Constructing sliding tools

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By GEOMETER

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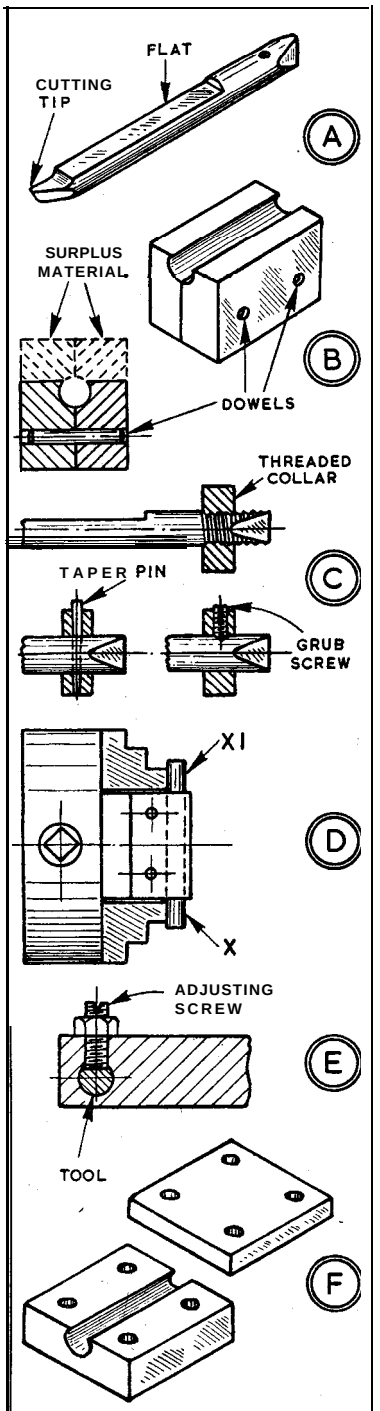
As DESCRIBED in the previous article, certain kinds of simple form-turning are best accomplished by means of single-point sliding tools passing over the contours of form plates or form bars which control the movement of the tools for the cutting tips to machine the work to closely-resembling or exactly-similar profiles.

Providing the changes of contour are not too abrupt, and high precision is not essential, this method ensures a clean normally-machined surface, free from chatter, and requiring the minimum of smoothing and polishing with glass paper if the material is wood, and with emerycloth if it is metal.

A major condition, of course, with a sliding tool is that, while it moves freely endwise, it must not tip over or deflect unduly; and if the tool is of round material, as it can well be for amateur use, when of silver steel, it naturally follows some means of radial location is essential. This, as shown at ***A,*** where is depicted a typical small sliding tool, can be a flat extending far enough to permit the tool the necessary movement in its holder.

Denending on the type of holder, the flat on the tool can engage a flat-ended screw, or a flat plate when the holder is in two parts; or again, a special .washer With a D-hole for the tool to slide through can be attached to the front of the holder. The tendency for the tool to overturn when cutting can be kept to a minimum by maintaining the cutting tip central, similar to an ordinary turning tool with a small radius-and it should also have top rake and side clearance. At the opposite end, the tool should be squared, then chamfered equally from each side, and the corners removed to leave a small radius.



The flat on the tool is produced by filing. and a check kept on its parallelism-by calipers, or a micrometer for preference. Alternatively, a small jig of the type shown at ***B*** can be used, which is advisable when several tools are required, or they have to be replaced quickly.

Such a jig is made by dowelling two pieces of flat material, drilling and reaming on the centre line, then machining away the surplus material so that a piece of round stock gripped in the jig can be filed doivn to the surface and provided with a uniform flat. The jig material can be hardened and tempered if it is cast steel, or casehardened if it is mild steel.

The final feature essential for a sliding tool is means for attaching a collar to take the thrust of the spring maintaining the rear end in contact with the form plate or bar. Choice in this rests between a collar which is threaded, one drilled for a taper pm, or one provided with a grub screw, as at C-the tool in each case corresponding, then being hardened and tempered.

When a jig, as at ***B,*** is used in filing flats on tools, its accuracy must essentially be beyond question, and can only be ensured by a machining process-of which ***D*** shows the principle of the set-up in a four-jaw independent chuck.

The two blocks, finished except for facing off the surplus material, are held in the chuck with a bar through the bore, this bar locating back to two of the jaws, while the blocks are secured, then being pushed out. Assummg the jaws to be true, the blocks will be faced off squarely; but if the jaws cannot be relied upon, the bar should stand slightly away from them? and be tested to run truly at pomts, X-Xl, as the blocks are tightened.

At ***E*** is shown how a simple tool holder can be furnished with a flat-ended adjusting screw to locate the tool and allow it to slide, while at ***F*** appears the body and top plate of a two-part holder for bolting together-with shims interposed if necessary@

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