1
Krentzel, Jim L.	1	1
Laity, Donald G.	1	1
Leary, Kevin M.	9	2
Leonard, Grant G.	1	1
Lieberman, Carl T.	4	1
Lillico, John E.	2	2
Lord, Frank R.	13	3
Lovgren, Christine	26	7
Macchia, Frank S.	5	1
MacKinnon, Karl T.	1	1
Manna, Tony	1	1
Markins, Charles W.	1	1
Marks, James M.	1	1
Martin, Edward E.	4	1
Matley, Wayne O.	6	2
McKay, C. Guy	1	1
McNeil, Thomas	1	1
McVey, James I.	5	1
Mehaffey, Francis	3	3
Melton, Eddie J.	1	1
Metz, J.A.	4	1
Moonan, Wm. J.	5	1
Morgan, David H.	5	1
Morrow, Hope E.	1	1
Mrykalo, Vincent E.	4	1
Neal, Douglas R.	14	14
Neie, Gary A.	9	3
Nelson, Clifford G.	1	1
Odenheimer, Fred	5	5
Ostrosky, Alexander	5	1
Ousley, Robert L.	5	1
Pagano, Joseph L.	4	1
Palm, Stanley S.	1	1
Parry, Nancy W.	5	1
Pearson, Walter T.	5	1
Pettit, Thomas V.	5	1
Phillips, Webb J.	10	2
Pierce, James C.	4	1
Pierson, James B.	1	1
Pike, Gene A.	5	1
Plumb, Norman	5	1
Potter, Randal F.	1	1
Powell, Samuel B.	3	1
Prentice, Randy A.	1	1
Preuitt, Ernest S.	3	3
Privette, R.V.	1	1
Probst, Dale E.	1	1
Quint, Richard B.	8	2
Railsback, Leonard E.	2	2
Reiter, Michael D.	1	1
Riedel, Paul W.	4	1
Roe, Donald E.	1	1
Rosenfeld, James I.	5	4
Schmitt, Jake E.	5	1
Schoppert, Robert L.	5	1
Shroyer, Alvin M.	1	1
Sierota, Walt	1	1
Sipe, Glen P.	1	1
Sloan, Kenneth A.	4	1
Sloffer, Phillip C.	5	1
Smit, Robert	4	1
Speir, Leon J.	5	1
Stevenson, Robert L.	1	1
Stone, Sidney O.	21	7
Stout, Clarence P.	1	1
Swafford, Kent E.	1	1
Towne, Christine S.	5	1
Tremper, Fred W.	9	3
Turner, Jeffrey R.	1	1
Vanderlip, David A.	5	1
VanPatten, Aija B.	1	1
Vogellehner, Karl	1	1
Wah, Loo Kok	1	1
Walmsley, James O.	1	1
Wathen, Michael J.	5	1
Welton, T.Scott	1	1
West, Ivan	4	1
West, Richard E.	2	2
Wheeler, Richard K.	5	1
Wiant, Benjamin F.	5	1
Wilkinson, Asa	4	1
Winn, Lloyd P.	17	5
Winters, Kenneth E.	5	1
Wisenbaker, Martin G.	1	1
Wolford, Peter	4	1
Wood, Edward E.	4	1
Wurz, Douglas K.	5	1
Wuske, Paul W.	1	1
Yeager, Michael W.	1	1
Yonley, Fred T. Jr.	9	2
Zastrow, Lila M.	10	2
Zeiner, John J. Sr.	5	1
Zeringue, Nolan P.	6	3

The Auxiliary Exchange

President's Message

Eleven reasons why I am not going to attend (or why I am not at) the International Convention in Kansas City this year:

1. I am not interested in the organization.
2. I see no opportunity in attending for me.
3. There is no place for my children to go while I am there.
4. No one asked me to join the Auxiliary.
5. I am not a member of an active chapter and therefore have no voice.
6. The Auxiliary is too "old fashioned."
7. I am too shy to "butt" into the group.
8. I don't feel as if I belong.
9. No one has ever asked me for my opinion of what goes on in the Auxiliary.
10. If what I read on the Auxiliary Page is true, why is there not some way for all of us to receive the franchise?
11. I feel that it is necessary to take part in everything or not be involved at all.

If you are reading this and missed the convention, re-read the program and consider what you have "lost" this year.

You have my personal invitation to join the Auxiliary and to take part in only a few or in as many of our activities as you wish in the future. This includes being able to join us in Las Vegas in 1986! I will look forward to meeting you there!

