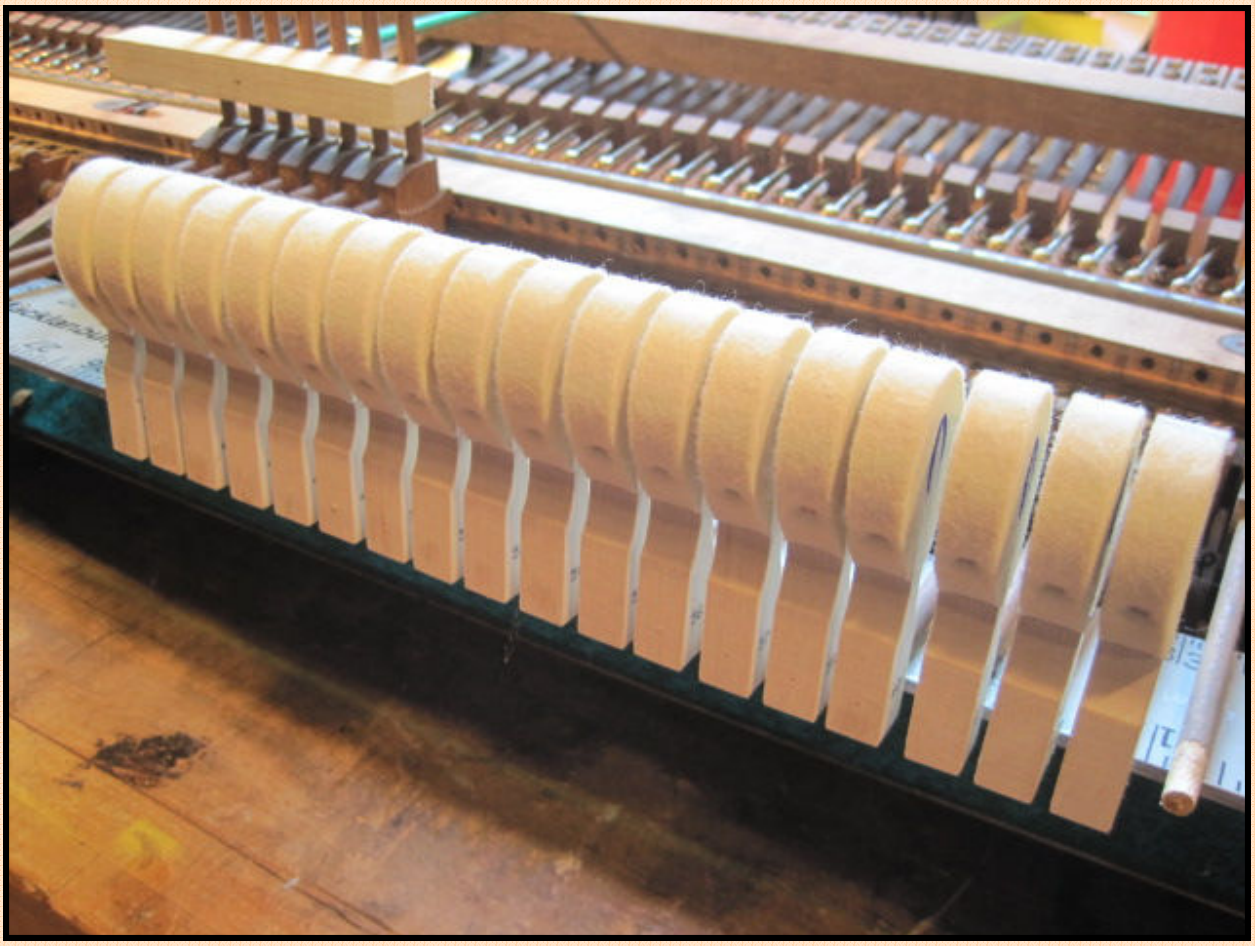
Schaff Piano Supply Company Presents:

Upright Hammer Replacement



By Chuck Behm

Action Work

Upright Hammer Replacement

-Rationale-

Piano hammers are amazingly resilient, considering the fact that for the hammers to do their job, felt is pitted against steel for decade after decade. When a piano is new, the hammers bring out the best of the piano's potential. Over the years, however, the integrity of the felt diminishes, and the tone of the piano suffers. The useful life of a set of hammers may at times be prolonged by a professional job of shaping and voicing, but eventually wear and tear will take its toll, and the only solution is replacement.

Piano hammers are a specialized product, and need to be duplicated to fit the exact piano in question. Because of the amount of labor (and therefore expense) involved in the duplication and installation process, it is a procedure that needs to be proposed thoughtfully to the owner. If the piano is indeed worth the effort, it can make a vast improvement in the instrument. One thing to point out is that new hammers are very long-lived, and that under normal circumstances, a new set of hammers will most likely outlast the owner of the piano!

These instructions represent a basic starting point in learning to install hammers in an upright piano. As with so many repairs, there are plenty of finer points to be learned as one progresses in his or her development as a technician.

Where to Begin?

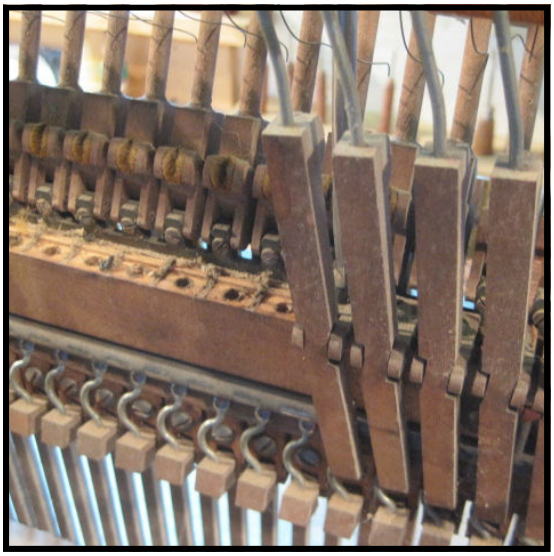
When an upright piano action has deteriorated to the point where nothing less than a complete overhaul will do, the list of things to do can seem overwhelming. Fortunately, the job doesn't have to be done all at once, but can be tackled one step at a time. For an action in the condition of the one used for the photos for this article (Tryber & Sweetland, circa 1890), a good starting point would be to have a duplicate set of hammers produced by **Schaff Piano Supply Company** for replacing the old. In the case of the action shown, that repair would be followed with a new set of bass and treble dampers, new bridle straps, new hammer rail felt, new center pin bushings, etc., etc., etc. In addition to action work, the piano in question was to be refinished, restrung and repinned, and outfitted with new keytops and key bushings.

Piano restoration is all about seeing the possibilities in an instrument that can be brought back to life again. Nothing else in the piano repair business is as challenging or rewarding as rejuvenating beautiful instruments from the past. For those who haven't dabbled in restoration as of yet, this is as good of a place as any to begin. Find an old upright, a diamond in the rough, and see what it can become with a little elbow grease and determination.

Before packaging up the set of hammers to send to Schaff, clearly write your name, along with the hammer number, on the molding of each hammer. Use pen, not pencil, to make sure that the writing shows clearly. Tape the hammers together, and include with a note listing your business name and customer number. Box up and send to:

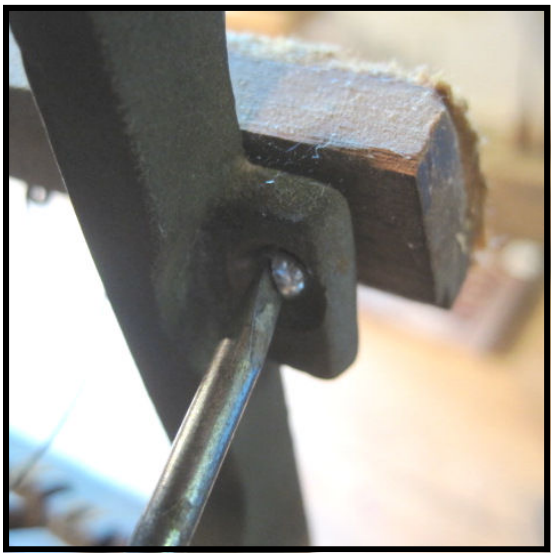
Schaff Piano Supply Company
attention: Hammer Duplication
451 Oakwood Road
Lake Zurich, IL 60047

Note: To facilitate the job of hammer replacement, parts that will be in the way of the process should be removed. The damper assembly and damper spring rail are obviously in the way.



