

In-House Keytop Recovering— (Professional-Grade Results Obtained in the Small Shop Setting)



By Chuck Behm

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-Rationale-

For the technician who services vintage pianos, the question of how to deal with a set of beat-up keytops frequently arises. In the case of a piano with original ivory, the decision is whether to restore the ivory keyset, or to remove the ivory altogether and recover with plastic keytops. With a cheaply made smaller piano with imitation ivory keytops in bad condition, the issue is more likely to be whether or not the piano is worth the investment in time and money.

When recovering keytops is the chosen course of action, one must next decide on whether to outsource the work, or whether to do the job in-house. If one wishes to send the keys out, several businesses offer excellent quality recovering service. If the choice is made to do the work in-house, this article will provide the technician with an easy-to-grasp set of procedures which may be utilized with a minimum investment in equipment and tools.

Part 1 - Surface Preparation Procedures

GO GREEN! The first step in recovering a set of keys, (if the keytops you are replacing are genuine ivory), is to save any good tops to recycle in later ivory keytop restoration jobs. The larger your collection of old ivory, the more often you can find that near-perfect match to blend in where needed.

To remove the good tops, first heat an old iron on a medium setting. Cover the ivory of an individual key with a lightly dampened rag and heat for several seconds. Then use a putty knife to carefully pry off the keytop (Photo 1). Ivory tails may also be saved for recycling, although it won't be long before you have far more tails than you will ever use.



Photo 1: Precious commodity.

Once any good ivory has been salvaged from the keys, the top surface of the keysticks must be prepared to receive the new keytops. Schaff's line of [German keytops with fronts](#) are an excellent choice for new keytops. These measure .090" thick, and are almost certainly thicker than what is being removed. If so, it is advantageous to actually remove a thin layer of wood from the tops of the front end of the keysticks, so that the new keytops end up at the same approximate level as the old. A variety of tools are used in this process by different technicians. Following is a list the more commonly used tools with a brief appraisal of their effectiveness in prepping keysticks and recommendations for their use in the shop.

1. **Disc sander, used either on an electric drill, or on an electric grinder:**
Poor control of the amount of material being taken off – the use of any type of a rotary sander results in highs and lows in the surface of the keystick. Not recommended.
2. **Belt sander, hand held:**
Fast removal of material, but again, poor control of the amount of material being taken off, resulting in an uneven surface. Not recommended.
3. **Belt sander, table top or free standing model:**
Useful in situations where the removal of wood is unnecessary, but the removal of a heavy, uneven layer of old glue from the keystick is needed in preparation for the installation of new ivory keys, or imitation ivory of a similar thickness to the old (Photo 2). Even then, a delicate touch is required to avoid tipping the keytop from side to side, or front to back. If the removal of a layer of wood from the top of the key is necessary, achieving a satisfactory result is unlikely, in that keeping the surface of the keystick perfectly level is difficult. Recommended only in very limited situations.



Photo 2: Used with care, old glue may be quickly removed.

(Note: If the old keystick is not crusted with glue, and no removal of wood is needed, dressing the keystick without power tools of any kind may be accomplished simply by placing a full sheet of either 60-grit or 100-grit sandpaper grit side up on a flat work bench, and bearing down on the keystick as it is worked face-down backward and forward over the sandpaper.)

4. Band saw:

Although a layer of keystick material may be skimmed off with a band saw, the resulting surface may not be as flat and true as needed. Especially in situations where a blade's width of material or less is to be removed, the blade may tend to wander slightly from side to side, resulting in the top of the keystick being untrue. Not recommended.

5. Router / router table set-up:

With a 2 ½" straight mortising bit used with a router bolted to a router table, satisfactory results may be achieved. The fence is slid back and secured at a distance from the router blade, so that the keystick is milled down on the backside of the bit, as the key is run in between the fence and the spinning router bit. However, although this method may produce satisfactory results, I would advise against it for the safety's sake, in that the bit is exposed and out in the open. (Photo 3 shows the set-up in use).

