MAKING RAPPER SWORDS.

This is not really intended to be a set of instructions, but rather, an account of how I made a set of rappers. Very little thought was put into the production methods I used, and in any case my methods of work were to some extent dictated by the limitations of my workshop, although this is fairly well equipped.

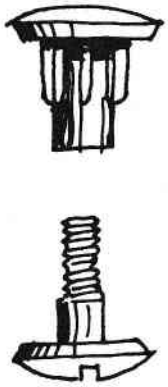
There was a need, at the time, to get a set of swords finished quickly, so I resolved to just 'bash on' and left 'head scratching time' out of my programme, quite probably with the result that more time was wasted in the end!

I assume, then, that you will

simply use this text as a rough guide, and that you will think of short-cuts, alter or improve on the design of the swords and adopt methods appropriate to your own workshop and equipment.

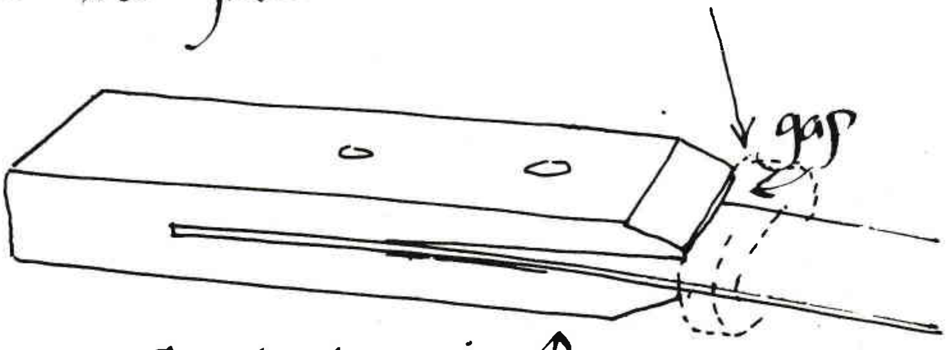
Perhaps the most awkward problem in making a set of rappers is that holes need to be made in the high carbon, hardened and tempered spring steel blades. Ordinary drills will barely scratch this material, and tungsten (or titanium) carbide drills politely decline to drill holes exactly where you want them, so probably the best method is to punch the holes, so I will deal first with making a punch and guide-block for punching holes for the fixed handles.

I should explain here that I had decided to attach the fixed handles using saw handle screws in preference to rivets as these can be tightened when the handles begin to 'open' through time.



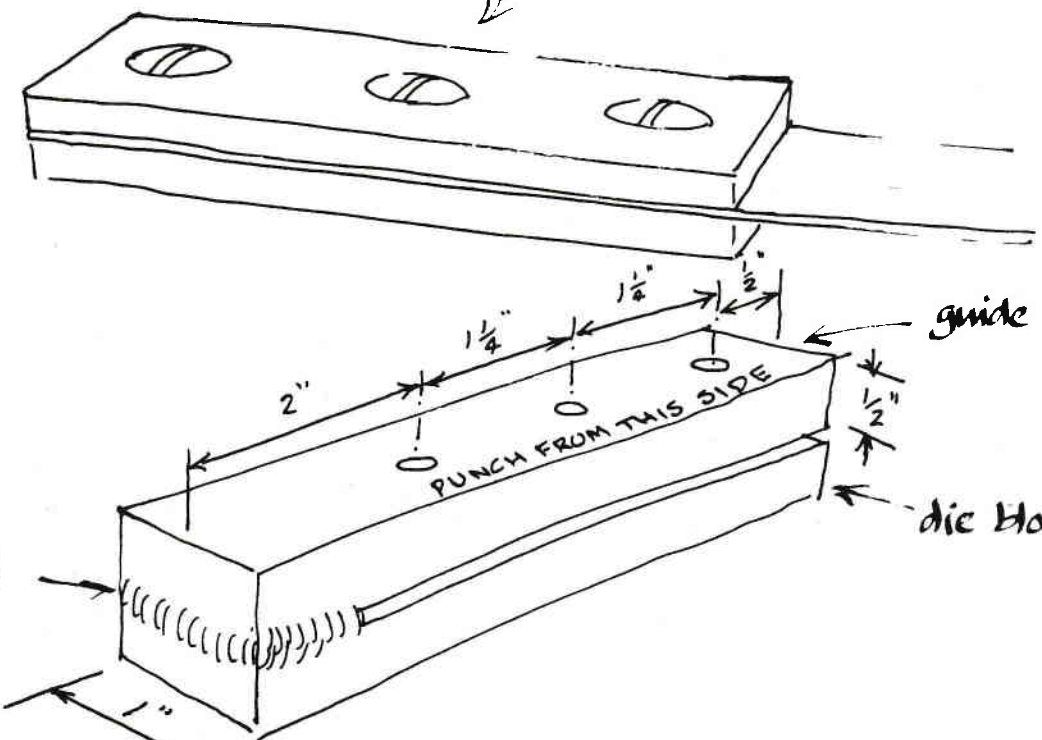
A saw handle screw.

