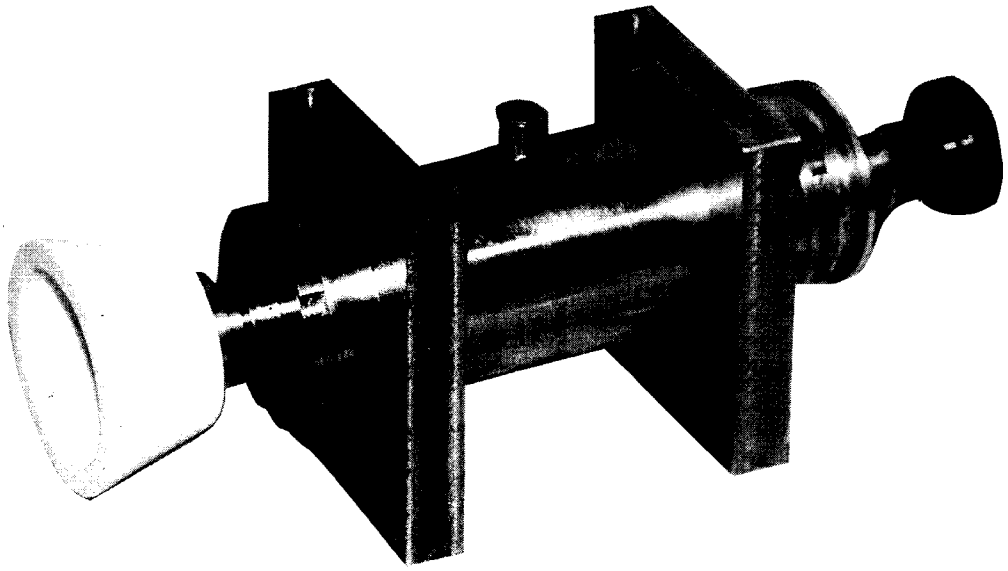
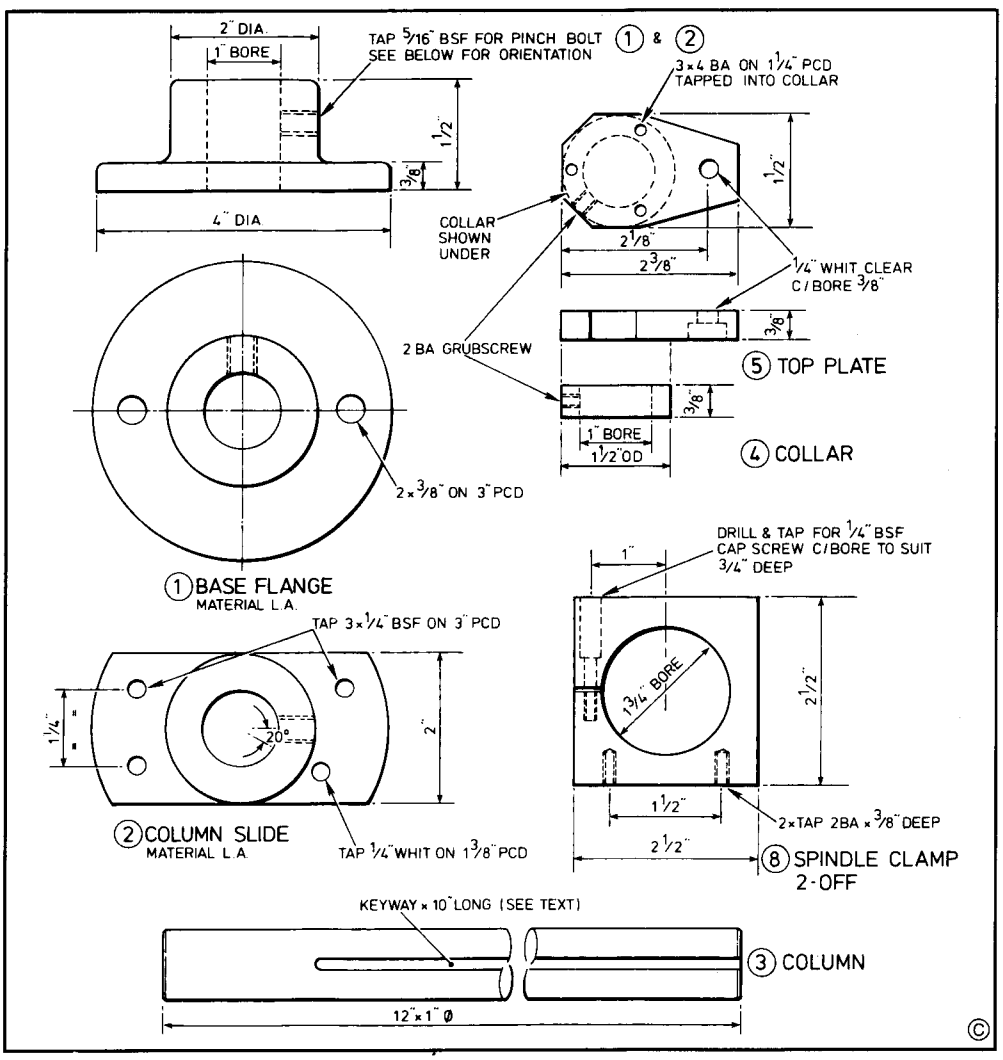


