



SELECTING & VOICING THE RENNER HAMMER

By Rick L. Baldassin

RENNER[®]
USA Division of
Lloyd Meyer & Company

Selecting Replacement Hammers

Louis Renner & Company produces the hammerheads for the world's finest piano makers, as they have done for over 130 years, and have grown to become the largest, independent, producer of hammerheads in the world. The German Steinway, Bösendorfer, Fazioli, Schimmel, Bechstein, Blüthner, Estonia, Förster, and Steingraber are among the world's premium pianos that use Renner hammers which are produced to each manufacturer's specifications. Our selection of hammers for the North & South American markets include the following premium product lines which incorporate the original designs developed early in the 20th century for vintage Steinway and other quality pianos and the latest advances in hammer making technology. These superior hammerheads are produced utilizing the most advanced technology and state-of-the-art machinery in the industry, combined with the finest German hand-craftsmanship.

The grand hammers are made in 3 basic weights, with an additional weight in the Hamburg Collection, and 2 boring sizes which will fit 80% of the pianos you are likely to encounter. 3 universal sizes are also available, which can be custom bored, shaped, and tailed, for the remaining 20% of the grand pianos. The upright hammers are available in two basic sizes which will fit nearly every upright piano.

Renner Premium Blue

The original Premium Blue hammer specially designed for vintage Steinway and other quality pianos.

Renner Premium "Blue Points"

Latest refinement of the classic Premium Blue line, incorporating Weickert Special felt, also designed for vintage Steinway and other quality pianos. Higher tension felt. Less voicing required.

Hamburg Collection

Designed for Hamburg Steinway grand pianos produced after 1970. Wider width and heavier weight.

Special Features of the Renner Blue Point and Premium Blue Hammerheads

Hammer Felt

The special hammer felt used in the Renner hammer is produced by the Würzen Felt Company, in the former East Germany, which supplied vintage Steinway and other quality pianos their special hammer felt for over 100 years. The felt became unavailable for several decades following World War II, during the Russian occupation, and became available again with the reunification of Germany. It continues to be the finest hammer felt produced in the world, resulting in the widest possible harmonic and dynamic tonal range with a minimum of voicing required.

Hammer Molding

The molding used in the Renner Premium Blue and Blue Point hammers is a special species of Walnut wood, grown in Germany. It is carefully selected for its uniform, lighter weight, and responsiveness. It is aged naturally, prior to final conditioning, to assure long term stability and performance in different climatic environments.

