PHOTOGRAPHS BY WALTER HALL

Kitless Ebonite rollerball

Walter Hall makes his own vacuum chamber for stabilising pen blanks

WALTER HALL

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The kitless fountain pen I made in *Woodturning* 287 and 288 involved working with aluminium, using expensive triple start taps and dies imported from the USA and a Bock nib unit with special tap. All of this expense and complexity might have given the impression that making kitless pens is a dark art, restricted to the rich and highly skilled turner. In this article I intend to disprove that by showing how to make a simple rollerball pen using only the taps and dies that might be found in a relatively cheap set, of the type commonly sold in discount supermarkets and DIY stores and turned from the much more forgiving medium of Ebonite.

On his occasion I have incorporated a clip salvaged from a Taylors Mirfield Omega pen kit, a small spring from my spares box and a rollerball refill from Beaufort Ink. All the other components are made on the lathe from Ebonite, a hard rubber material used for making ten-pin bowling balls, vintage-style pens and the stems of tobacco pipes.

Before going on to the step-by-step process, I would firstly like to thank all of those readers who responded to my request in a previous article and offered suggestions for holding taps on the lathe in a way that would ensure accuracy. I received several responses, some of them very ingenious and all of them practical. In the end, I opted to purchase a relatively inexpensive drill chuck tapping attachment from RDG Tools, suggested to me by Geoffrey Laycock. This consists of a chuck mounted on a spindle which slides in a hollow Morse taper. The work is turned by means of a tommy bar through the spindle against the workpiece, which is held in the locked headstock spindle (see step 9).

EQUIPMENT AND MATERIALS USED

Ebonite rods
Engineers jaws, pen blank jaws or pin jaws
M10 x 1.25 die
Drill
3mm drill bit
4.8mm drill bit
6.5mm drill bit
Scrap acrylic
60° revolving centre
Abrasive
1/4in BSP thread
1/4in BSP nuts
Clip and refill for pen
Thin parting tool
Adjustable pen mandrel
Cone bushing
Threaded mandrel
Spindle gouge/skew chisel
Tripoli and white diamond compounds

1 After first making a drawing to figure out the relationship of the parts and the exact sizes required to accommodate the refill, cut the Ebonite rods to length. Then begin by turning a spigot on a piece of 20mm black Ebonite to form the external threads on the nib unit. There are many ways in which the material could be mounted on the lathe; I chose to use engineers jaws in a scroll chuck. Pen blank jaws or pin jaws would also work well or even a collet chuck if you have one large enough to accommodate the Ebonite rod


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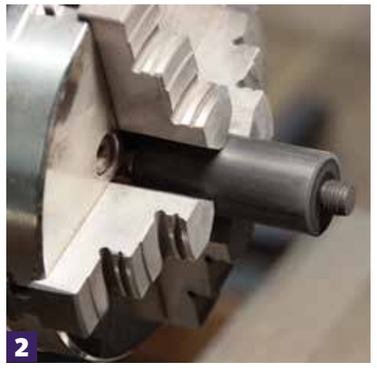
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2 Using the methods outlined in my previous articles, cut the threads on the spigot using an M10 x 1.25 die. This is quite a large size and a coarse thread, but the next size down in a standard set of taps and dies is usually M8, which does not leave sufficient clearance to accommodate the 6.5mm diameter bore required for the body of the refill. The size makes for a chunky pen and the coarse thread is concealed when the pen is in use

3 Drill out for the refill, first drilling right through at 3mm diameter, then to 4.8mm and then 6.5mm to the precise depths shown in the drawing. This will ensure a good fit of the refill in the writing tip of the pen. If your tailstock quill is calibrated you can use this to measure the depth, otherwise mark the drill with tape


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4 Here is the completed thread and bore which still needs a little tidying up. Note that the threads nearest to the body of the unit have been trimmed away to provide clearance so that the components fit tightly together when assembled. When doing this, take care not to overcut and remove the whole threaded spigot or weaken it so that it snaps off in use