Louise Strong
President

The Royal City That Wears A Crown

From east, north, south, west, we hope you are all converging on Kansas City this month to attend the 29th annual convention of the Piano Technicians Guild. Many good plans are being finalized to ensure your comfort and entertainment. We are ready to welcome our visitors from Japan and other parts of the world.

One of the many attractions for some of you will be the Hallmark Company's extensive operation just across the street from the Hyatt Regency Hotel. This is where the people work to produce the cards you buy when you "care enough to send the very best". The founder, Joyce C. Hall, was not a native Kansas Citian, nor even a native Missourian. He was born in 1891 in what has been described as the "barely-there" town of David City, Nebraska, and came to Kansas City at age 18 selling scenic post cards. He liked the town well enough to decide to stay. Stay he did, and prospered. Although his empire was not founded overnight, in six years he was manufacturing and selling his own line of cards. World War I helped by creating a market for cards to cheer the "boys over there". When he died in 1982, his 72-year old, billion-dollar company had made its mark in the greeting card industry, and from sponsorship of quality television (Hallmark Hall of Fame) from major support in founding "People to People", and the lavish real estate venture known as Crown Center.

Most of the rags-to-riches story is boringly familiar. However, one aspect not given much public attention is the unusual name. "Joyce" apparently plagued him into adulthood and even after he had achieved some degree of fame. He used to explain that it was derived from the surname of an admired Methodist bishop, Isaac W. Joyce of Minneapolis. Although it bothered him some, he never considered dropping it and using his middle name. As he put it, "Clyde wasn't any great shakes of a name either." To his associates, he was simply "Mr. J.C."

Another interesting aspect of Kansas City is the American Royal event, held in October of each year. Kicked off by a huge parade, and preceeded by thousands of FFA (Future Farmers of America) young people converging on the town for their annual convention, it is probably one of the largest livestock shows in the world. Cows, horses, sheep, etc., of all breeds and accomplishments are brought to be shown and judged, and one of the greatest society events of the year is the competition for jumpers. The American Royal queen and her court reign over the entire proceedings, and for almost three weeks the entire area is submerged in news of the events. As said before, we still have roots in the agricultural community and the fate of the wheat (and corn, soybean, oat, millet) field gives us concern when the weather appears not to cooperate.

A few miles to the north one can visit a well-known distillery and out east is found an excellent winery. By venturing into a certain area of downtown, one can "smell the coffee" (Folger's), and in the industrial bottoms to the northeast, the refinery. We have silk stocking districts and inner city slums. And of course, thousands of "little people" who live fairly well, pay their bills and have their pianos tuned.

As is so often said here, "Welcome, no stranger!"

Luellyn Preuitt

Two State Conventions In Eastern Region

Many of the growing number of state conventions provide excellent Auxiliary programs. Couples often plan their calendars around these annual events because they are great times to share with friends.

So it was on the last weekend in March just as the trees began to bud. People drove from throughout Pennsylvania and surrounding states to the 11th Annual Pennsylvania State Convention in Philadelphia. Auxiliary activities were well planned and fond memories are with all who attended.

Things started off with an Early Bird Reunion Thursday evening, and a class in the art of cross stitch was held Friday morning. This was followed by a luncheon that included table favors, door prizes plus a talented storyspinner, **Loralee Cooley**, who also led a chorus of water glasses. The afternoon class featured a tax expert on the tax and bookkeeping problems that would apply to piano technicians.

Saturday was a day for touring and Longwood Gardens was the first stop. Nothing could have been more refresh-

ing than to stroll through greenhouse after greenhouse of gardenias, orchids, topiary and tropical vines. Lunch at the Gardens was followed by a tour of the Brandy Wine Museum where the Wyeth Collection of paintings is established.

The program was planned by **Bert Sierota** and **Shirlie Felton** with the help of Bert and Walt's daughter **Pat**. Many hours of planning go into arranging a schedule of activities such as this. The planners often do not know if all of that effort is appreciated. If Bert and Shirlie were watching as people checked out of the hotel on Sunday making plans then to see each other next spring, they would have realized then how much their Auxiliary Program contributed to the obvious good time had by everyone. Those programs invariably do.

Many thanks to Shirlie Felton and Julie Berry for excellent reports on the above. To avoid duplication we combined the two reports.