A GRINDING SPINDLE
Assembly, and a mounting fixture

D. Bradley

has described most of the machining required to make the spindle, this time he discusses the assembly of the spindle, the arbors for the various wheels and a fixture to secure the spindle for use.

● *Part II from page 724 (19 June 1992)*



Final assembly is fairly straightforward. First a final check that everything is going to fit then push the outer race into the wheel end of the casing. Next assemble the inner race at the wheel end onto the spindle with the bearing spacer and push the spindle into position. Then push the disc springs into position, making sure they are assembled in the order shown followed by the outer and inner race of the drive end bearing. I recommend the use of a little molysulphide grease on the disc spring stack and sliding outer race even if the spindle is to run in oil. The disc springs, although not preloaded at this stage are held in position by the inner and outer races and the drive end cap can be carefully screwed into position. Finally push on the drive pulley and you should be able to feel the disc washers. If you can't the disc springs are binding. If all is OK tighten up the locking collar and secure the grub screw.

For lubrication pack with grease on assembly, being careful not to over fill. The oil I used was Singer machine, in which case 10-15cc is ample. Unless the oil seals fail it should last a lifetime but an oil/grease nipple can be fitted. You should now have a fine grinding spindle ready for running in. All that remains to be done is to machine the taper in the spindle, if you haven't already done it, and make the grinding wheel arbors, one for each wheel.

A somewhat larger spindle than is used in some grinding spindles is employed in this design, purposely to facilitate the use of FCMS. This will be appreciated by most amateurs at least, it also allows a reasonable size drawbar and thread. The drawbar and the arbors are straightforward except to say that the taper in the spindle and arbors may benefit from being lapped in. If in any doubt at the accuracy of the collet tapers it is worth making up a male and female lapping pair out of something fairly soft like brass and to use these prior to final test. The accurate location of the arbors in the spindle is a must if you are going to get the repeat of wheel seating required.

The arbors are rather substantial, allowing as they do the use of a ⅜in. drawbar in which I used a ¼in. x 32TPS thread. The bore of the wheels I used were ½in., the wheel itself being gripped by 1/16in. thick flanges which are made to the same diameter as the card inserts and are relieved over all but the outer ¼ by 1/32 inch. The inner flange is eventually Loctited and the outer is drilled and countersunk for a 2BA screw. A typical arbor is shown in **Drawing 2.**