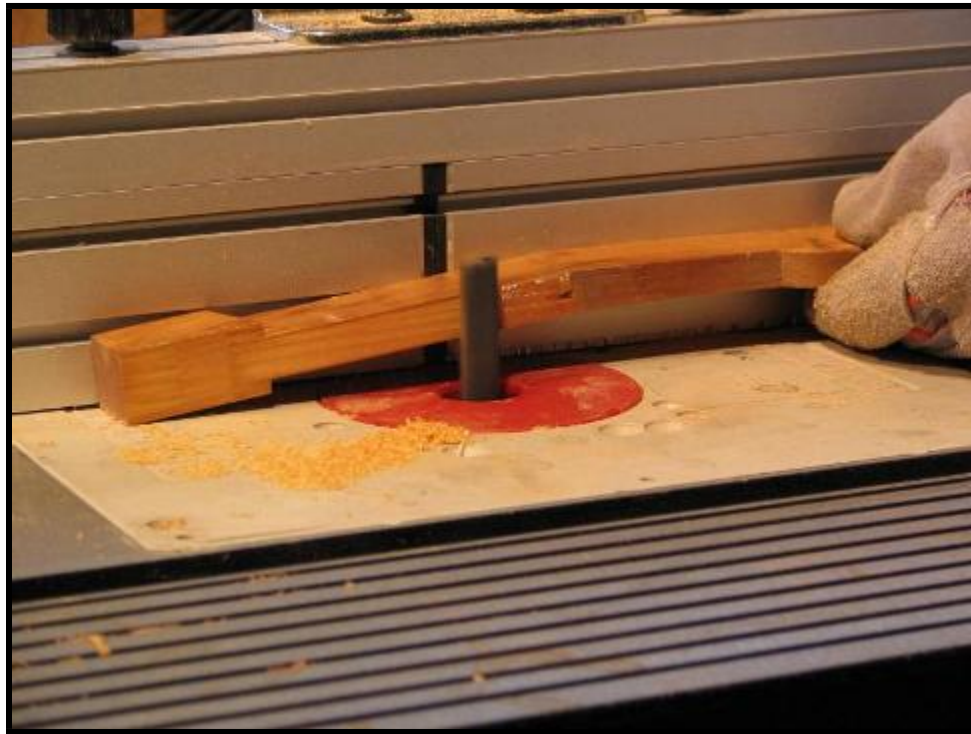


Photo 3: Using the router to surface the keytop.

In addition, because of the counter-clockwise rotation of the bit, and the fact that the keystick is wedged in between the bit and the fence; the bit tends to grab the workpiece and pull it forwards, giving one a disconcerting feeling of loss of control. The surface produced is flat and useable, but because of safety issues, I would hesitate to endorse using this method. Not recommended because of issues with safety.

6. Table saw:

Among ordinary shop tools, the table saw is, in my opinion, one of two preferred tools for preparing keysticks, when a layer of wood is to be removed to compensate for a thicker keytop material that is to be applied. As with any power tool, safety precautions must be followed. Compared to the other tools discussed on the previous pages, the table saw gives the most satisfactory results, combined with the greatest feeling of control. Its usage will therefore be dealt with in detail. Recommended where removal of a layer of wood is necessary.

Drill press / Wagner Safe-T-Planer combination:

This method, from all reports the author has heard, is very effective as well. Although I myself purchased the Safe-T-Planer with the intention of trying it out some time ago, I haven't yet used it to the point where I would feel justified in explaining its operation. In Photo 4 below William Monroe (who does have considerable experienced with its use) demonstrates the set-up he employs in utilizing the Safe-T-Planer in his shop. Also recommended where removal of a layer of wood is necessary.



Photo 4: The Wagner Safe-T-Planer.

Preparation of the keytop using a table saw:

Once valuable ivory tops have been removed, (or if the old tops are an older style imitation ivory), the simplest way to finish preparing the keysticks for recovering is to cut the old tops off, along with a thin layer of wood, with a table

saw. Cutting off the tops, (as opposed to removing all the old key covering material with an iron and damp rag, then using the saw to trim just the wood), saves time that can be put to good use at later stages of the job.

For those shop owners who don't yet own a table saw, this would be a good time to invest in one. A good quality free-standing or bench-top model will be needed, and will prove to be an all-around workhorse of a tool in the shop. One feature that is worth shopping around for is a good quality fence that locks up square without having to readjust. Less expensive models with cheaper fences will require more time to set up for an accurate job – something to consider when choosing the right saw for your shop. Sometimes purchasing the better quality (and more costly) tool in the beginning is actually the more economical choice in the long run, in that you'll be less likely to feel the need to upgrade later.

