

Kevin will be
at Rochester
with hands-on
rubout!



Photo 1—With the piano legs on blocks, slide the piano dolly underneath. Sections of large beams on top of the dolly will support the piano with legs removed.

Steps to a Quality Piano Refinishing

By Kevin E. Hancock
Washington, D.C. Chapter

Introduction

This is the first of a series of articles on the steps and processes leading to the successful cabinet restoration and refinishing of a piano. Refinishing a piano is much like the challenge of rebuilding one. While the process has some absolute goals, each job has different problems and challenges that will require adapting skills and techniques to meet that specific goal. If some basic rules are followed and quality materials are used, it is not difficult to complete the restoration of a unique piece that has fine wood-grain patterns and craftsmanship that has grown harder to find in many new pianos. Many of the pianos made in the late nineteenth and early twentieth centuries were blessed with exquisite quartersawn mahogany, burl walnut, rosewood, and other fine woods. It is important to remember that if the piece is of historical value or has a finish with any potential to be rescued through preservation and restoration, that should be the path to follow in the restoration process. Unfortunately, over the years, the protective coatings on these old woods have often fallen to ruin by abuse, neglect, and light damage, most of which is not reversible. In the October 2003

through March 2004 issues of the *Journal*, RPT Webb Phillips provided an excellent overview of the refinishing process. What I will discuss in this series of articles are some specific processes, techniques, and materials that I use to bring back that old beautiful mahogany piano to its original splendor.

Proper Preparation

For ease of shop movement and to be able to work on the legs off the piano, I like to position the case of a grand on a dolly. I have built a few dollies for different sized grands that can roll under a piano. After lifting and placing the legs of the piano on 3 in. (8 cm) blocks of wood (see Photo 1), I slide a dolly under the piano and place sections of large beams under the case to carry the piano. Once positioned, I remove the blocks from under the legs and can then remove the legs from the case. The larger 4 in. (10 cm) wheels on the dolly allow for easier movement around the shop.

As you begin the evaluation of a piano restoration it is important to note the anticipated repairs, loose veneer, and



Photo 2 — Scored with a knife or saw, small cracks in the lid will be visible once finish is removed.

placement of the hardware, felts, leathers, and buttons before tearing down the piano. If there are cracks in the lid, they should be noted and scored with a fine saw or blade (see Photo 2), as, once stripped, they might not be visible until a finish is applied. Cracks like the ones in the photo will need shims glued into them to reduce the chance of the cracks to reappear. You should also look for loose legs and lyre, loose and missing veneer, joint failures, and cracks in other parts. The loose and missing veneer will need repair or replacement. Be sure to save any small loose pieces, as they can be re-used, especially where nice inlay is involved.

Every piano is different, and many will not have excessive veneer or cabinet damage; however, there is often loose veneer that cannot be seen initially. Tapping around suspected areas, like the edge of a lid, with the back of your fingernail and tuning in your ear to listen for hollow sounds will detect loose veneer. With all the work that goes into a quality finish, parts with loose veneer must be repaired or you might find yourself with a poor quality final product which may lead to premature finish failure.

Finding the bulk of the repairs and making note of them before beginning the finish removal is a good way to plan out the complete restoration. Throughout this series of articles I hope to discuss many of the repair techniques and processes for dealing with the damages that most pianos might have.

Make note of the decal with measurements and positioning on the fallboard. In the case of a Steinway, there are many choices for replacement and knowing what was originally used will be important. Taking photos is a good idea for

reference in placement and ease of reassembly. Noting these details will ensure the completed job will look the way the original maker intended.

As you disassemble the piano, labeling the hardware will ensure the piano goes back together smoothly. Place hardware in labeled Baggies™ and take note of any unusual pieces that may go back together differently. Separate Baggies into specific groups like “music desk,” “lyre,” “lid,” etc. Tape groups of screws together into sub groups like “lyre bottom,” “music desk guide rails,” or “top prop hinge,” to avoid confusion during reassembly. Reassembly that appears simple during the first day’s work on a job may prove to be quite difficult in a few months. Take the time now to label the hardware, and you won’t regret it later.