5 Make a mandrel from scrap acrylic or Ebonite by drilling and tapping an M10 x 1.25 thread in the end. The nib section can then be mounted on this, supported by a 60° revolving centre in the tailstock and turned to shape


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6 Once you are happy with the shape of the tip, sanding and polishing can also be completed with the work mounted on the mandrel. Any woodworking abrasive will be suitable for use with Ebonite. I like to use Abranet which can be easily cleared if it clogs with material. Work through the grits and do not use too much speed or pressure

7 With the nib unit completed, work can begin on the body of the pen. With a suitably sized Ebonite rod mounted in the chuck, cut a spigot for the external thread (cap to body). For this, I used a ¼in BSP thread, often supplied in metric tap and die sets as it is a commonly used size in plumbing and compressed air fittings. It fits neatly over the 11mm diameter nib section


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9 Here you can see the drill chuck tapping attachment mounted in the tailstock. Once carefully aligned (my tailstock has a lot of play against the lathe bed) this makes accurate tapping an easy task. Note the brass nuts still in place for support during tapping

10 The drilling and tapping work on the barrel is now complete and we can begin on the cap. This is mounted in the chuck, drilled through for the 8mm tip thread and drilled in steps to accommodate the writing tip, then finally drilled out to size and depth for the ¼in BSP cap to body thread. This thread is cut and then the work is reversed in the chuck and tapped to 8mm for the threaded tip that holds the clip in place


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11 You should now have a barrel into which the writing tip, spring and refill fit and operate properly, a cap that fits onto the barrel without binding against the writing tip and an offcut of Ebonite which will be used to make the tip of the cap. Test the fit of the components and make any minor adjustments needed to ensure everything works properly and there is a good alignment of the pattern in the Ebonite. This can be adjusted by carefully sanding the end of the cap until properly aligned

12 The remaining piece of Ebonite is now mounted in the chuck and two spigots cut to match the external diameter of your chosen clip and for the 8mm thread


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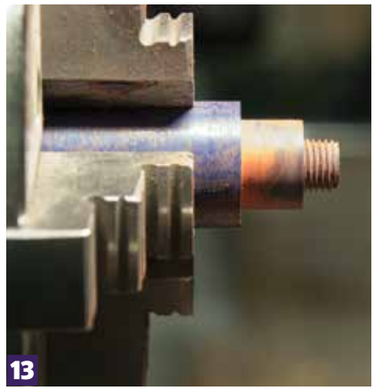
13

13 Cut the threads right up to the face of the work by reversing the die in the holder. There is no need for a recess behind the threads as the clip will provide the necessary clearance. This part can then be parted off using a thin parting tool. Take care not to lose this small component by holding it lightly with one hand while parting off, but do keep your fingers clear of the very unforgiving engineers' jaws

14 To shape the body of the pen, it must be mounted on the lathe using some form of mandrel. I used a standard adjustable pen mandrel with the rod altered to the internal length of the barrel, supported at the open (threaded) end by a cone bushing and at the tailstock end with a small revolving centre. Use sharp tools and take light cuts to avoid the need for unnecessary and potentially damaging tailstock pressure


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15 The cap may be mounted similarly or simply mounted between 60° centres and turned near to the final dimensions

16 To achieve a perfect fit, the barrel and cap are assembled together and mounted on the mandrel for final shaping and sanding

17 To shape the tip of the cap, it is screwed to the cap body which is then mounted on a threaded mandrel in the chuck. I use a scrap ¼in BSP air line fitting as a mandrel but if need be you could make a mandrel by cutting a thread on a length of acrylic or Ebonite rod. The shaping is done with a sharp spindle gouge or skew chisel

18 Use the clip to check the fit and shape. Here you can see that a little more still needs to be done to achieve a good shape. Once all the components are completed they are hand sanded through the grits to 600 before final polishing

19 Ebonite can be brought to a good shine by buffing with Tripoli followed by white diamond compounds. A light touch is required to avoid overheating the work. Ebonite does not respond well to being overheated so keep speed and pressure low

20 All that remains now is to assemble the components. No pressing or gluing is required, everything simply screws together

21 Your final piece should look something like this ●


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