To prepare for trimming off the tops of the keysticks, fully raise the blade and check with a combination square to make sure it's at a perfect right angle (Photo 5). Even a slightly tilted blade will produce a set of keytops that resemble the shingles of a roof. Also, I would run a piece of scrap wood through the saw and use the square on the edge produced to double check your work. Mistakes are always easier to fix before they happen.

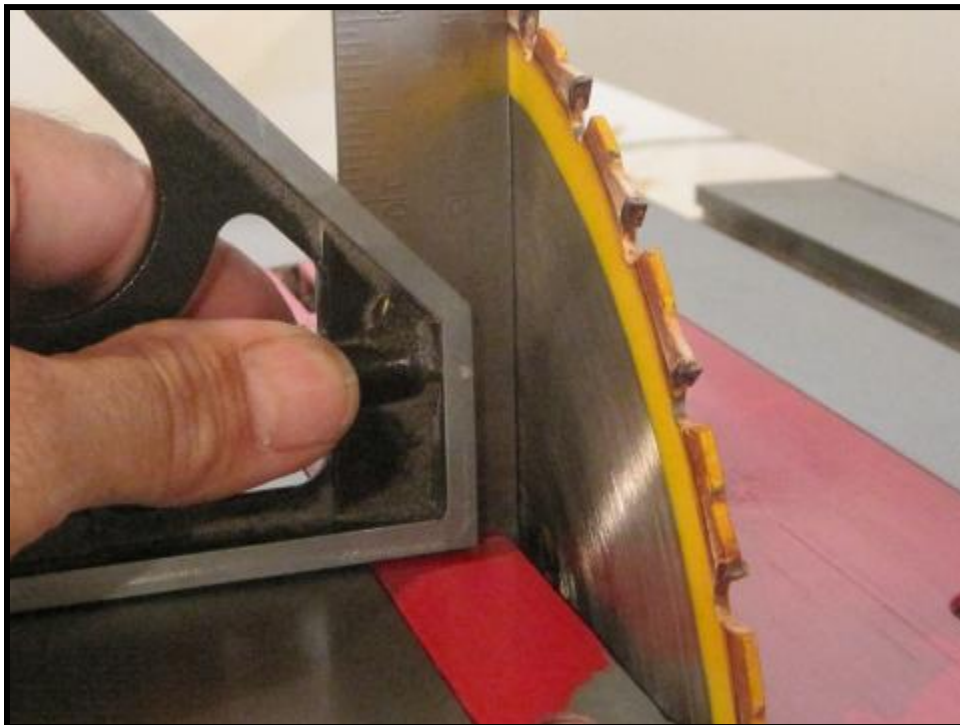


Photo 5: Squaring up.



Photo 6: Blade too shallow - this would produce an uneven cut.

The blade needs to be raised to its full height, by the way, so that the keystick will not exit on the far side of the blade, as shown in the above photo. The key will be pushed in part way, then retracted. If the front of the keystick makes contact with the teeth of the blade a second time, more material will be removed, resulting in an uneven cut.

Caution: *This work is most easily done without a blade guard in place, which tends to obstruct the technician's view during the procedure. With the blade at full height and without a blade guard in place, the operator should use extreme caution. Wear protective eyewear and earplugs, of course, and only operate your saw when fully alert and unhurried.*

Once the 90 degree angle has been set and checked, the width of the cut to be made will need to be set. The bottom of the keystick will butt up against the fence, so that the blade will cut off the old ivory or ivorine, plus a fraction of an inch off of the top of the keystick. (The amount of wood removed should equal the difference between the new keytop material and the old ivory or imitation ivory - when done correctly, the new keytop will sit at the same level as the old key.) The keys will still need to be leveled, of course, but at least there will be no compensation required for the entire set being too high to begin with.

On the initial trial cut, I wouldn't recommend trying to hit the correct width the first time, but instead err on the side of too shallow of a cut. That way, you can get a better feel for how much the fence needs to be adjusted, and you can gently tap it a bit at a time towards the saw blade until the width of cut is correct.

