MODEL ENGINEERS'
WORKSHOP

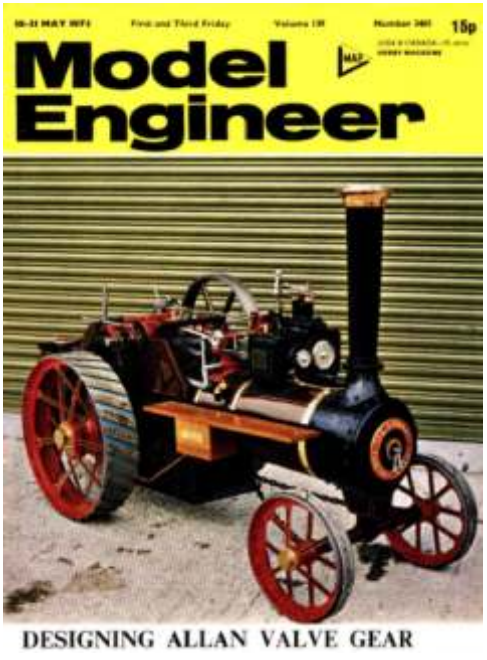
## A HEAVY-DUTY BORING TOOL-HOLDER

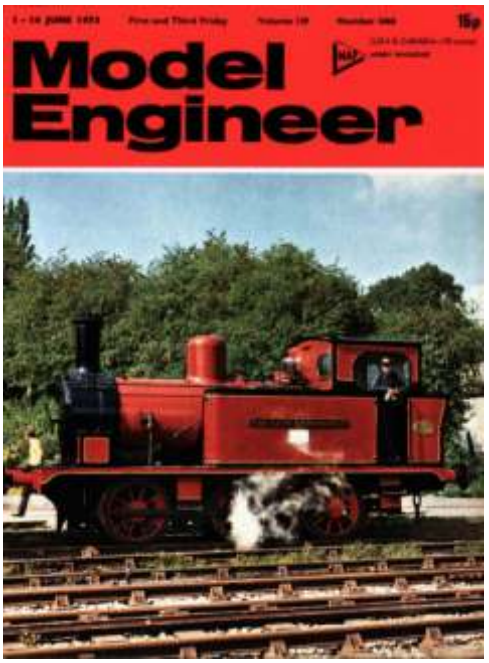
Alistair Sinclair revisited an old design by D.H. Downie in MEW 240, April 2016. Here's his introduction.

An email to the Editor in the January *Scribe a Line* (MEW No 237) from David Byways asking for his help caught my attention concerning a boring bar tool holder illustrated in issue 235, pages 64 and 66. The query elicited a reply from Ian Strickland which referred David to an article in *Model Engineer* issues 3465 and 3466 from 1973. These contained an article by D H Downie giving details of just such a tool post. Information was therefore forwarded to David from Ian which no doubt helped him to go on and make this.

**The Milne Boring Tool Holder**
My interest in this was initially aroused because upon reading the email, I remembered that an old text book from 1950, *Machine Shop Methods*, (reprinted in 1998), showed a 'Heavy Duty Boring Tool Holder' which I was sure was similar if not identical to the one illustrated in issue 235. I do not have the ME article to which Ian Strickland referred so cannot confirm if it ***is*** the same but it seems very likely given the details illustrated in the 1950's text book.

**This document includes a reprint of both parts of D.H. Downie's article, including plans and instructions for making his version of the boring tool holder.**