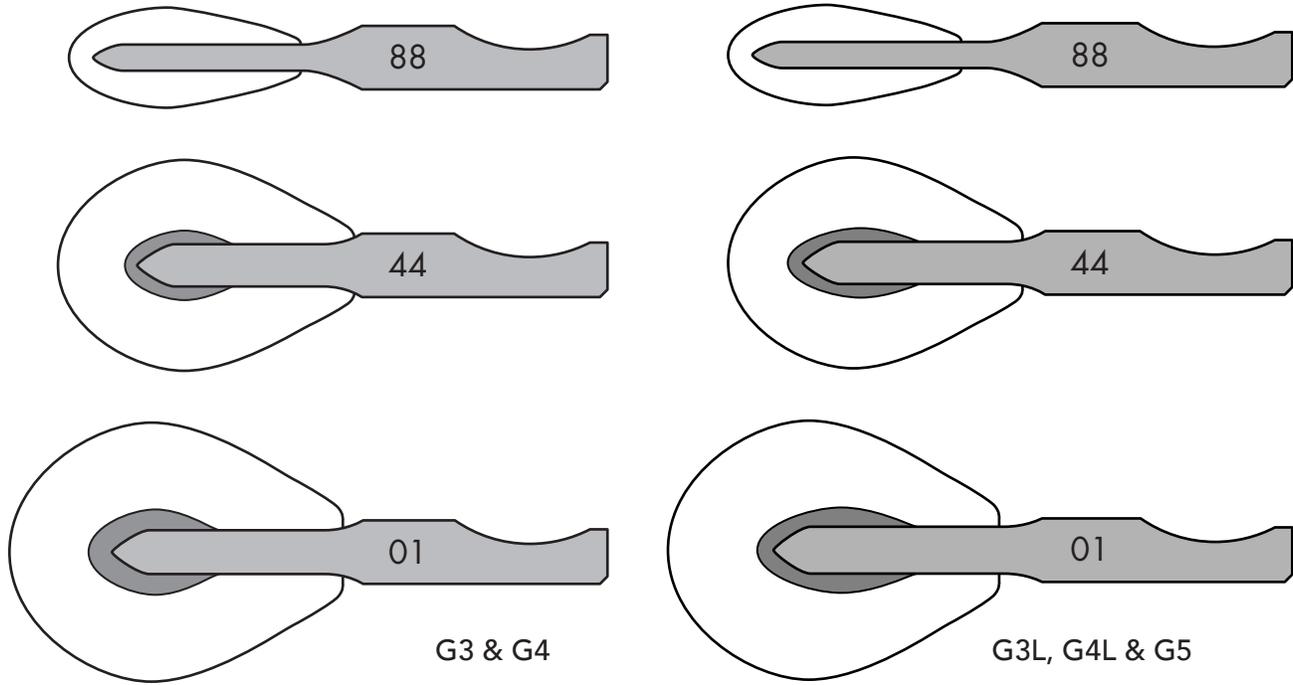
Renner Compression Clasp

Each of our hammerheads incorporates the exclusive Renner T-Clasp™ to maintain the desired felt tension and even weight distribution within each hammer. This unique clasp is made from a proprietary, surface-coated, hardened steel, which is used to lock the felt to the base of the molding without damaging individual felt fibers. To assure uniformity, each clasp is optically sorted and matched by computer to assure the correct dimensions and alignment of the stems. The clasps are then inserted electronically into each hammerhead, one-at-a-time, applying equal pressure to both sides of the hammerhead, to assure uniform tension and perfect centering and alignment of each clasp. Each hammerhead is then hand inspected individually to assure absolute perfection.

Hammer Presses

Our unique hammerhead presses allow for the perfect centering of the outer and under felt on the hammer molding, with special sensors controlling the amount of pressure and temperature applied to each individual hammer across the scale. This protects the structure and integrity of the felt during the pressing process, and results in the optimum tension and responsiveness of each individual hammer.

