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Section 1 -- Making the dial blank.

Tools used

- Metal for the dial blank.
- Drill, power and hand, fine.
- Hard, thin, clear plastic, for dial stencil.
- Scribe
- Ginder
- Toothpicks
- Soft solder (40%tin/60%lead)
- Copper wire (about .7-.8mm diameter).
- Tweezers, medium, e.g., Nr 2.
- Solder flux.
- Soldering plate.
- Torch.
- Helping hands.
- Paint stripper.
- Fine snippers.
- Fine file

- Broaches.
- Loupes.
- Pin.
- Pin vise.

Making the disk.

You need a round disk of the correct diameter and the correct thickness. For thickness, about .4---.45mm seems good. The diameter depends on the watch case being used. The first object is to have a disk with a hole in the middle for the center pinion. For this you can either use a lathe, a saw, or another dial that is bigger than you need. Since I don't know about lathes (I wish I did), I'll just mention the other two methods.

If you are using a saw, e.g., make a hole in your brass (or whatever) of about 1.5mm. Then cut a disk a bit bigger than you need with that hole at the center.

If you use another dial, strip the paint and cut off the dial feet. Then file or grind the place where the dial feet were until flat. In Picture 1, you can see where the new dial feet are, as well as where the old ones were.

Once you have a disk that is a bit bigger than you need, you need to grind it to the exact size required. I use a bench grinder for the coarse work, and a mini-tool grinder for finishing it. The trick is to keep it round. For this, I use a variation on turning (where the cutting tool stays stationary and the object being cut turns). I put the disk on a toothpick, and carefully hold it next to the grinder (be extremely careful, and have a clear work area). This way the grinder grinds away, and the disk spins, keeping it round. (Picture 2.) You might have to change toothpicks, as the disk will cut into them. Don't try using something harder, as it will cut into the disk and enlarge the hole. (Guess how I know this.)

You now have a disk with a center hole of the correct diameter. You now need to add the dial feet, and, possibly, the hole for the sub-seconds pinion. For this, a dial stencil is useful.

Dial stencil

When the movement is apart, I take the movement plate and make a stencil in plastic of the location of the center, 3, the dial feet, and the sub-seconds pinion. You could do this with the movement together, I believe. The idea is to make pin marks where appropriate then to cut small holes in the plastic. It is important to make note of the orientation, otherwise you will put things on the dial in a mirror image. Picture 3 shows a stencil for a Longines 23M.

Remember we are talking about small items and tiny distances. Close does not count. You have to use an eye glass when doing this, or at least I do. Also remember that using an eye glass distorts perspective. Things may look straight from the angle you are looking, but not be.

Marking the dial

Take the stencil and put it on the movement side of the disk. Make sure everything is lined up. I put a small indentation on the side of the disk in one place to mark 3. So, with the center hole and 3 marked on both the stencil and disk, you should be able to line things up exactly. Also, be careful here about orientation, you don't want the dial feet and sub-seconds in a mirror image of where they should be. Now using a scribe or pin, mark the various places on the dial.

Adding the sub seconds hole

If you are using sub seconds, drill a hole in the appropriate place. I go for about 1mm in diameter. Smaller would probably be better. It depends on the pinion of your movement. Finally, file or sand or grind the edges of the hole so they are smooth.

Adding the dial feet

Take a fine drill (say .9mm) and drill into the dial where the dial feet are to go. (Picture 4.) You only want to drill a little, about half way (.25mm). You can use the power drill, if you are brave, but a hand drill might be safer (I use a pin vise).

Now take a length of copper wire and file the end a bit so that it angles in, but still has a flatish end. Put a bit of flux in the hole. (Picture 5.) Get the filed end of the wire to stand straight up in the hole. I use a broken helping hands to position it. Put a bit of solder (1mm) next to the copper wire. (Picture 6.) Tweezers come in handy here. Now take the torch, light it, and heat that area, being very careful not to heat the other dial foot, if it has already been done. Move the flame in and out just until the solder flows.

After the solder cools, the copper wire should be firmly attached. Cut it about 1.2mm from the dial. Then file it to the appropriate length. I use a failed dial to hold it when I am filing. I put the foot through the sub seconds hole. (Picture 7.)

Finished dial

You should now have a dial blank, with the dial feet, etc., in the right place. I messed up my first attempts. You may too.

You may have to file away a bit of the solder, if it sticks up too high. Also, you may have to broach the center and sub seconds holes. Better to make them too small and have to enlarge them, than the other way around.