The Royal Earsdon team used to use thick rubber washers of the type found on the screw tops of lemonade bottles to prevent the blades of other swords from becoming jammed under the fixed handles.



Standard version

Our version

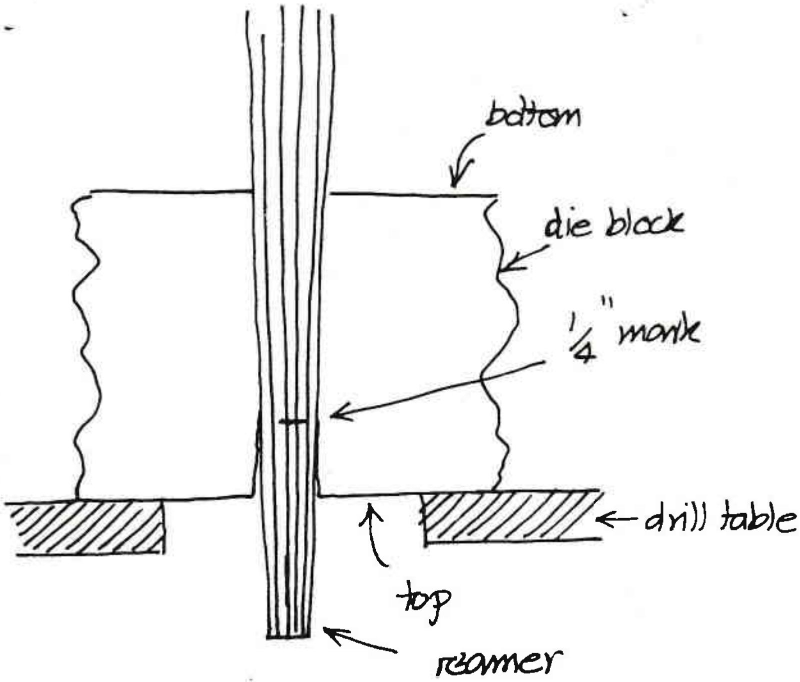


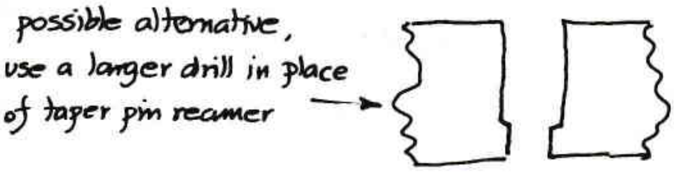
The guide & die block was made from two 5" lengths of 1" × ½" black mild steel.

Beginning with the die block, one of the 5" lengths was marked out and drilled as shown using a $\frac{15}{64}$" or 6 mm drill and following with a ¼" reamer.* The drilling and reaming operations were carried out on a pillar drill (verticality is important). The holes were then taper reamed from one side and this side heavily marked with a centre-punch (or hacksaw) as a reminder, as it is vital, later, to remember which side is which, and there isn't much difference in appearance. In taper ~~to~~ reaming I used a $\frac{9}{32}$" taper pin reamer and used a micrometer (or Vernier calipers)

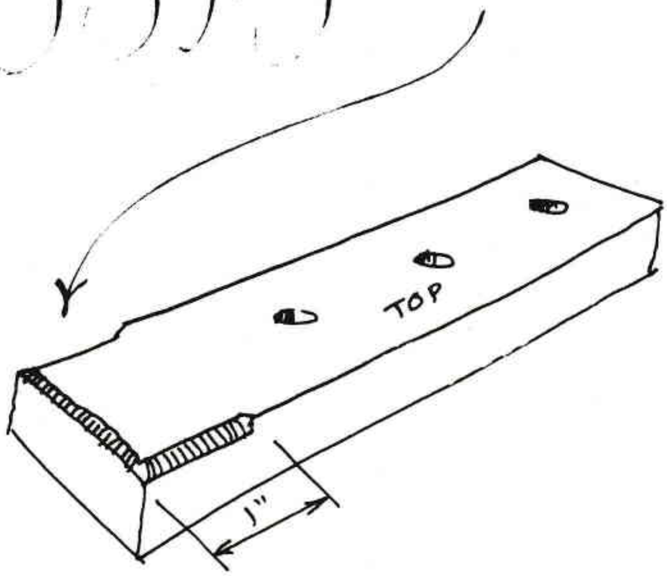
* See page 15

to establish the point at which this was 1/4" diameter. This point was marked with a felt-tip pen. The reamer was then fitted in the drill chuck and the stop collar set so that the 1/4" mark stopped just above the table surface. This was to ensure that the holes in the die block remain at 1/4" for a short distance. Reaming was done at a slow speed with lots of cutting fluid.





