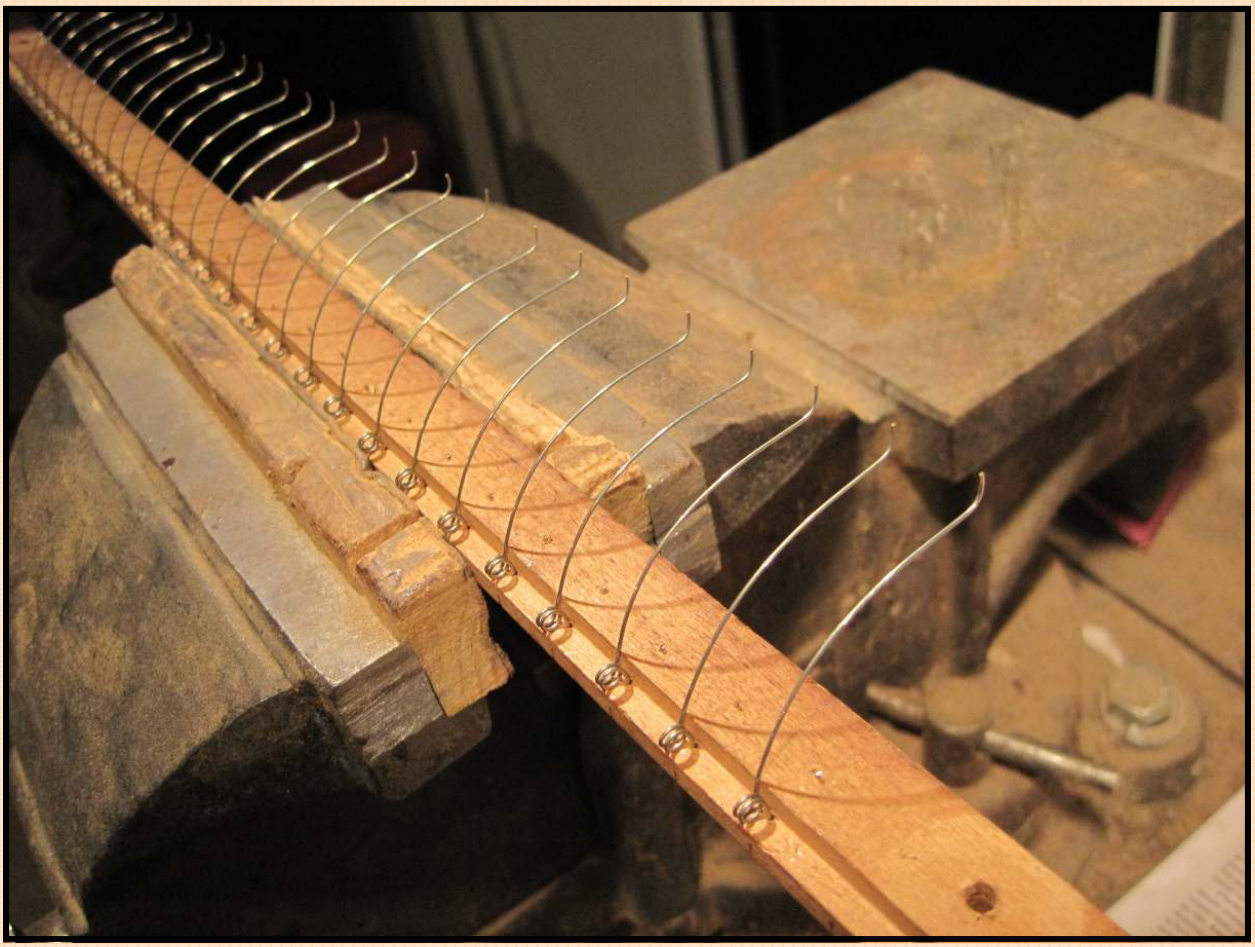
Schaff Piano Supply Company Presents:

Replacing Hammer Butt Springs in the Upright Action

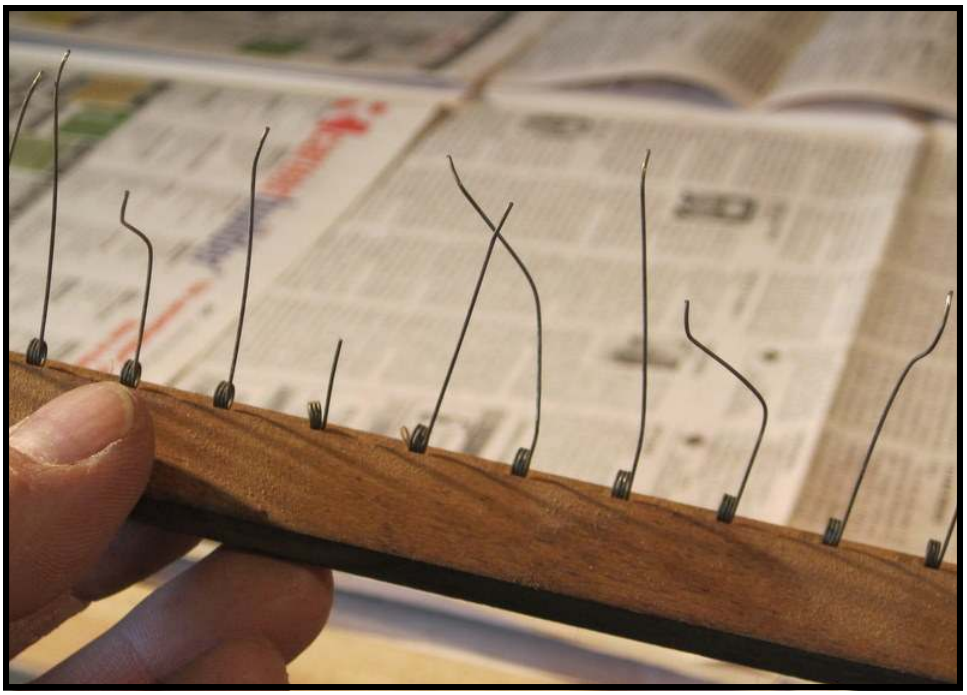
Basic Procedures



Action Work

By Chuck Behm

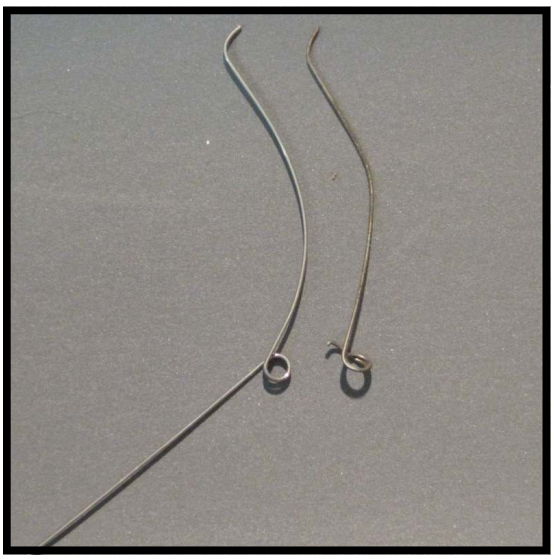
Replacing Hammer Butt Springs



-Rationale-

In the restoration of an upright, the decision of whether or not to replace hammer butt springs must often be made. In some cases, the original springs are in good condition and may be retained. In other situations, however, broken and badly bent springs need attention. Misshapen springs will sometimes jam up against hammer butts, causing notes which often have an unusually heavy or uneven touch. Springs that are broken off may result in bubbling notes or notes with an unusually light touch. Although bent springs may sometimes be "massaged" back into shape, in more severe cases it may make more sense to remove the set of original springs entirely and replace with new.

The best type of springs to use for replacement of an entire set are springs with tails that fit through the original holes in the spring rail. The procedure for this type of spring replacement is not overly complicated, and may be readily accomplished in a morning or afternoon. If the project piano is being improved in numerous other ways, it is a procedure that should at least be considered.



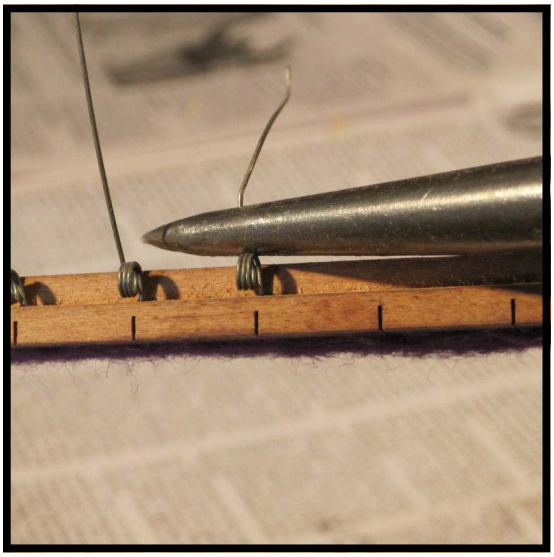
Step 1: Before removing the entire set of hammer butt springs, make sure you have the correct replacement springs.

Four varieties are available from Schaff:
1 7/8" - Short Tail (Cat. No. 519A)
2" - Long Tail (Cat. No. 519B)
Spinet Butt Springs (Cat. No. 3777)
Butt Springs (Cat. No. 3736)

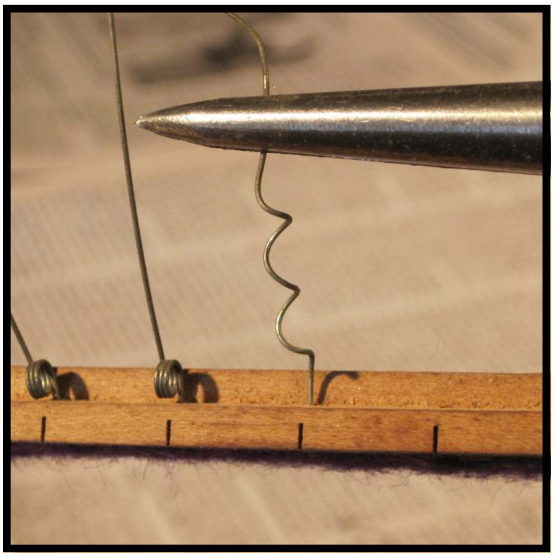
Consult catalog for reference pictures.

Step 2 : Remove hammer butt spring rail from piano action, and strip the spring rail felt from the back side of the rail. Don't scrape the remnants of the felt from the rail yet.

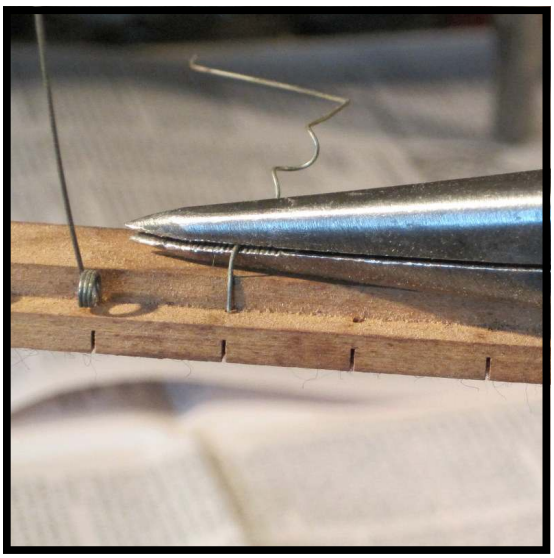
Step 3 : Remove the old hammer butt springs. Holding the rail in your lap, as shown, use a pair of needle nose pliers (Cat. No. 239)to pull the old springs free. The following directions will help you avoid having springs break off in their holes.



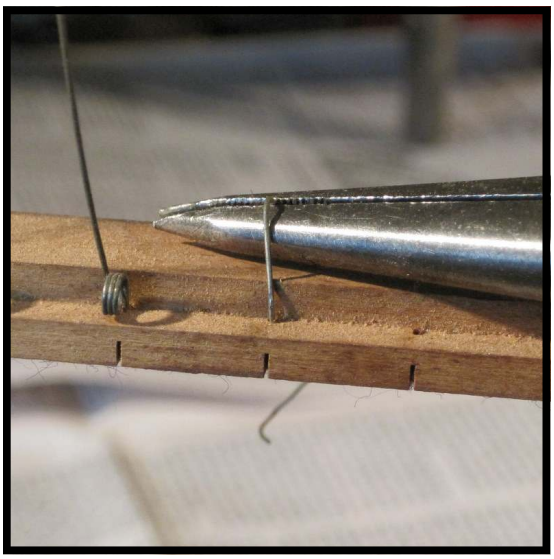
Step 4 : Use the pair of needle nose pliers to grasp the old spring directly over the coil. (Photos taken with rail on bench for sake of clarity.)