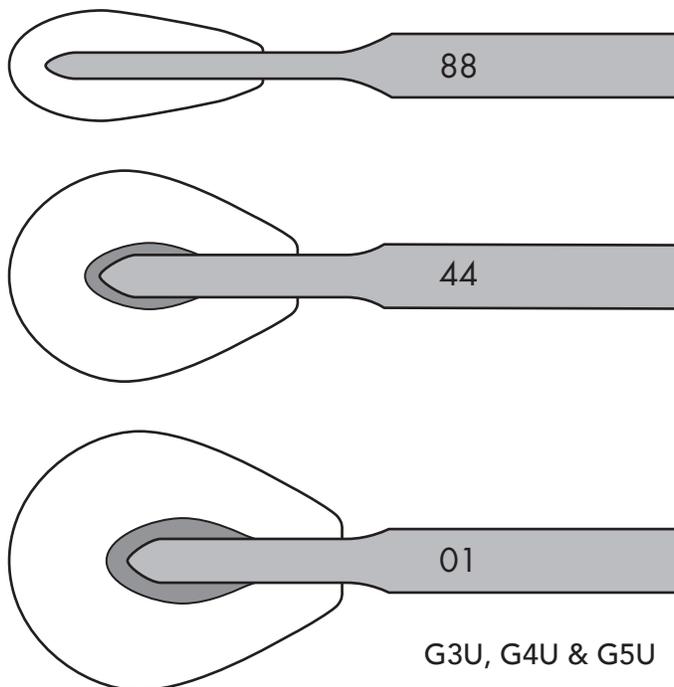
Grand Hammers



| Premium Blue (PB) & Premium "Blue Point" (PBP) Grand Hammer Specifications | | | | | | | | | |
|--|------------------|----------------|-----------|--------|----------------|------------------|-----------------------------|----------------------|--------|
| Model | Molding Material | Size (lbs.) | # Hammers | | Overall Length | | Hammer Bore Range | | Width |
| | | | Bass | Treble | Bass | Treble | Bass | Treble | |
| G3-PB G3-PBP | Walnut | Gr.3 14 lb. | 32 | 64 | 3 1/8" | 2 13/16" | 2-2 1/4" | 1 11/16- 1 15/16" | 27/64" |
| G4-PB G4-PBP | Walnut | Gr.4 16 lb. | 26 | 70 | 79.5mm | 71.5mm | 51-57mm | 43-49mm | 10.9mm |
| G3L-PB G3L-PBP | Walnut | Gr.3 14 lb. | 32 | 64 | 3 1/4" 83mm | 2 15/16" 75mm | 2 1/8- 2 3/8" 54-60mm | 1 13/16- 2 1/16" | 27/64" |
| G4L-PB G4L-PBP | Walnut | Gr.4 16 lb. | 26 | 70 | | | | | |
| G5-PB G5-PBP | Walnut | Gr.5 18 lb. | 26 | 70 | | | | | |

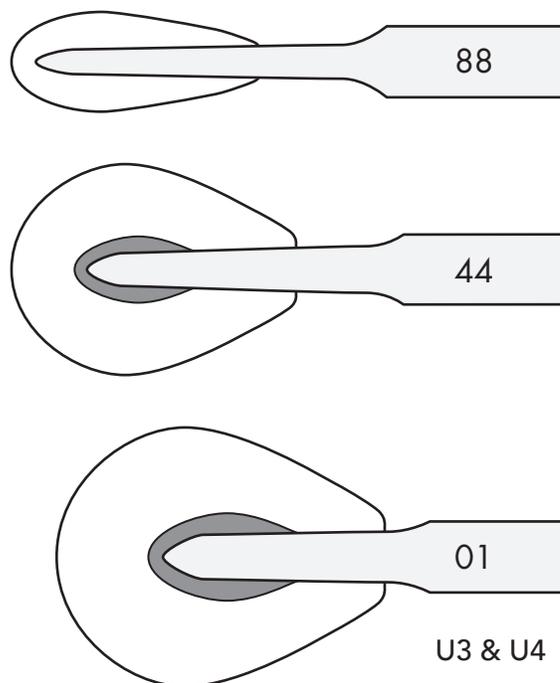
Renner USA offers a wide array of custom hammer technical services which include: custom hammerhead boring, pre-filing and pre-voicing the hammers, and hanging the hammers to the original factory specifications and precision.

Grand Hammers



G3U, G4U & G5U

Upright Hammers



U3 & U4

Premium Blue (PB) & Premium "Blue Point" (PBP) Grand Hammer Universal Molding Specifications

| Model | Molding Material | Size (lbs.) | # Hammers Bass Treble | Overall Length Bass Treble | Hammer Bore Range Bass Treble | Width Bass Treble |
|-----------------------|------------------|----------------|-----------------------|----------------------------|-------------------------------|-------------------|
| G3U-PB PB "Lites" | Walnut | Gr.3 14 lb. | 96 | 3 5/8" 92mm | 1 11/16- 2 5/8" 43-67mm | 27/64" 10.9mm |
| G4U-PB G4U-PBP | Walnut | Gr.4 16 lb. | | | | 29/64" 11.5mm |
| G5U-PB "Big Blues" | Walnut | Gr.5 18 lb. | | | | |

