

Schaff Piano Supply Company Presents:

Filing Hammers

Basic Procedures



Action Work

By Chuck Behm

Filing Hammers

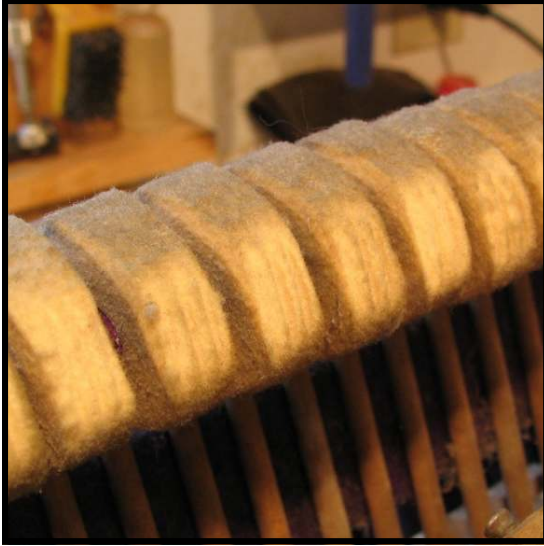


-Rationale-

In the restoration of an upright piano, the condition of the hammer heads is crucial. If hammers are heavily worn to the point where they are more flat on the striking surface than egg shaped, replacement with a new set of hammer heads is recommended. If, on the other hand, the wear is of a more minimal nature, with string cuts that are not too deep, filing the hammers is an option to consider.

String cuts occur over time in the striking surface as the steel of the strings bite into the felt. When hammers are produced, felt is stretched over the wooden molding of the hammers. The fibers on the outer surface of the hammers are at tension. As fibers are broken, a layer of dead felt forms on the outer surface of the hammers. The tone of the piano suffers, and as the cuts deepen, the hammers no longer impart a clean blow to strings but wrap around them instead.

Skillful filing of the hammers removes this wear layer, giving the hammers a clean profile that produces a crisper tone and that is more easily voiced.



Possible candidate: This set of hammers is not beyond saving. Though the strings have cut rather deeply into the striking surface of the hammers, the original profile would not be drastically altered by filing off the outer wear layer. Some adjustment to the regulation of the piano would need to be made once the hammers were filed, of course, but one could expect that the overall outcome of a careful filing would be an improvement in the tone of the piano.



Lost cause: To file these hammers into anything resembling a normal shape, so much felt would need to be removed that these bass hammers would be left with the profile of a hammer from the high treble. A previous amateurish attempt to remove cut marks by filing the front of a hammer flat is visible in the middle of the photo.



The alternatives: A new set of high quality hammers produced by the specialists at Schaff, such as these to replace the old hammers from the photo above, produce a vastly superior sound to the originals. When, however, the condition of the factory set does not necessitate replacement, filing the hammers is an option to consider. Following are the detailed procedures used in filing hammers.

-Basic Procedures-



Photo 1: A century of wear and tear

The use of a variable speed Moto-Tool ([Dremel Tool®](#), Cat. No. D-395), in the filing of hammer heads is a double-edged sword. On the one hand, in the hands of a skilled technician, it is a fast, efficient way of shaping a worn set of hammers, such as seen in Photo 1 – giving the piano a crisper, more pleasing tone. While hammer filing is not a cure-all for all that ails an older piano, it is often a good first step in bringing back the tone of a piano that has been neglected for far too long. On the other hand, in the hands of an inexperienced beginner with no training in the use of the tool, there is no faster way to completely ruin a set of hammers.

How does a beginning technician gain experience in the use of the Dremel Tool for filing hammers in a responsible way? Start by looking for opportunities to make an improvement in tired old instruments sitting in church basements or school practice rooms. Offer to tune a piano, file the hammers, vacuum out under the keys, etc. for no charge or a highly reduced rate. Learn from the experience, and after sufficient practice, you'll have the skills to bid on jobs for customers. Or, better yet, if you know a technician into more serious restoration, ask if the next time a piano is having a set of hammers replaced, you might be able to work on filing the old hammers before they are removed.

