Nov. 8, 1966 J. HARGREAVES 3,283,394

METAL CUTTING TOOLS

Filed July 16, 1964

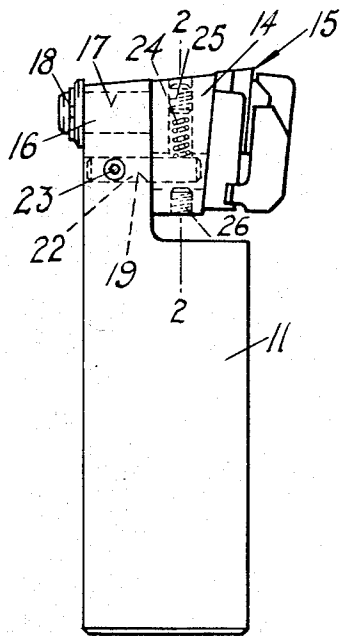


Fig. 1

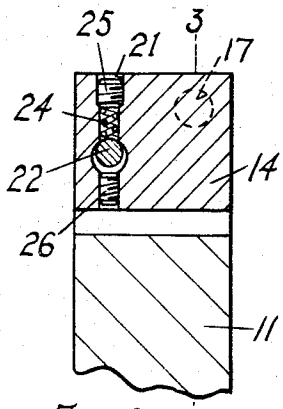


Fig. 2

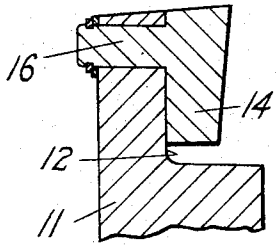


Fig. 3

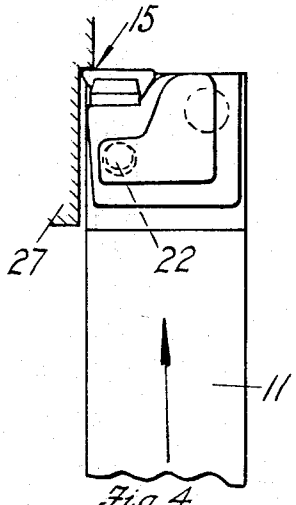


Fig. 4

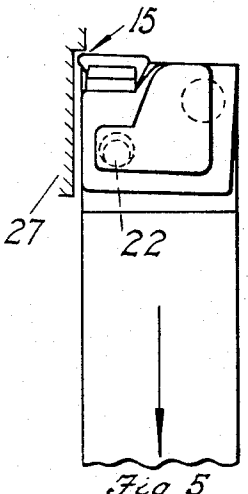


Fig. 5

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METAL CUTTING TOOLS

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2 Claims. (Cl. 29—96)

This invention relates to metal cutting tools of the kind in which a cutting tool is advanced relative to the work when cutting and is retracted slightly from the work before complete withdrawal so that no return mark is left on the work.

According to the invention, a tool of the kind specified includes a shank adapted for connection to a toolholder, a bit support mounted on the shank for movement between an operative position and an inoperative position, and biasing means urging the bit support to its inoperative position, the arrangement being such that, in use, when a bit is held in the bit support and advanced relative to the work, the pressure between the work and the bit will hold the bit support in its operative position against the action of the biasing means, but as soon as contact of the bit relative to the work ceases the biasing means will move the bit support to its inoperative position in which the bit is out of contact with the work.

A tool as specified above has the important advantage that it can be applied to a variety of existing toolholders without any modifications to the toolholder. This advantage results from the fact that the tool is self-contained and it is not necessary for the resilient means to react on the toolholder. Moreover, in the preferred embodiment the arrangement is such that the resilient means is completely enclosed by the tool throughout the range of movement of the bit support, so that there is no risk of swarf impairing the action of the resilient means.

In the accompanying drawings, FIGURE 1 is a side view illustrating one example of the invention, FIGURES 2 and 3 are sections on the lines 2—2 and 3—3 in FIGURES 1 and 2 respectively, and FIGURES 4 and 5 are views at right angles to FIGURE 1 showing the tool during a cutting operation and whilst being withdrawn respectively.

Referring to the drawings, there is provided a shank **11** which is adapted for connection to a toolholder which is an existing part of a machine tool. For a facing operation the shank is secured to the toolholder (not shown) so as to extend parallel to the direction of traverse relative to the work as illustrated, and for a turning operation the arrangement is such that the shank extends at right angles to the direction of traverse relative to the work. Other configurations of the shank relative to the bit are possible depending on the operation and machine.

The shank is of generally rectangular cross-section, but at one end is recessed to form a shelf **12** adapted to receive a support **14** for a detachable bit assembly **15**. The assembly **15** forms no part of the present invention and is not therefore described in detail. Conveniently, the assembly **15** is of the form described in our Patent No. 925,617. The support **14** is formed with an integral pin **16** which extends through a bore **17** in the shelf **12** and is held in position by a washer and

circlip **18** so that the support **14** is angularly movable about the axis of the bore **17**.

There are also formed in the bit support **14** a bore **19** parallel to the bore **17**, and a bore **21** extending completely through the support at right angles to and intersecting the bore **19**. Moreover, extending into the bore **19** from the shelf is a second pin **22** which is secured relative to the shank by a locking screw **23**. Bearing against the pin **22** is one end of a compression spring **24** located in the bore **21** with its other end bearing against a screw **25** closing one end of the bore **21**. The other end of the bore **21** is closed by a further screw **26** which projects into the bore **19** by an adjustable amount. The screws **23**, **25** and **26** and spring **24** are omitted from FIGURES 4 and 5 for clarity.

Angular movement of the bit support **14** about the axis of the bore **17** is limited by abutment between the pin **22** and the screw **26** and the spring **24** urges the bit support to an inoperative position shown in FIGURE 5 in which in use a bit carried by the support is out of contact with the work (shown at **27**). During a turning or facing operation the cutting pressures between the bit and workpiece hold the bit support in its operative position against the action of the spring as shown in FIGURE 4, but as soon as contact of the cutting bit with the work ceases the bit support returns to its inoperative position. The movement of the support will of course be very small, but sufficient to prevent a return mark from being left on the work.

The tool may take a variety of other forms. In particular, the pin **22** could extend from the bit support **14** and the spring **24** and screws **25**, **26** could be accommodated in the shank.

The cutting element of the bit may be an insert of any shape such as round, triangular or square adapted to be releasably clamped to the bit support, or the insert may be brazed directly to the bit support.

In a modification, the bit support is slidable on the shank between an operative position and an inoperative position.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A metal cutting tool comprising in combination a shank adapted for connection to a tool holder, a bit support, means mounting said bit support on said shank for angular movement between an operative position and an inoperative position, a first bore formed in one of the parts constituted by the shank and the bit support, said first bore extending parallel to the axis about which the bit support moves angularly, a second bore extending through said one part and intersecting said first bore, a pin extending from the other of said parts into said first bore, a member closing one end of the second bore, and a spring acting between said member and said pin to urge said bit support to its inoperative position, the arrangement being such, that in use, when a bit is held in the bit support, and advanced relative to the work, the pressure between the work and the bit will hold the bit support in its operative position against the action of said spring, but as soon as contact of the bit relative to the work ceases, the spring will move said bit support to its inoperative position in which the bit is out of contact with the work.

2. A tool as claimed in claim **1** including an adjustable member closing the other end of said second bore and extending into said first bore, said adjustable member

limiting angular movement of said bit support with respect to said pin.

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