The die block was then prepared for welding by filing as shown

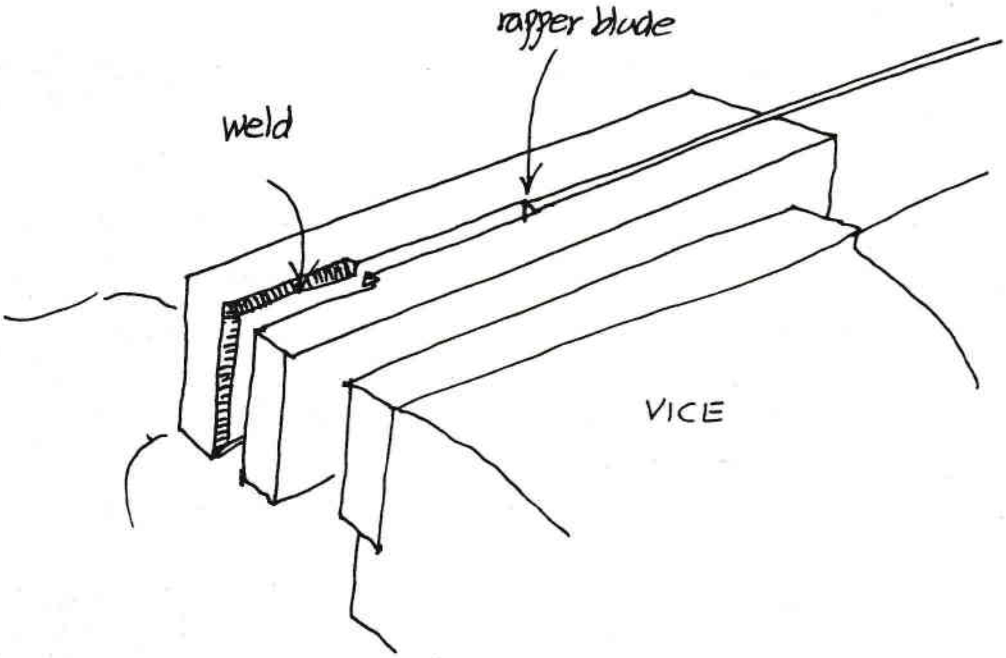


Before proceeding further I case hardened the die block. This involved finding a tin lid large and deep enough to accommodate the block and fitting it with a wire handle. The tin was filled with 'Kasenit' case hardening compound and the block pushed top downwards into it. The workshop stove was then stoked up and the tin and contents lowered into it.

The die block was left at red-heat for about half an hour and then picked out with tongs and dropped into a bucket of water (at room temperature to avoid cracks in the metal surface) There is usually a loud bang as the metal enters the water and the operator is usually drenched.

The quick block can now be made.

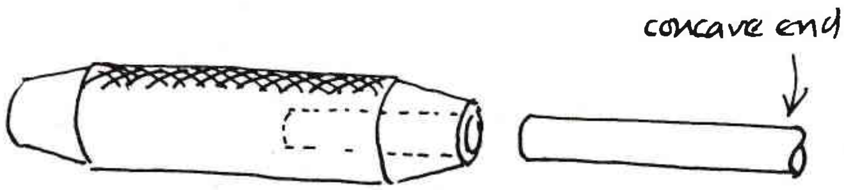
This was filed ready for welding and held, together with the die block in a vice as shown, with a rapper blade sandwiched between them. The top surface of the die block must be inner-most.



I used an arc welder to join the two blocks at this stage.

The blade was then removed and the blocks placed on the drill table, dieblock uppermost and a $\frac{1}{4}$" drill passed through each of the tapered holes so as to mark the positions of the holes in the guideblock. Having started the holes accurately in position thus, the drill was exchanged for a $\frac{15}{64}$" and the holes drilled right through with this, and followed with the $\frac{1}{4}$" reamer. I then marked the guide block using letter stamps to avoid punching from the wrong side.

The punch itself was made from a $2\frac{1}{2}$" length of $\frac{1}{2}$" dia. bright mild steel bar and a $1\frac{3}{4}$" length of $\frac{1}{4}$" dia silver steel.



The $\frac{1}{2}$" bar was turned, knurled and drilled 1" deep as shown to take the $\frac{1}{4}$" silver steel. The silver steel was hardened and tempered (light straw) for about $\frac{3}{4}$" of its length and ground at the tempered end using the corner of a grindwheel so as to form a concave end. The punch was assembled using 'Loctite Studlock'.