By the nature of the repair (it kicks up lots of dust), it is best to file hammers in the shop. For the sake of efficiency, when an action is taken to the shop for repairs such as this, considering making whatever other improvements that are needed.

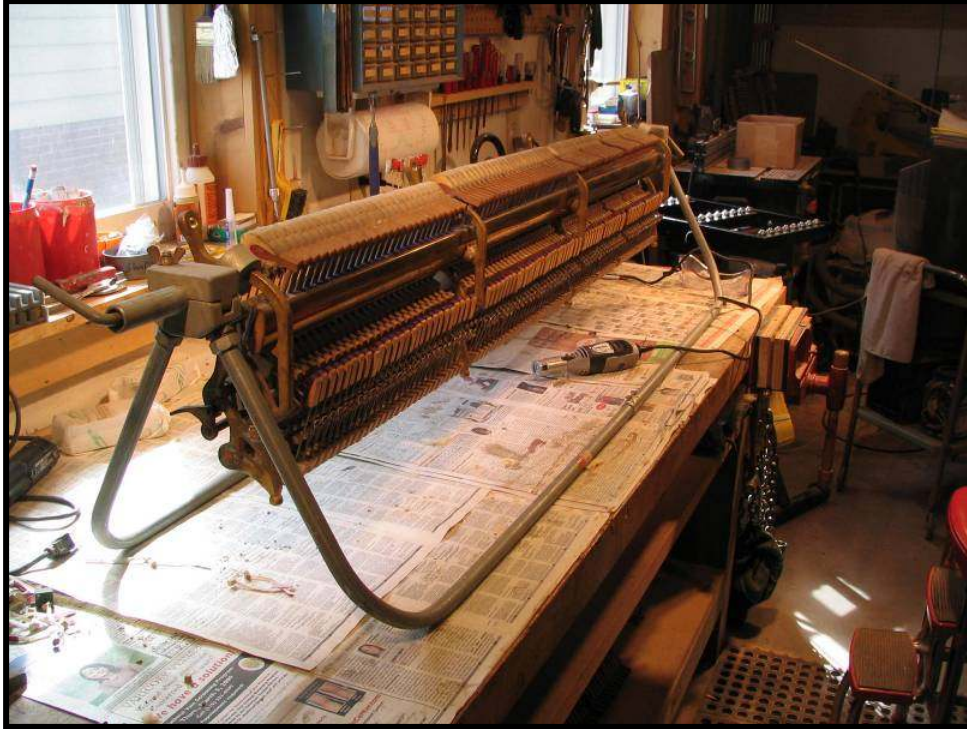


Photo 2: Set up and ready for work

To begin, consider setting the action up on your shop bench in an [action cradle \(Cat. No. 296\)](#). This allows you to reach over the action without fear of knocking it over, and breaking parts (Photo 2). If you don't yet own an action cradle, an [action extension post \(Cat. No. 297\)](#) will at least allow you to provide solid support for the action while it is on the bench.

Before using the Dremel Tool, remove parts that would be in the way. In the case of the Steinway action pictured on the previous page, the piggyback dampers in the lower tenor section need to be taken off while the job is being done. In some cases, the action brackets protrude too far and need to be taken off, at least one at a time. To remove an action bracket, remove the screws affixing it to the main action rail, sticker rail and damper spring rail. The screw attaching the bracket to the damper spring rail is sometimes a bit hard to get at. Push the hammer rail forward and back the screw out at an angle with a [flange screwdriver \(Cat. No. 34\)](#). In addition, an entire whippen assembly might have to be removed and also the let-off rail. To remove the let-off rail, loosen the screws holding it in place, slide the brackets off of the screws, turn the rail so that the let-off

regulating screws are facing you, and slide the rail out to the side. Watch for regulating screws that hook a bridal strap, impeding its progress.



Photo 3: Some disassembly required.