# A Boring Bar Holder

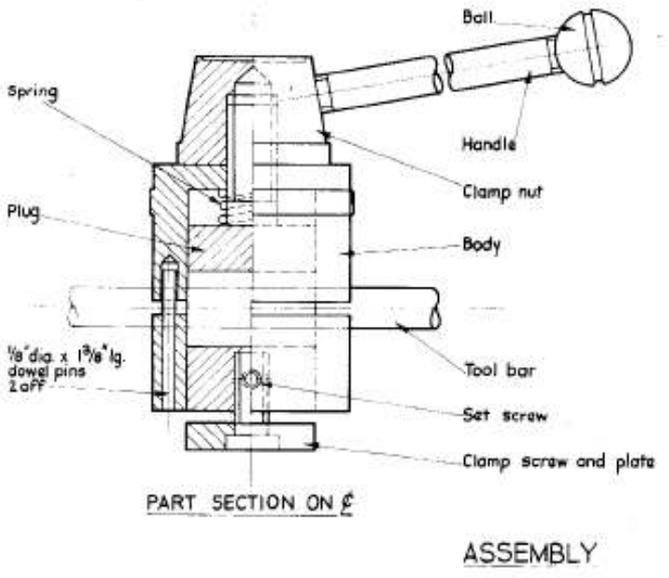
**by D. H. Downie**

SINCE THERE IS considerably more overhang when using boring bars and tools it is important that they should be securely clamped and rigidly supported to avoid inaccuracy and chatter. If your top-slide has tee slot clamping this sturdy holder will solve your problem. It accommodates three sizes of bars or tools of your own choice. It can be quickly clamped in position with the bar accurately on centre line with no fiddling with packing each time you wish to do boring. Easing off of the clamping handle raises the top half by the coil spring to facilitate changing of bar or tool. The length of material to suit your particular lathe is determined by the height of the lathe centre above the tool post slide. You get these dimensions by calculating from "A" as shown in the drawing. Even the beginner can add this tool equipment to his shop. Just follow my method.

