

Adaptations of the chuck-2

IN last week's article I mentioned a raising block by which a split mounting for a chuck could be bolted to the bed of the lathe instead of to the cross-slide table. Diagram D illustrated the principle. Another diagram showed how the centre part of the block could be bored out on the faceplate—a method convenient for the lathe owner as an alternative to a milling or a shaping operation.

The height of the raising block is the same as the height from the lathe bed to the top of the cross-slide table. In its simplest form it is the same width as the cap and base of the split clamp, which you see as U and V in Fig. A, where the raising block is W. The detent for the indexing gear has been omitted, although it is an integral part of the set-up.

In this arrangement of a chuck and mounting, the mounting is bolted firmly to the lathe bed, so that overbalancing is not a problem. Once you have got as far as developing a mounting from its elementary conception, by providing indexing for the chuck, you have the basis of a useful dividing head—a piece of equipment with an honoured niche in precision engineering. You may see regular examples based, as here, solely on mechanical principles, or in combination with optical systems, giving angles to fantastic accuracy on surface plates and on machine tools such as jig borers.

Extending its use

To extend the use of your chuck mounting—from the lathe to the surface plate, for example—you can make the base longer, as shown by pieces X and Y. On its own, this larger base will substantially combat the tendency, hitherto present, to overbalance on a free set-up. And you can always hold piece Y by a clamp placed over the edge of the surface plate.

In making this larger base you can use thick steel plate and a mild steel packing block. Alternatively, a wood pattern can be used to obtain a light alloy casting. This is easier than steel to machine in the lathe and offers little resistance in the drilling and slotting operations for bolts.

In diagram B you have an example of the chuck in its mounting on the larger base. Centres for six holes have to be spaced on a pitch circle that has already been marked. The chuck is indexed in its mounting by the gear on the back. A surface gauge is set to centre height, Z, and used across the circle. Two further indexings and uses of the surface gauge give the remaining centres.

Many pieces of work which have been part-machined on the lathe can be marked on the surface plate, for precision, without being unchucked. After the preliminary machining, you merely transfer the chuck and the work from the lathe spindle into its split mounting, with index, on the surface plate. Then you mark with a surface gauge.

It should not be overlooked that the chuck mounting has other uses—by itself, it is a useful accessory for the lathe.

Without the chuck

Two uses without a chuck are illustrated. In the first of these, Fig. C, you see the mounting bushed to take a boring bar with a flycutter. On occasion, too, a housing with a ball race may be substituted for a bush, if the ball race is quite sound.

In the second use of a mounting without a chuck, Fig. D, a bush with a large flange is fitted with lock-nutted setscrews, which form a steady for long work. By gripping the bush firmly and allowing the work to spin in the screws, you have the ordinary fixed steady. By gripping the work with the screws and allowing the bush to turn, you have a special rotating steady, for jobs for which the other is useless.

In diagram E is shown a mounting, with a chuck, on the cross-slide table for drilling a circle of holes in work. You set the cross-slide for the drill, which runs in a chuck in the lathe spindle, to be at correct radius. The saddle provides feed. This is the opposite of the procedure with a drilling head.

In machining a split clamp, you can bore it, as at Fig. F, on the cross-slide table, again by advancing the saddle.