Premium Blue Upright Hammer Specifications

| Model | Molding Material | Size (lbs.) | # Bass | # Treble | Overall Length Bass | Overall Length Treble | Bore Bass | Bore Treble | Width Bass | Width Treble |
|-------|------------------|----------------|--------|----------|---------------------|-----------------------|-----------------------------|-----------------------------|------------------|------------------|
| U3-PB | Hornbeam | Gr.3 14 lb. | 32 | 64 | 2 11/16" 74mm | 2 15/16" 74mm | 2 1/8- 2 3/8" 54-60mm | 2 3/8- 2 5/8" 60-66mm | 3/8" 9.5mm | 13/32" 10.4mm |
| U4-PB | Hornbeam | Gr.4 16 lb. | | | | | | | 13/32" 10.4mm | 13/32" 10.4mm |

Hamburg Collection Grand Hammer Specifications

| Model | Molding Material | Size (lbs.) | # Bass | # Treble | Overall Length Bass | Overall Length Treble | Bore Bass | Bore Treble | Width |
|-------|------------------|----------------|--------|----------|---------------------|-----------------------|---------------------------------------|--|------------------|
| S/M/O | Maple | Gr.5 18 lb. | 26 | 64 | 3 7/32" 82mm | 2 27/32" 72mm | 2 3/32 - 2 11/32" 53- 59.5mm | 1 23/32 - 1 31/32" 43.5- 50mm | 29/64" 11.5mm |
| A/B | Maple | Gr.5 18 lb. | 20 | 70 | | | | | |
| C/D | Maple | Gr.6 20 lb | 20 | 70 | | | | | |

Introduction

The purpose of this manual is to acquaint you with the Renner philosophy of hammer design, and give you a basic voicing procedure that will produce consistent and predictable results. The Premium Blue and Premium Blue Point hammers have been designed to be lightweight, and are produced without the use of chemical hardening agents. These hammers will fit the pianos on which you will work and will produce predictable, desirable results.

Tools Required

The tools required to perform the pre-voicing, pre-filing and voicing are as follows:

- Hammer Clamp to hold 1/3 of the hammers for pre-voicing and pre-filing
- 3-needle voicing tool for deep needling
- Sandpaper strips (220, 320 and 400 grit)
- Chopstick Voicing Tool



Renner Deluxe Voicing Tool

The tools required to perform the piano preparation are as follows:

- String hook
- String level
- Brass rod or hammer shank to seat strings
- Small hammer



String Level



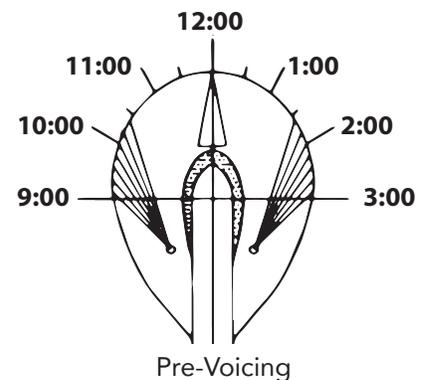
Renner Chopstick Voicing Tool

Precautions

There are many voicing techniques currently being taught by various suppliers, many of which do not work well on Renner hammers. We do not recommend the use of chemical hardeners (such as lacquer, sanding sealer, or plastic in acetone, etc.), squeezing with pliers, needling in the sides of the hammers, or changing the shape of the hammers.

Pre-Voicing

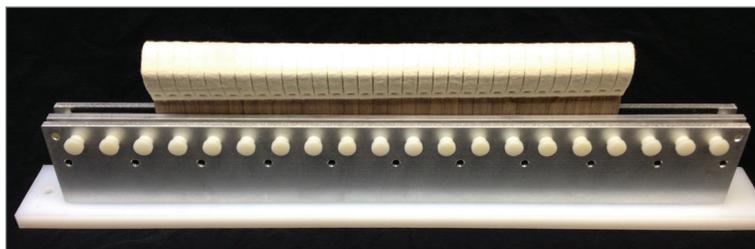
If this is your first set of Premium Blue or Premium “Blue Point” hammers, you may want to skip this section for now. Experience will tell you how much pre-voicing to do. Use a voicing tool with three needles (#5 Sharp) that are 10 mm (3/8”) long, and needle between 9:00–10:30 on one side, and 3:00-1:30 on the other. Begin with six stitches on each side in the bass, graduating to three stitches in the treble. Use a “pushing” technique rather than a “stabbing” technique. This will result in reduced needle breakage and greater accuracy as to where the needles enter the hammer. The pushing technique will require fewer stitches. Start needling low on the shoulder (9:00 and 3:00) and work up toward the crown (10:30 and 1:30).