Often we see unusual pieces of hardware that seem almost counter-intuitive in the way they work. Often these devices have been modified, replaced, or have simply eaten away the wood that they are supposed to support. An old Chickering music desk comes to mind when I think about tricky hardware that may not work too well. It can be challenging to remember exactly how some of these parts connect to each other and what makes them work properly. Paying close attention to how it is assembled and works will save a lot of time and frustration when it is time to put it back together.

The sectional continuous lid hinges should be labeled on the back side to note which way they go back on the lid. I engrave a “B” on the back side of the hinge to know that it was the bass end of the hinge (see Photo 3). If you plan to have the hinge re-plated, numerically mark each section

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before removing it from the hinge pin.

Often, the sections of hinge look very much the same; however, if you do not reassemble the hinge in the same order that it came apart, it is likely that the screw holes in the lid will



Photo 3 — The continuous lid hinge can be engraved on the back side to ensure proper reassembly.

not line up with the hinge.

Unless there is a request for nickel plating, solid brass continuous hinges do not need to be taken apart. Later, in the hardware restoration section, I'll discuss a process for satin polishing and lacquering hardware.

Proper Masking

As much as I prefer to strip and refinish pianos without the plate and strings in the piano, most of the time I work on assembled pianos. All too often, pianos have already been rebuilt or do not need rebuilding when they are refinished. Also, I do not want the job of having to do touchup work on the newly refinished piano that has scratches and dents as a result of installing the plate and strings. Though it seems impossible to refinish an inner rim down to the plate and soundboard, with proper protection and care, it can be done successfully. There is a chance that there will be a little touchup necessary on the wood around the plate. That cosmetic step comes later between coats of lacquer.

It is imperative that the musical parts of the piano be protected while refinishing. The plate, strings, soundboard, keybed, and underside of the piano cannot be subjected to removers, solvents, or finish overspray. The first step is the careful removal of the action. Remove the fallboard, keyslip, and the cheek blocks. Check to make sure all the hammers have settled back into place before sliding the action toward



Photo 4 — Begin masking the interior by running a strip of masking tape around the perimeter of the soundboard.



Photo 5 — Once the soundboard and plate are covered with cardboard, tape a 15 in. width of paper around the perimeter.



Photo 6 — A final layer of paper and tape protects the interior from harmful chemicals.

you. With your hands on the action frame slide gently, being careful not to touch any keys, as they will swing the hammers upward and could cause damage to the action. Once the action is removed, put it in a safe place.

The plate and strings are protected with multiple layers of paper and cardboard. Do not use plastic for protection, as it does not let the wood breathe and can trap moisture. Begin by running a strip of quality masking tape around the inner perimeter of the case right on the soundboard molding and plate (see Photo 4). I use the 3M™ 2040 brand tape. If there is a good quality finish on the soundboard and plate, there is not a concern that the tape will damage the finish. If the finish on the plate or soundboard is not good, there is a possibility that the tape will remove a little of the finish when the tape is removed. I anticipate a little touch-up work on these areas with some jobs and try to get a little gold paint from the re-builder for plate touch-up.

Laying out cardboard cut close to size to cover the soundboard and most of the plate supplements the paper and tape. Proceed with the first 12 – 15 in. (30 – 40 cm) layer of paper around the perimeter (see Photo 5). I then use a 48 in. (120 cm) wide paper to cover the entire area a second time, followed by a final layer of tape to make sure everything is closed off from removers and overspray (see Photo 6). Place a sheet of cardboard on the keyboard before protecting it with paper.

Types of Strippers

The most effective finish removers contain methylene chloride, both liquid and semi-paste. There are other very effective removers available that can be quite useful with certain finishes but might have limitations in speed, effectiveness, or flammability. DBE™ (3M's safest stripper), for example, is effective in removing finishes but works relatively slowly requiring up to 24 hours to remove a finish, is expensive, and takes up to a week to completely flash (evaporate) out of the wood. Trapped remover solvents in wood can cause problems with finish adhesion and drying later on in the process. This safe stripper is a good solution for those who do not have the proper facility and safety equipment and have plenty of time to get the job done.

