

united chunks give a more continuous chip with the least vibration of stresses.

In turret lathe practice, especially in bar work, the tool and work are held together by a back rest which

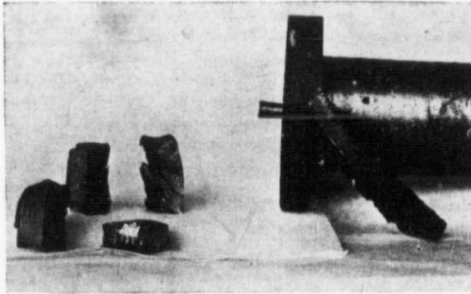


Fig. 7.—Sample of Broken Chips and Work with an Unbroken Chip. The View is About One-seventh Larger than Sample, the Exact Dimensions Being $1\frac{1}{2}$ In. Down to About 1 In. Diameter. The Feed was About 7 per Inch, Cutting Angle of Tool About 38 Deg., Extreme Edge 1-32 In. Flat. These Chips Were Broken by a Scheme Similar to that Shown in Fig. 16.

follows on the surface produced by the cutter, and in some kinds of turret-chucking work the tools for interior work are mounted on boring bars which take bearing either in the work or in the chuck which holds the work. When tools get this steadying support directly on or in the work, they are freed from the chattering due to the machine mounting, but not free from that due to their own frailty or to the intermittent flow of the chip as it is taken off in chunks.

RELATIVE DESTRUCTIVE EFFECTS OF HEAT AND LATERAL QUIVERING.

The writer is not unmindful of the effect of heat in the destruction of the cutting edge, and fully realizes that no perfection of mounting of the work and tools will prevent destruction of the cutting edge of the tool by heat, but wishes to bring out the importance of the destructive effect of chattering which is ever present in standard types of machine tools. Heat is undoubtedly most destructive when roughing at high speeds, but

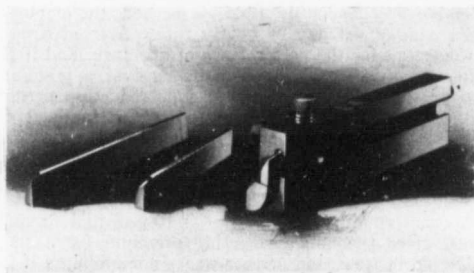


Fig. 8.—No-Clearance Tool for Standard Engine Lathe Tool Post With Three Cutters of Different Angles.

the quivering plays a very important, if not the greatest, part in edge destruction when finishing at the usual speeds.

Many machines are not run up to the high speed limit of the cutters. Even when provided with ample driving power, the strenuous life of attending a high speed machine is a little too much for the average man. As the speed is reduced, the quivering gains in relative importance, which should be taken into account in considering the no-clearance tool. With the slower speeds, tools should be used that give the best results at those speeds.

OTHER CONSIDERATIONS.

The failure of the keen edge under normal cutting conditions, and its surprising endurance under some abnormal conditions, seem to indicate great possibilities open to any scheme that would maintain the best conditions. For instance, at one time, we have seen the edge of a diamond point broken off by an ordinarily heavy chip and at another time we have seen a similar tool deeply imbedded into the metal without breakage, the tool having taken a plunge and lifted or plowed up a chip of enormous proportions without breaking the tool. Every lathe hand has seen this performance. Usually it ends with breaking the tool or the centre of the lathe, or both, but occasionally the lathe is stopped without breakage; then the lathe hand by great care

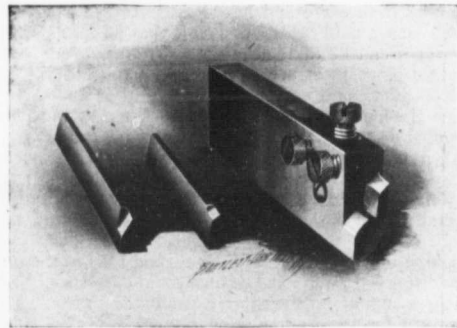


Fig. 9. View of Other Side of Tool Shown in Fig. 7.

may separate the work and tool without breaking the edge. The immense chip plowed up by a frail tool demonstrates what a cutting tool can do under some conditions.

We are also aware that under some conditions a cutting tool will actually sharpen itself in the process of cutting, yet neither of these results is regularly maintained. They suggest, however, the possibility of supplying a means by which they can be maintained in regular work.

(To be Continued in January Machinery Edition.)

Performance

By DOUGLAS MALLOCH

That man is strong who does the tasks
Made his by place and circumstance,
Who falters not nor questions asks
Nor leaves results to time or chance—
Who turns from finished things to new
And does the work he's told to do.

Yet stronger is this other man,
(However well may serve the one),
Who meets a problem with a plan
And does the thing that must be done—
With firmer grasp and wider view,
Does that he sets himself to do.—System.