Pre-Voicing

Pre-Filing

It is Renner's philosophy that to have a good sounding hammer, the shape of the hammer must be determined by grinding the side of the felt that will become the inside of the hammer, before it is glued. Once the hammer is pressed, the original shape must be maintained to preserve the continuous layers of felt around the outside surface of the hammer.



Hammers in Clamp

When the hammers are cut apart, tension is released where the felt has been cut, causing a "cupped" shape on the top of the hammer. This "cupped" shape must be removed to produce good tone. The most efficient way to do this is to "gang file" the hammers before they are hung. Place one-third of the hammers at a time into the hammer clamp, and secure the clamp in a vise or to the workbench. Using the sandpaper strips, remove a few layers of felt from around the hammer, starting low on the shoulder, and moving toward the top, stopping just short of the crown.

Start with 220-grit on the Premium Blue hammers, and 320-grit on the Premium "Blue Point" hammers. Once this has been performed on both sides, the crown can be gently filed, joining the two sides together. This will lessen the chance that too much material will be removed from the crown. This procedure can be repeated with finer grits, remembering that the more material that is removed and finer the grit used, the brighter the tone will be. You may want to finish with as fine as 400-grit for the Premium Blue, whereas a single filing with 320-grit should be sufficient for the Premium "Blue Point", unless you want a brighter sound.

When you have completed this step, the profile of the hammers should be the same as when you started, with the "cupped" shape removed. Please note that the more pointed shape in the Premium "Blue Point" hammers is achieved by pressing, not filing, thus the continuous layers of felt have not been disturbed, and the more pointed shape should be preserved in the filing process. Conversely, filing the Premium Blue hammer to a more pointed shape, thus disturbing the continuous layers of the felt, will have a detrimental effect on the tone.

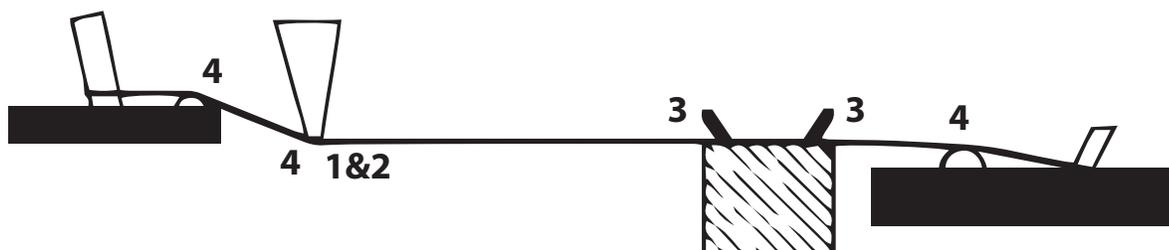
Ironing

After needling and filing (if performed at this time), you may want to iron the hammers to clean up the appearance. Ironing will remove the needle marks in the shoulders, and lay the fibers down from filing. Use a flat iron with the temperature on the "wool" setting. Try not to iron on the crown, as this will create a "pinging" sound. With the use of Würzen and Weickert Special felts in the hammers, you may find that the ironing procedure is not necessary to obtain the look you desire.