For an easy method of gauging this, place a key with the original key cover on the bed of the table saw next to the keystick which has been trimmed. Place a new keytop on the freshly cut keystick, and use your thumb to feel if the two keytops are at the same height. (Hint - If the front of the replacement keytop drops down below the bottom of the key, place the two keytops near the edge of the saw, with the fronts hanging slightly over the edge.) If the new top is still a bit high, adjust your saw and shave off a slight amount more, until there is no "bump" as you run your thumb back and forth between the two tops (Photo 7).



Photo 7: No bumps.

One last step before sawing that should be done is to use a straightedge to mark the keysticks for the point at which to stop cutting (Photo 8, next page). By doing this you ensure that you will saw back far enough, giving yourself room for the new keytop without having to trim out a corner. Allow $\frac{3}{4}$ " between the back of the new keytop material and the line. The straight line will help give the finished product an even appearance, as far as the cut line is concerned. (You'll notice from the photo that the keys are in the key frame. Removing the frame from the piano and bringing it to your shop along with the keys helps keeps things

organized during the recovering process, plus it allows you at a later point to more accurately notch



Photo 8: Marking the line.

At this point, you are ready to cut. Begin at one end of the keybed, and run the top of each keystick between the blade and the fence (Photo 9), keeping your eye on the pencil line where you will stop the cut. As you cut, press the key firmly against the fence to ensure that the top is at an accurate distance from the blade.



Photo 9: Knowing where to stop is important.

Before continuing with the process, review the following steps to ensure safe operation of the saw during this procedure:

1. Wear the proper protective gear. Safety goggles and earplugs are a must. If the procedure involves the removal of old keytop material, leather gloves and long sleeves (buttoned tightly or rolled back behind your gloves), as chips of ivoryine tend to zing back at your fingers and knuckles.
2. Grasp the keystick firmly with both hands, using your left hand to push the key down against the saw bed and sideways against the fence, and your right hand to push it forwards into the blade. (Note: Using a push stick is unnecessary, in that you are not passing the keystick completely past the blade, but retracting it immediately, once the cut is made. A pushstick weakens your grasp of the key, and is therefore not recommended).
3. **Always keep both hands behind the button of the key.** Since the progress of the cut always stops before the button, your fingers will automatically be out of harm's way.

Once all the keysticks have been trimmed (Photo 10), you are ready for the last step of the preparation process, that of removing the fronts .

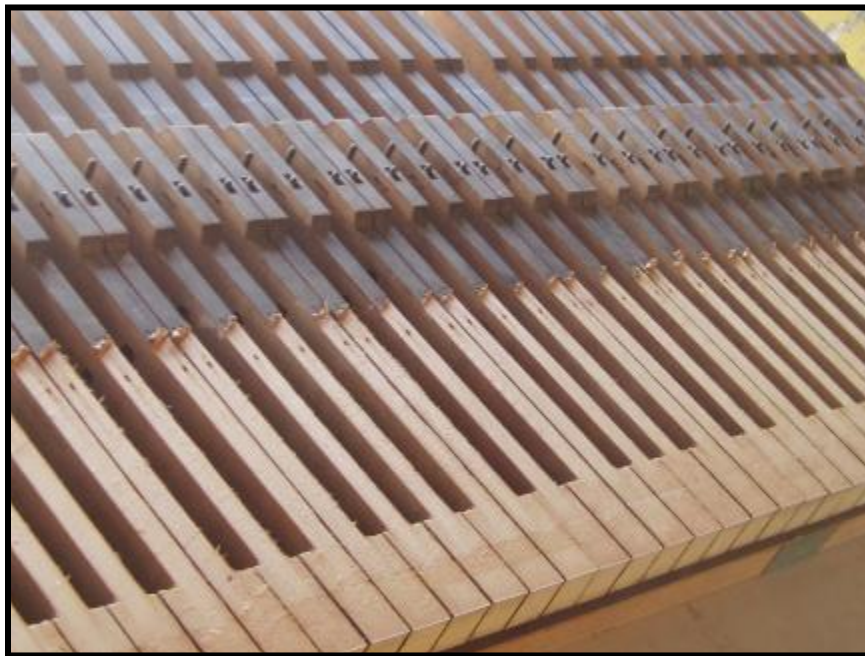


Photo 10: An even line of cuts.