Stripping Safety

The chemicals used in finish removers are very dangerous and must be handled with extreme care. Proper personal protection, including gloves, aprons, and, often, goggles are necessary. The best glove for working with methylene chloride strippers is a polyvinyl acetate glove. They resist penetration of MC better than any other glove. The interesting thing about the PVA glove is that it breaks down in



Photo 7 — Once the stripper has had a chance to act, remove the softened finish with wide putty knives.

water and some alcohols, so your sweat will deteriorate the glove from the inside out. One way to avoid this is to wear a thin polyethylene or latex glove inside.

Fresh, well-circulated air is a must when working with finish remover. I try to do most of my finish removal with open doors and constant air circulation. If this is not possible because of shop design or weather, there are fresh air supply breathing systems available for the best protection.

Many solvents are heavier than air, and gravitate downward leaving the higher concentrations of vapors near the floor. When using fans to circulate the air, try to locate yourself so the fresh air supply crosses your work area and carries the vapors across the room away from you. Solvent respirators can be useful with solvents washing but are not completely effective in protecting you when using removers containing methylene chloride.

Thorough Finish Removal

Start with the inside of the case and remove the finish completely before stripping the outside of the case. Apply thin coats of semi-paste remover with a brush, being careful to keep the coats thin. Keep a rag on hand to immediately catch any runs or sags of remover. After a few minutes, use a three- to four-in. (8 – 10 cm) putty knife to scrape off the finish (see Photo 7). I use two four-inch putty knives and scrape off the finish from the wood and then scrape the finish from one knife into a bucket. Repeat this step until the wood is clean and free from any finish. It usually requires three to four applications of remover before all the wood is clean.

After all the finish is removed, a lacquer thinner wash removes the excess stripper residue. I scrub the wood with Scotchbright™ and lacquer thinner repeatedly until the wood is clean and all the filler is removed from the pores (see Photo

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8). While some folks like to remove only the finish and leave the filler in the pores, I have found that the remover takes the pigment out of the filler. This leaves the pores filled with gray filler, which creates problems later. By getting all the filler out of the grain, you will have better results when you replace it with fresh new colored filler. I will discuss more details on the filler process in a later article.

With the inside of the case completely clean, liberally apply semi-paste remover to the outside. Give the remover a few minutes to work and apply more remover wherever it looks thin or dry. After a few minutes, use a four-inch putty knife to remove the finish.

All of the case parts are stripped with liquid remover through a flow-over system. A flow-over system is a pump and brush that circulates a liquid remover. It is done in a



Photo 8 — The residue left by the stripper can be removed with lacquer thinner and a Scotchbrite pad.

stripping pan, and the fluid is collected, filtered, and re-circulated through the scrub brush (see Photo 9). The liquid removers used in the flow-over process are not very effective if the temperatures go below 65 degrees F (18 deg. C). A pail heater is used to keep the remover warm in the cooler months. Each part is scrubbed with remover and the brush until all the finish is removed. Once the bulk of the finish is removed, I like to scrub the wood with a Scotchbrite pad and liquid remover to get all of the old filler and color out of the wood. A final wash up with lacquer thinner cleans any stripper residue off the parts.

While removing the finish from the wood keep in mind that the stripper is better at removing finish than sanding. Don't skimp on getting the wood as clean as possible with solvents. Deciding that something half-stripped is good enough, and that you'll let the sanding get it cleaner is not a

