

Its Sunday night, the wife is watching 'C\*\*\*\*\* Street', so its down to the 'Shed'. There's a tricky drilling job involving a very small drill to do.

All set up and away we go --- the drill snaps! It's the only one you have so do you:-

1. Lock up the shed and go in the house (with curses!)
2. Ring up Fred (*who's Fred? Ed.*) to see if he has the required drill.
3. Do something else in the shed.
4. OR make a replacement drill yourself?

Its not as hard as it looks, so for those interested here's how:-

Armed with micrometer or other measuring device, raid said wife's sewing box (*in our house it's a small plastic box in a kitchen drawer and never used. Ed.*) We are looking for a needle the shank of which is just smaller than the hole required. Place needle in pin chuck with the eye end outwards. With a pair of pliers grip the end of the needle and snap off the end. (fig 1).

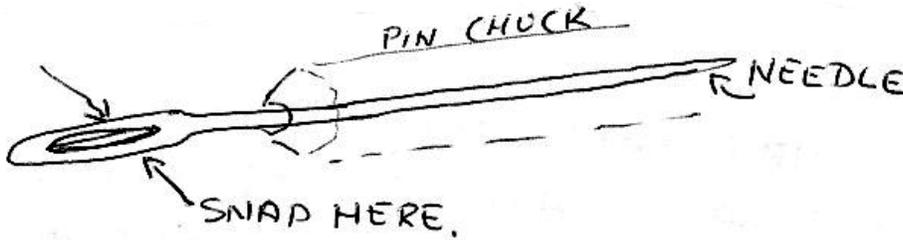


Fig1

This leaves a sort of spade end with a nick in it. With a diamond file or small oil stone smooth end until nick is removed. The next stage is to file with the above both sides of the needle to make it flat - rather like a screwdriver blade. The next bit is the fun bit (sorry!).

With oil stone etc file the end of the needle to a slope, sort of house roof shaped but with an angle on it (see fig 2.)

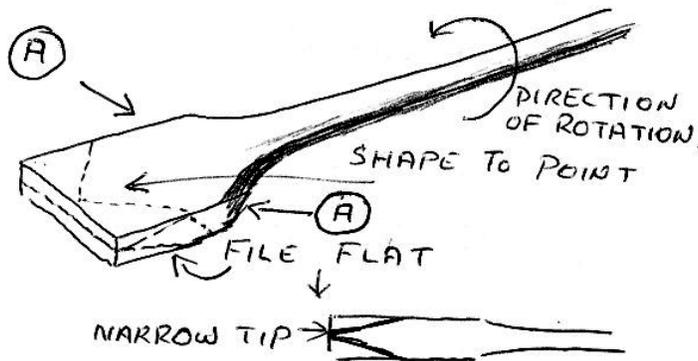
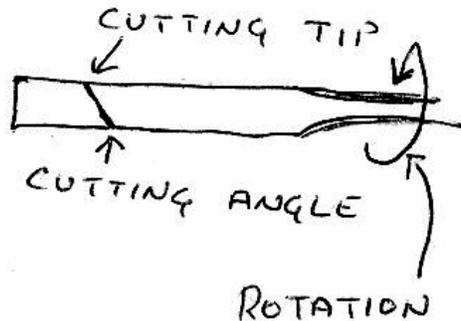


Fig2

The angle provides the cutting edge, not too steep and make the thickness of the tip narrow, try  $\frac{1}{2}$  -  $\frac{1}{3}$  of the thickness of the shank. Having made the tip with the top of the angle as near the middle as possible, its now time to file/stone the sides A. (fig 3).

Fig3



Reduce sides evenly in relation to the tip until the desired size is reached. These days I use a loup for the above work.

Finally remove the needle/drill and snap of the point for safety. Use a fine feed, remove swarf very often to drill the hole. I have made drills down to .3mm and used them on Brass, Copper, Alloy, whilst steel can be drilled its hard work, needing a lot of resharpening. It can be done using a lot of lubricant. Hole made, remove drill from chuck and look with pride (?) at both the hole and the spade drill you made.

Sewing needles also make tiny tapered Reamers - how? Place needle point outwards and with file/stone make three flats (fig 4). Ensure edges A meet and are sharp. DO NOT use a grinder as heat will remove the temper in a flash. All work to be done with hand tools, its not that hard.

One other thing - if your wife catches you raiding her sewing box, I know nothing about it!