For this step, and several steps to follow, a good quality wood vise is essential. If this is not a tool you currently own, consider investing in one. You will be hard pressed to find a piece of shop equipment more useful than a good vise.

That being said, move your set of keys to the bench. Starting at one end of the keybed, remove a keystick from the frame and put it in the vise vertically with the front facing up. Using an old shop iron and slightly dampened rag, heat the keyfront for several seconds. Taking a sharp [chisel](#), start in one corner with the flat side down and work the chisel across the surface of the keyfront, pushing with your right hand and swiveling the blade from side to side as you pry the old keyfront material off. Work towards the opposite corner, slowing down when you approach the point pictured in Photo 11. At the last moment, pop the front off by tilting the blade with your right hand. This will help avoid breaking off the corner of the keystick. If that happens, and it will occasionally, save the broken off piece to glue back on with [Titebond](#).



Photo 11: Slicing off the keyfront.

At times, removing the keyfronts presents no problems – they come off without a hitch. At other times they can be frustratingly difficult to remove. When they are difficult, avoid the temptation to just leave them on and glue the new

material over them. This looks unprofessional, and puts the front of your keys out further than what was intended.

Part 2 - Gluing Procedures

Note: Two methods for gluing keytops will be explained in this section of the article. One is quicker, but the other is easier. Having more than one procedure available to accomplish a goal gives one the flexibility to match the methods to the circumstances.

In situations where time is of the essence, the use of contact cement to glue replacement keytops will hurry things along. If facing a deadline with the need to get a set of keys in and out of the shop in a hurry, apply the glue and within fifteen minutes of application the final filing and finishing of the tops may begin..

On the other hand, if there is no big hurry to begin filing, PVC-E glue is definitely an easier method to use. The use of PVC-E glue will be explained first, as it would be the procedure of choice in most circumstances. For the occasion where one must have his eye on the clock, the somewhat trickier procedure involved with using contact cement will also be described.

Application of [PVC-E glue](#) to keytops is a very straight-forward procedure. Use a small [glue brush](#) to apply a coat to both the keystick and the inner surface of the keytop (Photo 12).



Photo 12: Not too much, not too little.

Once both surfaces have been coated, join them together, align them, and simply apply masking tape (the easily removable type) to keep the keytop from sliding, and place back into keyframe to dry.



Photo 13: Just a little squeeze-out visible.

Be sure to check the surface of each keytop before turning your attention to the next key. Squeeze-out along the edge is okay (Photo 13), but use a lightly dampened rag to clean any adhesive off the top surface to avoid damage.

Let the keys sit for overnight, and they will be rock-solid. No clamping is necessary - the glue will draw the two surfaces tightly together as it dries.

Alternative Method - Gluing with Contact Cement

Using contact cement to glue keytops is faster but trickier than using PVC-E glue. Since the chemicals used in contact cement react with the keytop material, it is essential to learn proper techniques to apply the glue without allowing it to come in contact with the good surface of the keytops. Sloppy procedures will result in ruined tops which most likely will need to be replaced.

To begin, apply a coating of glue to every keystick on both the top and front surfaces (if keytops with fronts are being applied). Allow this initial coat of glue

Caution: Good ventilation is essential when using contact cement. Have windows and doors to your shop open (or cracked, at least, on cold days) to bring in fresh air. Additionally, set up a fan to blow from side to side across the work area.

to dry for 15 minutes (until tacky), then apply a second coating (Photo 14). **This additional coat of contact cement applied to the wooden keystick is essential to achieve good adhesion.**



*Hint - If your bottle of contact cement comes with a brush type applicator, use it. However, if it comes with a plastic 'wand' put that aside, and use one of your **small brushes** from - they will spread the glue much more easily.*

Photo 14: Applying second coat of contact cement.

While the glue on the keysticks is drying, begin applying a single layer of glue to the inside surfaces of the keytops, following the three step method outlined on the next page. You may find it convenient to work with one octave worth of keytops at a time. Small plywood 'pallets' (Photo 15) that hold one octave worth of tops make it easy to keep the keytops



Photo 15: Plywood squares hold an octave of keytops.

straight. (The last thing you want to do when using contact cement is to inadvertently join the wrong top to a keystick.)



