

# smith & smith

## TECH HELP ARCHIVE 2007

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### TECH HELP - Clock Dial Resilvering part 4

Once the dial surface has been repaired and prior to the final graining the dial has to be waxed. All the engraved areas have to be filled with wax, this is messy and time consuming job but very rewarding when you suddenly see the dial spring to life. It might be better to use your piece of scrap brass to get the feel of how the wax reacts when heat is applied rather than be frustrated by having to go over your dial more than once because the wax does not look right.

First clean the dial thoroughly, apply a heat source directly underneath the area to be waxed and when it seems to be hot enough apply the wax stick. Too hot the wax will melt quickly and even start to bubble (not a good sign), not hot enough the wax will have the consistency of chewing gum and will not flow. Overheating can cause the dial to distort so work your way up in temperature applied rather than down. Do not use too much wax. Take the cardboard spatulas (see part1) and remove the excess wax, remember the more wax you remove at this point the less there will be to remove later.

Do not take the dial away from the heat source. Once the dial is cold and the wax is set it takes a lot of work to remove excess wax from the surface so the more you remove now the better it will be later.

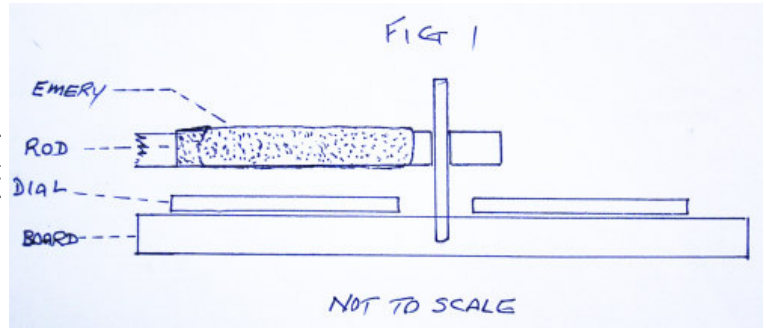
### Tech Help – Clock Dial Resilvering Part 5

The waxing process is now complete, only minimal traces of wax are left to be removed and you are happy with the result. The reality is probably the opposite and you are now relying on wet and dry to remove the wax residue you did not remove earlier. Select a suitable grade of wet and dry, this should be finer than the grade you will use for graining to ensure the graining overshadows the marks left while removing the excess wax. Use the emery wet and in a circular motion only where you have to. Be gentle, you do not want to remove fine wax filled lines or remove too much from the dial itself as this will show when you start to grain the surface. This is a fairly arduous task and patience is the main ingredient.

When you are satisfied the finish is as good as you can achieve, you can start with the graining process. This to some degree will be a matter of trial and error. Firstly, the emery selected must be the one chosen beforehand as suitable for the job at hand. You cannot experiment at this stage with the dial, if it is too fine the silvering will look odd and the marks left after removing the wax residue may still be visible. If it is too coarse you are stuck with it. Any attempt to remove it will damage the dial, it can also drag the wax from the fine lines of the engraving—with all of this in mind we can start the process of graining and silvering.

### Tech Help Clock Dial Resilvering Part 6

For graining, the dial must be secured to a flat board, thin double sided sticky tape can be used but only use very small pieces and not many of them otherwise it may not be possible to remove the dial later. You now need to secure a strip of emery to a timber rod which will then be fixed to the centre of the board allowing it to be rotated over the surface of the dial and impart the graining (**Fig 1**). The rod must be fixed so that there is no side play and the rotating must be firm and continuous. Some form of padding between the rod and the emery will ensure the graining covers the entire surface of the dial. However if a small area is not grained because of an indentation which could not be resolved during earlier preparation it would be best to leave it as is as any heavy handed attempt to grain could result in damage to the rest of the dial. When you think the job is as good as you can get it remove the rod by lifting it straight up off the dial, by doing this you will not interfere with the uniformity of the completed graining. **DO NOT TOUCH THE SURFACE**, your fingerprints will remain for ever, remove the dial and wash off in solvent. Spend some time doing this to make sure all residue is removed from the surface. Sawdust or corncob grit is a good medium for quick drying and it will not damage the surface. We are now ready for the silvering.



### Tech Help Clock Dial Resilvering Part 7

Before starting the silvering process check the surface of the wax which may now be a bit dull because of the graining process. If this is the case gentle heating, just enough to melt the wax will bring back a nice shiny finish. Now to silvering. Some dial finishers rub the surface of the dial with damp salt to prepare it better for receiving the silvering compound. If you do this make sure the dial is scrupulously clean both back and front by washing in cold water and drying with a soft cloth. **DO NOT SCRATCH THE SURFACE**. Take a damp cloth or piece of cotton wool and dip it into the silvering powder. Using a circular motion apply the powder to the surface of the dial Use copious amounts and work it into the dial using a light pressure. I suggest you hold the dial over a plastic dish or bucket to catch the excess powder as this can be reused. You will now start to see what you have worked so hard to achieve, the surface will take on a silver finish as if by magic. When you have finished the whole dial you need to wash it in cold water to remove anything that may have been left on the surface such as lint from the cloth or fragments of silvering powder. You can now apply the finishing powder using the same method used for applying the silvering powder. The silver will now become much brighter and this is the finish you will end up with. If there are any imperfections they may look worse or they may be hidden but one thing for sure the dial is better now than before you started. You can now lacquer the surface to protect it from tarnishing or leave it as it is. We started out suggesting you try your skills on a sample piece of scrap brass and ended up calling it a dial. Whatever path you ultimately chose the rewards are just as great.