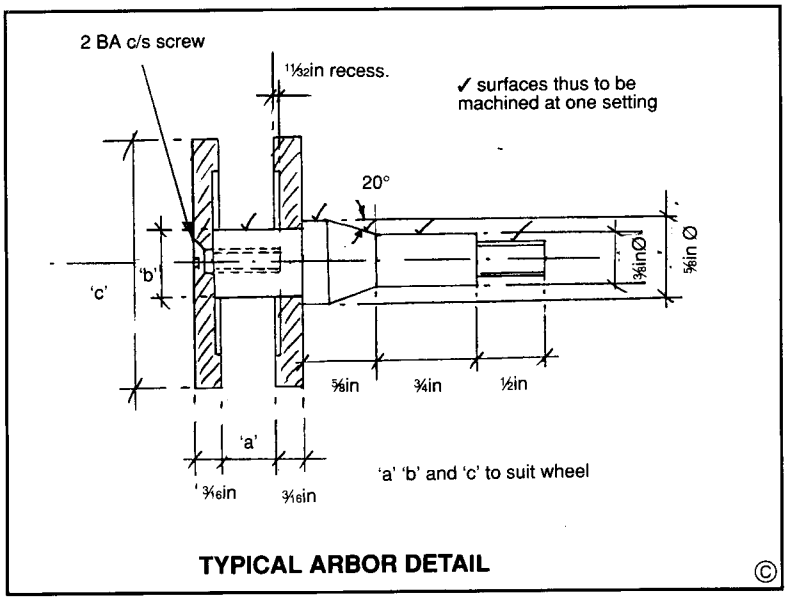
Completion of the spindle is the clever part but a fixture for locating and driving it is shown in **Drawing 3** and a photograph of my prototype is also shown. The fixture design, for which I have to thank my good friend Tom Meadows, is

simple enough to make and very versatile in use since, mounted on the lathe cross slide for example, it can be oriented in all planes. I hasten to add that I would not grind on my lathe but would use it for drilling small holes with the small chuck such as that shown in the photographs. The vertical screw being ¼in. BSW and thus 20 TPI can be easily calibrated if required as can be the rotation of the base. You will have to silver-solder a short brass collar onto the ¼in. studding about 1in. from the top, this is ⅜in. dia. tapped ¼in. BSW. I put a brass washer below the handle, which in my case was just a piece of MS turned up to suit. Just a word on the keyway. This is a V section on the prototype which has much to recommend it since the key, which is simply held onto the slide by means of 2×4BA setscrews, can be adjusted to give virtually no rotation. Such a keyway is more easily milled on a horizontal machine and must be parallel to the column. A straight keyway will be adequate and a suitable key can be accurately fitted to the column in the same way.

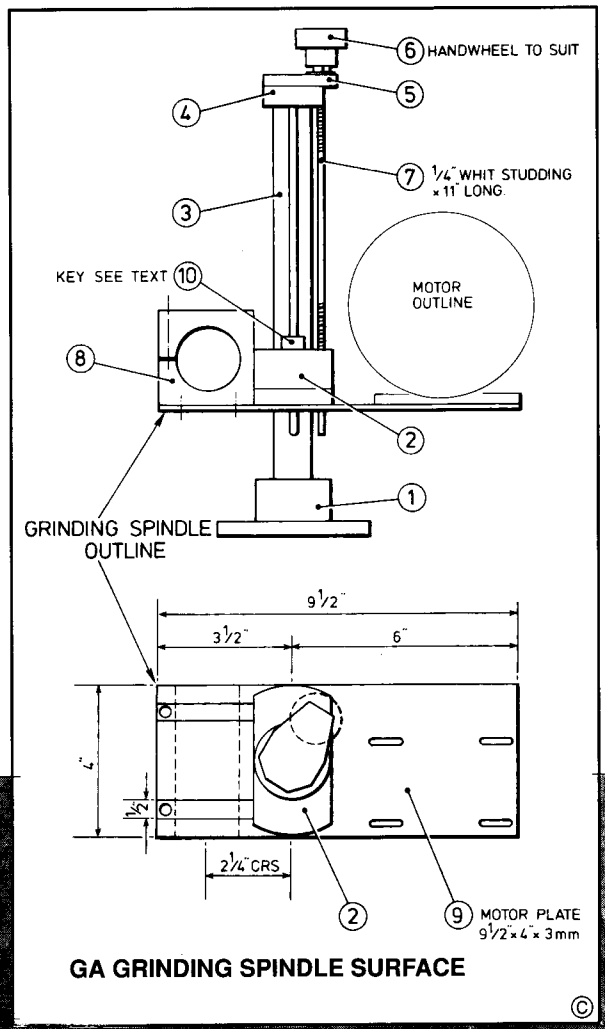
A 3,000 rpm induction motor will be required i.e. not series wound (brush) (most important), suitably wired for both forward and reverse direction and here also I strongly recommend that you consult a qualified electrician if you are in any doubt as to how to do it. There are so many motors on the market that I cannot give universal advice on connections but these should be available with the motor. Size will be a limiting factor and you will, I think, need about ⅛th HP, which should be more than adequate. The motor pulley has the same section as the spindle but is 2.4 in. dia. to give 4,800 rpm at the wheel, to suit a 4 in. cup wheel as the largest and lowest speed recommended for this spindle. I have used the heat sealed belting so universally available but also a V belt for which the angle of the V is 30 degrees.