Although this sounds like a lot of work to go through, removing these parts (Photo 3) will insure that you are able to do a more accurate job of filing the hammers, in that you will not have to hold the Dremel tool at an odd angle to work around obstacles.

Now, if you are using a Dremel Tool for hammer filing for the first time, put the [drum sander \(Cat. No. 224\)](#) in the chuck and tighten it, then place the drum sander guide over the housing and tighten it down. (Note – the drum sander guide [which includes an adapter ([Cat. No. 224A](#)) to fit the guide on modern Dremel tools] is made to work only with the Variable Speed Moto-Tool and Single Speed Moto-Tool. It will not work with any cordless model.) Make sure that the drum sander is centered in the slots of the guide. If it is too high or too low, remove the guide, make whatever adjustment necessary, and reassemble.

Hold the Dremel in your right hand, and turn it on to get the feel of it. If you have a variable speed model, try the different speed settings. The tool has a very comfortable feel to it. Take a deep breath and relax. We're ready to begin.

Position yourself so that you can comfortably reach over the top of the piano action with the tool in hand. If it's a particularly tall action, you might need to stand on a scaffold. I use a 2 x 12 supported by 3 lengths of 6 x 6's to provide a solid platform to walk back and forth on when I'm working on a high action. Putting the cradle with the action on a low bench, if you have one, will

accomplish the same goal. In any case, make sure you do not have to stretch to reach over the hammers. Wear ear and eye protection and a dust mask.

Turn the Dremel on and adjust the speed setting (if you have the variable speed model) to the second setting from the top. With the motor on, try some practice strokes without actually touching the felt of the hammers. Start with the Dremel held so that the middle slot of the drum sander guide is underneath the hammer. Now, rotate your wrist as you bring the Dremel up and over the strike point of the hammer all the way back halfway on the upper shoulder. It should be a smooth, fluid motion.

Imagine as you practice this stroke a line running through the pivoting shaft of the Dremel and extending outwards both ways for the length of the piano action, then another line connecting all the strike points of the entire set of hammers. Those two lines should at all times be parallel. Don't at any time (with one exception which will be noted later) during the filing process turn the Dremel so that the one line is cockeyed to the other. If you do, you'll find that you end up with hammers that are cockeyed to the strings as well.



Photo 4: Up and over

Once you've tried enough practice strokes that the motion seems natural, start on the left side of the tenor set of hammers, and file the first hammer. Push the hammer forward with your left thumb and bring the Dremel up and over the front of the hammer. If you are applying the right amount of pressure, you will see a peel of felt emerge from the large slot of the drum sander guide (Photo 4). This peel will either spit out of the guide as you finish the stroke, or will remain

attached to the hammer and need to be pulled loose. Stop your stroke before reaching the staple (Photo 5). You will finish the rest of the hammer in a separate step.



Photo 5: Peeled hammers

Stop to examine one of these peels. It should be over an inch long, and will have three slots where the strings have bitten down into the felt. Look at the hammers that you have completed. The felt underneath the wear layer will look new, and should be smooth all the way around – no string indentations. If string marks still remain take a second somewhat lighter pass over the hammer.

For a piano with average wear, the complete removal of worn felt from the shoulders and strike point should be completed in either one or two, or at the very most three passes. If you are taking more than three passes, you are either not removing enough felt on each pass (no peel, just flying dust), or you are going too far down into good felt, or you are trying to salvage a set of hammers that should probably be replaced instead of shaped. Keep in mind that by removing felt, you are changing not only the weight of the hammer, but also the distance of the strike point of the hammer from the strings, and the let-off point as well. Therefore, the goal should be to remove just the dead felt without taking any more felt from the hammer than necessary.

While in general you will want to follow the original contour of the hammer in bringing the Dremel up and over the front of the hammer, if there is considerable wear to the hammers, to the point where the strike points have flattened out, try on the first stroke to follow a curved path, while barely touching the strike point.