### Tech help How to straighten a clock wheel pivot.

Straightening clock pivots is not an exact science and too often a pivot will break off as the attempt is made making it necessary to re-pivot the wheel yourself or send it away to have done. This is a costly exercise in both time and money. As long as the pivot is not too badly bent it can be readily straightened with nothing but a lollipop stick. First enjoy the lollipop, it probably is the best way to remove it and although you can use any small stick it is not quite as enjoyable.

The assumption is you do have a lathe, not to have one severely limits what you should be able to do. Choose your wheel and then select a collet which fits the pivot exactly. Secure the collet in the lathe and fit the wheel pivot into it. Do not use the lathe motor but turn the lathe by hand, it becomes quite obvious how much the pivot is bent, leave the wheel stationary at it's highest point.

Take your "stick" and give the wheel a sharp tap as far away from the pivot end as is practical. The weight of the stick is sufficient to bend the wheel down against the pivot. Turn the wheel again and you will see how much more needs to be done. A few more light taps and the pivot is dead straight once more and normal polishing and burnishing will bring it up as new. Warning , do not use your 6mm lathe if you are trying to straighten large pivots.

## Tech Help - Square!

Filing external squares is easy but internal squares are one of the more difficult tasks we are faced with but sometimes a bit of lateral thinking can save the day. Sort of thinking outside the square. So, where and when do we have to resolve a square issue? Three which come immediately to mind are

French Clock minute hands, the ones with the long square, Ratchet wheels and Gong hammers, where they fit onto the lifting shaft. There are a number of others but once you get the idea the rest comes naturally. I will start with the material you are going to need and of course the tools. Tools, a Lathe is a must, not just for this application but for almost everything else. Material, BRASS CLOCK KEYS. One of the things clock keys have in common is a square hole up the centre, nicely machined and perfectly square. This square can be adapted with the aid of a lathe to easily do the three jobs mentioned earlier.

I will start with ratchet wheels because it is the simplest and the reason to do this job in the first place is because we goofed. You take in a clock repair, the winding square are badly damaged and they have to be filed back to square. In a seniors moment you file the square along it's entire length and when you go to fit the ratchet wheel back on it swims in the breeze and the customer will be in to pick up his favourite George Graham look alike within the next hour. Remember our work schedules are like our squares, we cut them fine and this is when we make our mistakes.

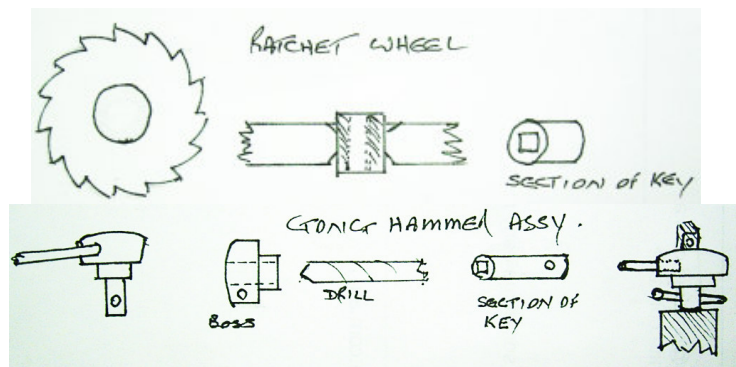
Next month. All three shown in detail

## Tech Help – Squares Part 2

To replace a square in a ratchet wheel select a suitable key. Make a hole in the ratchet wheel the same size as the key shank and chamfer front and back. Cut a piece from the key slightly thicker than the wheel. Lastly, solder the piece into the ratchet wheel. Please do this properly, dry solder joints are the bane of my life.

Gong squares are quite complicated because they are made to perform several tasks so it is best to replace the "square" section only, unless of course the entire gong is missing. Make sure you mark the position of the damaged square, if this is altered, the way the hammer falls will change and be detrimental to its operation. Measure everything taking particular care with the hole for the tapered pin. Next remove the hammer wire. Hold the boss in your lathe, select the largest drill (but not larger than the key) to drill right through the boss. If the hole is too small you may find that when you machine the key to suit the hole the square becomes too weak. After machining the key shank, soft solder into the hub and drill the pin hole making sure the brass square is down to the shoulder of the arbour. It may also be necessary to drill the hole for the gong wire a little deeper to make it secure.