Remove the dampers / damper levers from the action.

Number the damper heads or levers, and store in a safe location. If a number of actions are worked on at one time, mark the first damper of the set with the name of the piano the dampers go to in order to avoid confusion.



Remove the damper spring rail. Insert the screws into the rail so that they aren't lost when it comes time to return the rail to the action.

<u>Pause</u>:

While waiting for your new set of hammers to return, use the time to begin work on other areas needing attention. In respect to the Tryber & Sweetland upright featured here, the case was in dire need of repair and refinishing. Plus, the piano needed restringing, repinning, new keytops, etc., etc. **With a piano restoration, there's never a lack of projects to tackle to keep one busy and having fun!**

Fast Forward:

Note : Instructions for gluing are based on the premise that hot hide glue is to be used.

Once your new set of hammers has arrived, begin a new glue batch while you take care of other preliminaries. Pour clean water into your glue pot (Cat. No. G-1155). Use the glue pot as a double boiler to avoid creating a mess and save time in cleaning up.

Now, pour a small amount of water in a jar small enough that it will easily fit inside the glue pot.

Pour an appropriate amount of glue crystals (dry cabinet glue: Cat. No. 399 1/2) into the water, place jar in the glue pot, and stir the crystals.

Note: As long as the glue crystals are still visible (photo), the glue is not ready to use.

As the glue crystals begin to melt, stir the glue and check consistency. A correctly mixed batch of hot glue will have a consistency similar to warmed honey. If the mix is too watery, add in more crystals. Don't overdo this, or you will be adding in more water.

To check the progress of your glue, lift your brush from the glue pot, and check to see that a long strand of glue runs off the brush.

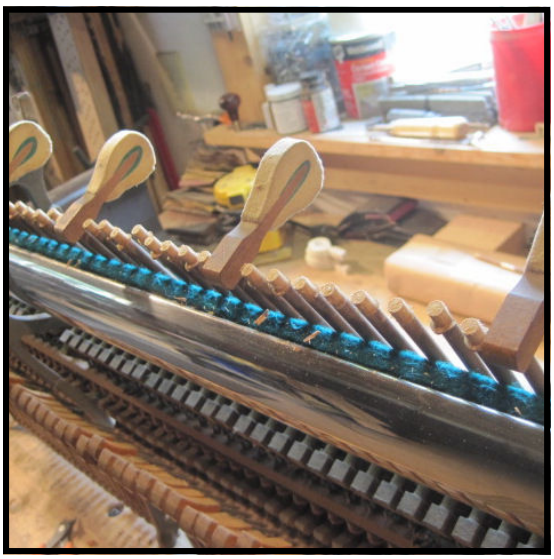
Caution: Your glue will stay fresh longer if you keep it covered. If your glue pot has a temperature control, turn it onto the standby setting.

Remove old unneeded hammers quickly by splitting the moldings with a pair of flush cutters (Cat. No. 215). First split the molding with an up and down cut, as shown.

Caution: Don't remove the remaining end hammer to each section, as this will serve as your guide hammer in aligning the new hammers for each section. Also, a middle hammer or two for each set might be left temporarily to check hammer spacing against the strings.

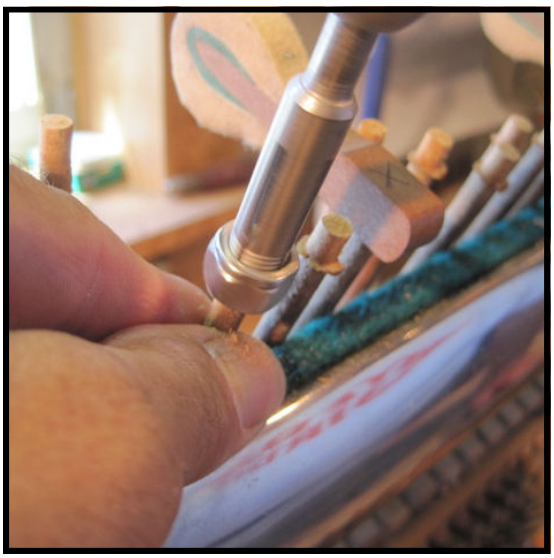
For stubborn hammers, complete the removal by making a side-to-side cut to further split up the molding.

Twist hammer heads gently from side to side, until they easily come loose without damaging the hammer shank.



Note: Guide hammers will remain for the time being. The outside guide hammers for each set will be used in lining up the new set of hammers. Hammers left in the center of each section will help ascertain that the shanks are properly lined up with the strings.

The old glue collars remain at the top of each shank. These need to be cleaned off.



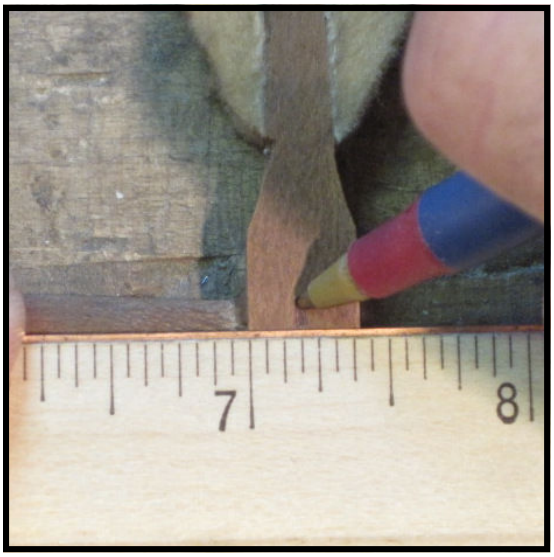
Use a hammer shank reducer (Cat. No.75) in tandem with a combination handle (Cat. No. 26) to gently clean the old glue off the shanks. Don't remove any wood from the shanks as of yet.

The old hammer shanks with initial cleaning off of the old glue accomplished. Further work in reducing the size of the shank may be undertaken when the new hammers are ready to install.

Guide hammers with remaining felt need a smooth surface. File by hand, or use a Moto-Tool (Cat. No. D-395) for quick results.

Note: *The top guide hammer will most likely be worn through to the wooden molding. Don't worry about filing smooth, as the wood marks the strike point..*

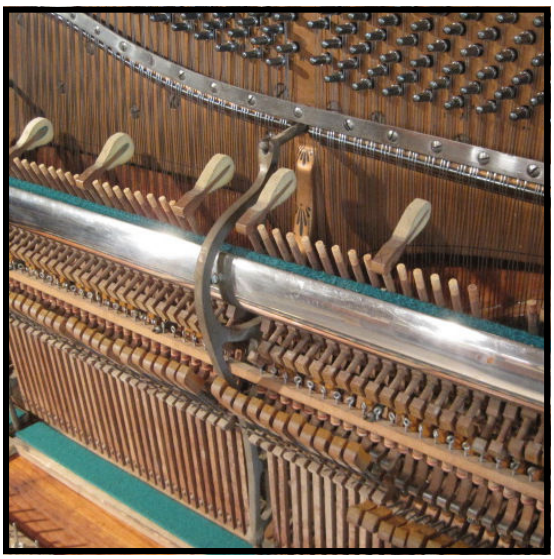
A smooth rounded surface is all that's needed. The shape of the shoulders does not matter at this point.