From the speed with which felt is removed, it's easy to understand why an inexperienced technician using an incorrect technique could easily damage a set of hammers to the point where they were rendered unsalvageable. The key is approaching the job with confidence, and removing felt in an artistic, flowing way.

Once the fronts of the hammers have been nicely shaped for the entire tenor set of hammers, remove the drum sander guide to go back and finish each hammer from the wooden molding to where you stopped on the initial stroke. For this step, I would turn down the speed of the Dremel a notch or two. Without touching the molding with the sanding band, lightly let the sander follow the hammer up over the staple (expect a zing as the sanding band touches the metal of the staple). Since for this stroke you are going in the direction of the spin of the sanding drum, you need to apply very little pressure. The Dremel will easily follow the contour of the hammer as you finish the job.



Photo 6: Maintain a light touch

Again, work from left to right. Push the hammer forward with your left thumb, and lightly stroke the Dremel from the molding upward (Photo 6). Feather this cut with the initial cut to produce a smoothly shaped hammer with no hint of a bump between the first and second sanding operation. In starting the cut from the molding, be extremely cautious in trying not to nick the wood of the molding. This is a sign of a hastily done job, and detracts from the appearance of the hammers. Usually, I make at least three passes for this stage, but always with a very light touch.

Note: In beginning this cut, to get in close to the wood of the molding, you will find that you are not able to keep the line of the tool parallel with the line of the hammers. You will need to turn the Dremel slightly askew in order to start the cut (Photo 7).



Photo 7: Dremel slightly tipped in to begin cut

As you complete this step, you'll notice that the hammers are looking much more like a set of new hammers than the tired old set they were before (Photo 8).



Photo 8: The clean felt underneath comes to light

From the side, the newly shaped hammers should have a nice, rounded, somewhat egg-shaped appearance (Photo 9). Obviously, if a set of hammers has worn down flat, shaping would be out of the question, in that the amount of felt which would need to be removed to produce an egg-shaped hammer would be considerable, so much so that the geometry of the action would be drastically altered. In cases where excessive wear had taken place, I would recommend either leaving well enough alone, or outright replacement of the entire set of hammers.



Photo 9: The desired shape

On the extreme treble, many times the wear extends all the way through the thin layer of felt almost to the molding underneath. For the top octave or so of hammers, be very cautious in filing over the strike point. I tend to just lightly touch up the visible upper portion of the hammer so that they blend in as far as color with the others, and leave the strike point alone. Covering felt with a thin layer of buckskin where the strings have cut through to the molding on the final few notes is an option that might be considered.

At times, hammers will be too thick to fit easily in the slots of the drum sander guide. In such cases, instead of trying to force the issue (which usually results in a choppy and unsatisfactory appearance), use the Dremel in the fashion that was explained for the finishing of the section between the molding and up past the staple – just continue on around the front, past the strike point and down under. This technique, while requiring a more delicate touch, works just as well in shaping the hammers – it just takes more time.

Use a [sandpaper file \(Cat. No. 218\)](#) to clean the sides of the hammers. Once the hammers have all given the initial shaping, give the action a thorough cleaning by blowing out dust with a compressed air gun (set to a fairly low pressure). Instead of using extremely high pressure to blow everything out (including butt felts, loose dampers, etc.), use a moderate pressure and a soft 1" brush to clean out the decades of dust that cling to the insides of the action.