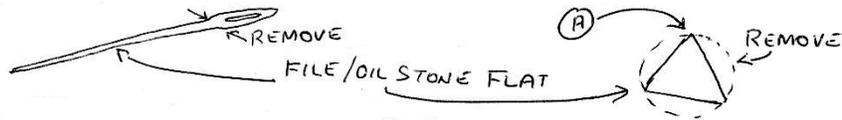


Fig4

## Spade Drill Bits Part 2

Dave Douglas

What if, as mentioned in part one, the wife catches you or has no needles of the right size? If, in the stores you have some fine piano wire / silver steel, here is how to do it. Its more work but having perfected the work you have a new skill ! Look for a piece of wire, we will start with piano wire, this seems to be tempered silver steel, or at least behaves the same , that's what matters. Piano wire can be obtained from model aircraft shops. Cut off about 2" (50 mm) and , holding it at one end in a pin chuck place the other end on a scrap bit of steel clamped in the vice with your best hammer give it a good blow to the end of the wire ,flattening it. ONLY ONE BLOW ! Any more and it's possible the wire will crack .

With the wire being semi hard treat it as in part 1. Sewing needles ie. diamond files / oil stone. Again follow directions in part 1. Shape the flat end to screwdriver blade shape. Angle end of blade both for cutting and to a point.

Having obtained the required size / shape its time to harden it. Heat up the drill to be, by holding it in a pair of pliers at the opposite end to the drill tip. Have ready a tin/container of water. Hold drill above water and heat bright red (colour of cooked carrots) and plunge VERTICALLY into water. It has to be vertical or drill will bend due to cooling on one side. Now we have a very hard drill that's brittle it needs tempering, or" letting down ". Polish with a bit of emery to remove scale and clean to show the steel. Look for a piece of scrap steel on the bench / floor ( my usual place ! ) say 1/4" ( 6 mm) thick by 1 1/2"(30 mm) long. Heat up \_ this is the tricky bit ( sorry again!) you need it hotter than the temperature for tempering BUT not red hot. With the piece of steel really hot, place the polished drill on it with the shank on the steel and the drill bit sticking out in the air. Watch the colour slowly moving along towards the tip, when the tip turns purple/blue pick up and plunge vertical into the water. Remove and treat as the sewing needle to obtain the size required, that's for piano wire , but what about silver steel?

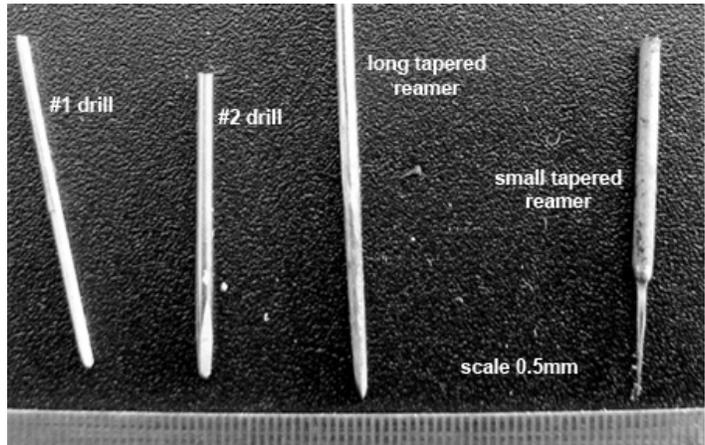
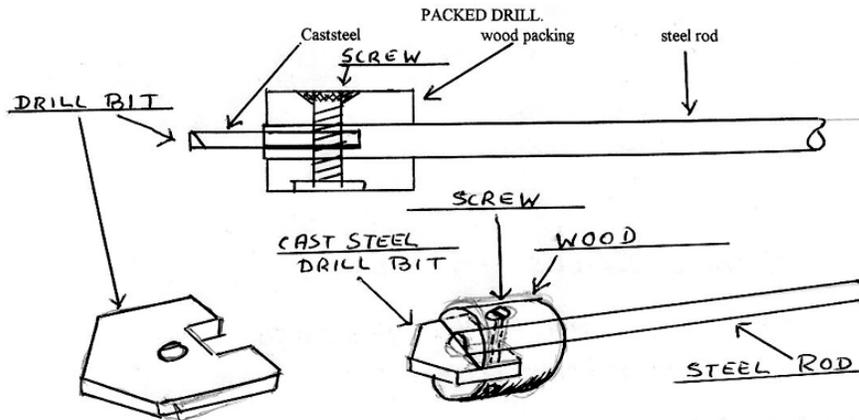


fig 1



A few years ago ( at least 4!) I bought at Harrogate a bundle of silver steel rounds some of which were very small/thin. The only difference from piano wire is its softer but still only give it one blow with hammer to spread it. Otherwise treat the same. So that's how to make small drills. Before the advent of the twist drill they were the only drills available.

Small drills yes, how big can they go? In an old workshop book they give details of quite large( 1"/25 mm or bigger) but they were made from steel rod and with a cast steel bit. On each side wood was fixed, this was known as a "packed drill". [fig.1] Well I hope you find the above of interest, any questions? Sorry, I'm off round the field with the train see you when I come back! (p. s. this is my first effort typing with my computer !).

(Jolly good too Ed.)

Dave Douglas.