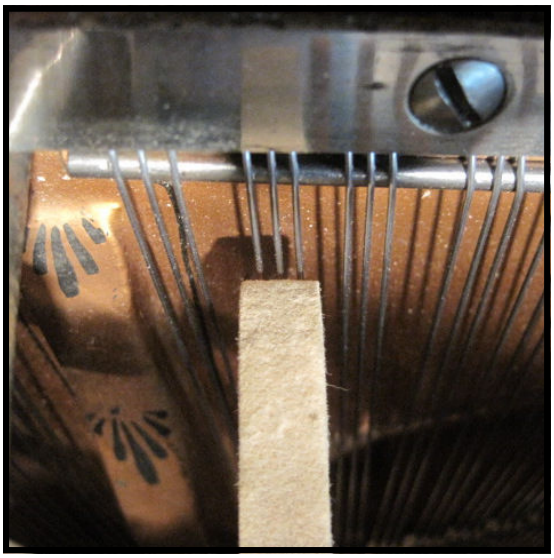
Remove the guide hammers one at a time to mark the center line (which will identify the strike point), in order to line up the new hammers. Use a ruler (a 6" stainless steel rule [Cat. No. 3197]would be ideal for this) to mark the exact center of the molding on the tail end.

Extend the line from the reference mark through the arrow point of the wooden molding and on to the leading surface of the hammer.

Indicate the strike point by drawing a line on the outer surface of the hammer head perpendicular to the center line.



If hammer shank alignment is in question, check it out by installing the action in the action long enough to line up the guide hammers with their respective sets of strings.

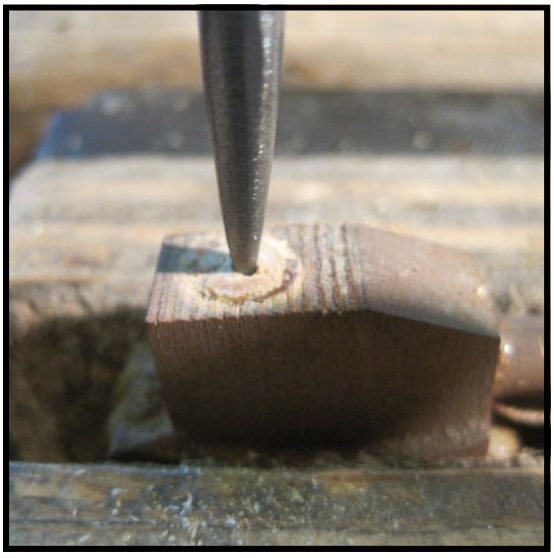


Check alignment by manually pushing up the guide hammers to the strings.

If any of the original hammer shanks are broken or missing, this is a good time to repair or replace. With long splits, a splice is usually possible. For a blunt break such as shown in the photo, replacement is necessary.

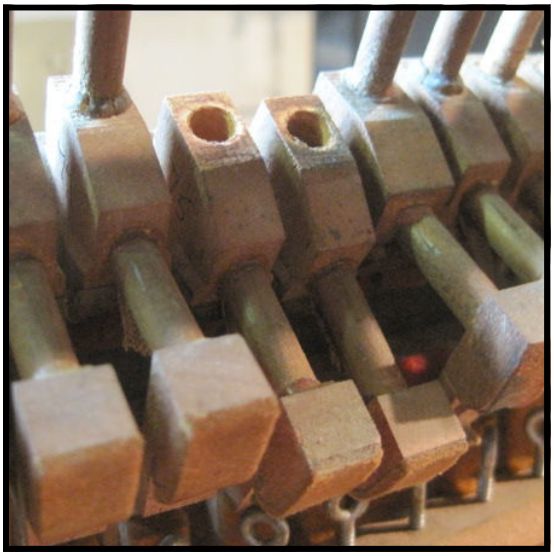
For a broken stump of a shank too short to steam and remove, snip flush with the top of the hammer shank.

One technique for removal is to drill the old shank out. To do this, first file off the rough top of the remaining shank with a flat bastard course cut file (Cat. No. 252).



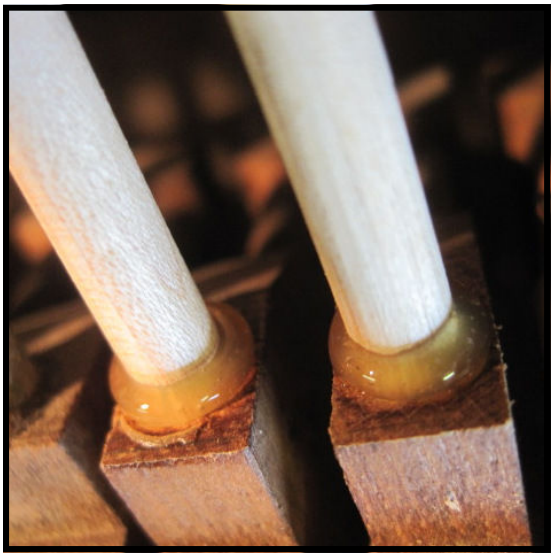
To prevent the drill bit from wandering, use an awl (Cat. No. MF-365) to mark a center point.

Secure the hammer butt in a drill press vise and drill the old shank out with a 7/32" drill bit.



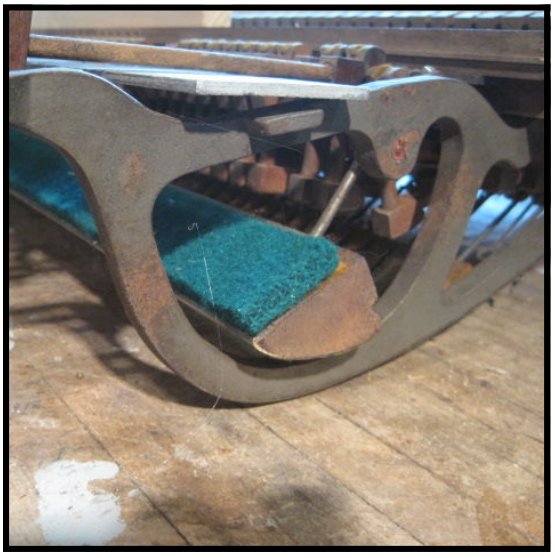
Replace the hammer butts due for new upright hammer shanks (Cat. No. 504) back into the action before installing the new shanks.

To apply glue to a new shank, the easiest method is to hold the loaded glue brush (Cat. No. 438) stationary, while rolling the end of the shank over it.

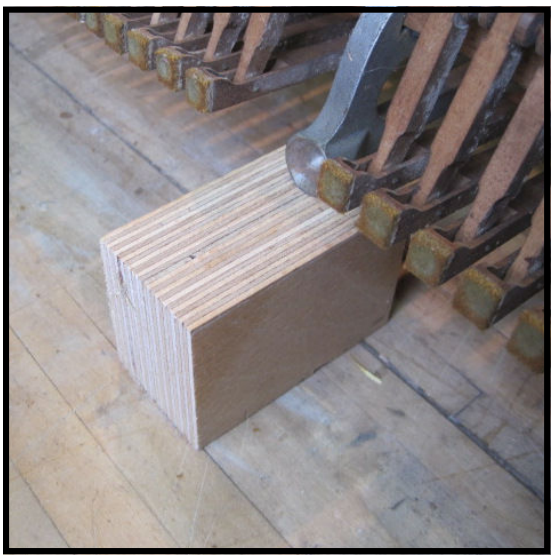


As the shanks are inserted into the hammer butts, turn the shanks so that a glue collar is formed.

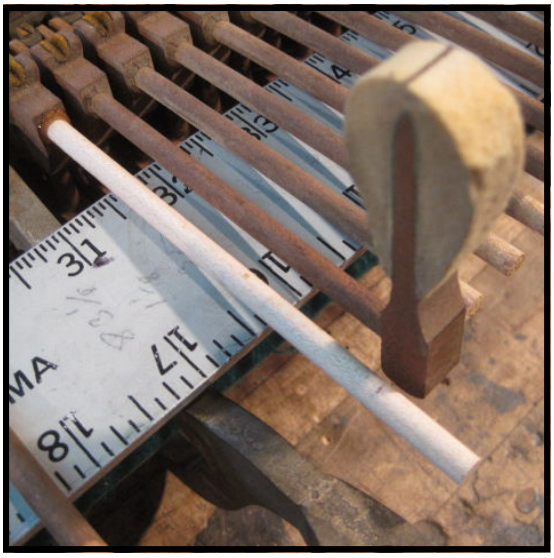
At this point, it is time to arrange your bench for the installation of the new hammers. One method which will expedite the process is to lay the action down on your bench with the hammers facing up.