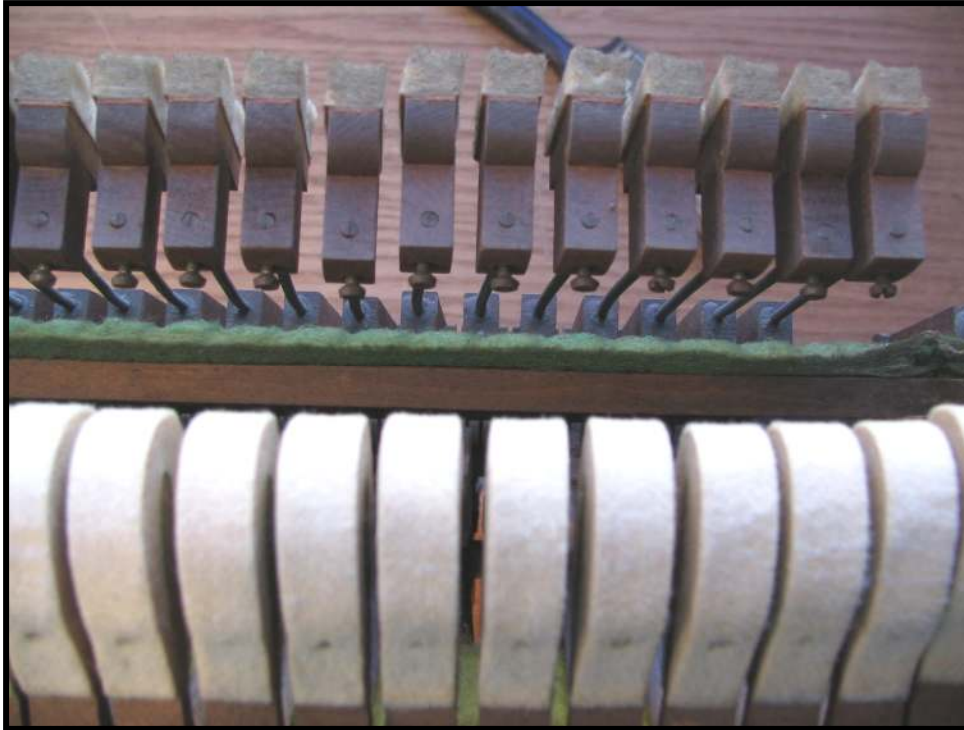


Photo 10: Almost perfect

When the entire set of hammers has been shaped, and the action is cleaned, check to make sure each hammer is square to the string line by peering up over the tops of the hammers (if you are using an action cradle, simply rotate the top of the hammerline toward you) to visually compare (with one eye) the front of each hammer to the reference line provided by the damper spring rail (Photo 10). If hammers are slightly out of square (check the 6th hammer from the right in the above), use the Dremel free-handed on low speed, or your sanding stick to make slight adjustments. When the action is replaced in the piano, use your sanding stick exclusively to touch up any hammers that are not striking on all the strings.

Once the action is back in the piano, adjustments to the regulation of the action will be necessary to put things back to normal. First of all, the hammerblow distance would need to be adjusted by inserting spacers to lift the hammer rail. This, of course, will result in more lost motion which should be taken up. Finally, the let-off distance will need adjusting, as it would now be further back.

from where it was originally.

One final note of caution seems necessary. This is a repair that will change both the tone, and the touch of the piano. The Haddorff upright featured in most of the photos for this article came out with a gorgeous tone - much more pleasing than it originally had. I would not, however, encourage a hard-pressure sell job on any customer regarding such an undertaking. Explain that in most cases, an improvement in tone (crisper, cleaner, fewer 'dead' spots, etc.) is noted, but that there is no guarantee as to how much improvement there might be. I always ask my customers if they are happy with the tone of the piano as is. If their reply is, "Yes, I love the tone of my piano!" I say no more. I wouldn't consider changing what the customer clearly does not want changed. However, if the customer is unhappy with the muffled, muted quality of a piano with worn hammers, I would not hesitate to recommend the job as a possible improvement. Once you become proficient at it, it is a repair that is both satisfying and profitable to perform.

Tools and supplies:

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

Tools:

Variable Speed Multi Pro Tool.....	Cat. No. D-395
Drum sander guide.....	Cat. No. 224
Sandpaper file.....	Cat. No. 218
Action cradle.....	Cat. No. 296
Action extension post.....	Cat. No. 297
Flange screwdriver.....	Cat. No. 34
Combination tool handle.....	Cat. No. 26

Supplies:

Sanding bands (100).....	Cat. No. A-8
Replacement sandpaper strips (12).....	Cat. No. 21

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

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

Notes on Procedures