Piano Preparation

Since even the best set of hammers can only bring out the sound that is already in the piano, the bulk of the voicing job is actually done on the piano. No amount of needling or filing can

compensate if this work is not done. While all regulation is important to tonal production, spacing of the hammer to the strings and let-off are particularly important. The string terminations are also a major concern. We recommend the following procedures in this order:

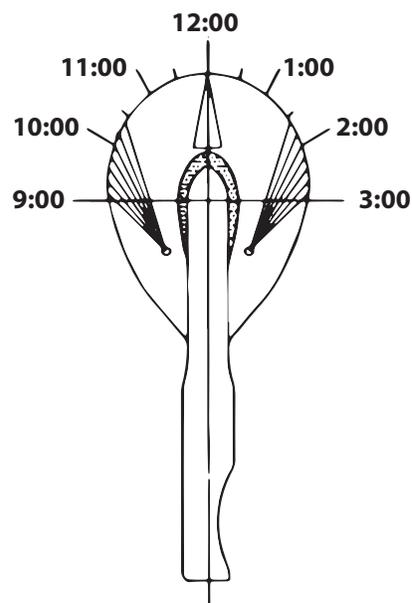


1. **Lift all of the strings.** This is done to remove the natural curvature of the wire as the string leaves the agraffe or capo bar. The piano must be at pitch before the strings are lifted. In the agraffe section, place the string hook about an inch from the agraffe and gently lift upward as you pull the string hook toward the agraffe. In the capo section, place the string hook next to the capo bar and gently lift upward as you pull the string hook away from the capo bar.
2. **Level the strings.** Place the string level on the unison as close to the strike point as possible. Lift the outside strings until the bubble is centered, then lift the center string until you hear an equally muted sound as each of the strings is plucked. Then file the hammers to fit the leveled strings. An alternate method is to block the hammer to the strings after it has been pre-filed and the tops are perfectly square. Pluck the strings and note any strings that are "open" and ring. Lift the strings that are not ringing, until all the strings are equally damped when plucked. Renner hammers are particularly sensitive to having a perfect fit of the hammers to the strings.
3. **Seat the strings on the bridges.** Use a brass rod or hammer shank to seat the strings on the bridge. Holding the rod at the angle of the bridge pins, gently tap in the speaking length at both the rear and front bridge pins.
4. **Seat the front and rear duplex segments.** This is done by lightly tapping on the speaking length side of the termination to remove the curvature in the wire.
5. **Do a fine-tuning.** All of the above operations will place the piano out of tune, so it should be re-tuned at this time.

Hammer Voicing

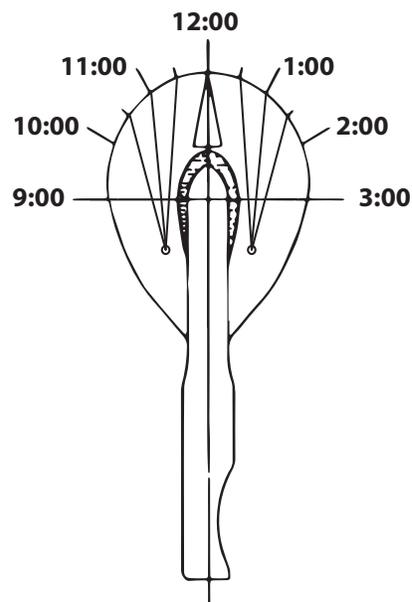
With the pre-voicing (if you chose to do it), pre-filing and piano preparation completed, you are now ready to do the hammer voicing. It is important in this process to focus on one aspect of the tone at a time and correctly regulate it, while ignoring other aspects as much as possible. Check for the following in this order:

1. **Dynamic Range**—Play sample notes from pianissimo (very soft) to fortissimo (very loud) using ten blows. Are you able to play through the entire dynamic range without the sound distorting or breaking up? If not, deep needling from the 9:00 to 10:30 and 3:00 to 1:30 positions will improve the dynamic range. If you skipped the Pre-needling procedure described previously, that procedure should be performed now. If the needling done in the Pre-voicing procedure was not enough to achieve the full dynamic range, a few more stitches in the same area should help. When finished, you should be able to play with very loud blows, and the sound should remain clean and undistorted. Do not be concerned with the attack of the sound at this point. The attack may be too bright from soft to loud, or too mellow from soft to loud. The important thing to this point is whether or not the note can be played loud without the sound breaking up. Once you have achieved this on your samples, then add the same number of stitches on the hammers between the samples, or graduate between, as necessary. When you have achieved the full dynamic range, you will also notice that the sound is more “open” than when you started.