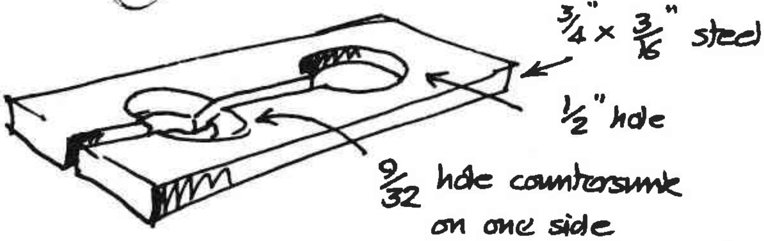
If the punch shatters at first use, grind it back to remove all broken material and form a new end. If this makes it too short you'll have to start again. Remove broken stub of steel by heating, and extracting with pliers, or if it has shattered right up to its handle, drill the other end and insert a new piece there. The concave end should be more or less as shown below right, or an alternative method

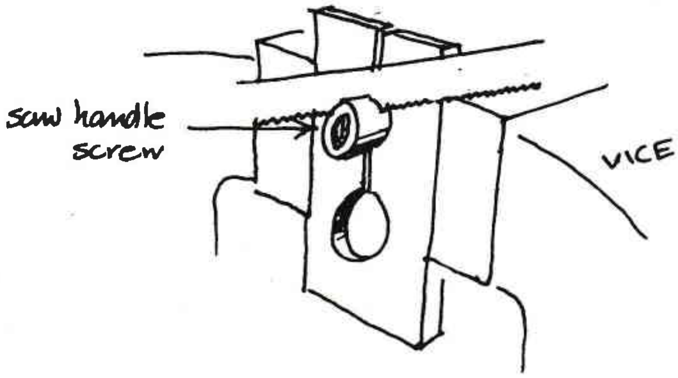
is to grind the end at a slight angle. I succeeded in getting my punch to work correctly at the fifth attempt, and that punch has now cut over 150 holes, with occasional sharpening.

In use I found it best to have to hand another couple of pieces of ¼" dia steel, and proceeded as follows:-

A blade is inserted in the guide & die, which is placed, die downwards on an anvil, or any heavy block of metal. The blade is carefully positioned and the punch inserted in one of the end holes (having first had a drop of oil applied to its business end to aid withdrawal) and given a smart blow with a hammer - I used a 2lb one. The punched out disc of steel should drop out through the tapered hole in the die. If it doesn't, push the punch through again until it does as the discs can be troublesome if they get jammed in any quantity in the die. Twist the punch to remove it from the blade, and put one of the pieces of 1/4" steel rod in its place while the hole at the other end is tackled, again replacing the punch with a steel rod. Finally, punch the centre hole. In this way all holes will be exactly equally spaced and will lie along a straight line, (important in assembly of the handles later) assuming your marking out and drilling of the dieblock was accurate in the first place!

The holes in the blades now needed opening up to $9/32$" to accommodate the saw handle screws and this was done using the tapered reamer again - it seemed quite happy to cut the metal, unlike the drills.* In case you're wondering, I did try to make a 9/32" punch in the first place but never managed to get one to cut without shattering. Also, saw handle screws are more commonly available in brassed steel, and these are, I think, smaller in diameter. I didn't relish the thought of having rusty screws to look at after the brass had worn off, so opted for the brass ones. I found, however, that the minimum length of a pair of these was a shade over 3/4", so the minimum thickness of the fixed handle on the rapper would also have to be 3/4", too clumsy I thought so I decided to reduce the length of the female screw. This meant making a small holding device. In use, the





screws are pushed into this from the countersunk side, as far as they will go, and sawn off against the face of the holder. Another problem then arose, I found that the female screws were not threaded to their full depth, so a $7/32$" B.S.W plug tap was obtained and, again using the holding device, all screws were tapped to full depth, so that when assembled, the overall length of the pair was $9/16$"

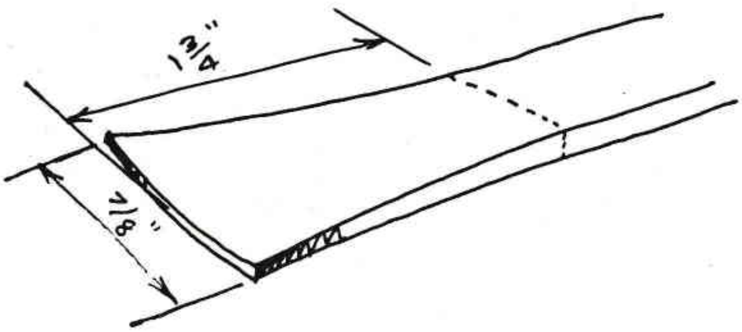
The handles were made from old school T-squares, which were of beech, cut down to 1" × ¼" × 4¼". I drilled mine through the punched blade to ensure accurate alignment of the holes, inserting female screws as holes were drilled to avoid movement of handle relative to blade. All holes were drilled $9/32$ as the female screws pass through both halves of the fixed handle. The male screws pull the splines on the female screws into the wood as they are tightened, and with a bit of luck the wood doesn't split! The holes need countersinking first of course.