May In New Hampshire

Eighteen registered for the Auxiliary Program at the New England States Convention in West Lebanon, New Hampshire, May 3-5. Although there are no chapters in the area, they do support the technicians and put on a lovely program. Friday featured a tour to historic Woodstock, Vermont and a visit to the famous Billings Museum. Lunch was held at the Woodstock Inn with time to visit the many nice shops afterward.

PTGA Corresponding Secretary **Bert Sierota** presented a crafts class on Saturday in which she demonstrated how to make a magnetic keyboard from a pattern designed by her daughter, **Pat**. All attending were able to work on their own that they could take home with them. It must have been a success since nearly everyone who participated completed the work.

PTGA Treasurer **Kathryn Snyder** presented a cake decorating class. She brought two cakes already decorated — one with the PTGA seal and the other a Mother's Day cake. She demonstrated the different types of flowers and edgings, and explained how to use icing for decorative purposes. They then got to eat all the samples! In addition to the two current board members previously mentioned, past presidents **Ginny Russell** and **Jewell Sprinkle** also attended.

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

Don't Miss "The Best Of Kansas City"

If you didn't sign up for the tour you may be missing a great opportunity, although it still may not be too late if space is still available.

You will be able to recall the frontier days as you travel the streets of Old Westport, the largest outfitting post for wagon trains bound West on the Santa Fe Trail in the early 1800's. You will ride through Country Club Plaza, the world's first totally planned, and perhaps, most elegant of shopping centers. The Spanish architecture, impressive fountains and imported statuary make this a drive through an outdoor art gallery.

The tour goes through Mission Hills, one of the three wealthiest residential areas in the United States and then on to the Harry S. Truman Sports Complex, the only dual stadium of its kind in the world. It is the home of the Kansas City Chiefs (football) and Royals (baseball).

A special treat awaits you at Stephenson's Apple Farm Restaurant where you will enjoy sipping cold cider drawn from a wooden barrel and browsing through the many antique-filled rooms. Stephenson's is nationally known for delicious food.

After lunch the tour goes to the historic town of Independence and includes the Vaile mansion, the Truman home, the church in which the Trumans were married, and the world headquarters of the RLDS Church, among other interesting things.

In addition to all of the above, there will also be a tour of the Truman Library and Museum, one of seven Presidential Libraries in the United States.

Tidings And Tidbits

The Pennsylvania State Convention always provides an abundance of grist for this mill and this year's affair in Philadelphia was no exception.

Miriam and **David Snyder** brought their daughter, **Christi,** to her first PTG convention. She and **Charlie Berry** compared notes on the quality of hotel cribs, while Christi's grandma, **Kathryn Snyder**, looked on....**Charlie Heuther, Ginny Russell** and **Shirlie Felton** all celebrated birthdays that weekend. Naturally, a party was in order....Friends of **Bob** and **Linda Smit** surprised them with a shower for their baby expected in June...**Zee Hawkins** drove up from Washington for the festivities. (Hubby **Marshall** was PTGing in Spokane at the Northwest Regional that weekend and flew back to Philadelphia to meet her).

As this is being written (in May) seven past presidents have already indicated that they plan to attend this year's International Convention. They are: **Esther Stegman** (66-68); **Dessie Cheatham** (70-71); **Lu Preuitt** (71-73); **Ginny Russell** (74-76); **Helen Pearson** (76-78); **Jewell Sprinkle** (78-80); and **Julie Berry** (80-82).

Ron Kistler, *one of PTGA's male members from the Lehigh Valley, PA Chapter, displaying the original needlepoint he won at the Pennsylvania State Convention. This work was designed and made by* ***Bert Sierota*** *and depicts all the locations of previous Pennsylvania State Conventions.*

National Executive Board

Mary Louise (Mrs. Donald) Strong
President
One Knollwood Drive
Rome, GA 30161

Helena (Mrs. Dean) Thomas
Recording Secretary
RR. Box 210A
Edinburg, PA 16116

Norma (Mrs. D. Elwyn) Lamb
Vice President
1833 Echo Park Avenue
Los Angeles, CA 90026

Bert (Mrs. Walter) Sierota
Corresponding Secretary
5201 Whitaker Avenue
Philadelphia, PA 19124