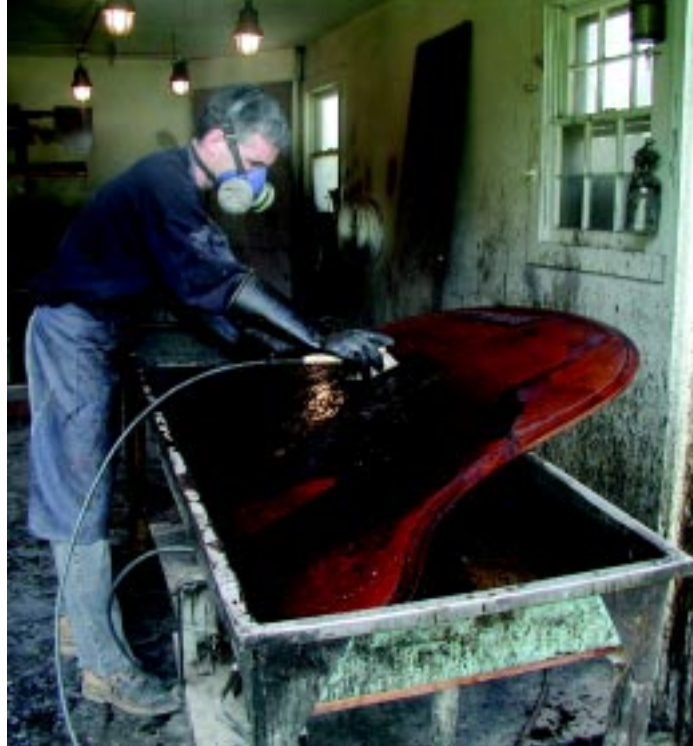


Photo 9 — A flow-through system effectively removes finish from case parts.

good practice. Yes, sanding is an important step, but only after all signs of the old finish are gone.

With the wood cleared of finish and filler you will be surprised how much cleaner it will be after a mild soap and water wash. Many removers have waxes to retard evaporation and might be left in the wood. I mix 1/2 cup (200 ml) of BoraxTM with a gallon (3.8 liters) of warm water and scrub the wood with a maroon Scotchbrite pad. This removes any stain, dye, or filler that might remain in the wood. It also will help lift out silicone oils and waxes that might remain. This is just a quick wash down, rinse, and wipe dry process. I do not soak the parts in water or use power washers. Skipping this step can lead to extra sanding, uneven staining or dyeing, drying problems with lacquer, and potential finish adhesion problems. This step assures me that the wood is clean and the adhesion of the new finish will be at its best.

The wood is now clean, free from finish, oil, wax, old felt, buttons, and fillers. Next month we will tackle cabinet and veneer repairs, sand the wood, and prepare for pigments and the finish.

About the Author

I started in the piano and antique restoration and refinishing trade as an apprentice with Gerald Haggerty in 1974. I had the great fortune to work and learn from a true artisan and craftsman servicing many fine pianos in the Washington, D.C. area. In 1976, Gerald moved out of the area, and I began my own shop at the age of 19. For nearly 30 years I continued to restore pianos in my one-man shop and learn through others in the trade. Focusing solely on piano cabinet restoration and refinishing, I have had great opportunity to study the nuances of fine piano construction, and develop skills and techniques to bring these masterpieces back to their original splendor. Visit my web site at www.hancockrestorations.com. ❏

Steps to a Quality Piano Refinishing, Part 2

Accurate Cabinet and Veneer Repair

By Kevin E. Hancock
Washington DC Chapter

Introduction

In the December 2005 issue we discussed the preparation and process of removing the old finish on the piano. This month we will get started on the cabinet and veneer repairs that lead up to the application of the new finish. If done properly, the cabinet can be returned to its original condition, – which is a must for the final restoration to look its best.

The specifics of necessary cabinet and veneer repairs will vary from one job to the next. The typical restoration includes repairs to the front of the case, hairline cracks in the lid, and missing veneer on the edge of the lid. Some of the more difficult repairs might include bubbles of loose veneer in the center of a lid, loose veneer on all four sides of a grand leg (Mason & Hamlin pianos are classic for this anomaly), or the fine old upright that has experienced a flood, leaving loose veneer around the entire lower area of the piano.

Veneered Construction

The typical piano part consists of five layers of wood. The face veneer is the outermost layer and can be of varying thicknesses depending on the part. The lid, for example, typically has a core of solid, edge-glued boards that are just over 1/2 in. (13 mm) thick. On each face of this core is a layer of cross-banding veneer 1/28 in. (1 mm) thick with the grain running perpendicular to the grain of the core. This cross-banding is then veneered with the top layer of wood, which is also 1/28 in. thick.