Step 1: Hold the keytop as shown with your left hand. Use the glue brush to carefully apply a layer of cement to the inside of the front. Don't drag the brush heavily over the edges, which would likely result in a bead of glue winding up on the outer surface of the front..



Step 2: Reposition the keytop so that you're holding it as shown, with your thumb holding the bottom edge of the front, and your middle finger balancing the keytop from underneath. Hold the keytop tightly with your thumb to avoid having it slip and drop to the floor.



Step 3: Now glue the underside of the top. Brush the glue out from the middle out to the edges. Again, be careful not to drag the brush too heavily over the sides.

Caution: Working efficiently is important, in that there is a window of time once the glue has been applied, in which the contact cement is effective. Read the directions on the bottle of cement that you're using to see what the guidelines for the particular product you are using are. Generally, after several hours, if the two surfaces have not been joined together, an additional application of cement to both surfaces will be required.



*Hint - Be careful as you set the keytops down on the bench or pallet not to let the sides touch. If they are allowed to touch, and dry adhering to each other, run a **precision knife** down in between the two keytops to separate them.*

Photo 19: Place glued keytops on pallet with top surface.

As glue is applied to each keytop, place it on the bench or octave pallet to dry for 15 - 30 minutes (Photo 19), or until tacky.

When both the keysticks and the keytops have dried until tacky, begin joining them together. First contact should be at the lower edge of the front (Photo 20). Fold the keytop and keystick in towards each other so that they meet at the corner. Practice will make perfect on this step.

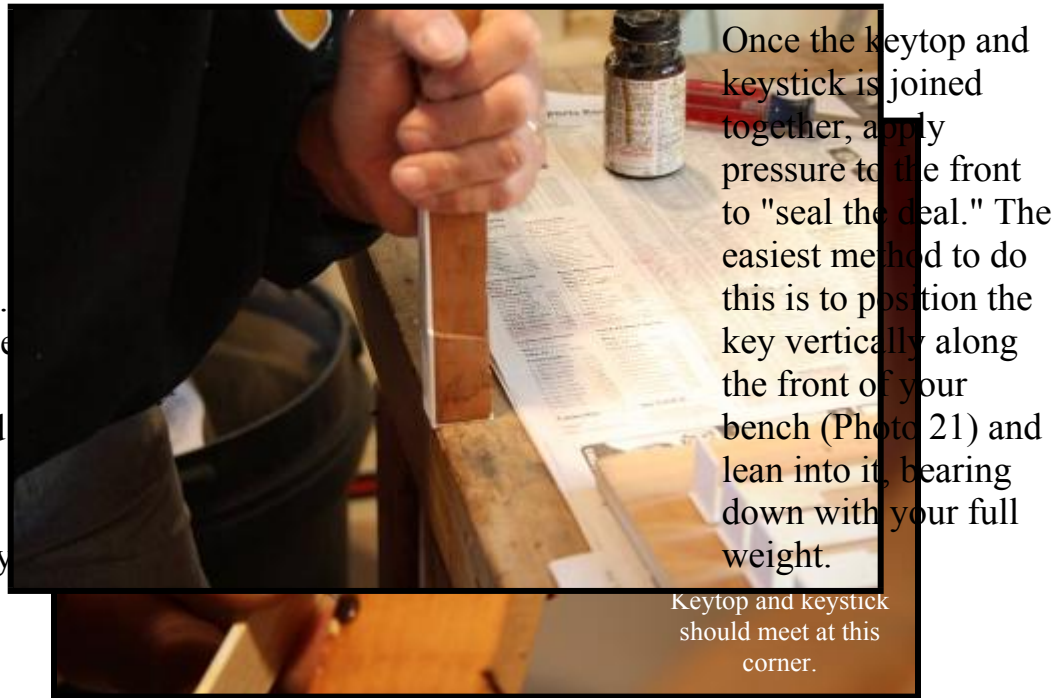


Photo 20: Bring the keytop and keystick together.

At this point, any excess material on the front of the key should be dealt with. Use a [coarse cut 10" file](#) to file the keyfront down flush with the wood of the keystick. This works best when done using the dog of your bench vise as shown in Photo 22.



Photo 22: Filing the front of the key down flush.

