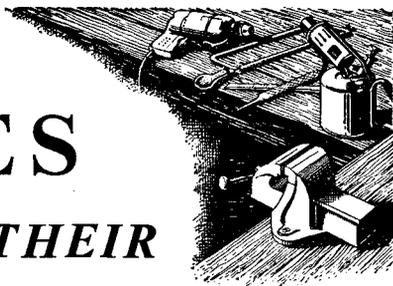


The principles and practice of thread cutting are dealt with by GEOMETER in this article on



BEGINNER'S WORKSHOP

DIES AND THEIR USES

FOR PRODUCING EXTERNAL threads on screws, bolts, pipes, etc., dies are employed, which are the counterparts of taps used for cutting threads in holes.

Dies, therefore, run in the same rates of threads and sizes as taps, with the difference that one die is usually sufficient for one diameter and rate of thread, whereas two and sometimes three taps are required. This is because the die is normally adjustable and can be contracted to produce threads in stages.

The engineers' most common die for general use is the split die, also known as the circular or button die. The outside diameter is a standard dimension, 3/16 in. or 1 in., and in larger sizes 1-5/16 in. A range of such dies of one size can be used in one die holder.

Three screws for adjustment

The split die is adjustable in its holder by means of three screws, the centre one with a coned end to fit in the slit, and the two side ones flat-ended or round to support the die either side of the slit, or to close it when necessary.

Certain types of split dies incorporate an adjusting screw in the side or in the slit, and this must be regulated instead of the centre screw in the die holder to obtain the required size.

Die nuts resemble split dies, but are non-adjustable, and intended for use by turning with a spanner. While they will actually cut threads from a start in case of need, they are more often used for cleaning or sizing existing threads.

Another type of die, used in a stock, is the split rectangular pattern, which is in two portions sliding in V-guides in the stock. An adjusting screw in the stock admits of putting on cuts for the dies. This type of die can be placed round the work some distance from the end, as the two halves can be opened to clear. It will also cut threads somewhat oversize and undersize, to a greater degree

than a split die. Dies of this type for different rates of thread can be used in the one stock.

Examination of a die reveals that the thread one side is bell-mouthed, or that there is a throat, while the other side ends squarely or flat. It is important that the die is placed on the work for a start so that the throat side advances first, gradually cutting the thread, and the rear portion of the die finishing it.

Danger of breaking

If the square or flat-sided portion of the die is run on the work, there will be difficulty in starting the cut, a considerable danger of breaking the die or chipping the threads, and a likelihood of tearing the thread on the work. The throat portion does not, of course, leave a full thread, and a nut run on will not go right to the

end. The die can, therefore, be reversed on the work to bring the taper threads to full depth, though this needs to be done carefully to avoid breaking the die or damaging the thread.

A split die is placed in the die holder with the flat side against the internal shoulder, the throat side outwards, thus permitting the face of the die to run up to any shoulder on the work, and enabling pressure to be put on the die to start its cut. Later, if necessary, it can be reversed in the holder to finish the thread.

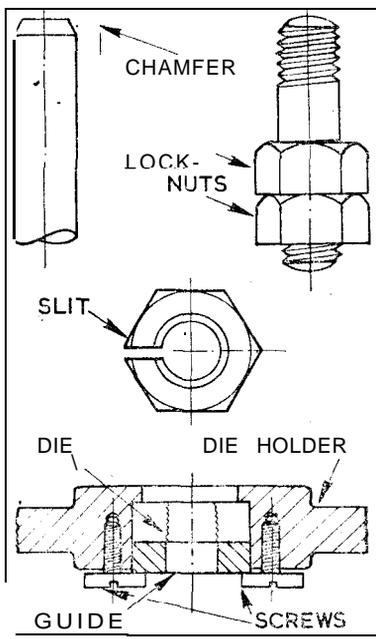
The centre screw should engage the slit, and with the side screw free, the centre screw should be advanced to open the die slightly. Side screws should then be advanced to support the die. Failure to do this may result in breakage, as a die is hard and relatively weak against internal pressure. This setting will normally produce an oversize thread; then to bring it to size, the centre screw should be slackened slightly, and the side screws advanced to close the die.

Applying pressure

The end of the work should be chamfered for the throat of the die to start easily on the tapered portion. The die is placed on the work, end pressure applied, and the die slowly turned by means of the holder. Once a start has been made, it will advance itself, but should be eased back about every 1-1/2 to two turns to clear chips and free the thread; failure to do this may result in a broken die.

When starting a die, care should be exercised that it is square, and in the first few turns, it should be sighted from the side, and trued as required. Certain die holders are provided with a guide in front of the die to maintain it square on the work.

Work which is already threaded can be held without damage by using two nuts locked together, or one which is slit to grip in the vice. Lubrication may be as for tapping: that is, oil for steel, paraffin for aluminum and duralumin, while brass is threaded without lubricant. □



Preparing and holding the work