

# The Owner's Guide to Piano Repair



## Focus On: Grand Piano Hammer Replacement

Information provided courtesy of:

**Scott Andrews**

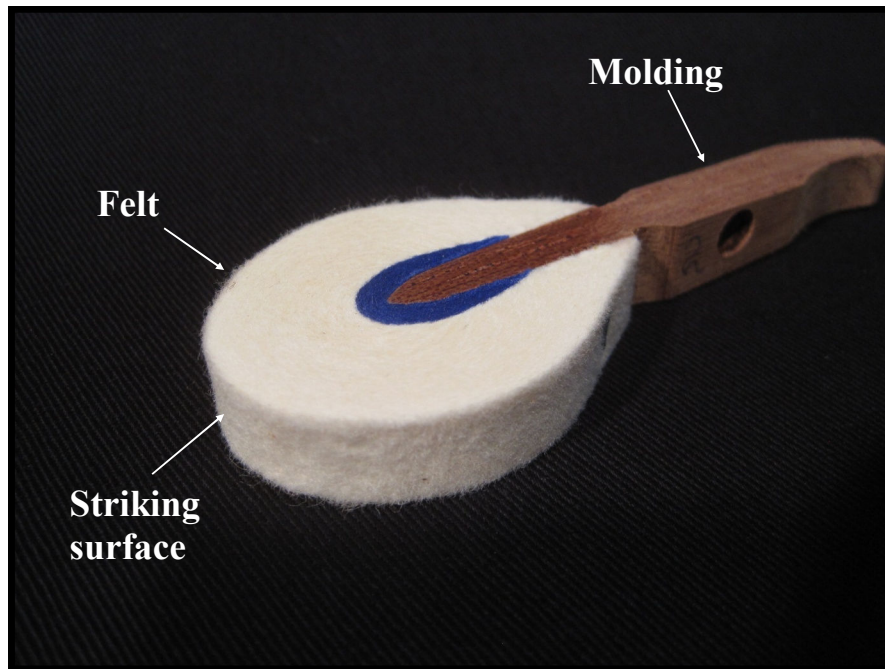
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**Although the hammers on a grand piano are extremely durable, they do deteriorate over time, and at some point need to be replaced.** Worn hammers may cause the tone of a piano to be harsh and unpleasant and can also make it difficult to control the keys to produce the music you love. **The hammers on your grand piano are worn to the point where replacement would help bring back beauty and richness to the tone of your instrument.**



*A new grand hammer head ready to install.*

**Do you find yourself frustrated with the poor performance of your piano and wondering what could be done? The following is intended to help you decide whether to have a new set of hammers installed in your instrument.**

**Why exactly do worn out hammers cause a problem with the tone of a piano?**

When hammer heads are manufactured, thick, stiff felt is stretched around a wooden core, or molding, at great tension. The striking surface is smooth and round and more or less egg-shaped (see photo above). The tension of the felt provides a bounce to the hammers so that when they strike the strings the deflection that they cause to the strings results in vibration or tone.

Over the years, however, the steel of the treble strings and the copper windings of the bass strings gradually cut into the felt, breaking the felt fibers and resulting in a layer of felt on the outside of the hammers which is pulpy or dead. The piano's tone is altered as this dead layer increases, and eventually the hammers don't produce a clean blow at all, but instead strike the strings with a flattened and grooved surface (see photo on next page) which produces an unsatisfactorily harsh sound.

This photo illustrates the type of wear and tear that hammer heads are subjected to. These hammers are from the treble section where each note has three steel strings. Over the years the strings cut deeply into the felt. Instead of striking the strings with a clean blow, hammers such as these produce a muddy, muted tone—a far cry from the tone the piano once had.



No matter how good the tuning of a piano, or to what extent other repair work has been done to a piano with a set of hammers in this condition, the resulting tone will be less than optimal.

**When the hammers are worn, is there any less expensive option than outright replacement?**

Yes, if the amount of wear is minimal, the hammers may be suitable for a job of reshaping and voicing. However, if the cuts in the felt are deep, reshaping may not be feasible.



*Worn hammer after filing*



*New replacement hammer*

If the amount of felt to be removed during the shaping process is significant (the photos above contrast the thin layer of felt remaining on the reshaped hammer to the thicker layer of felt of the corresponding replacement hammer), total replacement with a new set of hammers would be a better choice. Otherwise, the changes to the weight and dimensions of the hammers which result from shaping would adversely alter the touch of the piano.

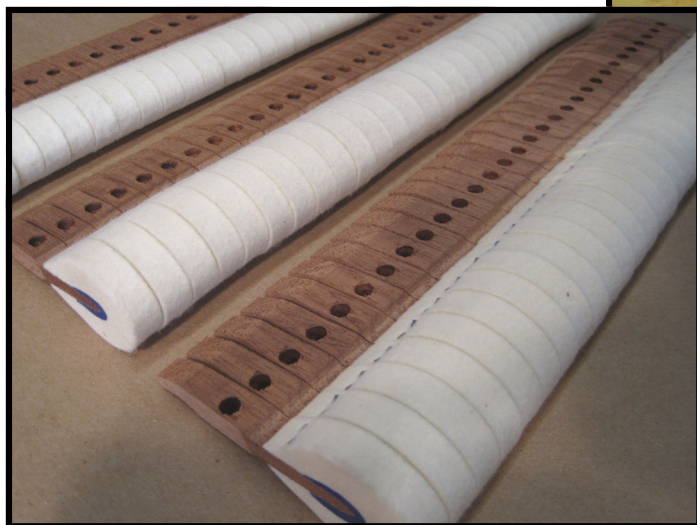
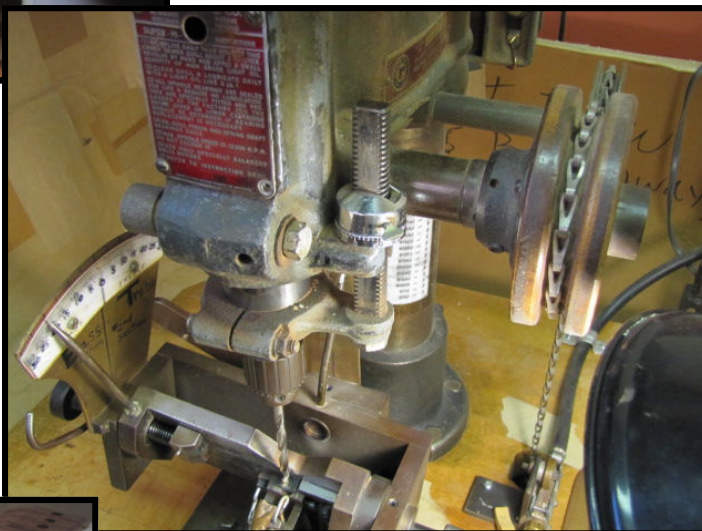
## Are replacement hammers a one-size-fits-all type of product, or are they custom made for the individual grand piano?