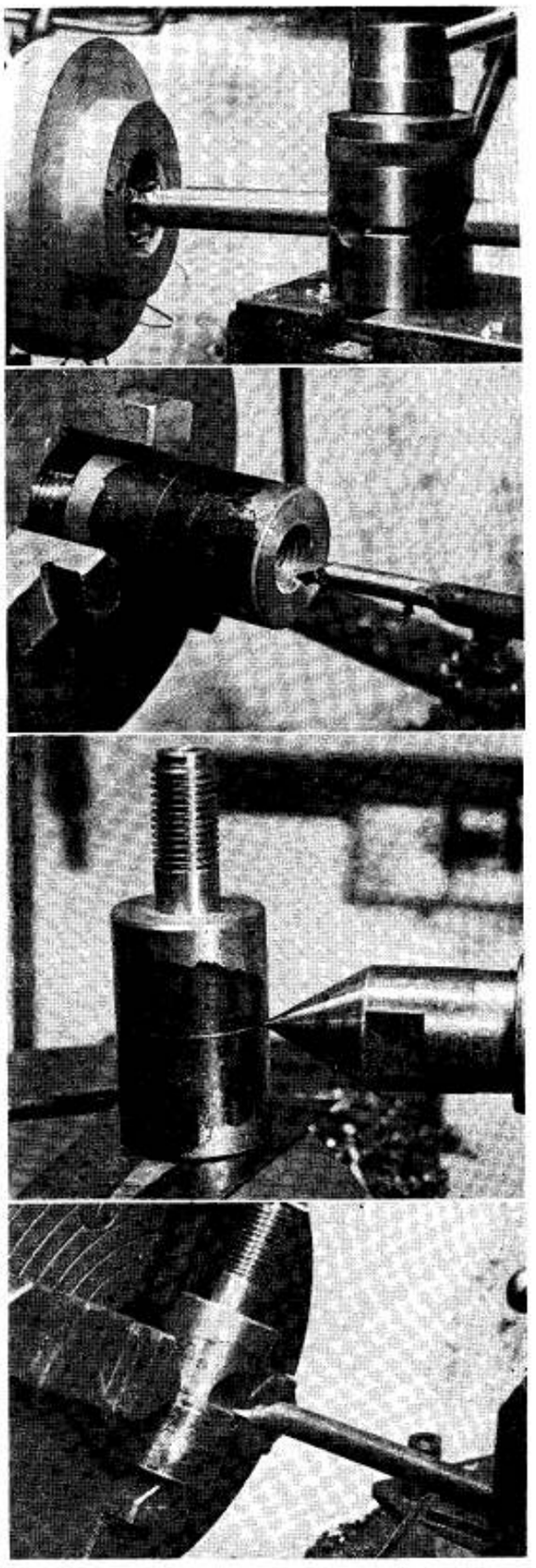
**The Centre Plug**

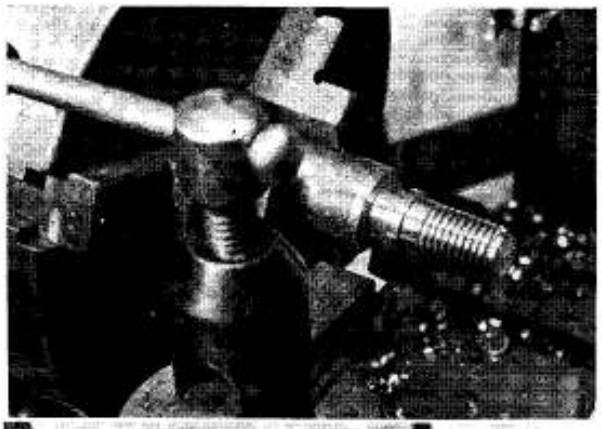
The length of material will be "A" plus 2 $\frac{1}{16}$ in. Chuck truly and machine the end down to $\frac{1}{2}$ in. dia.

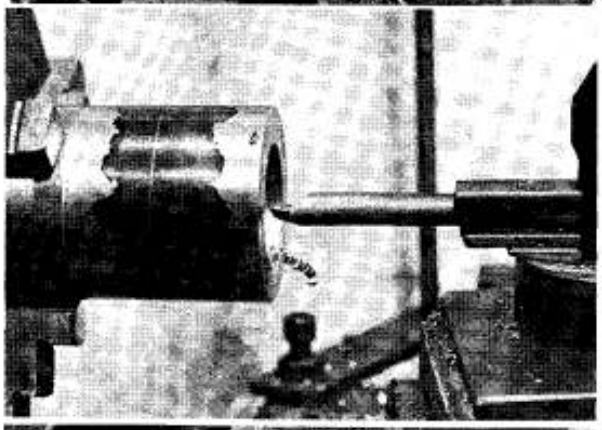
*Top to bottom:*
*The toolholder in use in the author's workshop.*
*Rough out thread-finish with tap-tool slide 27½ deg. to left.*
*Scribe by rotating firmly against your tail centre— 30/1000 packing beneath.*
*Drill and bore through the plug ½ in. bigger than your largest bar.*

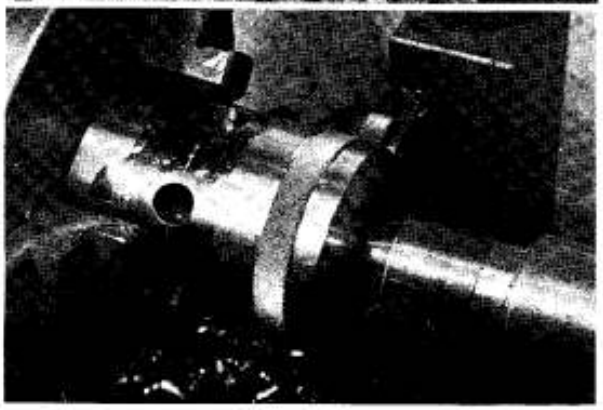



ASSEMBLY









for a length of 1 $\frac{5}{16}$ in. and thread this 16 t.p.i. (BSF). Reverse, face the end to length, drill $\frac{1}{4}$ in. BSF tapping or to suit your tool slot. It is advisable to rough out the thread with a screwing tool and finish with a standard tap, now stand the piece on your tool rest with thin packing, say 0.030 in. beneath, and scribe it by rotating firmly against your tail centre to give centre height for boring. Set the piece in your four-jaw chuck the scribed line to tailstock centre, check that the material is held centrally sideways by the chuck jaws. Drill and bore through to $\frac{1}{8}$ in. clear of the largest bar you intend to mount.

