Accuracy in CHUCKING

GENRRALLY at a first chucking of bar stock in a self-centring chuck one expects slight eccentricity on checking with a surface gauge, or testing with a scraping cut. This is because the chuck grips over a range of sizes, and it is very difficult to eliminate from a screw the periodic errors which cause small variations in its pitch. The scroll of the chuck, which moves the jaws, is of course a type of screw.

On measuring machines and jig-borers where feedscrews must be to the highest standard of accuracy, there are special arrangements to

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compensate errors of pitch; or the errors are tabulated so that allowance can be made for them. Inevitably, then, in commercial chucks, there are likely to be small built-in errors, which for accurate work one should be prepared to avoid.

Accuracy at a first chucking-particularly when a self-centring chuck has been strained-can often be improved by packing at a jaw, or two jaws, with shimstock or foil of suitable thickness. Tinplate may also be used, and even paper when the jaws have considerable gripping surface and the diameter of the work is fairly large-otherwise concentration of pressure will cut through the paper. Similarly, in chucking hard, heavy pressure will mark the surface of the work, unless protective foil, preferably brass, is used as a sleeve round the work or as strips at the chuck jaws.

At a second chucking of bar stock, accuracy can be promoted by observing two points. One-the more important-is to dot the stock to No 1 jaw before unchucking, so that it can be replaced as originally fitted. The other is that in the original and every subsequent chucking one should tighten on No 1 jaw (or screw). Thus, one duplicates the original conditions, neither replacing nor tightening the work at hazard, however long the time between chucks.

From this comes the axiom of many turners: " Always tighten on number one." Then there is no doubt about which jaw (or screw) should be used.

By combining this principle with that of the sleeve to protect work, the highest standard of accuracy is obtained at first chuckings. A piece of material, such as brass, is chucked, faced, centred, and then drilled and reamed, or bored. After dotting to No 1 jaw, it is removed and hack-sawed along the side to make the split bush, ***A, in*** which bar stock or turned components can be accurately and safely gripped.

When such a bush is tapped in the bore, it can be used for chucking screwed components, though an unsplit, tapped mandrel serves just as well. In fact, mandrels of various types machined in the chuck and used immediately (or dotted for re-setting) frequently provide the best solution to the problem of ensuring accuracy in chucking-or in rechucking for second operations.

Even with split bushes or mandrels, accurate chucking may not be possible when chuck jaws are bell-mouthed at the ends. It applies also to four-jaw chucks, whose jaws like those of the self-centring type can be trued by grinding. In the lack of other means, a tool post grinder can be used with a grinding wheel that will easily enter the body of the chuck. To hold the jaws of the four-jaw type, a ring is mounted at the second step, and the inside faces set spinning concentrically for grinding, B.

A ring outside the jaws will not, of course, serve for a self-centring chuck, because of the reverse thrust on the scroll. Each jaw must be separately clamped. It is done with a bolt in the tee-slot, a plate and a packing piece, C and ***Dl.*** Alternatively, a hook clamp can be made for each jaw, D2 and 3. With either jaw holder, closing pressure should be applied to the chuck before final clamping.

For grinding jaws separately, using a cup wheel, a set-up can be made on an angleplate on the faceplate, locating each jaw by its groove on a squared strip on a parallel plate, ***E,*** and then clamping; while to reduce width on chamfers, each jaw can be mounted in a pair of angle iron supports, ***F,*** and clamped through hook bolts for grinding on face Y-Z. ❑