The action brackets should make solid contact with the surface of the bench.

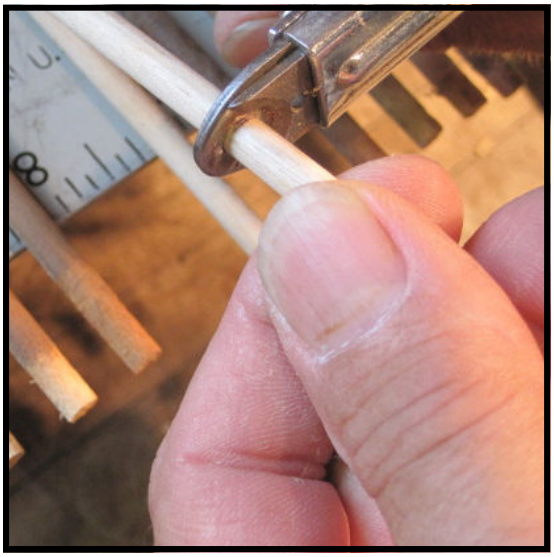


At the back of your bench, you may wish to elevate the back of the action slightly by placing wood blocks under two or more of the action brackets.



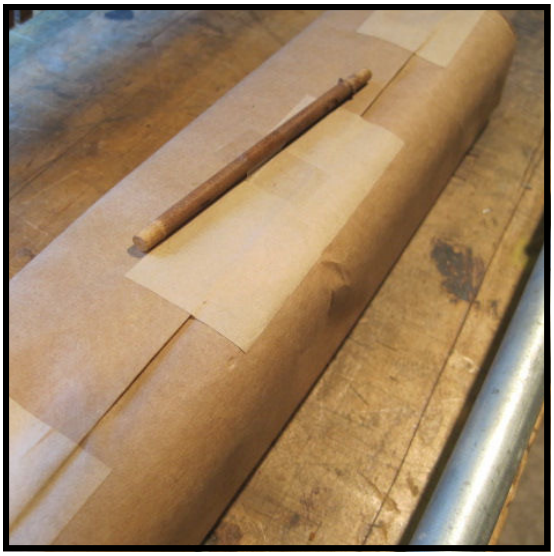
To prevent glue from getting on the hammer rail felt, use a straight edge to prop up the hammer shanks by running it in between the action brackets and shanks, as shown.

Replacement shanks may now be trimmed by using a ruler to mark the cut line using the original shanks on either side for the correct length.



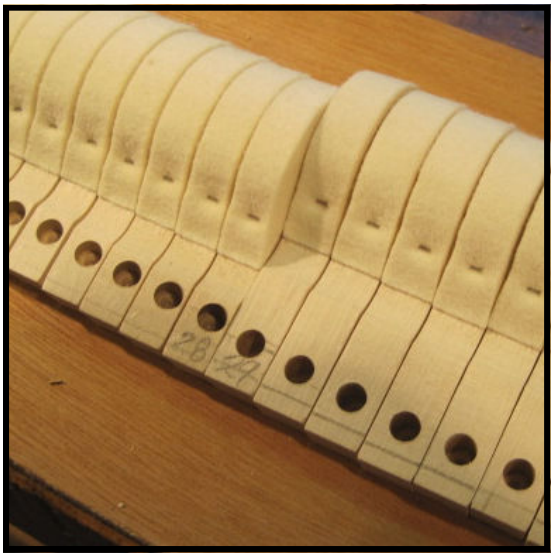
Snip the ends of the new shanks off to correct length using a pair of hammer shank cutters (Cat. No. 237 [shown], or Cat. No. 3208).

With any broken or missing shanks re-paired or replaced, hammer installation will go more smoothly than if broken shanks need to be repaired during the process.

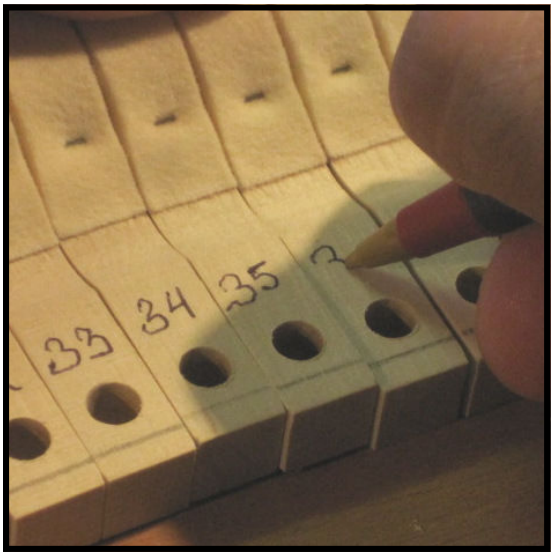


At this time, the new set of shanks from Schaff should be opened.

Caution: If numerous sets of hammers are replaced, mark the maker and model of the piano on the outside of the package of hammer heads to avoid a mix-up.



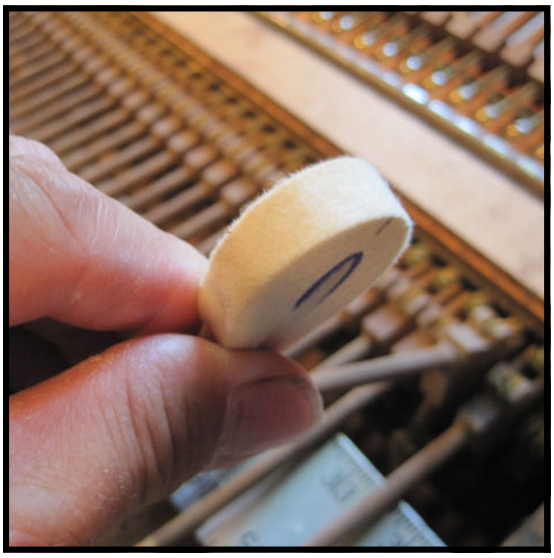
Lay out the new set of hammers on a flat surface. The penciled in numbers put on by Schaff correspond to the end hammers from each set sent in for duplication. Hammer number 28 in the photo corresponds to the end hammer of the bass section, and hammer number 29 corresponds to the first hammer of the middle section of hammers.



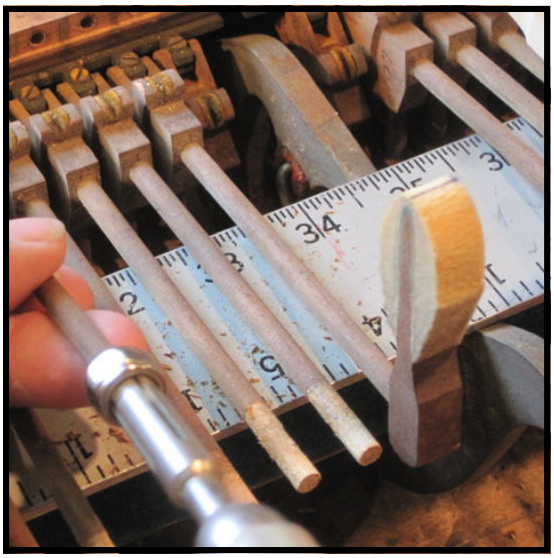
To avoid confusion during installation, take the time now to number the underside of each hammer with the correct number.

Note: The stamped number from the hammer manufacturer will most likely not correspond with the actual placement number. This is because certain hammers are removed from the new set during the drilling process at carefully selected places to better match the original set of hammers.

Before beginning installation, check the fit of the hammers to the shanks. Place a hammer on each shank, and try swiveling back and forth.