I stamp the date on the fixed handles and renew the blades after three years.

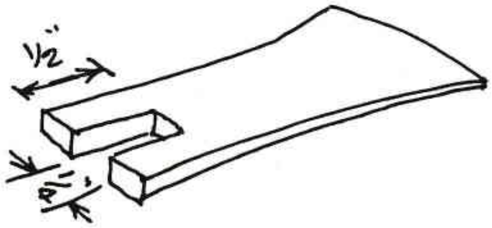
Now for the swivel handles.

I made the bolsters from 3/4" x 1/8" bright mild steel strip as follows:-

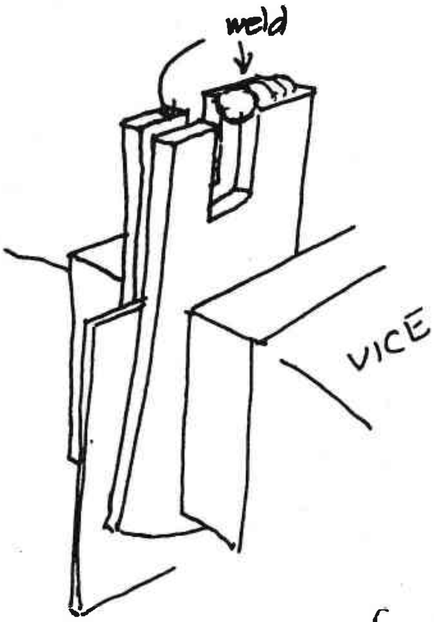
The end of the strip was heated to bright red/orange in the stove and then forged to a fish-tail as shown.



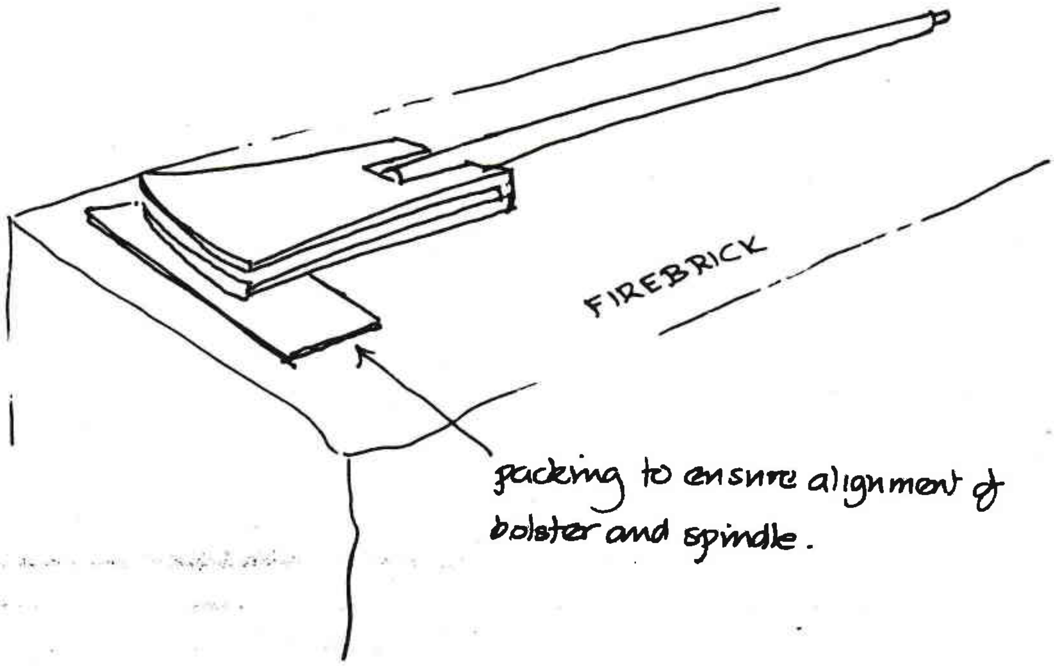
The fish-tail was then sawn off to a length of 1 3/4". This process was repeated until 14 'fish tails' (for 7 swords) were made. A notch was then cut in each of these. I used a milling cutter in a lathe chuck, with the fish-tails mounted in a machine vice on a vertical slide, but it could be tackled using a 1/4" drill, a hacksaw and file.