Kathryn (Mrs. Willis) Snyder
Treasurer
79 Furnace St.
Robesonia, PA 19551

Coming Events

Date	Event	Site	Contact
July 15-19, 1985	Piano Technicians Guild Annual Convention & Institute	Hyatt Regency Kansas City	Home Office 9140 Ward Parkway Kansas City, MO 64114 (816) 444-3500
Sept. 20-22, 1985	Wisconsin Days Seminar	Univ. Of Wisconsin Madison, WI	Joel Jones 1513 Humanities Bldg. 455 N. Park Madison, WI 53706 (608) 263-1887
Sept. 29- Oct. 1, 1985	Florida State Convention	Plaza Motel 600 N. Atlantic Daytona Beach, FL 32018	Walter T. Pearson c/o Community Piano 1128 State Ave. Holly Hill, FL 32017 (904) 255-4804
Oct. 4-6, 1985	N.Y. State Conference	Ithaca, NY	Ken Walkup 310 4th Street Ithaca, NY 14850 (607) 272-6547
Oct. 11-13, 1985	Ohio State Seminar	Holiday Inn North Dayton, OH	Francis Hollingsworth 2271 E. Spring Valley Paintersville Rd. Xenia, OH 45385 (513) 372-1981
Oct. 18-20, 1985	Texas State Convention	Executive Inn 3232 Mockingbird Ln. Dallas, TX	Martin Wisenbaker 808 Cordell Houston, TX 77009
Nov. 15-17, 1985	North Carolina State Convention	Raleigh Inn Raleigh, NC	Tom Karl 2251 Rumson Rd. Raleigh, NC 27610 (919) 828-3535

The Piano Man

Direct Importers
USED & REBUILT
GRANDS

Famous Names From Japan. Also Fine Domestic Brands.

Contact:
Nick Margaritas,
President
Baltimore, Md. 21228
301-747-0200
Division Of The Piano Man, Inc

VIP Hammers
(Variable Impact Pattern)
Easy to voice, producing a full tone that stays.
Musical bass strings, individually calculated, with a powerful fundamental and lots of bite.

P.O. Box 218, Station A, 308 Betty Ann Drive,
Willowdale, Ontario, Canada M2N5PO.
(416) 226-1171.

A. Isaac Pianos

Classified Advertising

Classified advertising rates are 25 cents per word with a $7.50 minimum. Full payment must accompany each insertion request.

For Sale

STEINWAY, MODEL M Ser. No. 283002. Call **(219) 282-1719 days. (219) 288-8981 evenings.** — Excellent case, good action, fair strings, good pinblock.

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

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

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

FOR SALE. Privately owned 1911 Baldwin concert grand. Excellent condition. **Gary Foster, 411 E. Seneca, Tahlequah, OK, 74464. (918) 456-3435 or (918) 456-5511, Ext. 2707.**

STEINWAY ROSEWOOD SQUARE GRAND S/N 22175 excellent. **(608) 249-2603.** Wanted: grand action model.

ALUMINUM KEY BUSHING CAULS, take the guesswork out of rebushing keys. Factory method. "Alumi-cauls" are accurately machined in the following standard sizes: .147", .145", .160", .087". $49.50/set of 90. 1/2 sets, 1/4 sets, multiple set discounts. Custom sizes made to order at extra cost. Complete instructions included. Lifetime investment. Call or write for more details. **Peter W. Grey, PO Box 56, Kingston, NH 03848. (603) 642-3633.**

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

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

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

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

ANNOUNCING THE REOPENING of Jack Krefting's Piano Rebuilding Shop. Custom rebuilding of fine antique and modern grand pianos in the Cincinnati area. For further information, call **(606) 261-1643 or write PO Box 16066, Ludlow, KY 41016.**

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

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

PIANO RENTAL/SALES/REPAIR SERVICE in No. Calif. near Redwood Nat'l Park. Growth area. Excellent reputation. Estab. 5 yrs. Serve 3 county area. Rentals pay overhead. Sale price $29,500. Includes piano (23) and parts inventory, QRS rolls (100), key mach., ans. mach., compressor, tools, plus much more ! Owner has other interests (sailboat). **HUMBOLDT PIANO WORKS, PO Box 8090, Eureka, CA, 95501 (707) 445-3397.**

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

HARPSICHORD AND FORTEPIANO PARTS and kits, original factory materials from the finest early keyboard suppliers in the world. Also Troubleshooting and assistance to fellow RTT's on harpsichord problems. Authorized Zuckermann Agent. Lowest Factory Direct Prices - buy from the source. Catalogs, price lists free. **Yves A. Feder RTT, Harpsichord Workshops, 2 North Chestnut Hill, Killingworth, CT 06417 (203) 663-1811.**