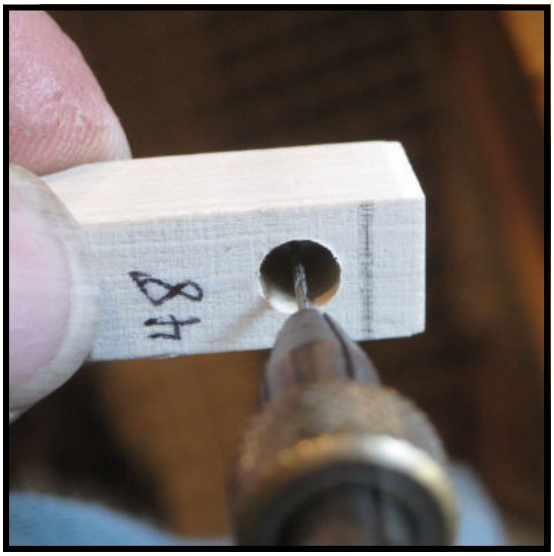
Note: If the hammer makes a ratcheting noise as it is pivoted, it is way too tight. If it squeaks or squeals as it is turned, it is somewhat tight. It should turn freely, but not be floppy.



Reduce the size of shanks where the fit is too tight, using your hammer shank reducer.

Caution: Go easy. Reducing shanks is somewhat like shortening pants—you can always take off more material, but it's difficult to put it back on.

If the set of hammers do not have pin-prick size vent hole to prevent air bubbles inside the shank hole, you may wish to consider adding them. A very fine drill bit is needed which may be purchased at a hobby shop. This bit, measuring .03", is too fine for a standard drill chuck, but may be chucked up in a pin vise (Cat. No. 152) which in turn is put into the chuck of a standard drill.



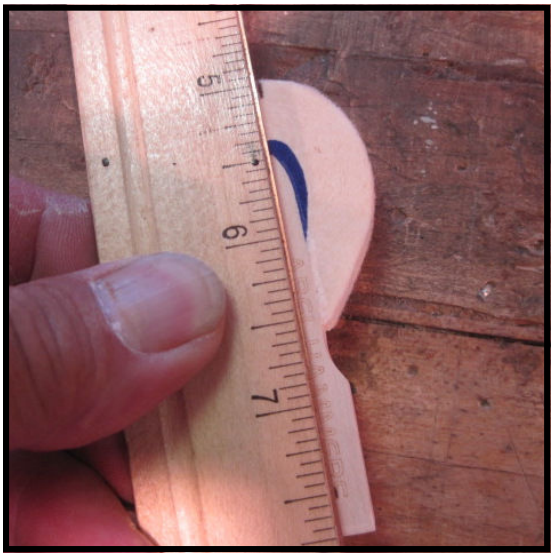
If you look inside the hammer shank hole, you'll see an indentation from the brad point of the drill. For the tenor and treble hammers, center your drill bit on that indentation and the vent hole will be in the center of the hammer shank hole.

Note: The vents for bass hammers are done differently. Directions on page 30.

Caution: Keep your finger clear of the position of the vent hole as you are drilling. ***Trust me on this.***

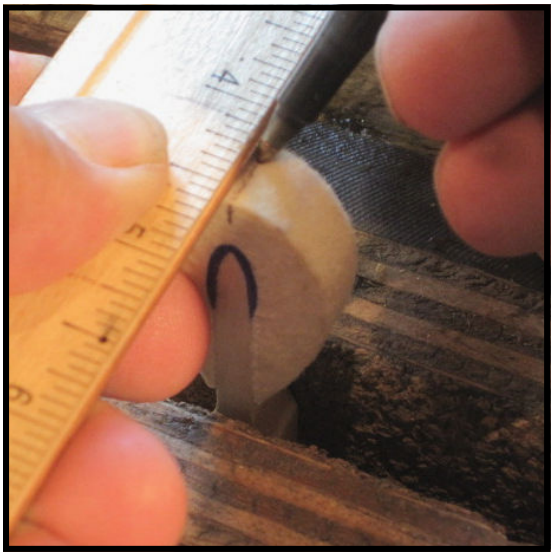
When the drill bit has gone through the top of the hammer molding, hold it up to the light to make sure that the hole is clear.

Note: Check the tightness of the drill bit in the pin vise frequently, as it will tend to loosen. When it does, the bit will slip in the chuck,, and most likely not go through the molding.



Prepare your first hammers for installation to go on either the inside or the outside of the guide hammers. Use the same method as before to determine the strike point line.

Note: Instructions are given in the order that the photos were taken—tenor section first, treble section second and bass section last.



Note: If you don't wish to draw a line along the entire side of your new hammers, a simple short line at the end of the hammer in line with the center of the molding will do as well. Lightly draw a perpendicular line across the face of the hammer to indicate the strike point line.

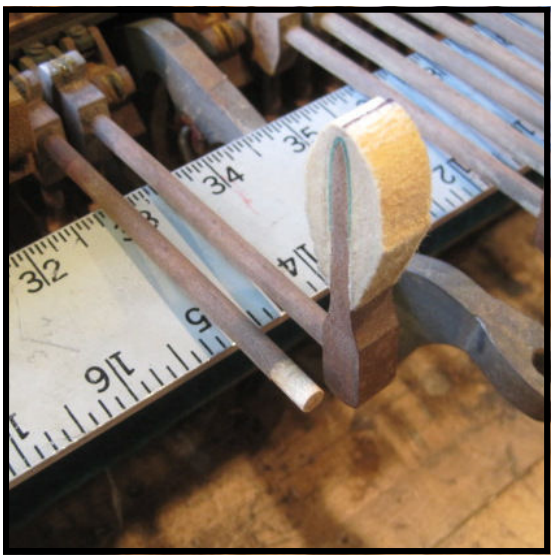
To hold hammers out of the way (since the hammer shanks are in a horizontal position), a simple tool constructed from a short length of scrap wood, and small eye-bolt, and a miniature bungee cord will do the trick.

The short length of wood keeps hammer shanks adjacent to the hammer / hammer shank being worked on out of the way. Gluing the hammer to the hammer shank is simpler with a little elbow room, so to speak.

From the opposite side of the action, this is what the devise looks like. The bungee cord attaches to the eye bolt which is screwed into the piece of wood on the front side of the shanks.

At the back of the action, attach the opposite end of the bungee cord to the bottom of a sticker.

Note - To move the hammer shank clamp down the row, you'll need to disconnect the bungee cord from the eyebolt to move the block one hammer shank over.

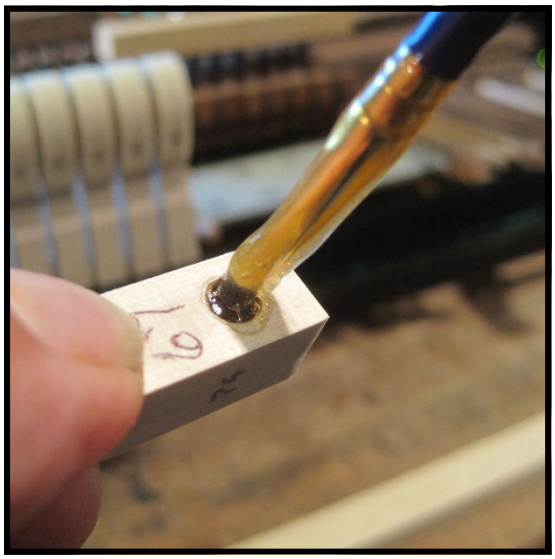


With all the preparations made, and the adjacent hammer shanks pulled back out of the way, it's time to install the first hammer.

Dry fit the hammer first, and make sure there is a adequate depth to the hole so that the strike line of the new hammer will line up with the strike line of the guide hammer.

If there is not enough depth for the hammer to fit far enough onto the shank, slice a sliver off the end of the shank using your hammer shank cutters rather than drill the hole deeper. Again, go easy. You can always slice a bit more off.

Caution: Before using your hot glue, double check to make sure the consistency is still good. If it has been on stand-by for some time, you may need to mix in a bit more water. Stir, and allow time to heat.