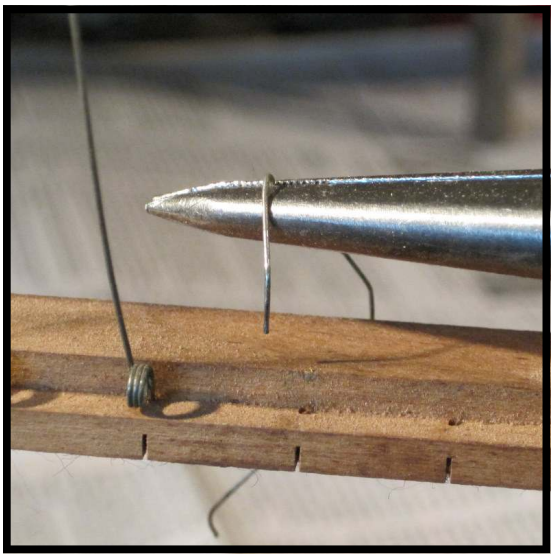
Step 5: Gently pull upward on the coil, somewhat straightening it out as shown.



Step 6 : Reposition your pliers to grasp the spring directly over the rail. With the spring held tightly, turn the pliers clockwise. The spring should begin to slide from the hole in the rail.



Step 7 : Continue to slowly turn the pliers clockwise, keeping the side of the tool in contact with the rail. Avoid any type of yanking motion which would likely snap the spring, leaving the hole plugged.

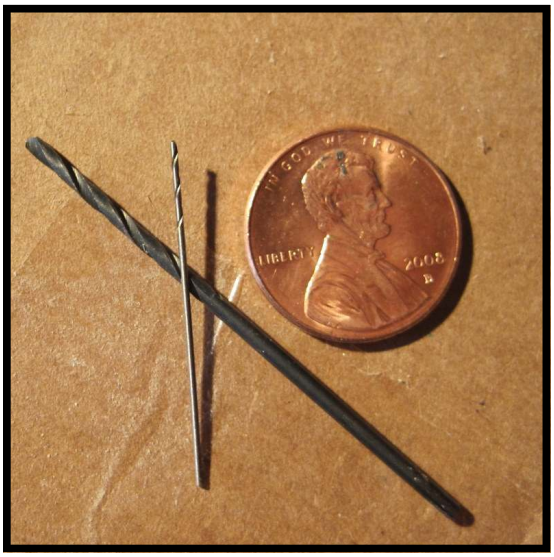


Step 8: When the end of the spring pulls loose from the rail, discard and go on to the next spring.

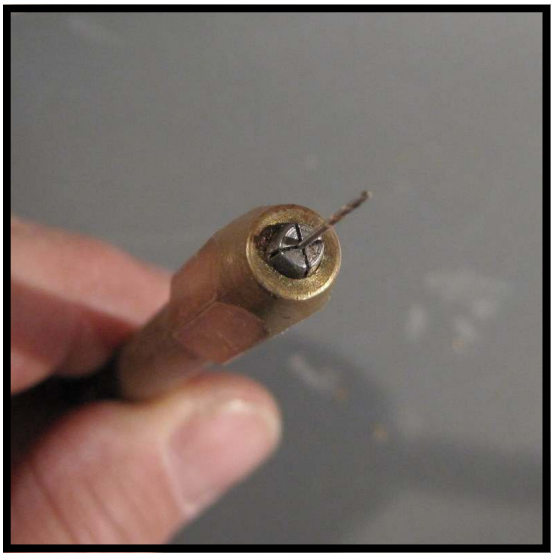
Step 9: With all the springs removed, place the rail in your vise in order to scrape off the remnants of the spring rail felt from the backside of the rail.

Step 10 : Use a sharp 3/4" or 1" wood chisel (Chisel set - Cat. No. 292) to scrape the felt remnants from the rail. With the flat side of the blade towards you, pull the edge of the blade over the rail in a scraping motion as shown.

Caution! Move the rail from side to side in the vise as each section is scraped clean. Do not attempt to hold the rail with one hand, and scrape the rail with the sharp chisel with the other hand!

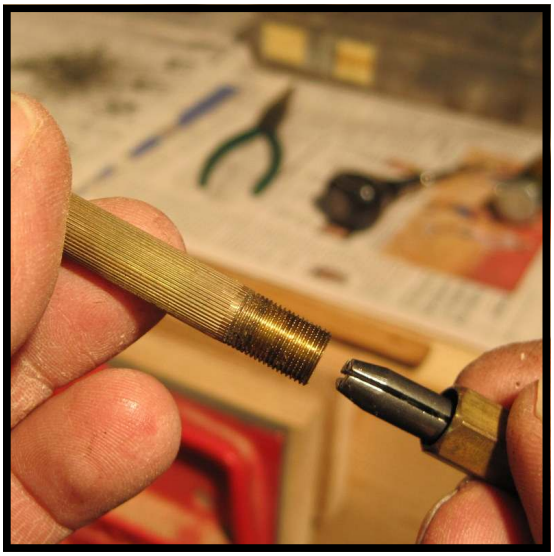


Step 11 : An ultra fine drill bit will be needed for the next step of the project. The size required is a 72 gauge drill bit, (Cat. No. D-72) which has a diameter of .025". This size of bit is shown in the accompanying photo in comparison with a 1/16" bit, the smallest size found in most ordinary drill indexes. It would be a good idea to order several, in that they do break easily.



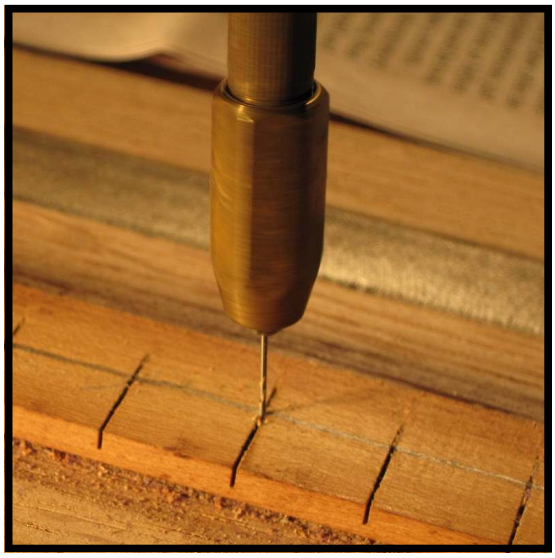
Step 12: One tool commonly available which will hold this size of drill bit is a pin vise (Cat. No. 152), or double ended pin vise (Cat. No 149). Another option would be to use a Dremel reducing collet (Cat. No. D-483) in a Multi Pro (Dremel) Tool (Cat. No. D-275 [single speed] or D-395 [variable speed]).