Structurally, the cross-banding makes for a much stronger board. Much of the glue failure on old pianos is between the core and the cross-banding. Most often, loose veneer is a result of wood movement variations. When a core wood expands and contracts from changes in humidity and temperature, the glue joint holding the thin top layers of veneer to the core cannot hold up to the stresses created by this movement.

There are some cases in which loose veneer is a result of poor or challenging engineering on the part of the piano maker. For example, bent wood rim construction in grand pianos necessarily exposes the endgrain of the rim laminations on the front cheeks. Applying a single thin layer of

veneer to this endgrain is a prescription for loose veneer. Veneer that has cross-banding or a second layer of veneer with the grain running perpendicular to the face layer will often reduce the problems associated with loose veneer on the front cheeks of a grand piano.

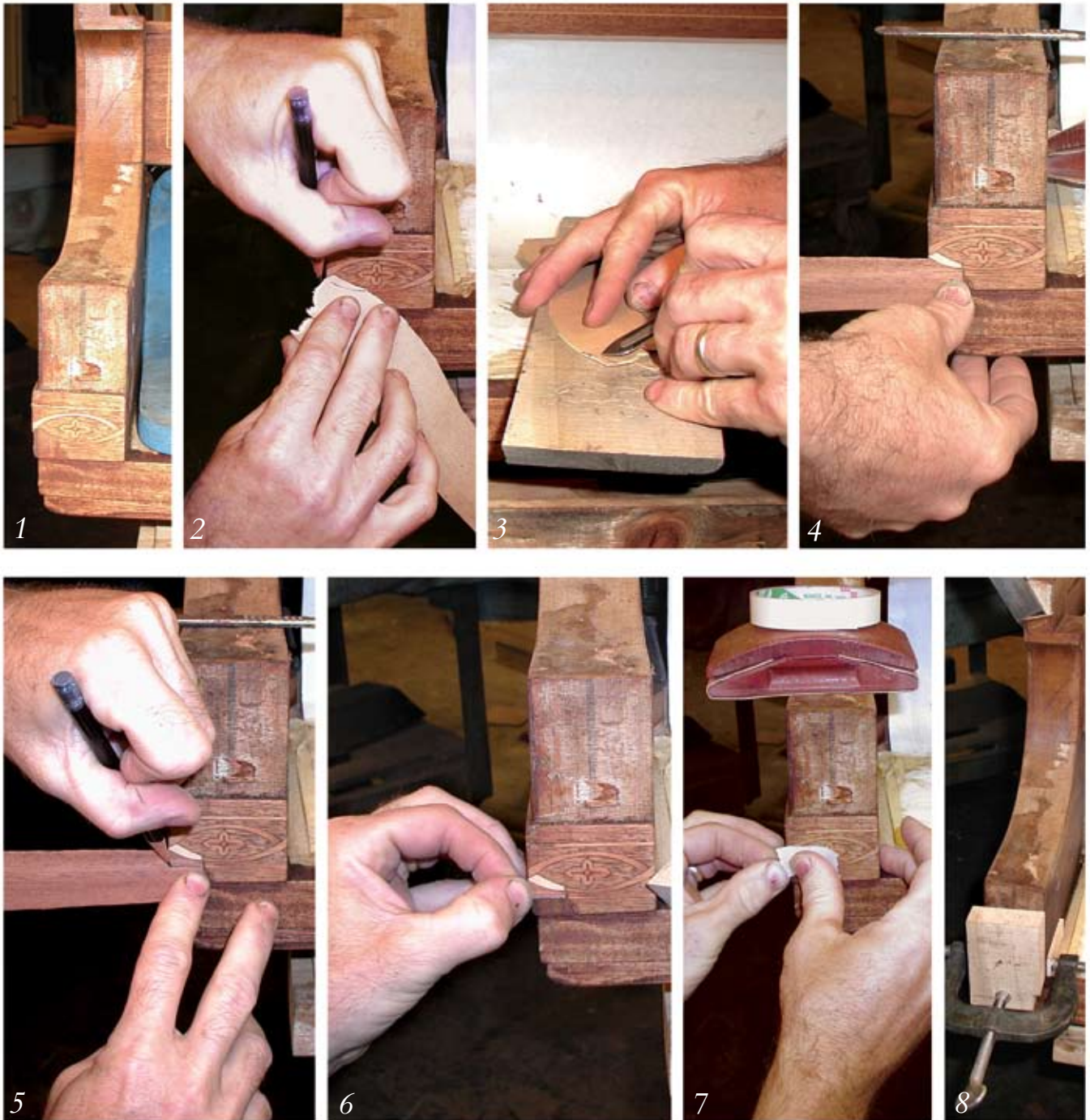
Locating Loose Veneer

It is important to locate as much of the loose veneer as possible before removing the finish, though veneer problems will appear throughout the course of the cabinet repairs and finishing preparation work. Often, much of the loose veneer is obvious and can be located easily with visual inspection. Make note of these impending repairs since they might not be as visible after the finish is removed. Before removing the old finish, examine the wood closely and look for fine lines in the finish that might indicate loose veneer. By tapping the surface with the back of your fingernail, you can attune your ear to the hollow sounds that loose veneer makes when it slaps against the substrate. This is veneer that is slightly loose and will need glue injection with a syringe to be secured before a new finish is applied. Finding loose veneer during the finishing process can really slow down momentum because you will have to stop the finishing, re-glue the damages, and clamp it for a few hours.