The final step of the process is to insert the key into your wood vise (have the faces lined with cork to prevent damage to the surface of the keytop). Cinch the vise down tightly, as in Photo 23 (next page), and pick up the next keystick and keytop to join together. Go through the same process, and as soon as you've filed off the excess material from the bottom of the keyfront, remove the first key out of

the vise, replace it in the keyframe, and put in the next key in the vise. Get into the rhythm of the process, and this step of the procedure will go very quickly.



Photo 23: Clamp keytops in vise lined with cork to seal the bond.

As soon as the key is removed from the vise, it is ready to be worked on. In a situation where time is a critical factor, this gluing method gets one to the final finishing stage much more quickly than using PVC-E glue.

Thoughts on the topic of versatility: The benefit of learning more than one method to complete a repair is that the technician can adapt to the situation more easily. By expanding upon one's "bag of tricks," the technician is less likely to be stumped when the situation is a bit out of the ordinary.

A related example of how versatility comes into play is in the procedure of leveling the keys, which should be done after a keytop replacement job. For the typical piano, use of the popular **key leveling device** will do the job perfectly well. However, in a situation where the keybed of a piano does not extend beyond the keys and no platform to run the key leveling device along exists, another method must be used. For such a piano, having a lightweight straightedge to use will save the day.

Part 3 - Filing Procedures

The difference between a mediocre set of replacement keytops, and one that is truly well done, lies in the final fit and finish that is given by the technician. In this final segment, procedures used to hand file keytops to perfection will be explained. While one may use a router with a laminate cutter a similar device to finish one's keytop, hand filing gives the technician a control over the finish of the keytop which one does not have when using a high-speed cutter.



Photo 24: Necessary tools.

Also needed (shown in Photo 25) are a 48" straight-edge, several 5" C-clamps and an [awl](#) for marking the notches around the sharps. With those tools procured, you're ready for the work at hand.

Besides a good quality woodworker's vise mentioned earlier you will need a [coarse cut file](#) and [fine cut file](#), plus a smaller [knife file](#) for touch ups (Photo 24). Rounding out the list would be a sheet of 400-grit sandpaper, and a package of [0000 steel wool](#).

The initial step is to scribe the line for notching around the sharps. To complete this step, first use your awl to make a scratch mark in line with the end of the wood at the notch for a key at the beginning, middle and end of the scale, such as A1, D4 and B7.

Next, extend the keyframe with just the natural keys so that it hangs over the front of your bench just far enough that c-clamps may be used to clamp down the straightedge.



Photo 25: Making a scratch line.

Use three clamps, with the tops of the clamps over the straightedge, and the bottom of each clamp under the keyframe. Line up the back edge of the straightedge with the three scratch marks you've made, then tighten the clamps down.

With a sharpened awl, carefully scribe each key, being careful to mark only the notch, and not the entire width of the key. As you work from one side of the keyframe to the other, hold each key up tight to the straightedge with your left hand, and scribe the line with your right. You should feel the point of the awl cutting into the keytop material. Make sure that during the entire procedure, you keep the awl at the same exact angle in relationship to the straightedge - angling it slightly outward so that the tip of the awl is exactly in line with the scratch marks used to position the straightedge.



Photo 26: Filing the sides.

With the lines marked for the notches, remove the clamps and straightedge from the keyframe and place your first key to work on in your vise, as shown in Photo 26. (Having the faces of the vise lined with either cork leather will prevent marring of the surface of the keytop during the procedures to follow). Use your coarse file first to remove the excess keytop material from the sides. Apply downward pressure on the forward stroke, and drag the file back lightly on the backward stroke. Always have the keytop placed with the key cover facing you to prevent chipping.

Be careful to file the entire length of the keytop evenly, using strokes that cut on a diagonal from side to side at the same time that the file is moving forwards and backwards. As you file the edges down flush to the wood, remove any excess glue or discoloration from the sides of the keys as well, giving a fresh, new appearance to the wood. Finish the sides with a fine file. Remove the cut marks from the coarse file and smooth the wood to give a finished look to the sides. When done with one side, flip the key so that the end is pointing in the opposite direction, and finish the other side. Work cautiously at the area of the notch while smoothing the sides to avoid chipping the keytop material.