Step 13 : If you do chose to use a simple pin vise, tighten the collet down firmly on the bit by using an adjustable wrench (Cat. No. 3200).



Step 14 : If a double end pin vise is to be used, remove the collet and holder from one end of the vise, and set aside for the time being.

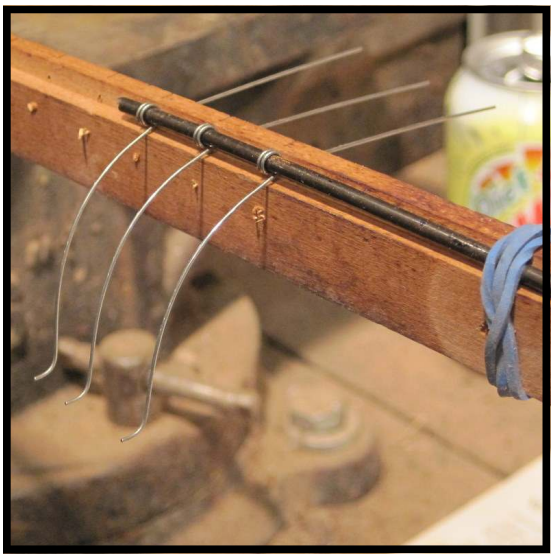
Step 15: The pin vise may be used in either a hand-held electric drill, or a drill press. Before using, make sure that the bit is centered by turning the drill on and observing the point of the bit. If not centered, the bit will need to be re-chucked, to avoid breakage.



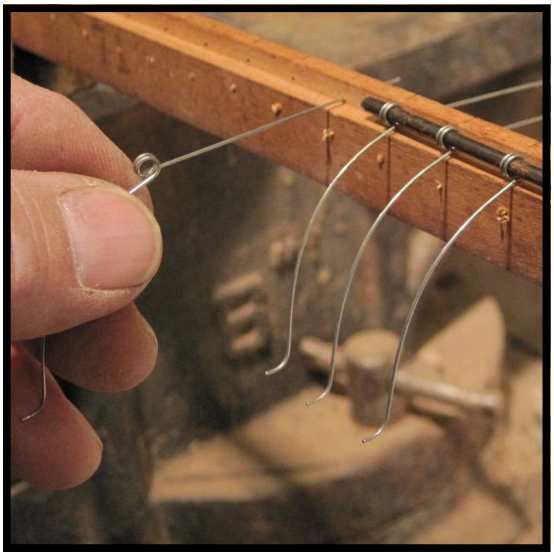
Step 16 : With the hammer spring rail held firmly in a vise, drill a hole at the back end of each spring slot. If using a hand-held drill, be very cautious to keep the drill bit from bending during the drilling process or a broken bit will likely result. If the bit does break in a hole, it usually may be pulled out from the other side. If the broken bit is not accessible, a new hole will need to be drilled a little further back. If drilling on a drill press, use a machinist's vise to hold the rail in place.

Step 17 : Taking an ordinary wire coat hanger, cut off a section of the long end of the hanger to use in the next steps. The diameter of the coat hanger wire should be such that the coil of the new hammer rail springs will free slide onto it.

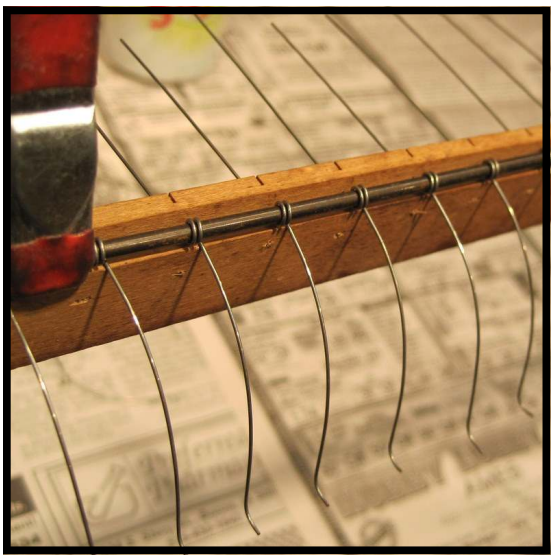
Step 18: From your inventory of standard replacement parts, count out a full set of springs for use This is the type of parts that it makes sense to keep in stock, in that when a job is brought to the shop, the required repairs can be made in a time-efficient manner without having to wait for a package of needed parts to arrive from the supply house.



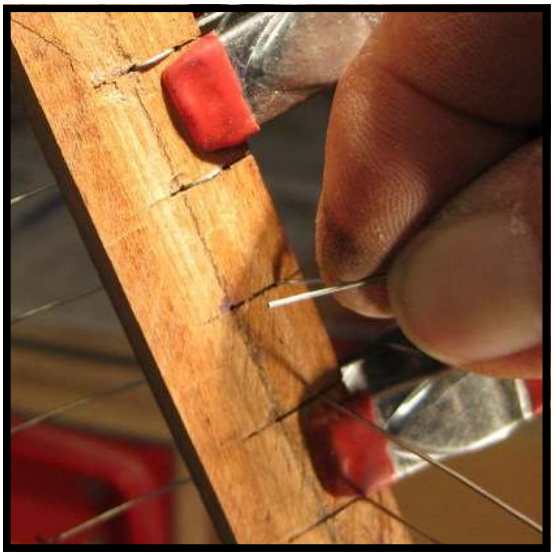
Step 19 : Begin the process of installing the new hammer butt springs by sliding the tail of the first spring through the original hole in the rail. With the coil of the initial spring in the dado slot, push the end of the coat hanger wire through the eye of the coil. Insert the tail of the second spring, and repeat the process. For this starting section of springs, use a rubber band to keep the coat hanger wire in place as it is pushed along the slot.