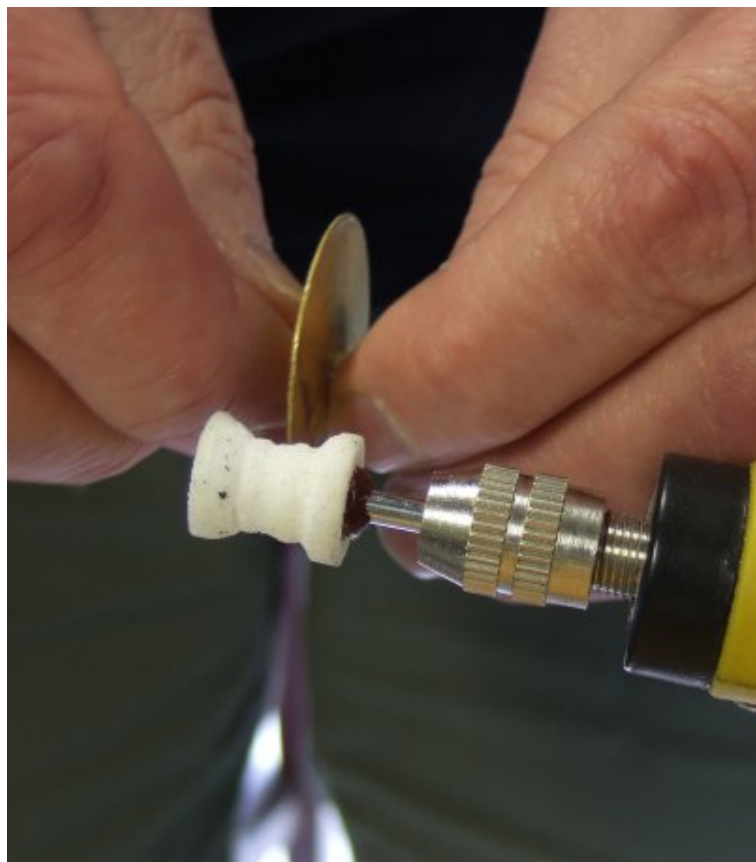
This may seem involved. It is in a way. There just aren't any decent shortcuts. Dial collants (two sided tape), super glue and epoxy just don't work for me. However, it doesn't really take all that long.

Pictures for Part 1

Note: These pictures are a reconstruction. When I am doing it for real, I have to concentrate.

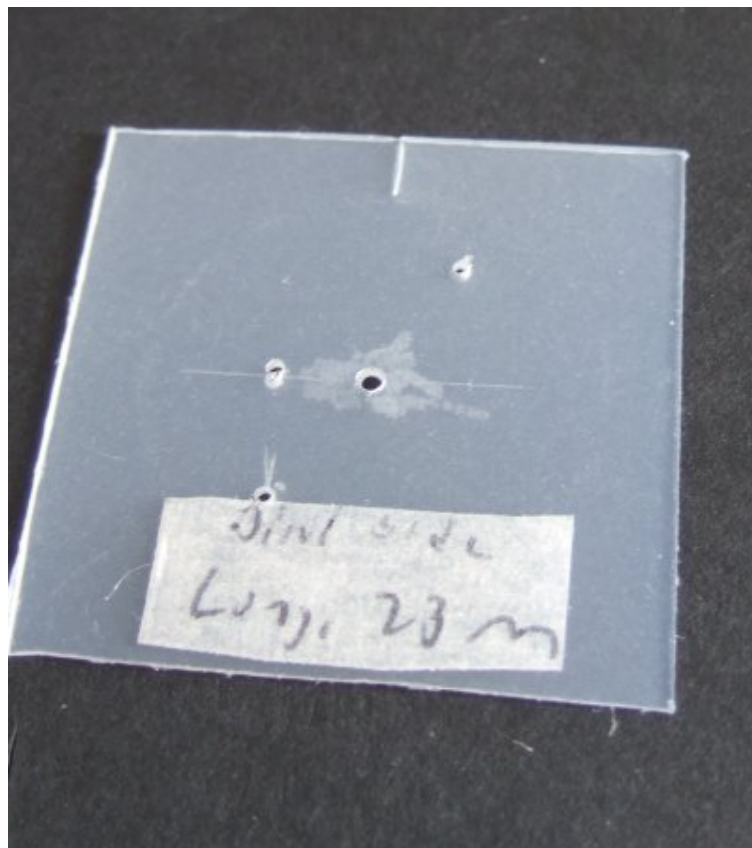
Picture 1. Here is a completed dial. You can see where the old feet used to be.





Picture 2. Grinding the disk to the right diameter.

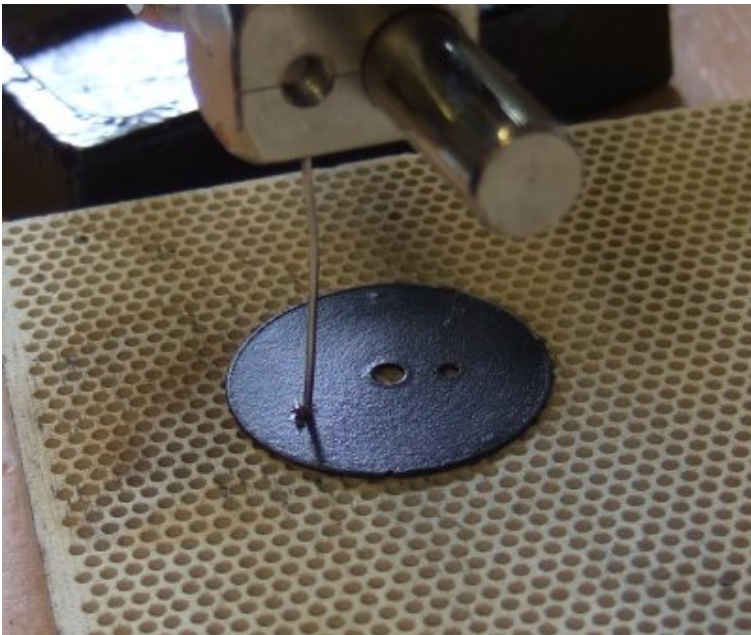
Picture 3. A dial stencil.



Picture 4. Hand drilling the indentation for the dial foot.>



Picture 5. Putting the flux in and around the indentation.



Picture 6. Everything ready to go. The wire is in the hole, and the solder is against the wire.

Picture 7. The dial foot being held by a failed dial and ready to be filed.



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