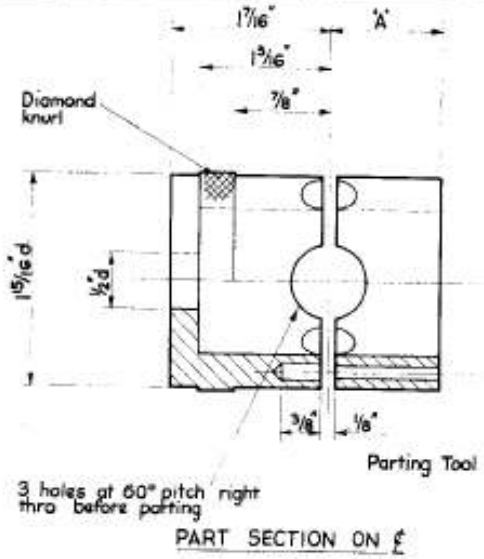
**Base Clamp Screw**

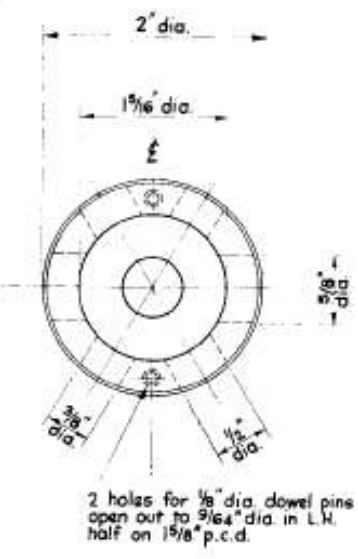
Machine the base clamp screw to fit the tapped hole in the plug and part off. Hacksaw a shallow slot in the head for adjustment.

Take a piece of b.m.s. flat, width and thickness to slide easily in your tool slot. The length to give good clamping and load distribution. Set it in your four-jaw chuck, drill centrally to take your clamp screw, the head fitting easily in the recess cut after drilling.

**The Body**

This is made from 2 in. dia. stock bar and the length for your lathe is "A" plus 1$\frac{3}{4}$ in. Set truly, face and drill right through to $\frac{1}{2}$ in dia. Now bore out an easy fit on the plug for a depth that leaves a wall of $\frac{1}{16}$ in. thickness in the bottom. Take a light cut on the outside to leave a $\frac{1}{16}$ in. wide band near the top end. Reverse the material, machine the short undercut up to the $\frac{1}{16}$ in. wide band and knurl. Brush out the teeth of the knurling wheels and keep lubricated in use. Get a clean sharp knurl. Again standing the body on the tool rest scribe a line around against the tail