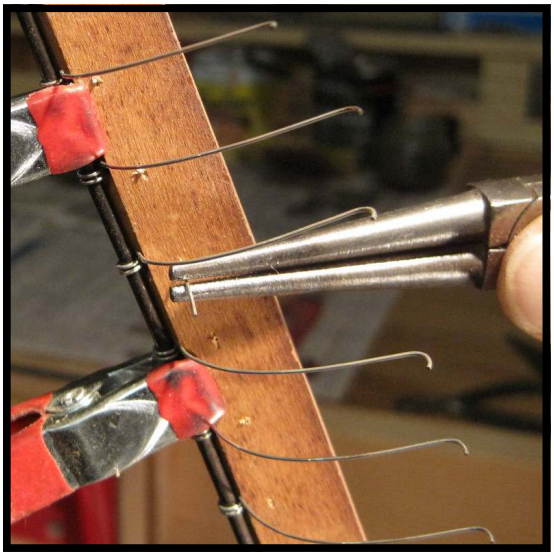
Step 20 : Continue on with this process until you have a dozen or so springs held in place by the coat hanger wire.



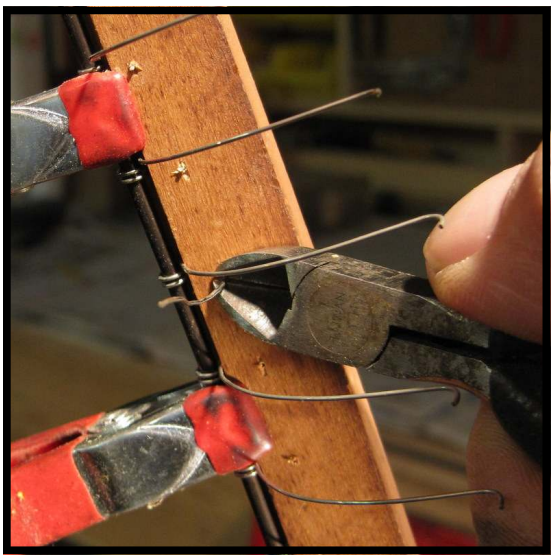
Step 21: Once a initial section of springs have been anchored with the coat hanger wire, secure the end opposite the rubber band with a small clamp.



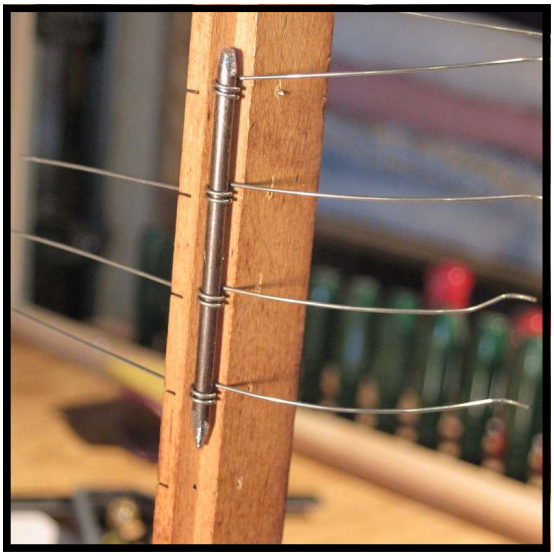
Step 22 : Turning the spring rail over, grasp the tail of a spring and bend it in towards the new hole that has been drilled. Try to bend the spring in a half-loop, and not a sharp bend. Push the end of the tail through the hole as far as possible.



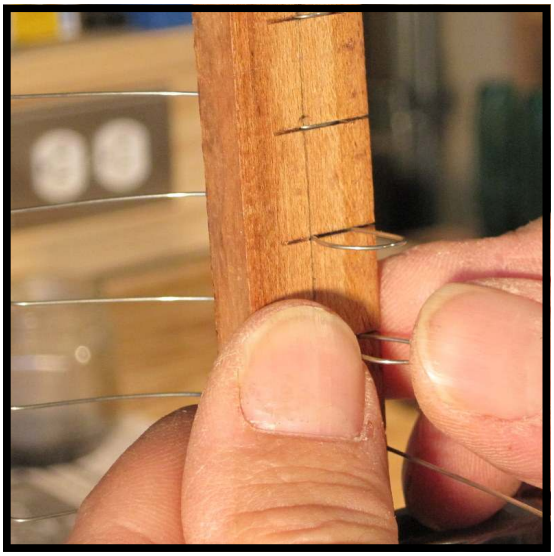
Step 23 : From the front side of the rail, grasp the end of the tail of the hammer spring with a pair of round nose pliers (Cat. No. 241) or needle nose pliers. Pull the slack out of the tail, then complete the process by grasping the tail again next to the rail and use the pliers as a lever against the edge of the rail. You will see the segment of coat hanger wire pull up firmly in the dado slot as the slack is completely removed.



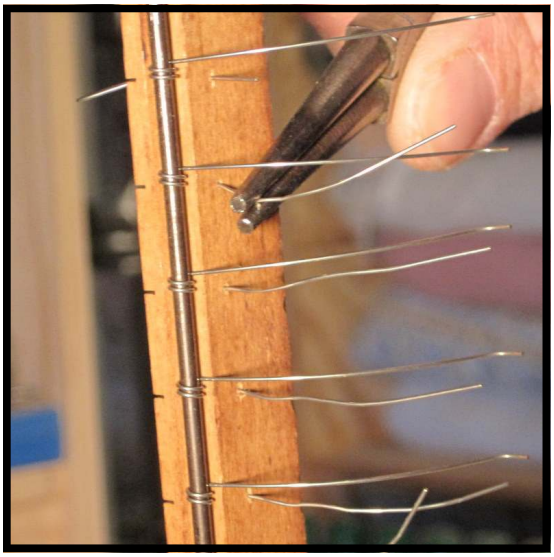
Step 24 : Use a pair of center pin nippers (Cat. No. 230) to snip off the excess flush with the rail.



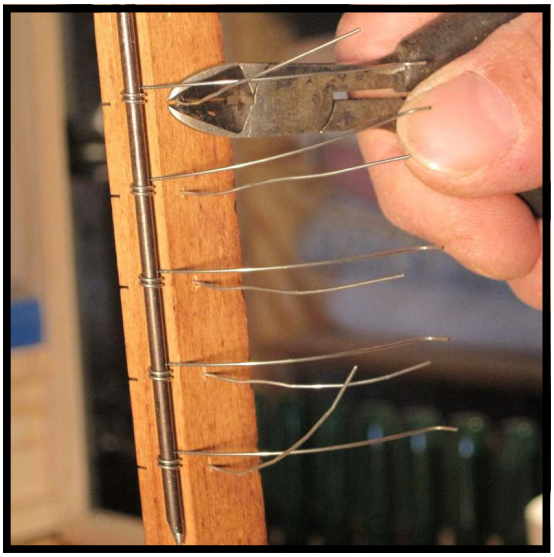
Step 25 : Once the first springs have been installed, the process may be sped up by putting the rail up and down in a vise, and by sliding a short segment of coat hanger wire down through the coils as the process continues. A short segment of wire, extending through four to seven coils, will be easier to slide along than a long segment of wire. As long as at least one coil holding the coat hanger wire has been pulled tight, this technique will work.