Repairs to Cheek Veneer

The photos below show step-by-step repairs for common veneer failures. The first series shows repair and replacement of veneer in the cheek area of a Steinway grand piano. The upper curved area of the cheek had veneer so badly damaged that it needed to be entirely replaced. The lowest flat surface had an intricate ornamental inlay with missing pieces. Each small missing piece must be individually cut from veneer that matches the original.

Photo 1 shows the entire bass cheek area. The loose veneer has been removed from the upper curved section of the cheek. Closely examine the loose and missing pieces of veneer, and keep any small pieces for possible re-use. This job will require two types of new veneer to replicate the original pattern. In Photo 2, I have cut the top curve in a piece of new



Photos 1 - 8, repairing and intricate inlay.

white wood veneer, carefully matching the grain direction to the original. Holding the new piece in place next to the original piece, pencil in the lower curve. Remove the new piece to a cutting surface, cut the lower curve with a razor knife (Photo 3). With the new white wood piece aligned (Photo 4), cut and fit a piece of new mahogany veneer to the edges of the other pieces of the inlay. Photo 5 shows marking the lower edge where the new mahogany piece fits against the white wood strip below. With the next piece fitted (Photo 6), I am ready to glue the pieces in place

A piece of masking tape pressed onto the newly fitted pieces of veneer will hold them in position for gluing (Photo

