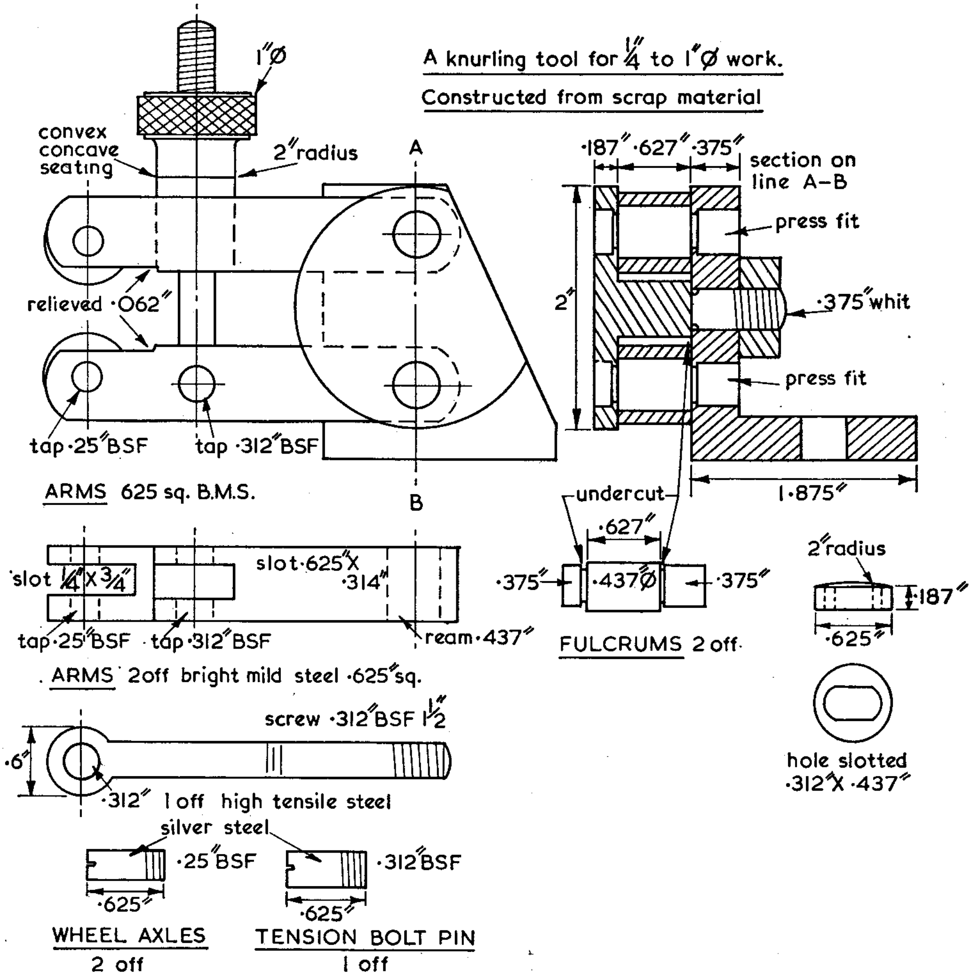
JEYNES' CORNER

A knurling tool from scrap material

DURING THE TIME I worked in the Production Shops and Toolroom when serving my apprenticeship, and later on after my return to England, I had to use the knurling tools kept in the stores, which, if the back centre was a little too hard, and the job a bit springy, often resulted in the snapping off of the centre point. I always considered the operation of knurling by one-sided pressure to be most unmechanical, and decided that some day I would design and make a knurling tool that applied pressure at 180 degrees; however, it was not until I had my last lathe that I set to and produced one to my own satisfaction.

Seeing Derek Beck's elaborate tool described in *Model Engineer* 6 June reminded me of the Heath Robinson affair I constructed from material obtained from the scrapheap, very like the old "Marlco" knurling tool advertised in *Model Engineer* some years ago. I spent some time looking for the drawings of my own effort, and eventually found them when looking for the drawings of a lathe saddle light bracket. As I found the tool very useful, I thought someone else might like to have a go. All the material was to hand on the scrapheap, and the whole affair started in real earnest when I was given two pairs of knurling wheels, and found a short piece of heavy angle steel machined all over; the job was built around these items. The arms were two lengths of ⅝ in. x ⅝ in. bright mild steel bar, and the tension bolt was turned from a large high tensile steel bolt ex one of the hydraulic presses. The slots in the arms for the wheels and tension bolt were formed by drilling, chipping and filing to gauge.

The feed nut was formed from part of a discarded plug gauge; the plug end provided the retaining disc, but required some ploughing before it was in the shape I wanted. I had previously found two locating pegs from a discarded jig, hardened and ground, and finally decided to use them as the fulcrum points for the arms, instead of the bolts I had originally decided upon, and made a good press fit into the angle bracket, and into the retaining disc. They never came apart while I owned the tool, in fact I think I could have dispensed with the thread and nut on the retaining disc shank. The axles for the wheels were made of silver steel, screwed ¼ in. BSF at one end, the fulcrum for the tension bolt was also silver steel screwed one end 5/16 in. BSF; both the wheel axles and the



fulcrum pin had slots for a screwdriver in the plain end. I took care to arrange the threads of these so that any seizing effect from the pressure on the wheels would tighten the threads, assuming that the work would always be revolving top towards the operator.