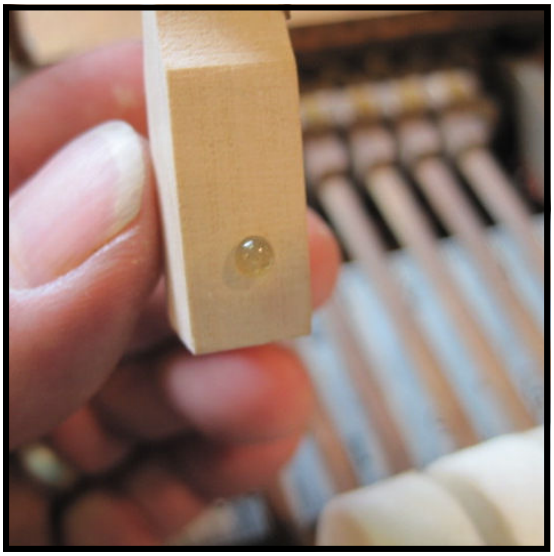


Using a small artist type brush dipped into the hot glue pot, swirl the brush in the shank hole. Don't overdo it. Too much glue in the hole and you'll have a mess.

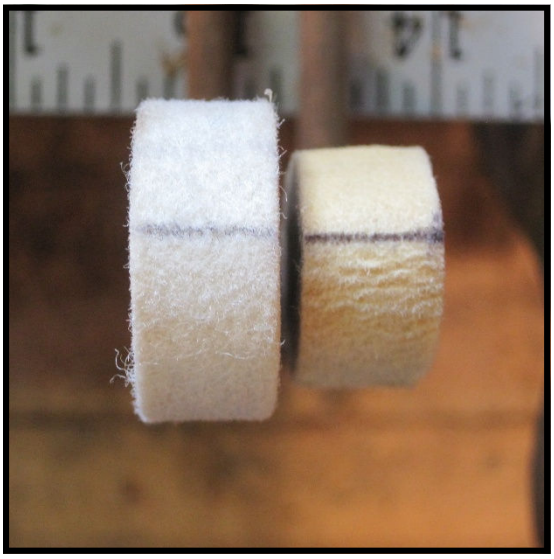
Use a glue brush to dab glue onto the end of the hammer shank. Enough so that you'll get a nice collar, but not so much that it's running all over.

Lift the hammer shank, so that you're clear of the guide hammer and put the hammer head on the shank. To form a nice collar, spin the hammer head completely around once or twice.

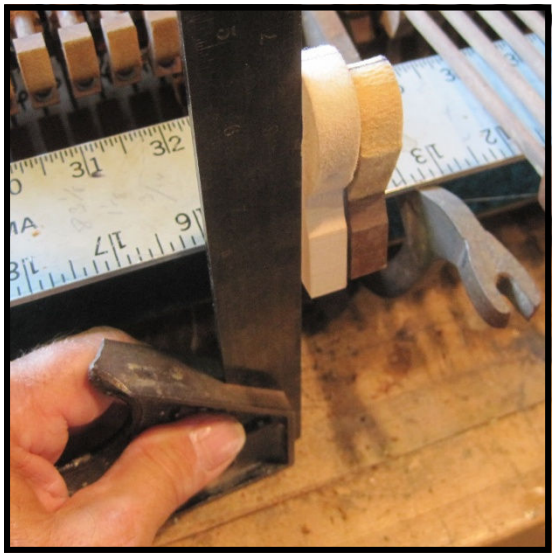
Look over the top of the hammer heads to check the collar. (This is one advantage of having the action laying on the bench instead of standing upright.) The collar should be neither too big or too small.



Note: You will most likely have a bead of glue forming at the vent hole. This is a sign that there is adequate glue to surround the shank all the way in the hole. Wipe the bead off with a rag or paper towel.

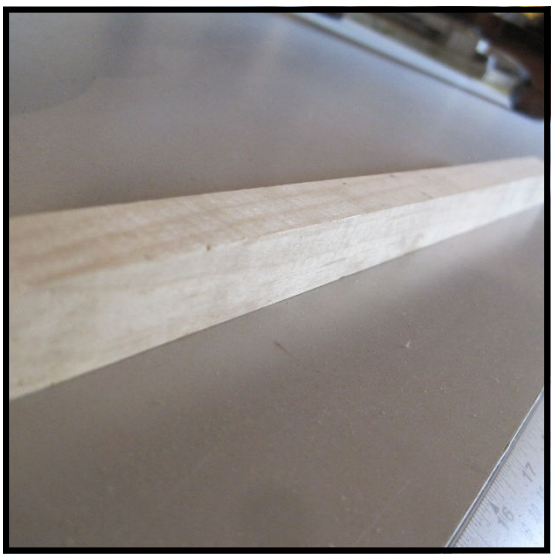


Looking straight down at the guide hammer and the first new hammer, the strike lines should line up perfectly. If they don't quite line up make a slight adjustment by pushing or pulling on the tail ever so slightly to adjust the depth of the shank in the hole.

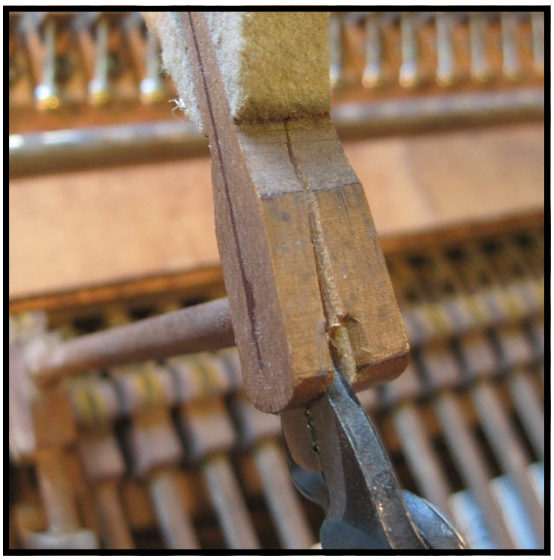


Use a combination square to check to see that the new hammer is perfectly perpendicular to the surface of the bench.

Repeat the process with the hammer on the opposite end of the set being worked on, then prepare a straight edge of the appropriate length to run from one new hammer to the other.

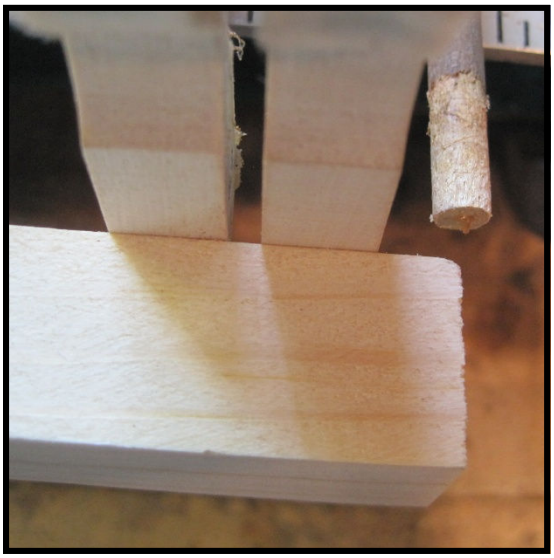


Caution: If you use a home made straight-edge as shown, make sure it is straight on all sides. Lay it on a perfectly flat surface, such as the bed of a shop tool, and make sure no light is showing underneath at any point.



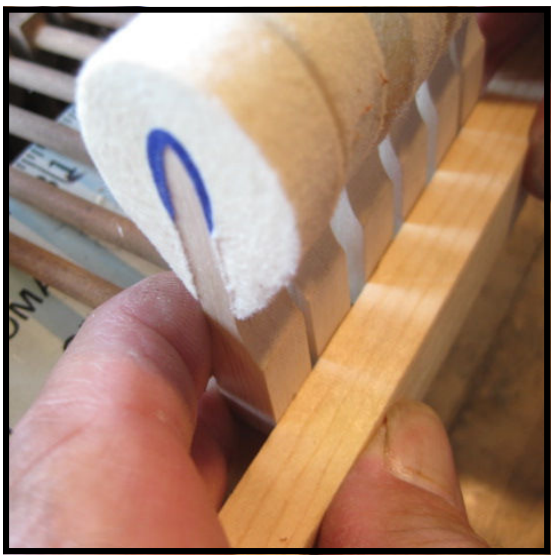
With a new hammer in place on either side of a set, the guide hammers for that set may now be removed. Be sure to clean and reduce the ends of the shanks.

Caution: Take five to give the glue on the new hammers time to set before cutting the old guide hammers off.