Hammers are always custom-tailored for the individual piano. Sample hammers from the piano are used for the purpose of duplicating original felt weight, boring angles, etc. to allow for a new set of hammers to be made which replicate the original set. The first step is to select a set from those available (photo below) which match the originals from a dimensional standpoint.



Hammer selection is also determined by what you as the owner want the piano to sound like. For example, do you want to go in the direction of a loud, aggressive sound or more towards a sweet, singing tone without the brilliance that characterizes many pianos today? (This should be decided before your hammers are ordered.)

After careful measurements of the sample hammers are made, a special drill press is used to bore the hammer heads at the correct location and with an exact duplication of angles (front-to-back and side-to-side) so that the hammers strike the strings precisely as intended when the action is returned to the piano.



The entire set of grand hammers is drilled and made ready for installation. A new set of hammers such as this is a huge improvement for an older instrument. With modern manufacturing techniques, hammers produced today rival or even surpass the quality of the hammers which were installed when your piano was first produced.

**Is the installation of new hammers simply a matter of gluing them on, or is there more to it than that?**

There is considerably more to installing a set of hammers than simply gluing them on. The old hammer shanks are carefully prepared for the installation of the new hammers. The type of glue is carefully chosen to best match the piano's needs and is applied in a specialized way. The exact positioning and orientation of the original hammer is analyzed and duplicated.

If the original hammer shanks and flanges are retained, the remains of the old glue must be removed from the old shanks, and the end of each shank carefully sized (using tool shown in photo right) before the new hammer heads are installed. The fit must be neither too tight nor too loose for proper adjustment.

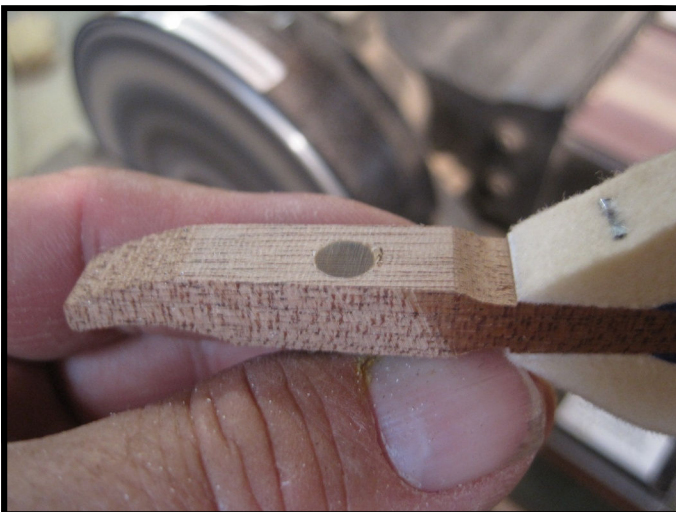


Depending on the circumstances, either a cold glue or a hot glue might be used. Here, hot hide glue is mixed to achieve an exacting viscosity and temperature for maximum performance.

Positioning of the new hammers begins with a determination of the orientation of the original hammers. In the photo to the right, the exact line at which the hammers impacted the strings is determined. The new hammers will be installed to match this measurement precisely.



A ring of excess glue in the form of a well-defined "collar" is one signature of a professionally done job. This practice is an example of the rich tradition that is a hallmark of piano production. Both quality piano manufacturers and skilled rebuilders alike are aware of the importance of adhering to traditional methods.



With a grand hammer, the hammer shank runs completely through the molding. Any excess length of the shank is removed to give a smooth outer surface. Attention also is given to the tail of the hammer, which is carefully shaped so that the hammer may be smoothly caught by the backcheck.

### **Is the value of an instrument lessened by the removal and replacement of the original hammers?**

Just the opposite. An old set of hammers on a quality grand piano might be compared to a balding set of tires on a classic car. Worn out hammers add nothing to the value of a piano in that they represent maintenance which needs to be taken care of before the piano is performing up to its potential. A strong case might be made for the keeping of original ivory which is still in good shape, or the original finish if the case has a lovely patina—but not for the hammers once they have outlived their usefulness. Having a new set of hammers professionally installed is always an improvement which adds value to the instrument because the tone of the piano will be vastly improved—the beauty of the piano's voice won't be masked by worn out hammers. (Other related issues may need to be dealt with as well, but having worn-out hammers replaced with a high-quality set of new hammers is always a huge step in the right direction!)



*A set of new hammers will go a long way towards creating a beautiful tone once again.*

**"In business to bring your piano to its full potential."**

**Please advise me when you wish to have this repair professionally done.**

**Scott Andrews**

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