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

PIANO KEYTOP REPAIRS. Replace heads, tails or sharps without removing keys or action. Unique clamps, no springs. One job pays cost. Front clamp $7.00; rear $8.00; brass plate front $3.00; rear plate $2.00; shipping $3.00. **Lewis W. Tarter, 14611 Devonshire Ave., Tustin, CA 92680.**

BASS-TENOR-TREBLE Bridge and apron duplication with quarter-sawn rock maple. Call or write for instructions. **GRAND WORKSHOPPE PIANO CO., INC., Church St., N.Y. Mills, NY 13417. (315) 736-2272.**

WEBER CONCERT GRAND, ca. 1865, rosewood, needs refinishing and some pinblock repair. $1,900. **Wendell D. Waters, 655 S. Carpenter Ave., Bartow, FL 33830. (813) 533-6994.**

PETERSON STROBE TUNER Model 420. Like new. Only $250. **H. Arganbright, 818 E. Main, New Albany, IN 47150. (812) 945-6212.**

Wanted

PIANO TUNER TECHNICIAN trained in W. Germany, factory and service experience, can present very best credentials, 25 years, speak English, looking for position SERVICE TUNER/TECHNICIAN with University/College in the USA. Please contact **Mr. Ranier Dotzek, c/o Lacher, Veitserlbach 38, D-8835 Pleinfeld, W-Germany.**

WANTED: Weber player piano 1909 style 40-PC. Also classical rolls 65 or 88 note. **(312) 720-9058 or (312) 748-0793.**

PIANO TECHNICIANS - Two positions open, experienced piano tuner and/or piano tuner experienced with Pianocorder installation and repairs. Company located in sunny S. Florida, benefits, paid vacation. **BOBB'S PIANOS & ORGANS, 2512 S. 30th Avenue, Hallandale, Fla. 33009. (305) 456-7800. In Fla. 1-800-531-9927.**

AGENTS WANTED — Profit opportunity for technicians competent in tuning, regulating, voicing, to market our piano remanufacturing service in exclusive, protected territories. On Steinway "L" remanufacture (incl. new soundboard, bridges, agraffes, hardened plate bearing surfaces, pinblock, hammers, keytops, bushing, completely renewed action, refinishing, etc. etc. using 1st class workmanship and materials) your cost $4,000 yet a good value to your customers at $8,000. Interested?? Respond with brief resume and estimate of units/year of our production you could market. **Phoenix Pianos; 2618 Wickliffe; Columbus, OH 43221.**

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

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

PIANO TECHNICIAN WANTED – Experienced in all phases of rebuilding, refinishing, etc. Tuning skills a plus, but not necessary. Good salary, benefits. Call or write - **Strawbridge Piano & Organ Co., 75 Park Lane, New Milford, CT 06776. (203) 354-4957.**

WANTED: Pre-1860 European and American grand pianos, fortepianos, harpsichords, clavichords and old piano tools. Any condition. Finder's fee for leads. **Edward Swenson, Box 634, Trumansburg, NY 14886. (607) 387-6650.**

Miscellaneous

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

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

GRAND PIANO STOLEN!!! REWARD!!!
For information leading to the recovery of a new Kawai 6' walnut satin grand piano, Serial No. 1261251 stolen February 1985 from Alabama-Georgia area. Call **(205) 821-9424 collect or write P. O. Box 2225, Auburn, AL 36860.**

INVENTRONICS, INC.
MIDWEST DEALER
ROBERT CONRAD—Kansas City, MO
Complete line of Inventronics Products featuring the
SANDERSON ACCU-TUNER
VISA/MasterCard (816) 444-4344
6405 Wyandotte, Kansas City, MO 64113