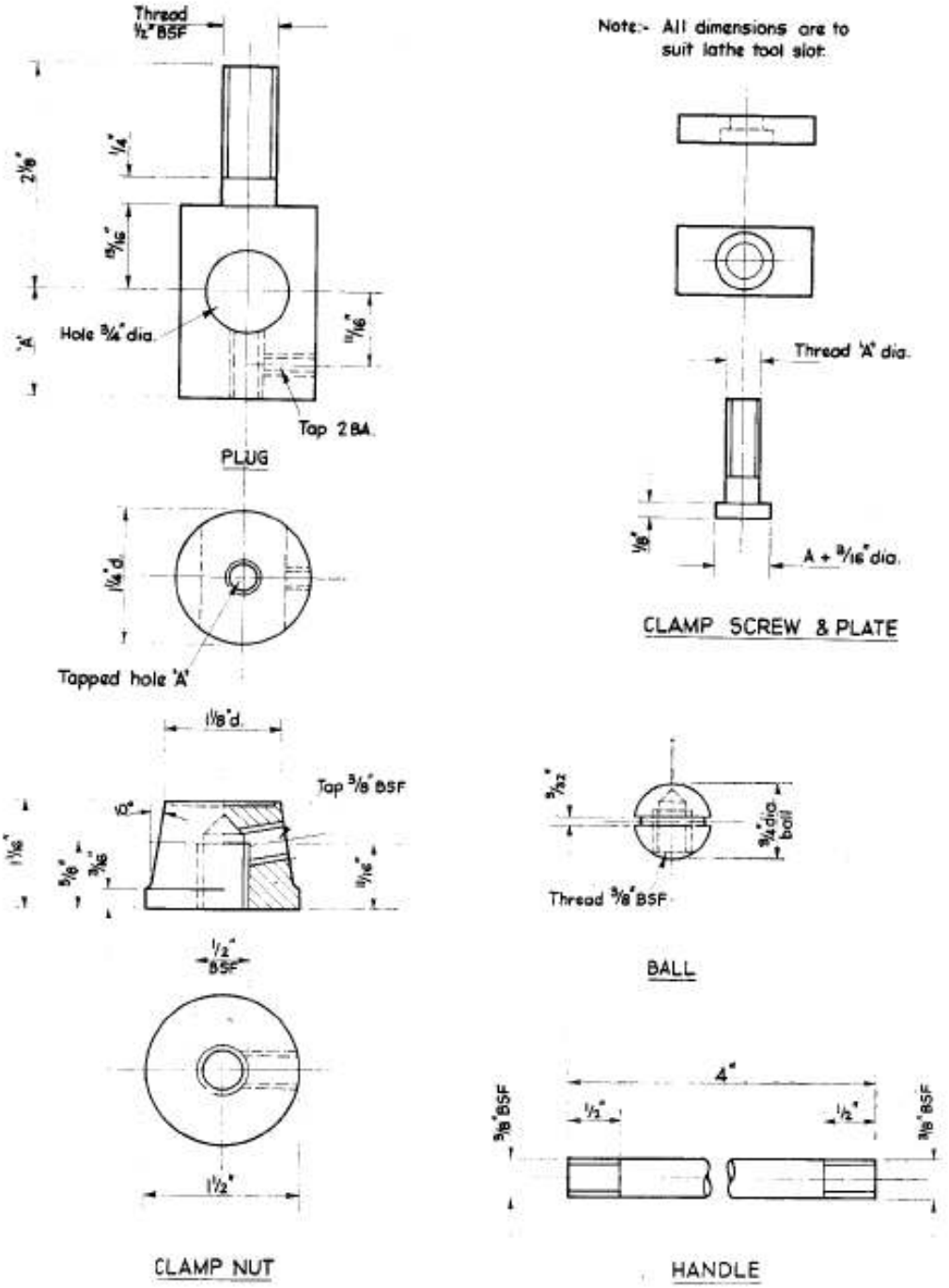



*Top left: Machine base clamp screw, tool slide at 27½ deg. to right.*

*Middle left: Bore out body easy fit on plug.*

*Bottom left: Knurl ⅛ in. wide band, get a clean, sharp knurl.*




centre. On this line are bored the three holes through for your choice of boring bars and/or forged tools. You can index the centres for the holes accurately this way. Take a short piece of stock bar over 1¼ in. dia. about 4 in. long. Machine a short end to take one of your gear wheels plus ⅛ in. to hold in the chuck. Use a gear wheel with a number of teeth divisible by six. A 30-tooth wheel is fine. Mount the mandrel with the gear against the chuck jaws. Set true, centre drill, use support of the tail centre and skim a push fit into the body. With a sharp vee tool mark six lines on the body, indexing the lines from each 5th tooth. Centre punch the intersections of these lines with the circular scribed line. How to bore the bar holes? It is much easier to do this with the body in its place in the tool rest than three separate settings in the chuck.

*To be continued*

# A Boring Bar Holder

## by D. H. Downie

*Part II* *Continued from page 513*

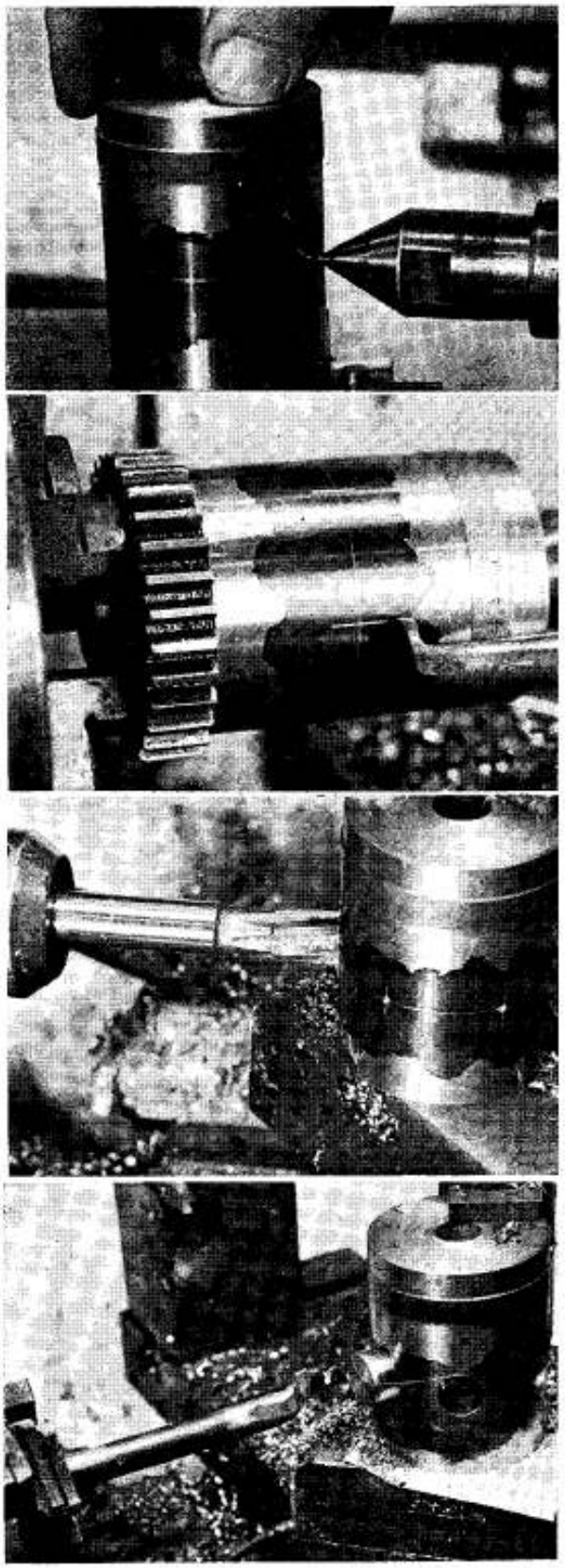
CLAMP THE BODY on your tool rest, line up the front dot to a small centre drill in the chuck and the rear dot to your tail centre. When finally set, start with a centre drill. Larger drills can easily run out if started on a rounded surface. Drill with undersize drill then finish drill to size for your largest diameter boring bar. Alternatively you can drill and ream, or drill and bore to size with a tool held in the chuck. Repeat for the other two different sized holes. This method ensures that all three holes are dead on the lathe centre line.