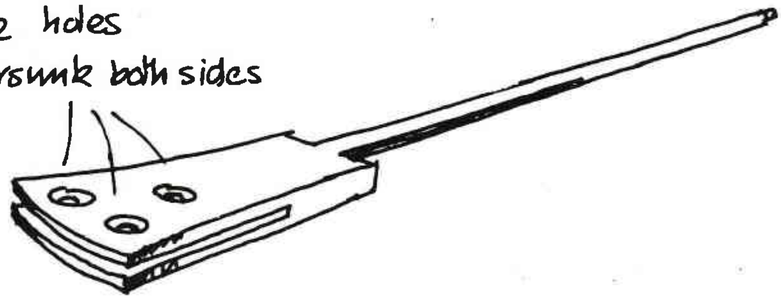
Seven spindles were then cut from 1/4" dia. bright mild steel rod at 4 7/8" lengths, and one end of each turned down to 3/16" dia for a distance of 3/16". A pair of fish tails were then clamped in a vice with a piece of 19 gauge steel, or an old rapper blade sandwiched between them while their ends were welded together. I used oxy-acetylene with a No. 3 nozzle. The spindle



was then welded in on a firebrick and the fish tails then placed in a vice again



while some more welding was carried out down the sides for about half an inch*. The welding filler could now be filed flush.



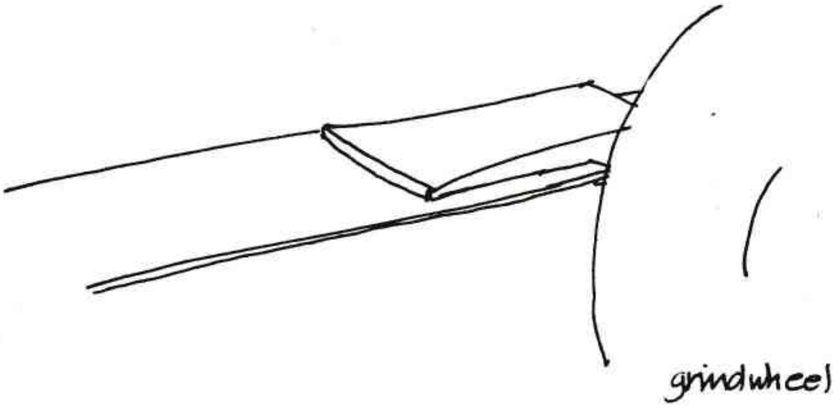
* 19 gauge packing was inserted between the fish-tails again here to prevent them from closing up during welding.

Three 5/32" holes were then drilled through the pair of fish-tails, keeping a piece of 19 g. packing between the two (an old razor blade could not be used unless softened first) This was to prevent a burr being caused between the fish-tails where it would be awkward to remove.

5/32" Soft iron rivets were to be used to fasten the blades in place, so when countersinking the holes, care was taken not to overdo this. The rivet heads must stand proud of the surface when inserted. A punch was then made exactly as already described to punch the holes in the steel blade. The fish-tails acting as a guide and die. Only about 1/4" of 5/32" dia silver steel is left protruding through the punch body.

After punching the holes, rivets were cut to length to leave about 5/32" protruding through the fish tail. Riveting was carried out with a 3/4 lb ball pein hammer.

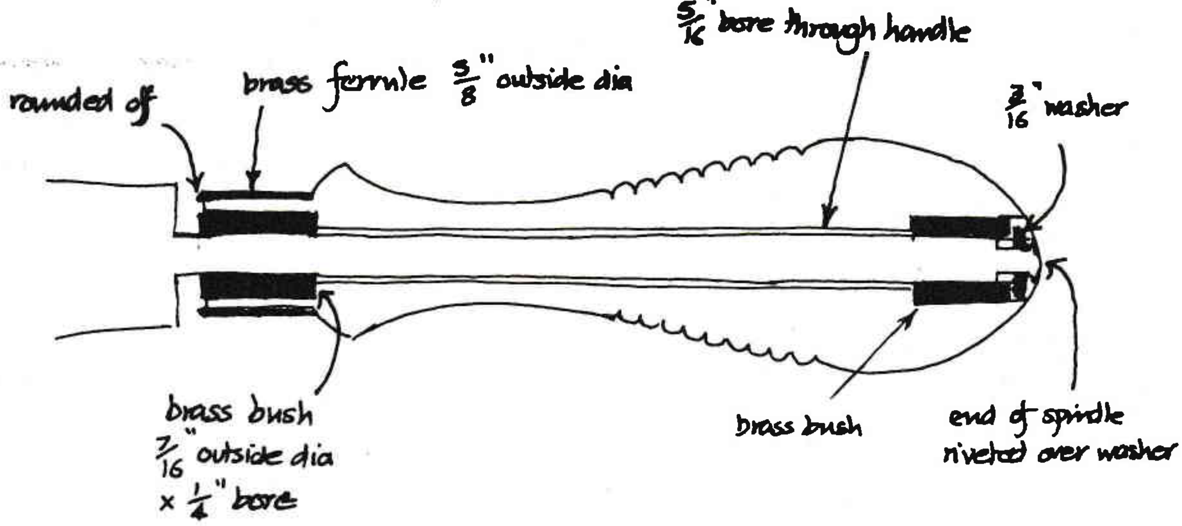
The blade and bolster assembly were then dressed using a grindwheel, oilstone, files and emerycloth to remove rough edges from the blade, rivet-heads, welding scale and blade



which is now needing removing from the sides of the bolster. I found it best to dress up the rivets before grinding away the surplus blade as this can be a help in holding the bolster in the vice.