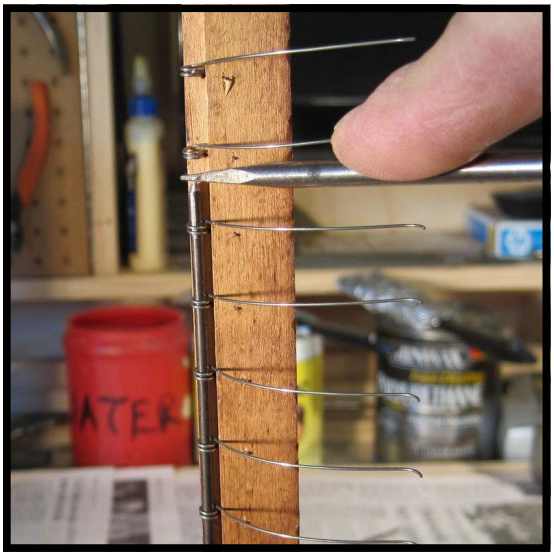
Step 26 : Working with three to six springs at a time, insert the tails, then turn the rail over to push the end of the tails through the new holes in the rail. Use your two thumbs as shown to accomplish this process quickly



Step 27 : Turn the rail back around again, and pull the excess through for each spring, working from the bottom to the top. Pull the springs tightly, but not so firmly that the tails break off. If you feel the loop as it tightens on the other side of the rail, you should be able to feel the wire seat itself in the slot.

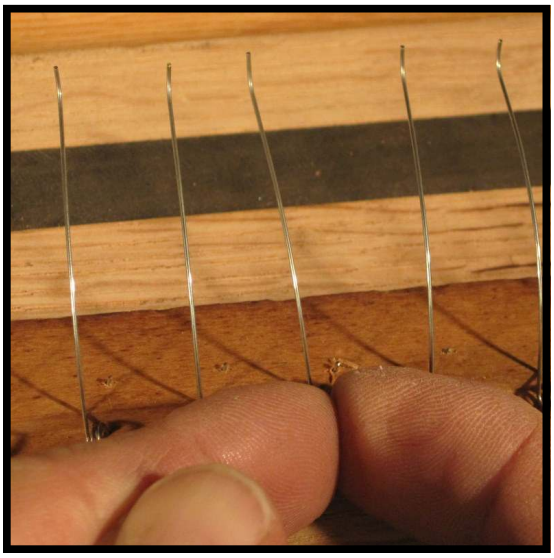


Step 28 : Once all the tails are pulled tight, snip the excess of each tail.

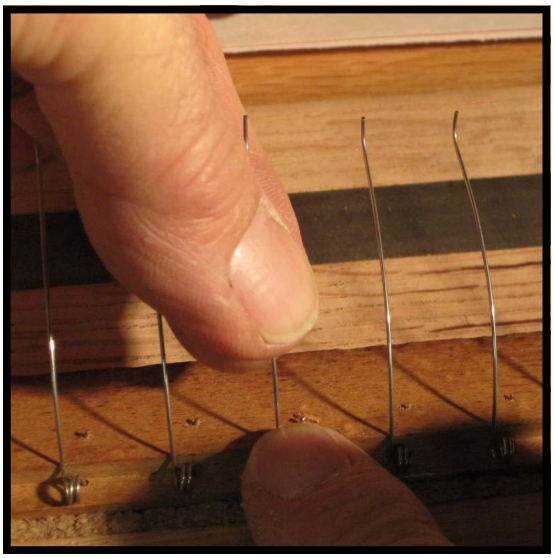


Step 29: As the process continues, use a jeweler's screwdriver (Cat. No. 3275) to push the coat hanger wire through a new set of wires and repeat steps 25 - 28. Move the rail upward in the vise as you move downward in the installation of the set of springs.

Step 30: Once the entire set of new hammer butt springs has been installed, place the rail in a vise with the springs pointing up and away from you as shown. Make sure that the spring coils are up above the jaws of the vise. Unless you have been fine-adjusting the orientation of the springs as you've worked, your set will probably look something like the set in the photo, with springs going at odd angles to each other. This should be corrected to ensure uniform tension.



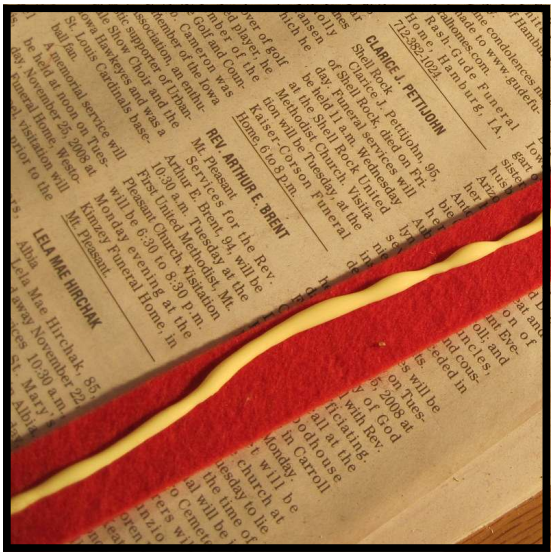
Step 31: Side-to side misalignment may be corrected by pinching the coil of the spring in between the forefinger of either hand. Press inwards on the coil from both directions, but slightly harder on the side opposite to that you wish the spring to move in the direction of.



