By GEOMETER

Second operation set-ups

A SOUND lathe-work principle is to machine as much as possible of a component at a single chucking in order to preserve alignment between faces and concentricity on diameters and to save time in resetting.

Many chucks do not hold really truly, particularly after a period of use, and there are components whose slenderness or fragility renders their rechucking a problem. Often, of course, a second set-up is inevitable and consideration must then be given to ensuring truth, avoiding distortion, and performing the work with the minimum of trouble.

A diameter, bore, or face on material gripped and machined in the chuck is obviously true until the material is moved, so that any such feature employed for alignment will result in a component being true on a second set-up.

Stub mandrels, as at ***A,*** machined from material held in the chuck, provide for the true setting up of bushes, sleeves, small wheels and pulleys., previously finished in the bore either by accurate boring in the lathe or drilling and reaming. Friction drive is sufficient for light cuts, and a mandrel can be turned with a slight taper, or a taper produced by a Swiss file and/or abrasive cloth. Pushing a component on by hand is sufficient and in some cases, a smear of oil is. advisable to prevent seizing. If the component is tight a clamp or protected-jaw pliers may be needed for removal.

Using a nut and washer, a component can be gripped on a mandrel; and when overhang is considerable support can be given from the tailstock. Mandrels may also be run between centres-but, naturally, more time is needed for making them. For ordinary stub mandrels scraps and off-cuts of most common materials can be used-mild steel, brass, aluminium alloy: and they can be given a reference dot mark to No 1 jaw for rechucking when necessary-or set up in an independent chuck.

A problem may arise when a large diameter must be turned with the component on a mandrel, since a friction grip, or even a mounting with a nut on the end of the mandral, will not ensure a slip-free drive. In the case of wheels or pulleys with spokes or holes, a solution is to employ a driving bar bolted to the mandrel and shaped and " set " as required to pass between spokes or through a hole. The mandrel should be partly finished, the bar fitted, then removed while the locating diameter and face are machined. Again support from the tailstock may be necessary in use, as at ***B.***

On more elaborate mandrels to run between centres an expanding sleeve or opposed cones may be used in the bores of components, as at C-the cone type somewhat wanting in accuracy. For the expanding sleeve the mandrel is tapered and the sleeve slit lengthwise to be displaced by a nut. A second nut at the large end is advisable when the mandrel taper is slight-to free the sleeve by screwing back against it.

Provided with threads externally or internally stub mandrels in the chuck afford means of setting up screwed components, as at ***D,*** for operations on the outer ends-turning, facing, threading, etc. To ensure truth, threads on the mandrels should be screwcut or cut with dies or taps from the tailstock.

Spindle-type components or those with shanks for location can be set up in various sorts of clamping or contracting mandrels or collets. A simple and effective type can be made from flat stock,. as at ***E,*** by bolting on a cap and setting in an independent chuck for drilling and boring--the cap then being eased on the joint face for a grip to be obtained on the shank of the component.

Collets to contract and hold components can be as at ***F.*** For the clamping type the stub mandrel is bored, turned, and a small undercut made at the shoulder. Without removing from the chuck the end is slit lengthwise with a fine saw. For closing, a clamp as shown is better than a collar with a screw. The type with a nut can have a taper thread by not running the die on fully, while the nut can be undersize from not passmg the tap right through