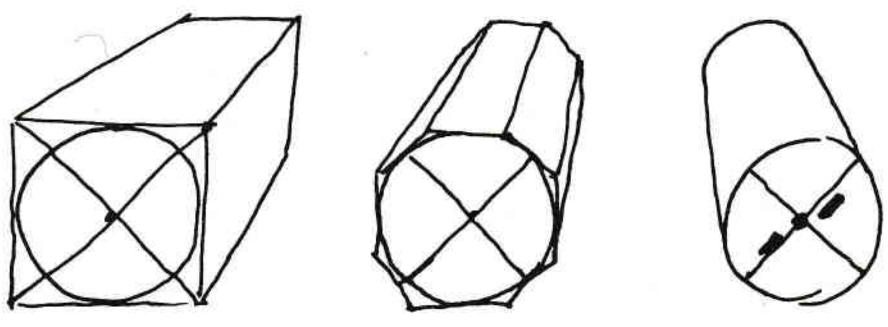
The handles themselves were made from beech again (school desk legs this time!). These were $1\frac{3}{4}$" square and were cut to $4\frac{3}{8}$"

lengths before starting.

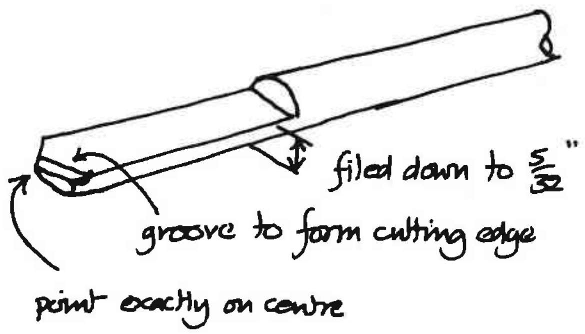


FULL SIZE DRAWING

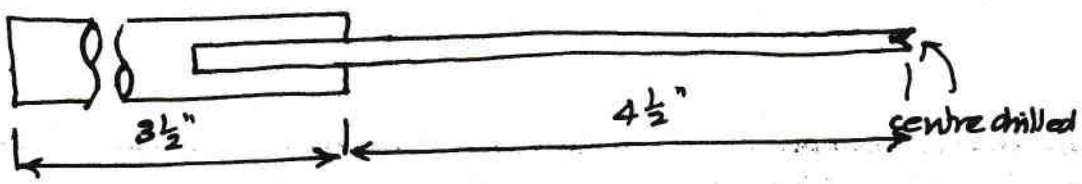
Centres were established at each end of each length, circles drawn on each end, and each length was then planed to an octagonal cross section before mounting between centres and turning to a cylinder approximately 1½" diameter.



Each cylinder was mounted in turn in a 3-jaw chuck and bored through with a long 5/16" dia drill. I made one of these from a piece of 5/16" silver steel as shown. This was hardened and tempered

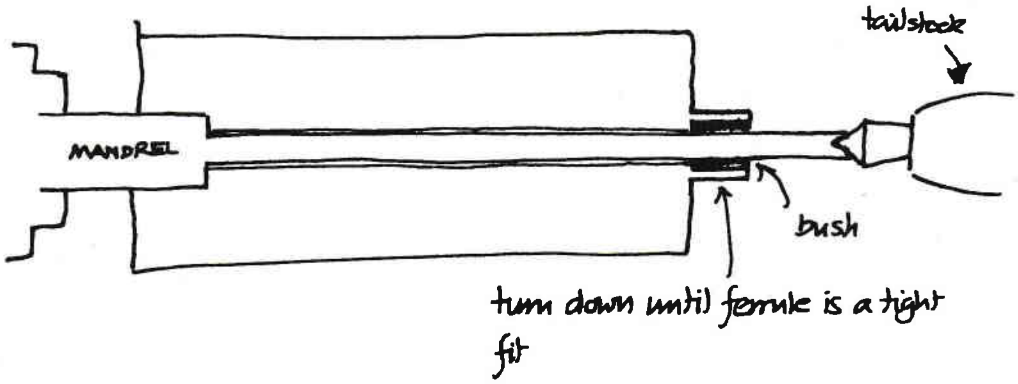


light straw. It is slow to use as it needs frequent withdrawal to clear shavings. The 5/16" drill was then replaced by one of 7/16" and the bore opened out to a depth of 5/8" in each end. N.B. The 5/16" drill may have wandered, causing it to have strayed off centre when it emerges from the other end. If this has happened you will need to use a tailstock centre to centralise the wood after reversing in the 3 jaw and before opening out the 'second' end to 7/16". These larger bores are to accommodate brass bushes which I had decided to fit. I happened to have some 7/16" × 1/4" bore tube to hand for this but the bushes could easily be made from solid and drilled. Seven 5/8 long bushes were then made and one fitted to each handle. Before proceeding further I made a mandrel from 7/16" and 1/4" bright mild steel rod as shown, and assembled it with 'Loctite Studlock'