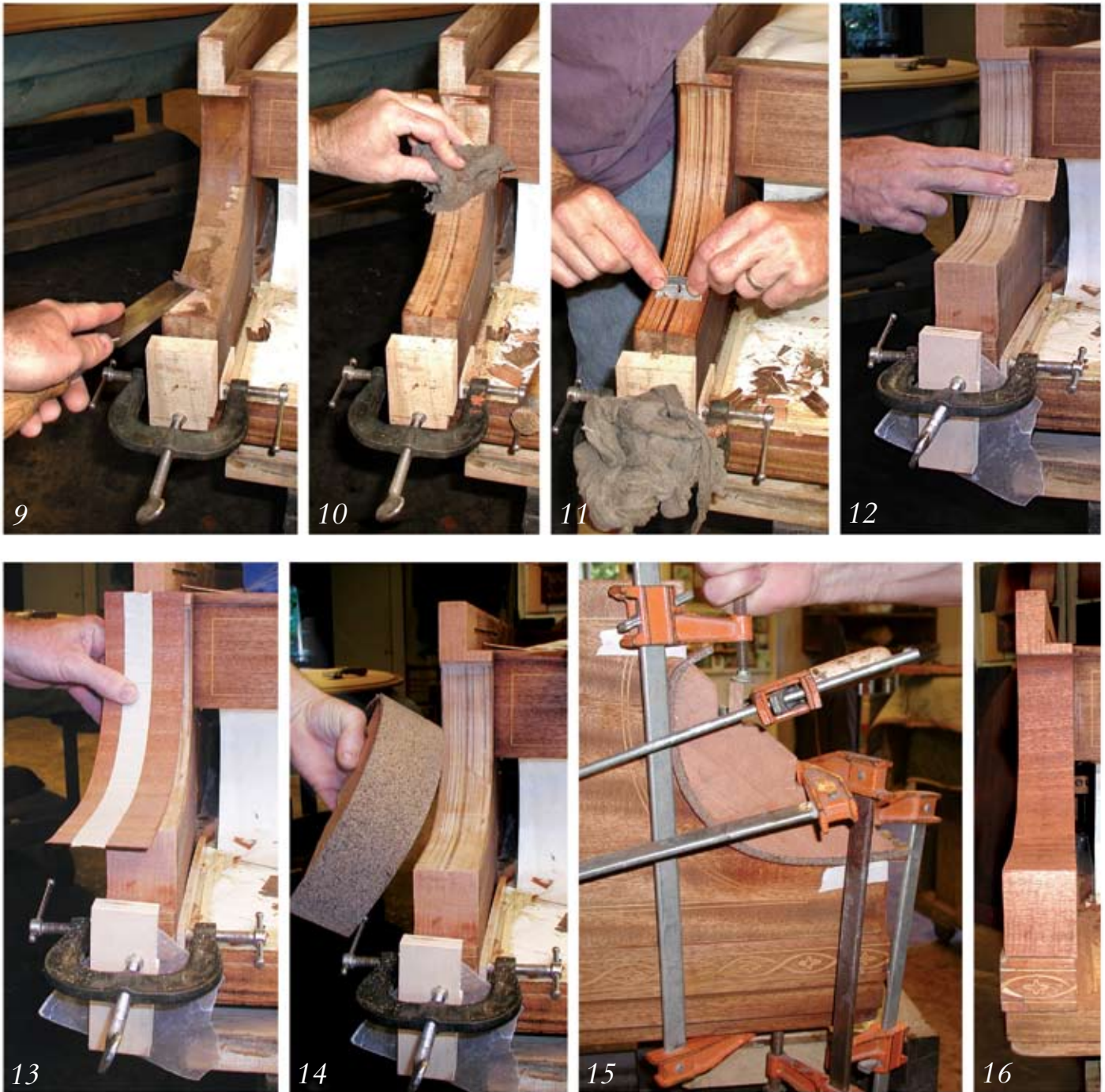
7). With glue applied and the fitted pieces of inlay held in place by masking tape, apply pressure with a small block and a three-way edging clamp (Photo 8).

While the glue dries, we can turn our attention to the upper curved part of the cheek. First remove the remainder of the damaged veneer with a chisel (Photo 9). Usually the veneer is loose enough that it peels off easily. Use a wet rag (Photo 10) to soften the old glue and remove any remaining small pieces. The old wood surface should be completely free of old glue and pieces of veneer. A single-edged razor blade can be used to scrape the damp surface clean as in Photo 11.

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Steps to a Quality Piano Refinishing, Part 2

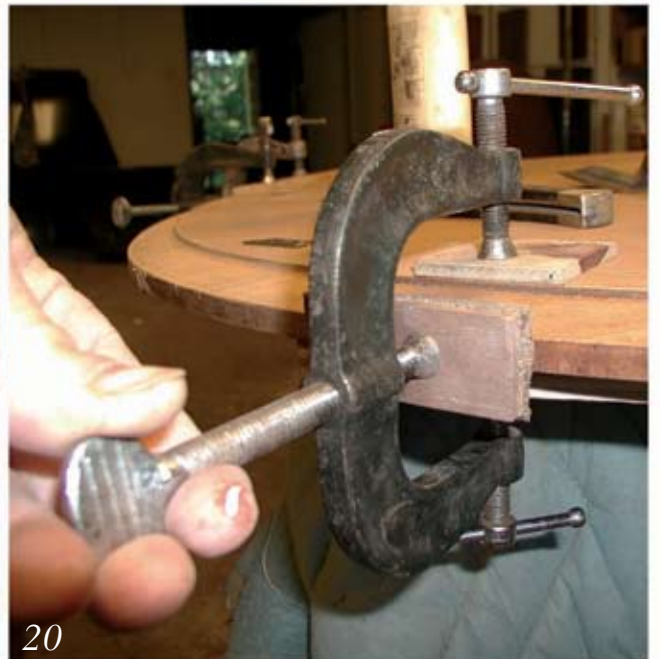
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Photos 9 - 16, a method of replacing curved cheek veneer.