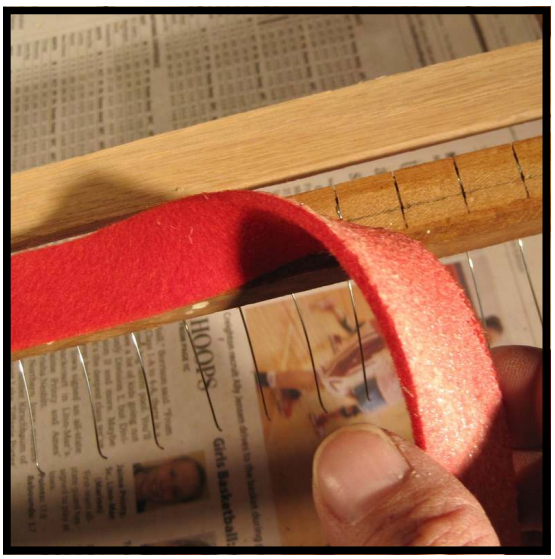
Step 32: Correct the slant forward or backward by "massaging" the spring. Hold the coil firmly in place with the forefinger of you right hand, while pulling upwards on the spring itself with the thumb and forefinger of your left hand. As the wire of the spring slides between your thumb and forefinger, encourage it to go downwards or upwards, according to the direction desired.

The completed adjustment of the springs.

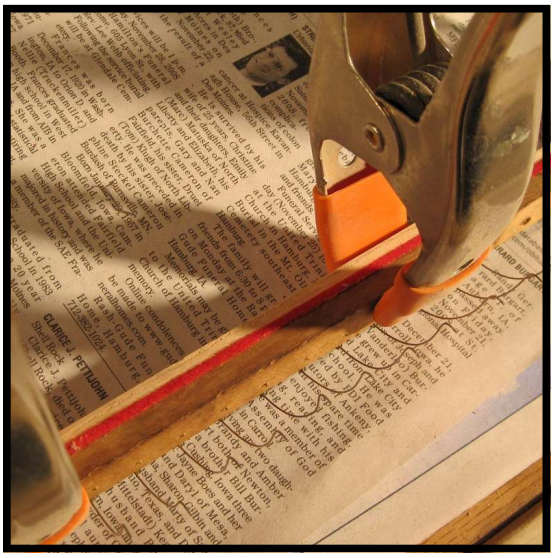
Step 33: The final step before returning the hammer butt spring rail to the action of the piano is to install a new strip of spring rail felt (311R [Red] or 311G [Green]) to the backside of the rail. Before gluing, cut a gluing block of scrap wood to place over the felt for clamping purposes. Titebond Wood Glue (Cat. No. 392) works well for this purpose. Support the hammer butt spring rail up off the surface of the bench by placing a block of wood under either end to the side of the springs.



Step 34: Run a bead of glue along the strip of spring rail felt. Spread the glue evenly over the surface. If necessary, make a second application to complete the coverage.



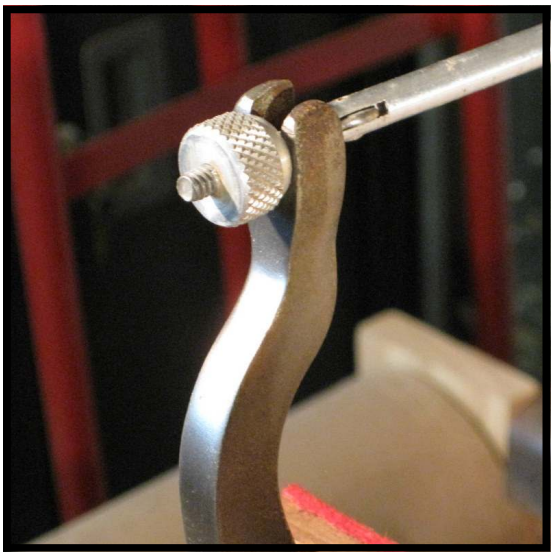
Step 35: Carefully stretch the spring rail felt on top of the rail itself. Flatten the felt out from the center toward the ends. Make sure that the felt covers the rail from side to side and is centered from top to bottom on the rail.



Step 36: Place the gluing block over the felt and use a key spring clamp (Cat. No. 247)on the side of the rail opposite the spring coils to hold it in place.

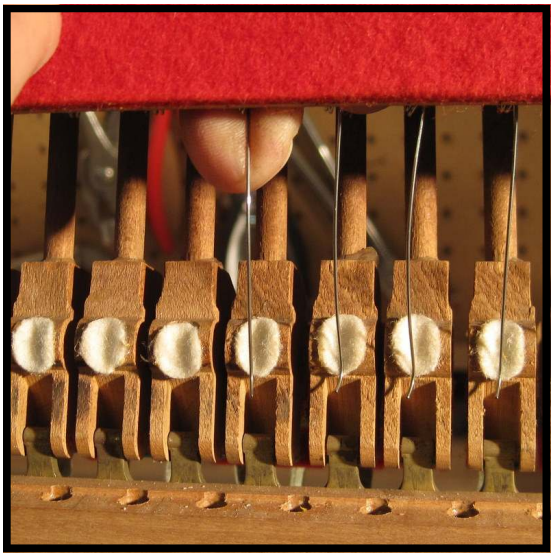
Step 37: Clamp along the center of the gluing block every 6 inches. Double check to make sure that the felt hasn't slid out of place. Set the clamped rail to dry on the bench as shown.

Step 38: After the glue has cured for at least an hour, the clamps and gluing block may be removed. If there is any glue squeeze-out between the felt strip and the wooden rail, remove with a sharp chisel.

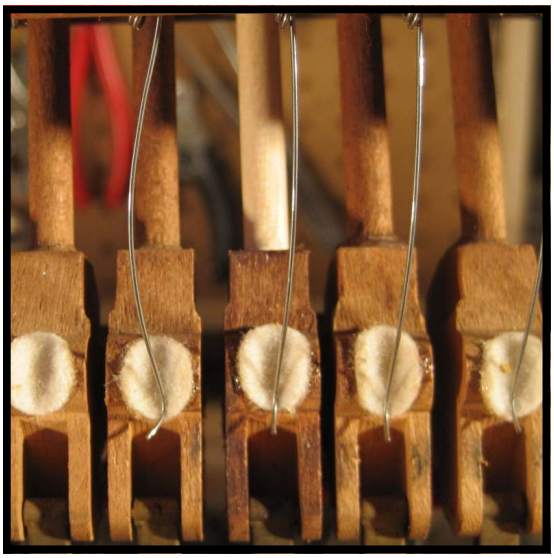


Step 39: The action should now be placed on your workbench. For safety sake, secure the action in place with an action post extension (Cat. No. 297).