Now is the time to drill for the two $\frac{1}{4}$ in. dowel pins. Drill from the base and for a depth of "A" plus $\frac{1}{8}$ in. This way gives perfect alignment of the pins. After parting the two halves of the body, the top $\frac{1}{4}$ in. holes are opened out to 9/64 in. dia. The pins enable the body to be turned, keeping each half of the boring bar holes in step.

Rechuck the body and part through the tool central on the line scribed around the body. A parting tool of 3/32 in. to $\frac{1}{8}$ in. wide is ideal. You can use your tailstock centre as a support in the $\frac{1}{2}$ in. dia. hole. It is vitally important to have a positive minimum of top rake on the parting tool. This reduces the forces acting on the tool which would cause "pull in" of the tool during the interrupted cutting through the bored holes and no trouble should be experienced. Remove burrs and sharp edges on completion.

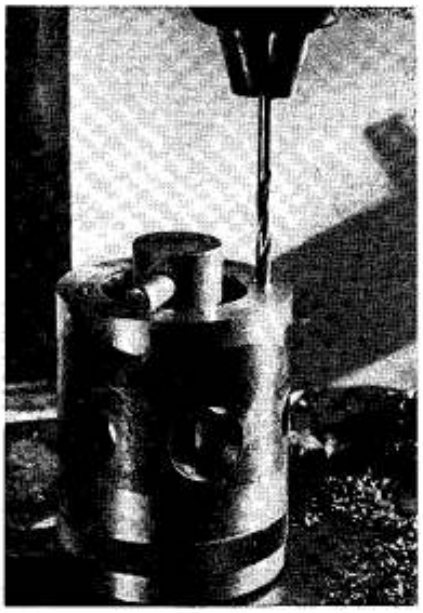
**Clamp Head and Handle**

Machine and clamp head, drill, screws and finish with $\frac{1}{2}$ in. BSF tap. Drill, and tap for the handle at 10 deg. For a comfortable grip fit a ball handle. If one is not available it is easy to make. Tap and fit a solid end to the rod $\frac{3}{4}$ in. dia., roughly shape it. File up and finish with a tubular silver steel hardened and tempered tool applied by hand with lever motion, the tool supported by a rest. Drill and tap for the 2 BA grub screw which locks the clamp screw once it is adjusted to slide into the tee slot. Fit a short piece of spring on to the top screw of the plug, sufficient to raise the