When replacing veneer that covers the corners of the piano case, careful attention must be paid to which surface of the corner veneer overlaps the other. In the case of the front cheek corner, the top curved veneer overlaps the lower flat veneer. Therefore, the lower veneer must be replaced first so that the upper veneer may be trimmed flush with the front flat surface. Photo 12 shows the lower piece of the corner glued in place and sanding the cheek surface after it

has dried. The new veneer is cut oversized and tape is placed on the back side to hold it together during cutting and clamping (Photo 13). Photo 14 shows a custom caul made to fit the curved cheek surface and apply clamping pressure to the veneer while the glue dries. The surface of the caul that contacts the veneer has a piece of 1/4 in. (6 mm) thick cork sheet applied to evenly distribute the clamping pressure. The caul has notches cut to provide clamping surfaces for



Photos 17 - 20, lid edge veneer repair.

the clamp pads (Photo 15). There must be enough pressure over the entire curved surface. With the glue applied and the veneer in place, I apply clamps in both directions. Note the strips of masking tape top and bottom to catch glue squeeze-out. The completed veneer repair to the left cheek area is shown in Photo 16.

Lid Edge Repairs

Not all lids have veneer on the edge, but when they do this is a very likely place for veneer failure due to the exposed endgrain of the solid core panel. Photo 17 shows a section of edge veneer that must be replaced. The surface has been scraped clean of old veneer and glue, and the remaining edges of old veneer are cut flat and square to provide

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Steps to a Quality Piano Refinishing, Part 2

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Photo 21 - 23, above, cracks in the lid edge are a common problem.

a tight joint with the new veneer. With the patch cut to width, plus about 1/4 in., fit the piece and mark for length (Photo 18). Note the piece of masking tape on the back of the veneer. This is helpful in preventing the veneer from breaking into small pieces. Apply glue (Photo 19) and clamp into place with a caul and a three-way edge clamp (Photo 20).

Cracks on the edge of a piano lid are a common problem. The wood core moves and eventually shrinks with the changes in humidity to cause this problem. Filling in the cracks with filler will eventually lead to failure, so it is best to clean the crack and glue in a new piece of veneer.

Photo 21 shows scoring a crack in the edge of a lid with a fine saw. Fit a mahogany veneer shim into the saw kerf and work in glue with a thin spatula blade as in Photo 22.

Fit the patch into the crack and allow to dry for a few hours (Photo 23). Cut off excess wood and sand as necessary. ☒



Graduate to: TuneLab

Lesson 4: Non-Standard Pitch. The standard for TuneLab normally is A-440. But sometimes you may need to use a different standard. TuneLab can be set to any standard by entering a Basic Offset. Entering +7.85¢ will give a standard of A-442. Entering -19.79¢ will produce a standard of A-435. The offset will affect all the notes of the scale by the same amount. Instead of entering the offset in cents, you can also let TuneLab calculate the cents offset for you by entering **F=440.5**, for example. The **F** in this usage means **Frequency** in cycle per second (Hz). In this example, TuneLab will calculate and use an offset of +1.97¢.

Another use for a non-standard pitch is to match an existing tuning on the same or on a different instrument. Use the **lock** mode to make TuneLab discover the offset by listening, then transfer that offset to the Basic Offset.

Instead of just reading about TuneLab, you can try out the real thing for free by visiting our website. TuneLab runs on any Pocket PC or Windows laptop.

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