Starting from one direction or the other, repeat the process for the next hammer in. This time, instead of lining up strike points, use your strait edge to line up the new hammer with the two outside hammers, starting with the top (or side, in this orientation) of the molding.

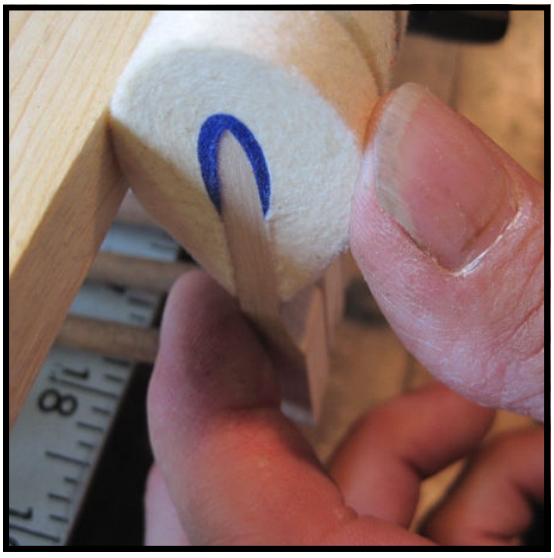
Caution: If the new hammer is too far out, push in with the straight edge, but stay below the vent hole to avoid making a mess. Glue should squeeze out of the vent if you're using enough glue.



If the hammer is too far in, grasp the molding as shown in the photo (see here a bit further down the line), and gently pull the hammer out to the straight edge. Keep your thumb on the straight edge and pull with your second and third finger on either side of the shank.

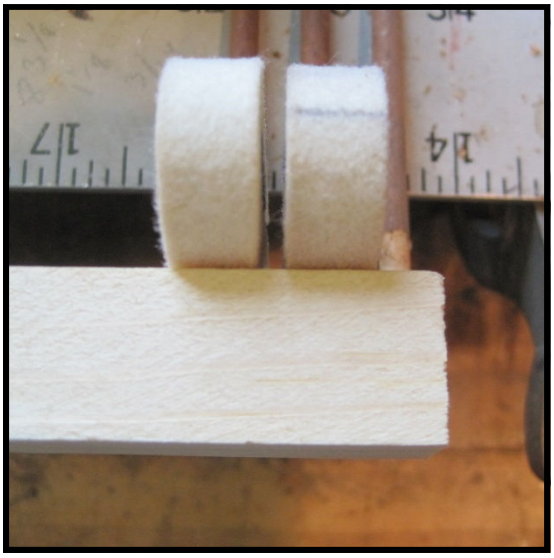
Caution: Avoid placing your fingers so close to the shank that they're in the glue collar..

Next, check the profile of the felt at the outermost point on the opposite side of the hammers.



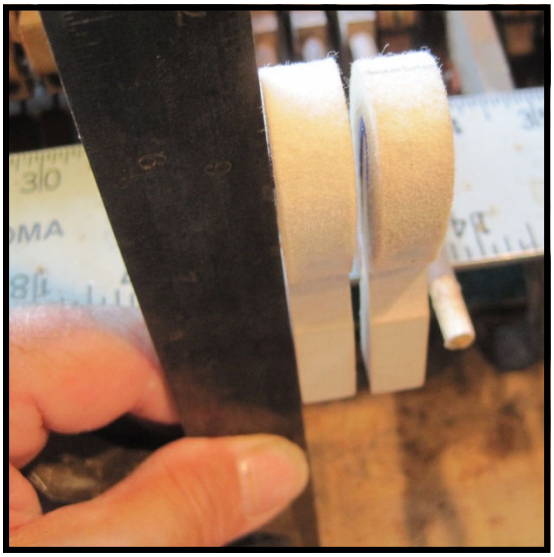
If there is a bit of misalignment, gently tip the head one way or the other as shown to bring the hammer head in line.

Caution: <u>At this point, avoid pulling the hammer in or out on the shank</u>.

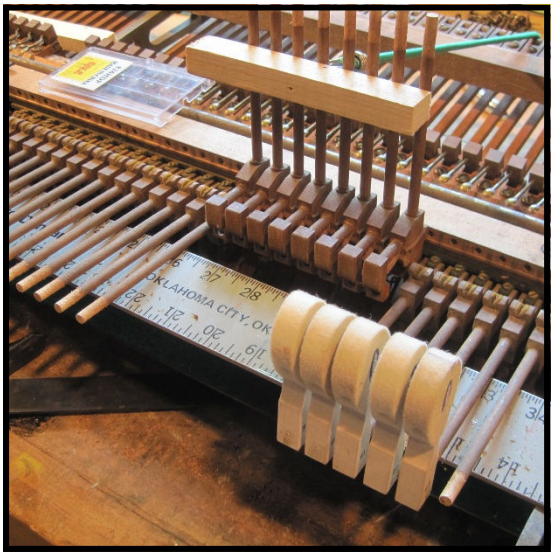


Keeping your straight edge moving, quickly check the opposite side of the felt.

Caution: If you've tipped the hammer head slightly to achieve alignment of the felt, quickly double check the alignment of the wooden molding, to make sure the hammer hasn't been pulled out or pushed in on the shank.

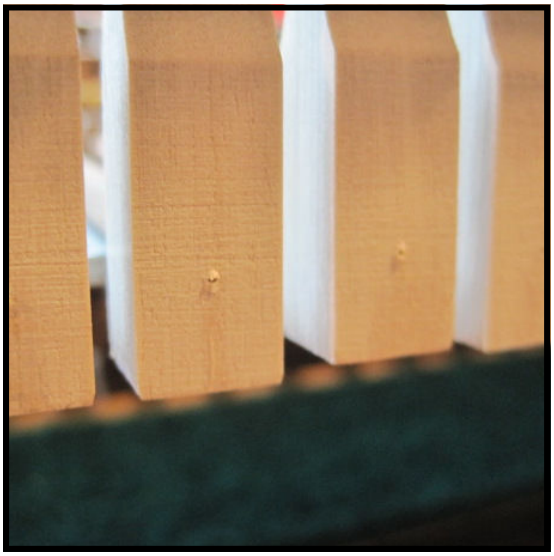


Quickly check the to see that the hammer is perpendicular. If hammer is tilted, rotate until it lines up with the square. Again, if an adjustment is made here, go back and double check the other adjustments. Repeat until everything lines up.



Note: As you move down the line, keep moving your hammer shank clamp one step ahead of where you're at. Keeping the road clear on one side makes it easier to spin each hammer head to form the collar.

As you work, pay attention to the details. Make sure that your collars are evenly formed.

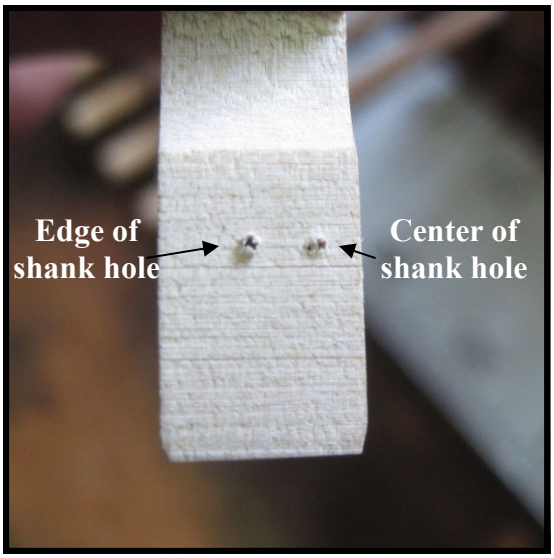


Clean vent holes as you go. When the glue is firmly set, lightly go over the tops of the molding with 220 grit sandpaper if they need further cleaning.