*Top to bottom:*

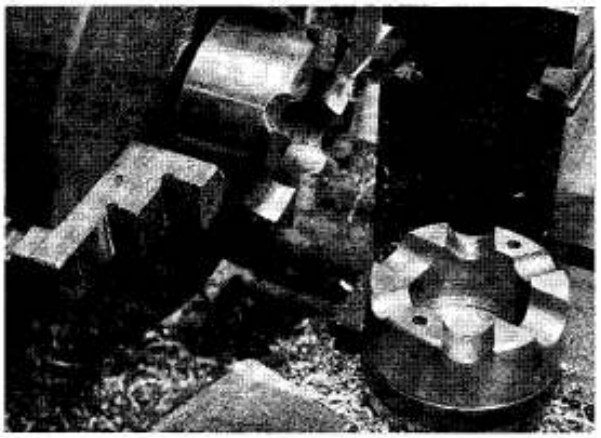
*(1) Body on the top-slide, scribe against tailstock centre.*
*(2) Index the centres this way, a 30-tooth wheel is fine.*
*(3) Clamp the body on tool rest and drill and ream the holes;*
*(4) or drill and bore with a tool in the chuck.*

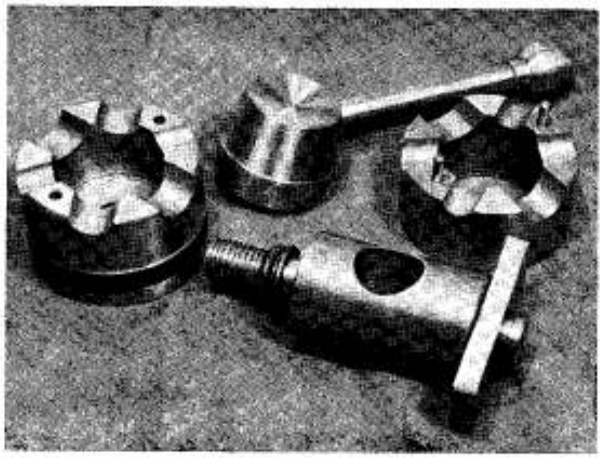


*Left: Drill from the base.*

*Below: Part through the body with minimum top rake on tool.*

*Bottom: The tool holder parts. Below right: Use the holder as a fixture to quickly machine the bar ends.*





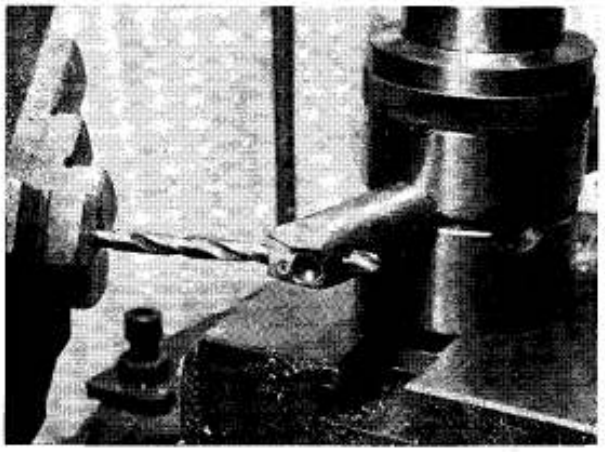
top half slightly when the clamp handle is eased off, and allows easy changing of the bars and tools. Fit all parts together and offer on to your tool rest for checking.

This is a tool accessory for the lathe and should be accurately made and well finished.

**The Boring Bars**

Cut two boring bars to the diameter you have chosen for the holders. Face the ends to length. Mount your holder on the tool slide and use it as a fixture for the detail drilling and machining of the bar ends. Insert each bar in turn into the holder clamp and drill the tool bit holes at 60 deg. to the body of the bar. A half turn of the bar and you can drill the tapping holes for the grub screw. Drill tool bit holes at right angles to the bar centre line at opposite ends, making the bars double ended. Start all drilling with a centre drill, to prevent any run of the larger drill which follows. With the bar in the holder and turning it at various positions the chip clearance bevels are quickly machined on the bar ends. These are optional but do improve the bars in appearance and efficiency. The smallest hole in the body will take forged tools made from silver steel rod or standard "Eclipse" h.s.s. Broken 3/16 in. or ¼ in. centre drills make fine h.s.s. tool bits for the solid bars.

This tool holder is in constant use in my own workshop and you can go ahead and make it with confidence.



## STEAM PUMPS

*Continued from page 550*

passing through a "wiper gland" in the top of the casing to the steam gland above, the whole design following the practice of our very successful force-lubricated compound Pinnace engines. They had a balanced crank, but no flywheel (the impeller acted for that purpose) but a hand barring gear was provided to set the crank right for starting.