Dynamic Range

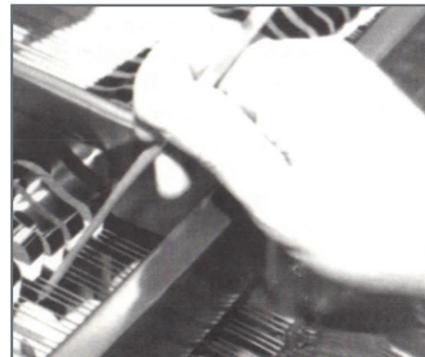
2. **Noise in the capo section**—This is most noticeable in the first capo section of certain brands of piano. If you hear an objectionable tone, try muting the front duplex with your finger while playing the note. If the objectionable tone goes away while the duplex is muted, then deep needling higher in the shoulder may help. Do not permanently mute this front duplex section, as this will cause a substantial loss of power. Deep needle from 10:30 to no higher than 11:30, and from 1:30 to no higher than 12:30, to the full extent of the needles. Be sure that the needles are aimed toward the two points to the side of the molding, thus preserving the triangle-shaped area under the crown, in which we do not needle. Proceed with caution, one stitch at a time, checking often, and do as little as possible. Too much needling in this area will reduce the power.



Noise in the Capo

3. **Sustain**—This is also most noticeable in the first capo section of certain brands of piano. When the note is played, does the note sing, or does it die too quickly? If it dies away too quickly when played, does it sing or die away when the string is plucked? If it sings when the string is plucked, first check the fore-aft position of the action to see if the strike point is optimal. You may also have a problem with soundboard crown or down bearing. If the note does sing when plucked, carefully check the fit of the hammer to the strings, and correct as necessary. Listen more carefully than before to be sure that not only each string is damped, but that the sound when each string is plucked is exactly the same. Once the hammer is fit, does the tone still die away too quickly? If so, shallow needling on the keyboard side of the hammer, along the edges will help. This is performed with the action in the piano, using the “chopstick” voicing tool. Play the note, such that the hammer tail is in contact with the backcheck. While holding your finger on the key, place the chopstick voicing tool in contact with the hammer low in the shoulder, where an additional poke will have no effect. While slightly easing the pressure on the key, push the hammer down into the backcheck, and apply firm pressure on the key. With the hammer held firmly in place, needle along the right and left edges of the hammer from 9:00 to 12:00. Listen to see if the tone has improved. The procedure can be repeated in two rows parallel to the sides of the hammers, between the string grooves, and on the rear side of the hammer.

4. **Metallic Sound**—If a metallic sound is heard, check to see if the sound is coming from a particular string or strings. Once the metallic sound is isolated, use the chopstick voicing tool and needle at the crown under the offending strings. These metallic sounds can also be the cause of the offensive sound in the front duplex segments. The use of the Würzen and Weickert Special felts has greatly reduced the presence of these metallic sounds.