A kit of parts to make both spindles is available from N.S.&A. Hemingway of Rochdale, see advertisement in this edition, at a reasonable price.

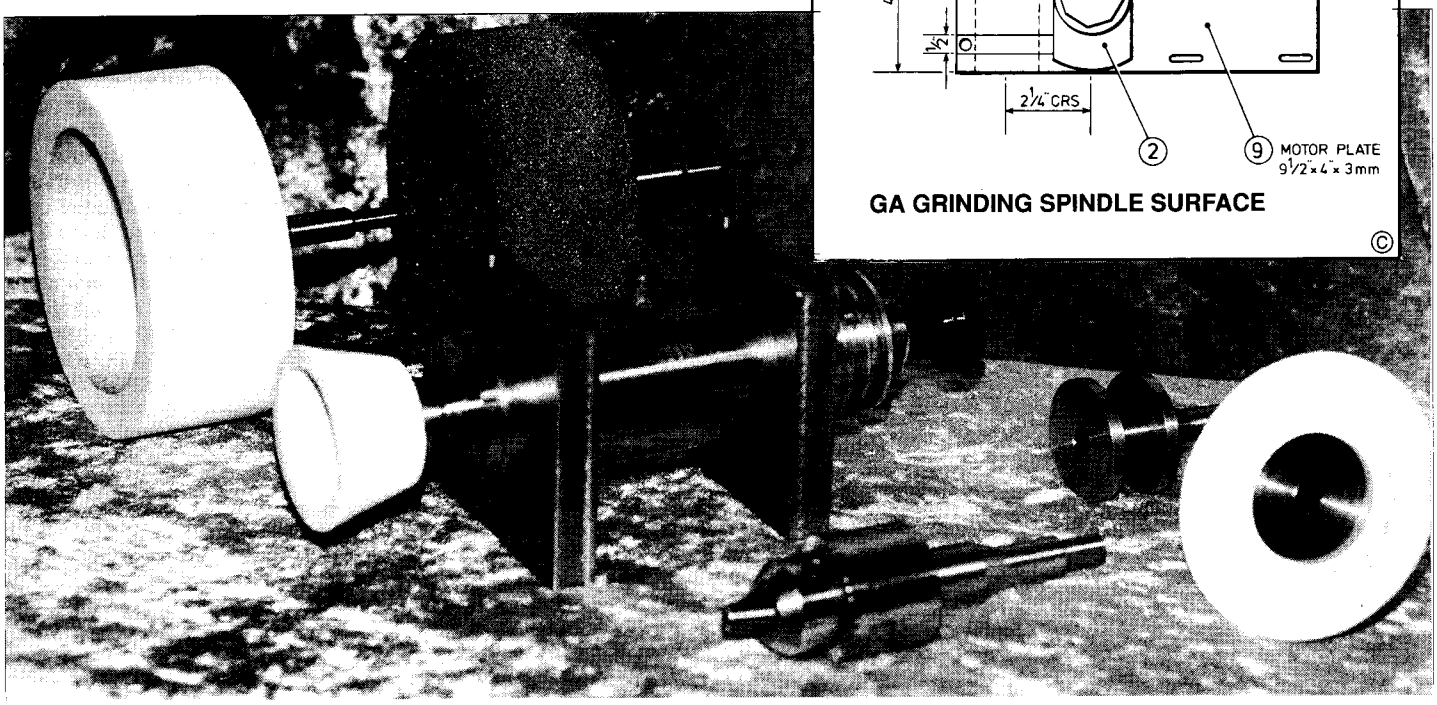
● *To be continued*



TYPICAL ARBOR DETAIL ©



GA GRINDING SPINDLE SURFACE ©



The completed grinding spindle, with a selection of arbor mounted wheels, a spare arbor and a drill chuck mounted on an arbor. This is the author's own unit.