The thrust upon the tension bolt and nut was taken by a convex and concave sliding face of 2 in. radius, the convex washer having a slotted hole to allow some angular movement of the tension bolt. Oil holes in the arms were drilled after the whole had been put together, to ensure that they were both on the top. The locating pegs I previously mentioned as being hardened and ground were also undercut, which helped the job going together when finally assembling. Before attempting to press the parts into position I warmed the bracket slightly, and kept tightening the nut on the shank of the retaining disc; the length of the fulcrum part was two thou. over the width of arm, and when the lot was blackleaded moved without any shake. I would say here I have always been a firm believer in the use of graphite for bearings under heavy load.

It will be noticed that the holes in the arms for the fulcrum point and the tension fulcrum pin are on the centre line of the arm, but the holes for the wheel axles are taken 1/16 in. towards the inner sides of the arms, and that 1/16 in. is removed from the inner faces of arms for a distance of about 1 in. to allow more of the wheel to protrude. I tried a spring to exert an opening pressure on the arms, but removed it, as I found that to have the spring long enough and strong enough to hold the arms wide open, by the time the arms were brought inwards to knurl a small diameter the spring had become a solid cylinder. I finally cut a piece off the disc to match the side of the bracket, and filed all the sharp corners off.

The making of this tool was quite straightforward, the only real need for a high degree of accuracy being in lining up the holes in the retaining disc with those in the bracket; I drilled the holes while the disc was in position, and finished the holes by boring right through, the job being mounted on an angleplate on the faceplate.

An Automatic Motor Stop

by J. O. Widdowson

NEEDING TO CUT internal threads in some expensive stainless steel and lacking experience, I decided to devise an automatic motor stop device for my Emcomat 7. Perhaps a knock-out on the half nuts might be better, if more complicated, but for odd threads I keep the half nuts engaged and use the power reverse.

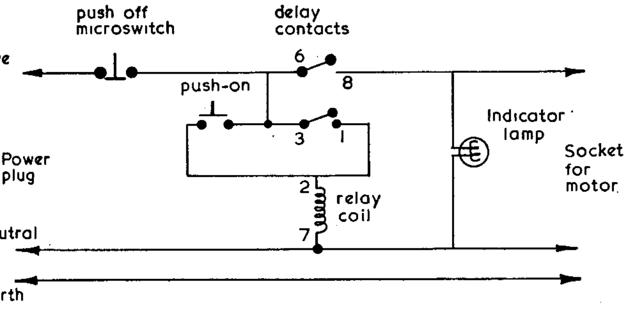
A micro switch with a protective rubber boot was mounted on a 3/16 in. x ¾ in. mild steel bracket across the bed close against the headstock, clear at the back, by a ¼ in. bolt to a similar smaller piece between the ways. A bracket bolted through the travelling steady screw holes (6 mm.) carries a bush through which a piece of ¼ in. dia. rod can slide or be locked by a setscrew. The end of the rod operates the micro switch as the carriage approaches it.

A no-volt release is desirable so that when the motor has been cut out it does not start again immediately the carriage is withdrawn.

A two pole mains voltage relay (with the micro switch, from Whistons) did the trick, together with a spring loaded push-on switch and mains indicator lamp. The relay I used (OMRON) was mounted on an International OCTAL valve base which has numbered tags as in the diagram.

Operating the push-on switch allows current to pass through the closed micro switch and relay coil, operating the relay. Current then flows via contacts 3 and 1 to hold the relay on. The motor and indicator lamp receive current through contacts 6 and 8. The motor is operated by its normal switches until the carriage rod contacts the micro switch and opens it, stopping the motor.

I find that with a cut on, the carriage stops within a very few thou. every time—and there is no power on to cause a breakage if I am slow to operate the motor switch or half nuts.



AUTOMATIC STOP AND NO-VOLT RELEASE

Miscellaneous Engine Drawings

M.2	*Heinrici hot air engine, inverted vertical type*	*75p*
M.6	*"Trojan", double-acting slide valve steam engine, ⅝ in. x ⅝ in.*	*45p*
M.7	*"Warrior", twin-cylinder double-acting steam engine, ¾ in. x ⅝ in. stroke*	*45p*
M.8	*"Spartan", high-speed uniflow poppet valve steam engine, ¾ in. x ¾ in.*	*45p*
M.9	*Diagonal paddle engine, twin-cylinder, ¾ in. x 1½ in. stroke*	*90p*
M.17	*"Vulcan", non-condensing beam engine, "A" frame type, 19th century*	*45p*
M.18	*Basic marine steam plant, oscillating engine, 7/16 in. x ¾ in. stroke, with spirit-fired boiler: ideal for beginner*	*40p*