Voicing with the
Chopstick Voicing Tool



Sustain



Metallic Sound

5. **Attack**—The attack is controlled by the very striking surface of the hammer. If the attack is too bright, very light needling at or just under the crown will soften the striking surface and reduce the attack. This can be performed in the piano using the chopstick voicing tool. If the attack is too dull, then the striking surface must be made harder. There are several ways this can be accomplished. First, try setting the string grooves. Place a rubber mute on the strings of the note you are trying to brighten, and play the note with repeated hard blows while shifting the action with the Una Corda pedal. This will compact the string grooves, simulating hours of hard playing. You can try ironing over the crown with a flat iron to harden the surface of the hammer. Use caution as ironing on the crown has a tendency to make the sound “pingy.” The surface of the hammer can be “polished” by sanding with very fine grits of sandpaper (600 to 1000). If none of these techniques has made the attack bright enough, try filing a few more layers away, maintaining the original shape, thus getting to where the felt is more compact and hard. After filing, be sure to test that the hammer fit to strings is perfect. Use a sandpaper file or strips to correct the fit, as necessary. You may need to iron again, but most often this is not necessary. Remember that the sound will get brighter in the first 50 to 100 hours of playing.

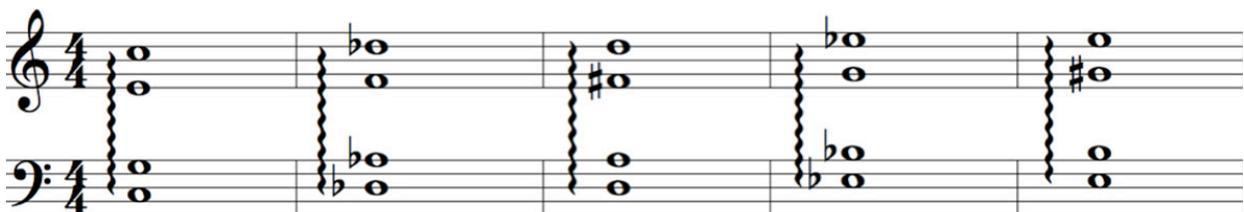


Attack,
Evenness
and Balance

6. **Evenness**—Play chromatically up and down the keyboard. Musically, the first note of each group of four sixteenth notes should be loudest. If as you play, any note other than the first note of the group is loudest, or if the first note sounds as if it is accented, then the attack must be reduced to match its neighbors. This is accomplished by using the chopstick voicing tool with the action in the piano. Begin with shallow needling at or just under the crown. This is easily overdone, so proceed slowly. Play up and down the keyboard with medium pressure and make the attack as even as possible.



7. **Balance**—When the piano is played, it is important that the individual notes of a chord combination have the proper balance. Any note that sticks out will detract from the beauty of the music. Voicing chords in this way will create the proper balance from section to section. Play a four-note arpeggiated chord to test for this. For example, in the Key of C, the notes of the chord would be C3, G3, E4 and C5.



This chord is then transposed chromatically up and down the keyboard. If any note seems to stick out, stop and fix it with the chopstick voicing tool, then immediately re-test. This is the only way you can really know if you have fixed the problem. In this example, note C5 has to fit as the fourth note of the series. A few notes up the scale, C5 will have to fit as the third note in the series, then as the second note, and finally as the bottom note. When every note can fit in any position in the chord, you have the proper balance.

In testing the bass, use just three notes. In the Key of C, these would be C3, G2 and C2. Each note must fit as the top note, middle note, and bottom note.



8. **Shift Position**—The next step is to check for evenness with the left pedal depressed, and the action in the shift position. The procedure is the same as in Step 6. It is crucial here to isolate the offending string(s), and work with the chopstick voicing tool directly under these strings, at or just under the strike point. Be sure that the action shift is properly regulated before performing this operation, understanding that if the hammer partially contacts the left string, this will create an objectionable sound that cannot be remedied by voicing. Too much voicing in the shift position can create problems in the rest position. This is why it is crucial to work carefully, only under the offending strings. When you have completed this step, repeat Step 6 to refine the evenness from note to note in the rest position.



Shift Position

9. **Final Test**—As the final test, play octaves up and down the keyboard to see if any stick out. If so, it is usually only one of the two notes that is louder than its neighbors. Correct this problem as in Step 6. When you have finished, the piano should have a wide dynamic range, be even from note to note, and balanced from section to section. The attack, which is the only subjective element in the procedure, should be suited to the application or customer's taste. This is your assurance that the piano will sound musical when it is played.