Next month: French Clock hand collet

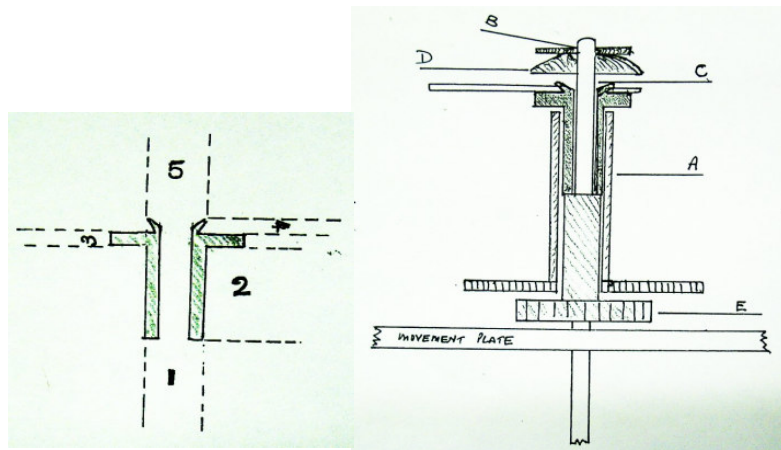


### Tech Help – Squares Part 3

Making a minute hand collet for a French Strike clock using a clock key. Firstly select a clock key which will fit over the cannon pinion and cut off the complete shank. The component parts to be machined are as follows.

1. The diameter must allow the hour wheel (A) freedom
2. The length must allow the pinhole (B) in the centre wheel (C) to be exposed just enough after the hand washer (D) and the cannon pinion (E) are fully depressed allowing the pin to be fitted and give sufficient tension for the hands.
3. Thick enough to support the hand but allow the hour wheel some end play.
4. Enough rivet height to stand proud of the hand.

This diameter must be a firm fit in the hand to allow adjustment of the hand on the collet before final riveting. Adjust minute hand so make sure the clock strikes exactly on the hour and complete the riveting.



### Tech Help – American Mainsprings

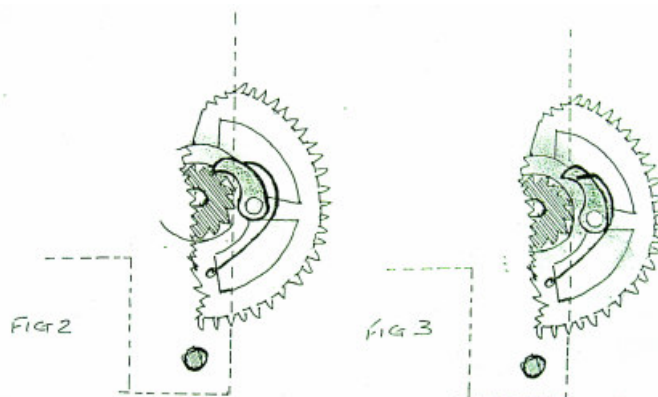
Dealing with these very long mainsprings can be somewhat daunting and often leads to them being left alone whilst the rest of the clock is restored. This is a definite no-no, unless the spring is fully released it cannot be cleaned and its condition cannot be determined. If unsafe practises are adopted when handling these springs serious injuries can occur and terminal damage to the clock will be inevitable.

Not everyone is equipped with a mainspring winder so not only is removing the mainspring likely to present some difficulty, putting it back in surely will. However all is not lost, as you will see both removing and replacing can be done with nothing but a piece of string and a let-down key. What is a let-down key? It is a key which enables the mainspring to be let down in one continuous movement rather than releasing the click and letting it fall back into the ratchet wheel after a few degrees of movement. Let down keys can be purchased in sets or you can make your own using something like a broom handle or a piece of dowling, fig 1.

There is of course the Smiths TH550 ratchet vycce which can also be used for this purpose. This useful tool costs only \$32.50 +GST and has many other uses. As soon as you have armed yourself with this simple tool and some heavy string, even a shoelace will do, you are ready to go.

### Tech Help – American Mainsprings Pt 2

A tightly wound mainspring should be let down to approximately the diameter of the main wheel. The reason for doing this is the mainspring, even though it will be secured will try to pull the mainwheel toward the pillar to which it is attached and with sufficient force to cause some damage as soon as the plates are pulled apart. If the mainspring is expanded sufficiently this will not happen. If it is expanded beyond the mainwheel that is not a problem. Ideally the click should be close to the outside of the plate so it is easy to get to. **(fig 2)** To achieve this allow the train to run until this optimum position is achieved. At this point if you are new at this I suggest you clamp one of the plates in a smooth jawed vycce to give you both hands free. Tie your heavy string or shoelace loosely around the mainspring you are about to release. Gently pull the clickspring away from the click and place it on top of the click. **(fig 3)** Place your let-down key on the winding square and turn in the winding up direction just enough to raise the click. You will see this happening and as soon as the click is free of the ratchet wheel you are in control of the mainspring via the let-down key. The pressure of the click spring will normally prevent the click from falling back in but if the click does falls back use a pair of tweezers or similar tool to pull it out of the way. **REMEMBER**, you have control of the mainspring during these operations, **DON'T LET GO**. All you have to do now is allow the key to turn gently in the palm of your hand in a controlled way and the mainspring will fill the string and is safe to remove after the plates are pulled apart.



Next month – Replacing the mainspring.