At this point the key is put vertically into the vise so that the notch might be cut out. Start with your coarse file and file straight upward. Exert pressure on your upward stroke only (Photo 27). Stop at the line. Be very cautious not to put any sideways pressure on the file, or the narrow side of the key will be filed into.

Photo 27: Upward pressure only.

Once a file's width of the keytop material is removed flush with the line, finish the job by turning your file on its



side, and carefully finish removing the remaining material.

Use your left hand to not only steady the top of the key, but to also prevent the side of the file from making contact with the finished edge of the keytop (Photo 28). File flush with the line. Remove any glue from the notch with a small, flat carving chisel. Check the pair of keys for each sharp by placing them in the keyframe to double check the adjoining notches. Make sure they are square, and that they line up with each other. Use your small touch-up file to make any final corrections to the notch.

Photo 28: Finishing the notch.

Now, remove the key from the vise, and slightly round the edges with the fine file, drawing it down and towards you (Photo 29). The side of each key should be rounded identically to all the others. Also use your fine file to round the front corner of each key evenly. Holding the key vertically, begin with the file parallel to the side of the key, and lightly curve the file



Photo 29: Rounding the sides.



Photo 30: Finishing the bottom of the keyfront.

With the sides and notches finished, turn the key over and butt it up against the raised dog in your vise to finish filing the bottom edge of the keyfront (Photo 30). Work the file back to remove any excess glue from the underside of the key.

The final step with the file is to file off the letter of the note at the back of the key (if present). Although this is ordinarily hidden by the upstop rail, removing it with the fine file just takes a few moments, and looks more professional. Buff the filing marks on the back of the key out with 400-grit paper.

With the filing of the keytop material completed, the final steps to follow are determined by whether a gloss or satin finish is desired by the owner of the piano. I offer both finishes, and find that the majority of customers prefer the satin finish. It has a slightly more porous, less slick feel which more closely approximates the feel of ivory.

To complete the keytop with a satin look, buff the gloss off of the plastic keytop material using a pad of 0000 steel wool. Hold the keytop occasionally



Photo 31: Buffing off the shine

up to the light to check for shiny spots which need further buffing. (As shown in Photo 31, this step is most easily accomplished with the key out of the vise, holding the key with the left hand while using the buffing pad with the right.)

For a gloss finish, buff out any filing marks (especially at the back of the key) with increasingly fine grits up to 2500-grit paper, then carefully buff out on a buffing wheel set on the lowest speed. [White bar polish](#). Be very careful; the buffing wheel will mar the edge if you round it from the heat generated.

With either finish, the end product of this procedure is a very professionally looking keytop (Photo 32), adding



both beauty and playability to the piano. It's truly a job that you can be proud to offer your customers. Being able to offer such services in-house adds to your professional reputation



The Satisfaction of Working With One's Hands

There is something to be said about the feeling of accomplishment that one achieves when working on a job where hand work is necessary. More and more, it seems, we rely on machines and tools to do our work for us, so much so that I believe the average person is less dexterous than his predecessors.

My own ancestors (as far as we can trace back) were cabinet makers from Germany (Hanover), who came to this country in the later years of the 1700's. Although I take pride in my own woodworking skills, I am quite sure that were the

power to go out in my shop, I would be hard pressed to use most of the tools that they relied upon in their own woodworking endeavors.

Finding jobs in the shop which can be accomplished as well without power tools and equipment seems to fulfill a yearning, at least in me, to return in some small way to our roots. In replacing keytops, I limit my use of power tools to the table saw featured at the beginning of this article. When it comes to later stages of the job, I work with simple files and chisels to complete the fitting of the new keytop material. There is a real satisfaction to using one's own two hands.

Tools and Supplies

For your convenience, the tools and supplies necessary to complete this procedure are listed on a separate price sheet.

Tools:

Chisel set.....	Price available upon request
Glue brushes.....	Price available upon request
Precision knife.....	Price available upon request
Coarse cut 10" file.....	Price available upon request
Fine cut 10" file.....	Price available upon request
Knife file.....	Price available upon request
Awl.....	Price available upon request
Key leveling device.....	Price available upon request

Supplies

German keytops with fronts.....	Price available upon request
Titebond glue.....	Price available upon request
PVC-E glue.....	Price available upon request
0000 Steel wool.....	Price available upon request
Nu-White bar polish.....	Price available upon request