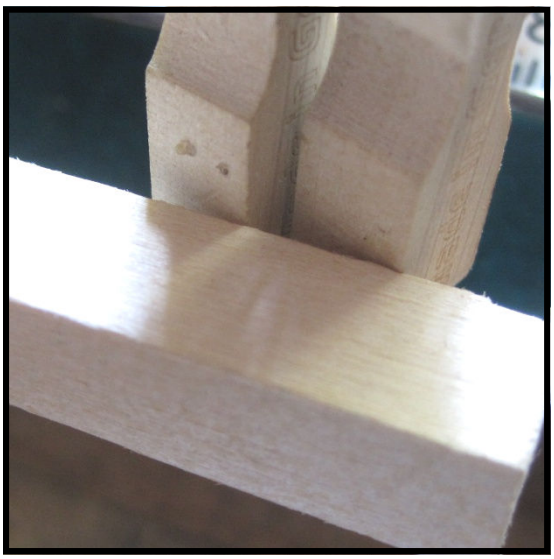
With the tenor and treble sections of the action completed, installation of bass hammers will finish the job. To align reference hammers, adjust position using the edge of the strike lines.

Remove the original guide hammers, and use hammer shank clamp to clear your path for gluing.

For bass hammers with a slanted bore hole locating the vent holes in the center of the molding requires a different start point for your drill if you wish the hole to be centered topside. Instead of lining up your bit with the center of the hammer shank hole, locate it along the edge of the hole, as shown.

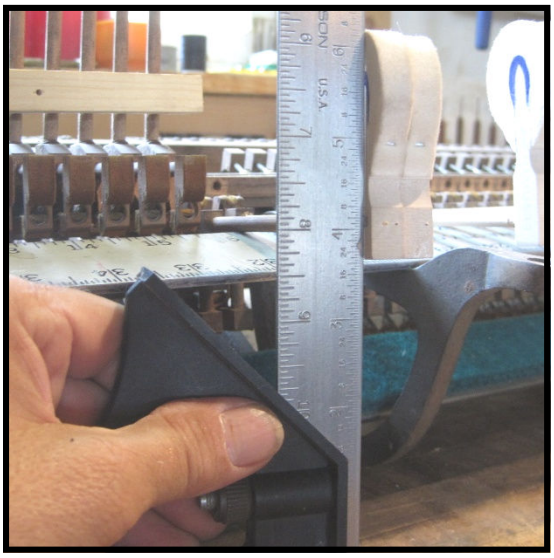


Note: Comparison between vent hole drilled using the center of the shank hole as the starting point, vs. drilling the vent off to the edge of the shank hole.



For the bass hammers, follow the same gluing procedures as with the tenor and treble. Start alignment by using straightedge to line up the edge of the molding of the new hammer with that of the reference hammers on either end.

Hint: If you turn your straightedge slightly so that the corner of the straightedge is touching the edge of the hammer molding it's easier to see any gaps in between the hammer and straightedge.



Next, check to see that the hammer is perpendicular by holding your combination square at a right angle to the center of the molding. Check this before you check the hammer felt for alignment.

Use the corner of your straightedge to check the alignment of the hammer felt of the hammer being glued to the reference hammers on either end. If it's slightly off, tip the hammerhead a bit to bring the hammer into alignment.

Caution: It's important to go through these steps a second time to make sure that everything is correct before the glue begins to set.

Tools and Supplies

For your convenience, all the tools and supplies necessary to complete a hammer replacement job are listed with corresponding catalogue number.

Tools:

Glue pot.....Cat. No. G-1155
Flush cutters.....Cat. No. 215
Hammer shank reducer .....Cat. No.75
Combination handle.....Cat. No. 26
Moto-Tool.....Cat. No. D-395
6" stainless steel rule.....Cat. No. 3197
Flat bastard course cut file.....Cat. No. 252
Awl.....Cat. No. MF-365
Glue brushes (12).....Cat. No. 438
Hammer shank cutters.....Cat. No. 237 or Cat. No. 3208
Pin vise.....Cat. No. 152

Supplies:

Dry cabinet glue.....Cat. No. 399 1/2
Upright hammer shanks.....Cat. No. 504

To order, call Schaff Piano Supply at 1-800-747-4266
or visit on the web at **www.schaffpiano.com**

Important note: Ordering information is given for the use of Schaff account holders only.

Afterword: Moving Towards the Realm of a Full-Service Shop

The benefits of maintaining a shop (which might be as small as a dedicated bench in the basement, or as large as an entire barn building—I've seen both ends of the spectrum) in conjunction with a piano tuning / repair business are many, especially when one begins to move into repairs which belong in the realm of the full-service shop. Offering hammer replacement services is a good example of the type of repair which will set your shop apart from those who don't offer a full range of repairs options to their piano customers.

First of all, for the technician who would like more business coming in to help the bottom line, nothing is better for one's reputation as being a serviceman / woman who can "do it all." When word begins to get around that no matter what the problem with a piano, you're the guy to call, you will see your calendar begin to fill up with appointments and projects. Offering complete action repair service (being able to take the action shown on page 3 of this article, and transform it into the action in the above photo, for example) is one step to becoming a full-service shop that customers will turn to in confidence that the job will not only be done, but be done right.

When one offers a full range of repair services, each piano looked over for the first time offers enhanced opportunities. Instead of examining a down-and-out instrument that has been neglected for years and declaring it to be "beyond hope," the skilled technician can see in his / her eyes what's possible, and can share that vision with the owner. Obviously, not every piano should be restored to the fullest extent possible, but many instruments (especially vintage, pre-WW II instruments) have the potential to be given an amazing second life. With the facilities and the skills to do the jobs that need to be done, a piano that has limped along with mediocre service for years can be turned into a jewel of an instrument. When this happens, not only does the piano shine again—so does your reputation!

Having a busy shop not only is helpful to the technician's bottom line, but it is a godsend for one's mental being. As one who's done the 30 - 40 tunings a week grind for weeks on end, I know that scheduling time in the shop on a regular basis is the tonic for avoiding burn-out. A day or two in the shop does wonders for one's frame of mind. Having project pianos torn apart and awaiting your touch gives purpose to your days, and keeps the juices flowing. At any one time, we average three pianos in various stages of restoration, so when I go out to the shop in the morning, I know that I can take my pick of projects to tackle. When days which are filled with tuning appointments roll around, it's a good feeling to gas up the car and get out on the road again. Variety, as they say, is truly the spice of life.

Having a fully equipped shop is also a great way to retire from a full-time piano tuning business, when one gets to the point where hitting the road has little appeal. One can make the transition gradually, if needs be, referring tuning customers a few at a time to trusted area tuners, while maintaining those contacts

which one has serviced the longest (or enjoys the most) until the time comes to part with those as well. Even without a regular tuning schedule, the skilled technician / shop owner can bring in shop work by putting out the word to local tuners that you're available for the doing the repair work they may not have time for. Retiring from the tuning end of the business does not necessitate retiring from the piano repair business altogether. Having a shop to go out to work in beats sitting around watching the tube!

Where to begin? Start by keeping an eye out for opportunities to offer your services. When a piano comes along that seems to hold potential for improvement, think big, and don't be put off by a real challenge (see photo). Give a full-blown estimate of all the repairs which you are capable of providing, and be willing to explain what exactly those repairs will entail. I find it best to give an itemized list of repairs, along with prices, so that the customer is empowered to decide which exact repairs to leave in and which repairs to leave out. Oftentimes, when everything is explained, and the customer has had a chance to think things over, owners who want to see their piano brought back to life will frequently request to do the entire package. Sometimes the only question the owner has is, "When can you work it in?" Those words are music to my ears!

Tryber & Sweetland's case detail.

For a vintage upright piano (such as the one featured in this article) I always take pains to explain that the commercial value of the instrument will most likely be less than the repair bill (sometimes far less), but that in terms of playability many old uprights are wonderful instruments, once they have been returned to more of what they were like when they were new. The other factor to be considered, of course, is sentimental value. If the piano belonged to the mother or grandmother of the current owner, commercial value is typically a moot point. It's never going to be for sale, anyway.

If you're a good salesman, and do good work, you will soon find yourself with a waiting list of customers eager for your services. Nothing beats knowing that you have the next 5 or 6 jobs booked, and ready to be delivered to your shop!

Chuck Behm

Tryber & Sweetland's case—befoe

Tryber & Sweetland's case—after

Notes on Procedures