The mandrel was fitted in the lathe, large end in the 3-jaw to a depth of a couple of inches or so. A cylinder with its bush fitted is then pushed on to the mandrel. Actually, this reminds me, I turned the 7/16" part of my mandrel from a 1/2" dia. bar to ensure it was a tight push fit in the wood, it happens to be exactly 0·437" (7/16") but this was lucky; you may well find your 7/16" drill cuts oversize.

I cut a series of ferrules from 5/8" dia brass tubing, leaving them rather more than 5/8" long, and then began work turning the wood, the mandrel being supported by the tailstock. I first of all turned down

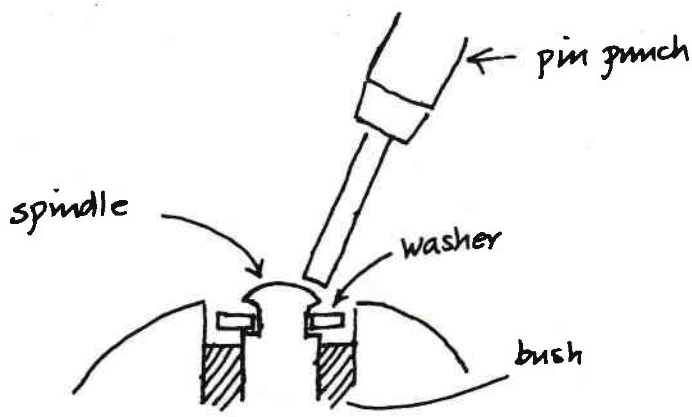


the bushed end until a ferrule fitted tightly over the wood. For this job I used an adapted metal cutting tool mounted on its side to resemble a skew chisel which I might otherwise have used. The tool being mounted in the toolpost, the cross-slide dial reading was taken, and then the other cylinders were in turn mounted on the mandrel and treated in the same way. The ferrules were pushed partly home on each cylinder, which was then returned to the mandrel where it acted as a second mandrel while the ferrule ends were trimmed, pushing the ferrule right home before trimming the other ends to length. The ferrules are now fitted permanently (hopefully). The lathe cross-slide was then exchanged for a tool rest and the remainder of the shaping carried out with a gouge and skew chisel. Before removing from the mandrel, each handle was stained black - they're going to get dirty-black anyway - and any kind of varnish doesn't last five minutes - so you might as well make them really black to begin with. I used shoe dye and with the lathe at full speed polished off any surplus stain with a rag (sweaty hands will do it otherwise, with some risk to your popularity)

The bushes can be fitted to the other end of each handle now. These are shorter ($\frac{1}{2}$" long) to allow room for a washer over the end of the spindle, and the end of the spindle itself should not project beyond the end of the handle.

I fitted the bushes using the mandrel to drive them home, striking the mandrel with a heavy mallet.

The bolster and spindle can now be rivetted into place but first of all you'll need some $\frac{3}{16}$" washers with an outside diameter of less than $\frac{7}{16}$" I had to make mine from standard washers by mounting them on a small arbor and turning them down.



The riveting was done with a pin punch while clamping the bolster in a vice. Make sure this job is thoroughly carried out, your life depends on it if you have any basket figures in your dance. My own inattention to this detail caused me to be flung the length of a hall to end up under the table of some of the (delighted) audience - it was a charity interruption at a teenage disco! You might feel safer with nut replacing the washer and 'rivetted' spindle (but 'Loctite' the nut in place!). Apart from staining the fixed handles, if you've so decided, that's that.

Our sword handles are more pear-shaped than standard, and ribbed to give maximum grip during basket figures, for the same reason, the fixed handles have no chamfer at their inward ends. Our blades are 20" long - shorter than standard as this helps to keep the set tidy and also makes for neater 'nuts', we think.

Frank Lee

Carlisle Sword & Morris 1986.

Saw Handle Screws	:-	North Shields Grinding Co. 38 Union St. North Shields. Tyne & Wear.
7/32" B.S.W taps	:-	Tracy Tools. 8 Shrewsbury Walk off South St. Isleworth, Middx TW7 7DE
Blades	:-	Specialised Products. Meadow Tce. Sheffield. S11 8QN