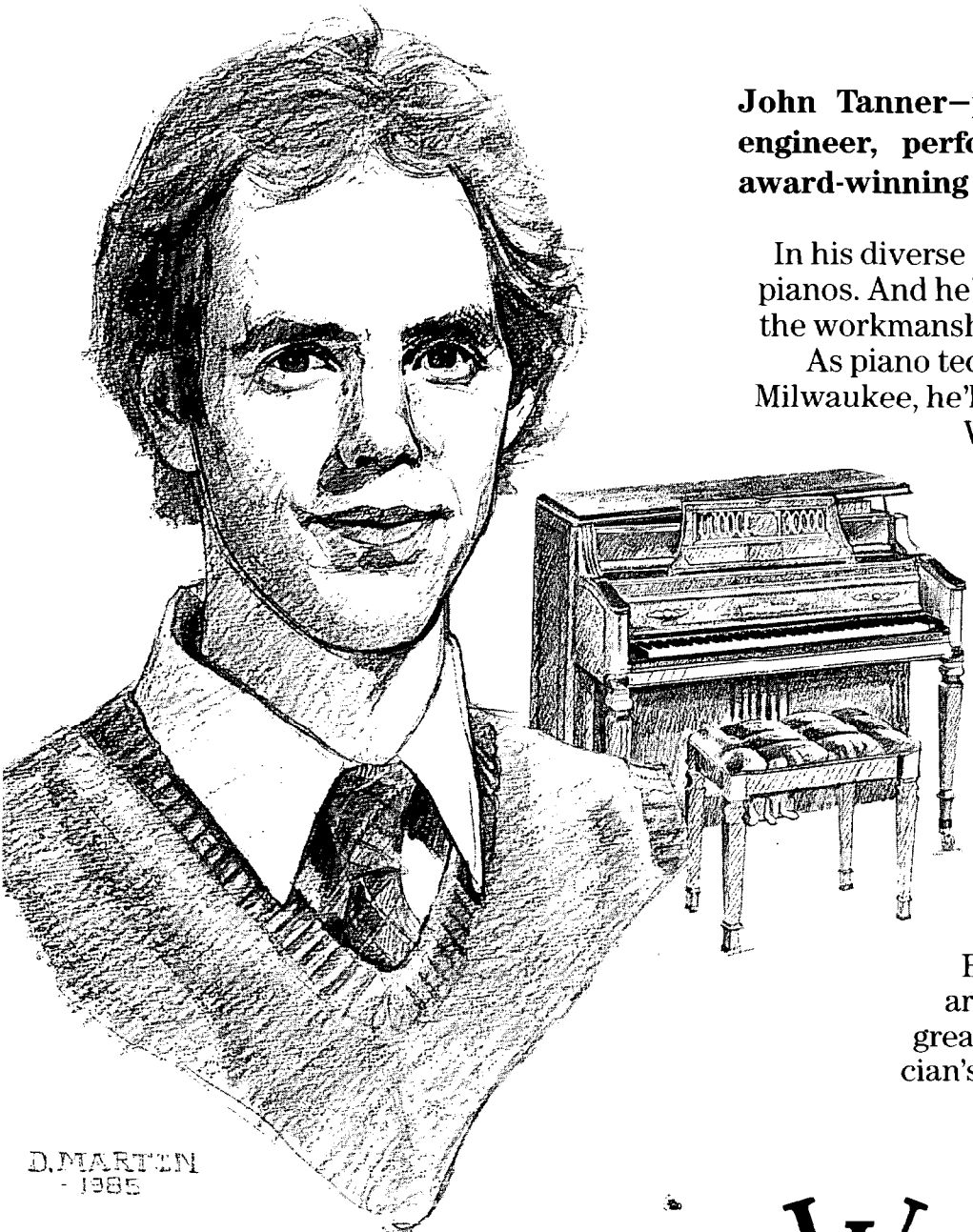
COLEMAN-DEFEBAUGH
Video Cassette
#1 — Aural and Visual Tuning
Covers pitch-raising, temperament setting, beat counting, Sanderson Accu-tuner, etc.
#2 — Grand Action Rebuilding
Hammers, shanks, wippens, key bushings, backchecks, etc.
2 hrs. VHS or Betamax... $79.50
Superior Instruction Tapes
2152 West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

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

KAWAI

The Master Builder.

"You could show a Wurlitzer piano the way it comes off the truck."



John Tanner—piano technician, recording engineer, performing musician, conductor, award-winning composer.

In his diverse career, John Tanner sees a lot of pianos. And he's "impressed with the quality of the workmanship" he finds in Wurlitzer Pianos. As piano technician for a busy dealership in Milwaukee, he'll tell you, "We check everything. We used to spend a lot of time on each piano. Is the hammer blow correct? Do the pedals squeak? All these things are OK on a Wurlitzer."

John Tanner is also involved in a lake front festival each summer where temperature and humidity changes can provide some real challenges for a piano technician. "Before they put Wurlitzer pianos out there, we had real problems."

By making sure Wurlitzer Pianos arrive in great shape...and stay in great shape, we make a piano technician's life a little easier.

WURLITZER®

DeKalb, Illinois 60115