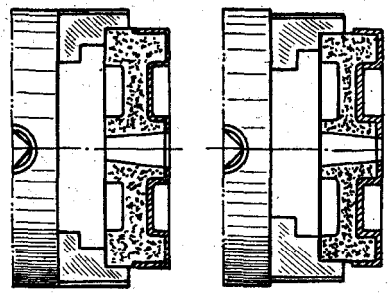
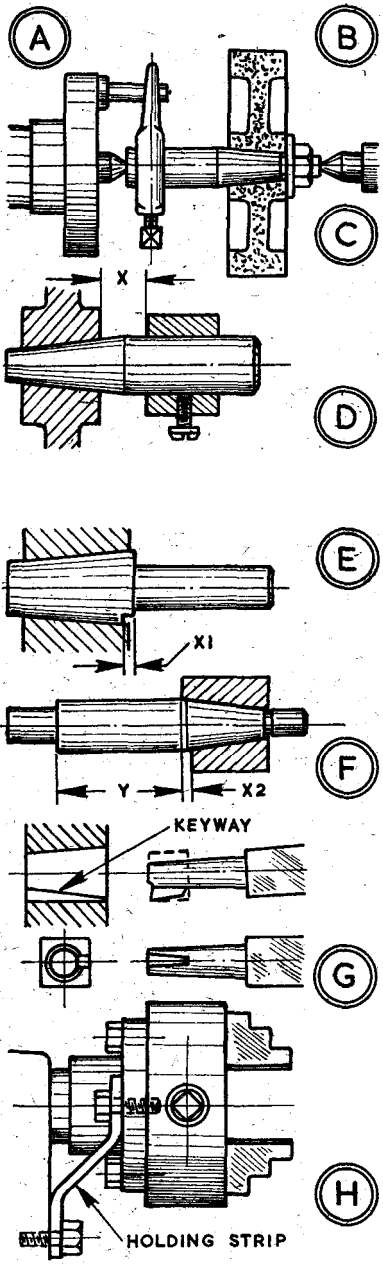
TAPERS

GEOMETER gives a few hints on machining and checking





THE DESIRABLE true running of a pulley or flywheel taper-fitted on a shaft is generally best ensured by finishing faces and outside diameter with the component mounted on a mandrel running between centres in the lathe. All important surfaces are thus finished at one setting and the wheel is both parallel and concentric-a condition difficult to achieve by chucking and re-chucking no matter how carefully this may be done.

The preliminary roughing out is advisedly done in a chuck (which cari be a four-jaw independent type with the jaws reversed if necessary, since heavier cuts can be taken in a chuck than on a mandrel). leaving about 1/64in. surplus for finishing. In this way, scale or any hard spots in the casting can be successfully dealt with in the rough machining, using a slow rotational speed and taking cuts deep enough to be everywhere well below the surface.

Diagrams A and *B* illustrate typical chuck set-ups for rough machining a small flywheel, the material removed at each being shown by the shaded areas At each set-up the wheel is pushed back to the jaws for facial alignment and the jaws are regulated for peripheral or general spinning truth.

Although it is not vital to do so it is generally best to machine the taper bore on the first set-up, and also to turn along the outside diameter. as far as possible. On the second set-up it is. then practicable to fit a taper mandrel in the bore and employ its end for checking and truing-if it should happen that it is difficult to apply the pointer. of a surface gauge to a portion of the outside diameter.

Moreover, should a small error result from the-setting, cleaning cuts can easily be taken on the mandrel set-up C since the particular faces will be towards the tailstock.

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When the shaft is available on which the wheel is to fit, it,can be tried in the taper as this is machined (or reamed) in order to locate the wheel endwise correctly-in which respect, should the taper bore be made slightly too large a reducing cut can always be taken over the face.

Alternatively, the bore can be sized from a reamer or mandrel, as at *D*, which may be necessary if the component is a replacement, or one is requiring to standardise tapers for wheels to be fitted on different shafts. In the case of a mandrel, a shoulder can be left in machining or a sleeve can be fitted for a distance *X* to obtain when the taper is at correct size; in the case of a reamer, a sleeve is essential when the distance can be measured with a rule, or a small gauge made just 'to push into the space.

A common type of gauge for this method of sizing tapers is as *E*, where the taper portion ends in a step on one side Xl. On the tool being pushed tightly into the bore to be tested, the step should-go just below the surface while the full diameter just stands proud-showing the bore to be within its particular tolerance.

Should the gauge enter too far a light correcting cut can always be taken across the face-assuming there remains sufficient material on other faces to machine them into relationship-which is as good a reason as any for finishing the taper early in. the proceedings.

The principle also applies to a shaft *F* where a ring gauge (corres: ponding to the component) is used. This may have a step X2 to locate the position where the taper finishes at the full diameter, or at the opposite end on the small diameter, though a better way is to take the distance Y from the face to a shoulder or the end of the shaft.

If a keyway is required in a wheel its cutting should be the fmal operation. From square silver steel a tool is made as G, turning the shank, filing the surplus to tool shape, then hardening and tempering. Planing cuts are taken from the saddle with the chuck secured against rotation, as at H, by a holding strip from backplate to headstock.