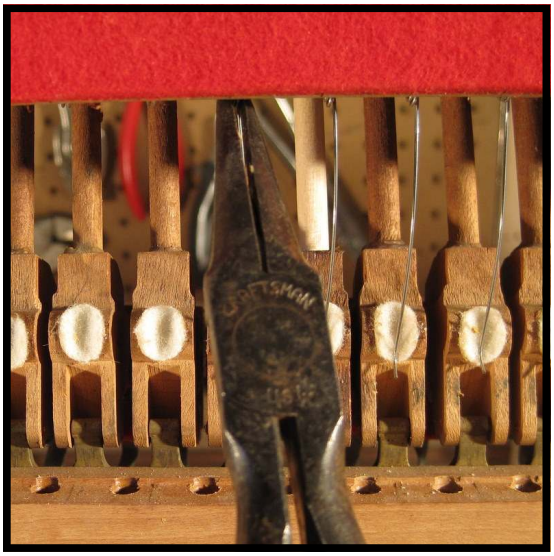
Step 40: The hammer spring rail is now ready to be screwed again to the action brackets. When returning the spring rail to the action, be careful not to bend any of the springs. Usually they will fit in between the hammer shanks as the rail is brought into position. At this point, do not try to position the end of the springs in the felted grooves in the hammer butts. If punchings were originally used to shim the rail out away from the brackets, either return or replace those.



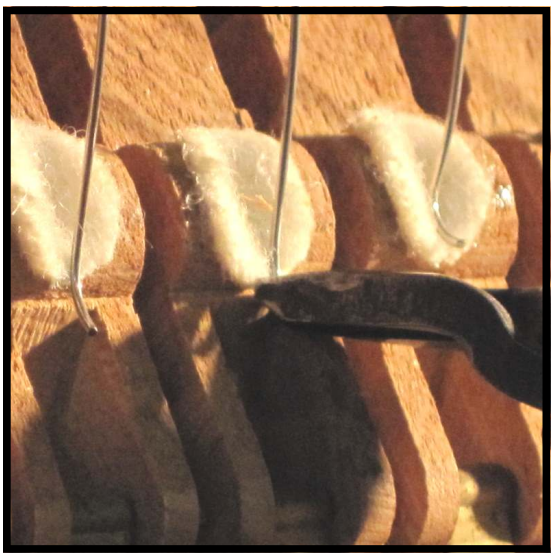
Step 41: To perform the last few steps of fitting and adjusting the hammer springs, it is best to remove the dampers and damper levers, number them and set to one side. With the dampers out of the way, you may easily push each spring forward to position it in the groove of the hammer butt.



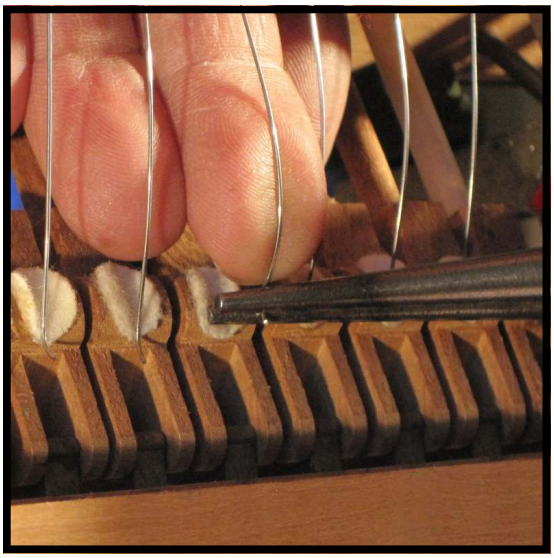
Step 42: With the springs positioned in the hammer butt grooves, check the orientation of each spring to make sure that they are not veering to one side or the other.



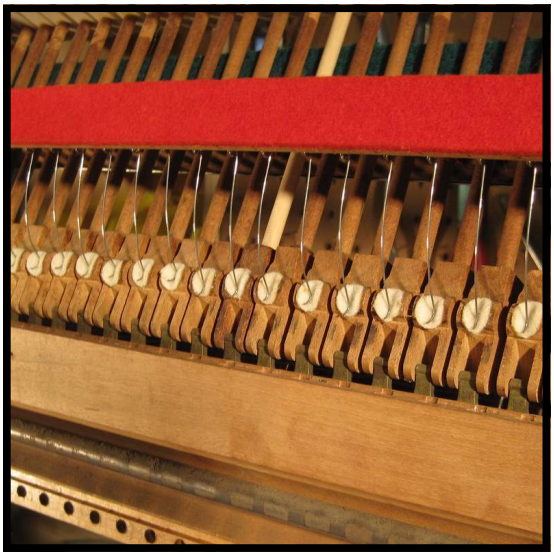
Step 43: If a spring is not aligned (such as the left hand spring in photo 42), grasp the coil of the spring with your needle nose pliers and twist in the desired direction.



Step 44: If the hammer springs are a bit too long, they may be trimmed and re-shaped on the end. First, use your pair of center pin nippers to snip each spring at the very bottom of the corresponding spring punching.



Step 45: To reshape the end of the spring, hold the bottom of the spring firmly with your pair of round nose pliers. Then, while pushing forward on the lower portion of the spring with the middle finger of your left hand, turn the round nose pliers slightly clockwise to put a partial bend in the very bottom of the spring.



Voila! A piece of cake!

I would like to give special thanks to Frank Pinn of Schaff Piano Supply for helping me understand and work through this process. His assistance and advise was invaluable for this project to be completed successfully.

Chuck Behm

Tools and Supplies

For your convenience, all the tools and supplies necessary to complete this repair are listed with corresponding catalogue number.

Tools:

Needle nose pliers.....(Cat. No. 239)
Chisel set.....(Cat. No. 292)
Pin vise.....(Cat. No. 152)
or Double ended pin vise..... (Cat. No 149)
or Multi Pro (Dremel) Tool.....(Cat. No. D-275 or D-395)
Adjustable wrench.....(Cat. No. 3200)
Round nose pliers.....(Cat. No. 241)
Center pin nippers.....(Cat. No. 230)
Jeweler's screwdriver.....(Cat. No. 3275)
Key spring clamps.....Cat. No. 247)
Action post extension.....(Cat. No. 297)
.025" drill bit.....(Cat. No. D-72)

Supplies:

1 7/8" - Short tail hammer butt springs..... (Cat. No. 519A)
2" - Long tail hammer butt springs.....(Cat. No. 519B)
Spinet butt springs.....(Cat. No. 3777)
Butt spring.....(Cat. No. 3736)
Spring rail felt.....(Cat. No. 311R or 311G)
Titebond Wood Glue.....(Cat. No. 392)

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

To order, call Schaff Piano Supply at 1-800-747-4266

Notes on Procedures