Clamped tool and work holders

SOMETIMES clamping instead of gripping by setscrews or grub-screws has certain advantages in mounting and setting tools, particularly those which are round -though flat and square types are not excluded.

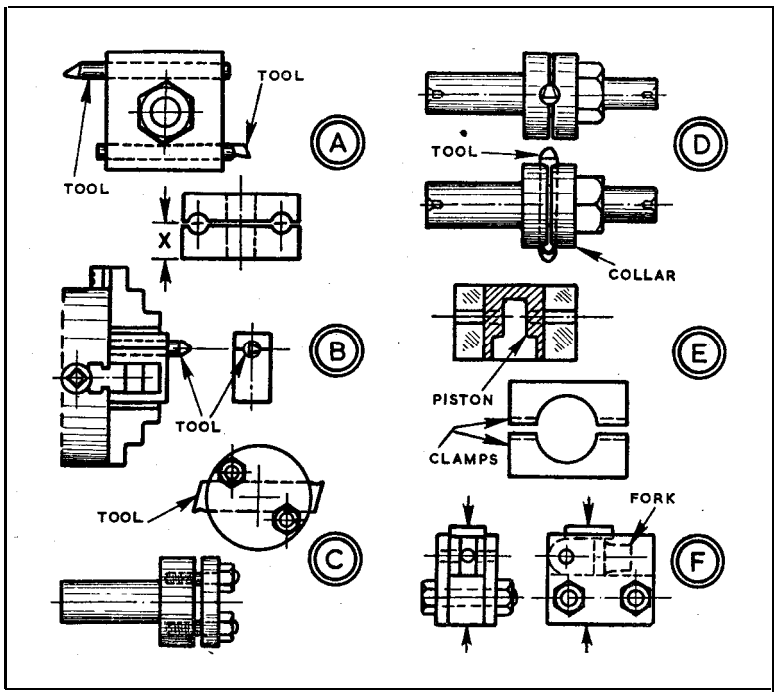
Initially, clamps are easily made by drilling and reaming, and in use these furnish a long firm grip on round tools or parts. They are easily inserted and removed, even when varying slightly in size. There is none of that local pressure leading to distortion and damage to holders, and burring of the ends of screws; nor that obstruction caused by a fraction of a thou excess on a tool of nominal size which prevents it entering a reamed hole. Adapting and extending the principle, round components can be securely held for machining, and accuracy promoted in their central and cross-wise drilling (and on occasion reaming) which for very small parts may have to be the substitute for an orthodox machining operation in larger sizes.

An example of a tool clamp is a two-tool " turret " which can be used on most small lathes to mount round bits-bought as such, or made from standard silver steel rod. The design is as at ***A.*** It requires only two square blocks of steel or cast iron, drilled vertically to fit on the stud on the topslide, and drilled (and preferably reamed) horizontally at their joint line to grip the tools. These can be fitted as required-one way or the other, extended and retracted, and rotated slightly for height adjustment, The clamp itself can be quickly turned and easily adjusted at angles which circumstances show to be the most convenient for turning, facing, boring and similar operations.

Little need be said about construction. It is four-jaw chuck work, facing the blocks all over (if castings) and drilling and reaming at the joint line, then easing by filing for grip. Simple wood patterns will produce cast iron blocks. In every case, it is advisable to make dimension X equal to the distance from the topslide to the lathe axis. Then boring tools will enter their work centrally, which is a convenience in small sizes. For other tools, two or three leaves of flat steel slotted to pass the stud, will give height adjustment.

For facing and certain radius-machining operations with a tool running in the chuck, a mounting for it can be ma& as at B. Adjustment of the chuck jaws regulates the setting, which is substantially preserved by the grip of the side jaws, when the jaw holding the cap of the clamp is loosened for adjusting or removing the tool.

By GEOMETER



Clamping of a flat, blade-type tool for a slotting operatron can be done with a holder, as at C, to use in the chuck. Narrow slots can be cut with a piece of hacksaw blade; and for wider ones, tools can be ma& from flat silver steel or cast steel bar. Pieces of square tool bit can also be used.

Round tools for slotting or flv cutting operations can be mounted in a holder, as at ***D.*** This consists of a mandrel with a substantial flange, up to which is held a collar -by a nut running on a thread on the mandrel. Drilling and reaming are done at the shoulder-collar joint line; and after the abutting face of the collar has been eased by facing or filing, the tool is firmly gripped.

For accurate cross-drilling'

Clamps holding work on a similar principle can provide for accurate cross-drilling-of the gudgeon pin-hole in a small piston, for example, as at ***E,*** where the corresponding operation in a larger size would be boring on an angle plate on the face-plate. The bored clamps can each be surface-gauge marked for the pin centre line, and this enlarged to a small V-by careful filing if there are no other means. Then, gripped face to face, the clamps can be drilled each way.

Accurate cross-drilling from each side of a part like a fork can be done in a holder, as at ***F. The*** side (guide) plates are drilled first, and the spacing block drilled with loose holes for its setting to give central drilling of the clamped-in fork.