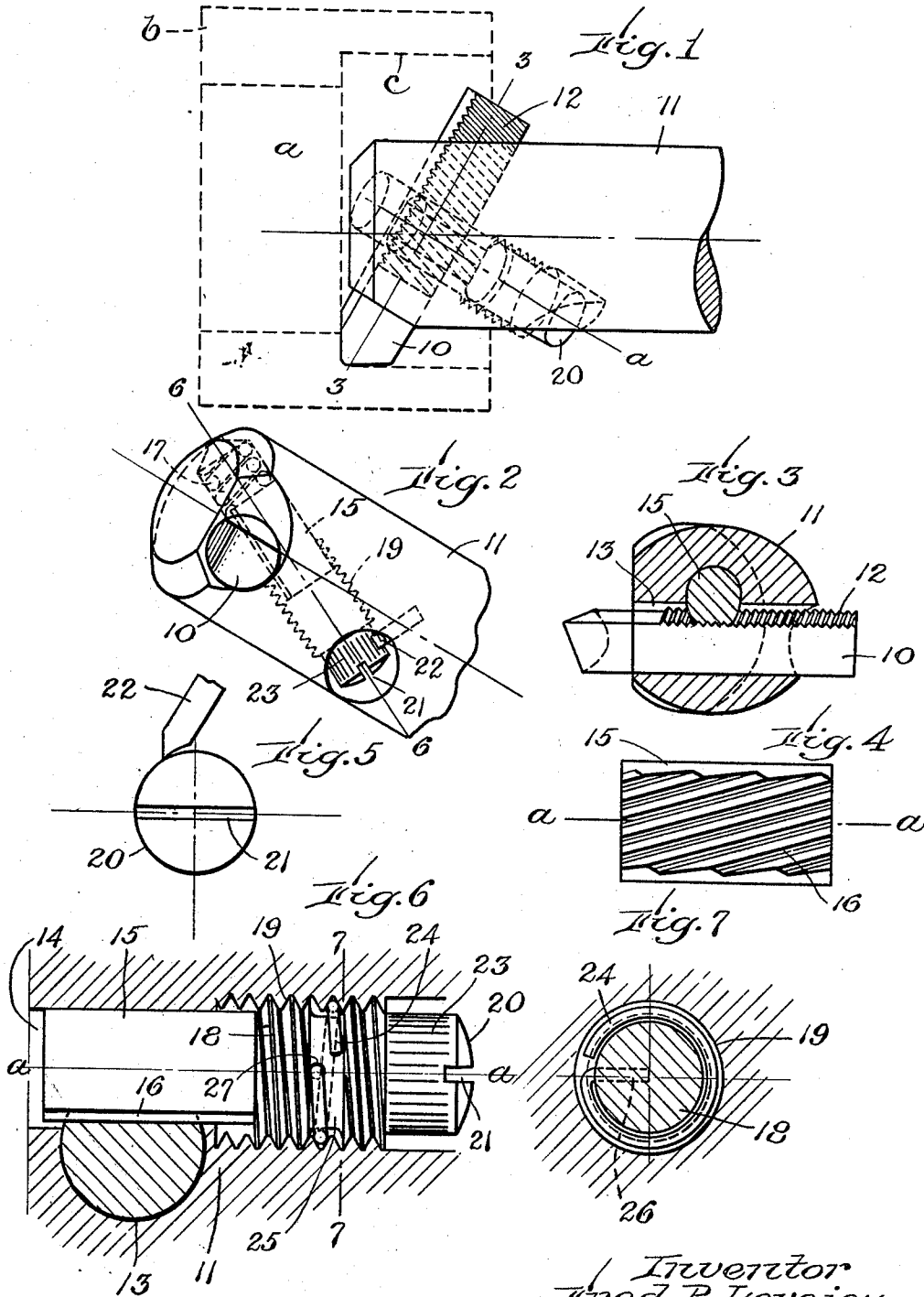


F. P. LOVEJOY.
ADJUSTABLE BORING TOOL.
APPLICATION FILED MAY 3, 1917.

1,316,731.

Patented Sept. 23, 1919.



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UNITED STATES PATENT OFFICE.

FRED P. LOVEJOY, OF SPRINGFIELD, VERMONT.

ADJUSTABLE BORING-TOOL.

1,316,731.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRED P. LOVEJOY, a citizen of the United States, residing at Springfield, in the county of Windsor and State of Vermont, have invented new and useful Improvements in Adjustable Boring-Tools, of which the following is a specification.

The object of the present invention is to provide an improved boring tool comprising a cutter, a holder therefor, and means for fastening the cutter to the holder in various positions of adjustment.

The cutter may be made of relatively high grade and expensive steel, while the holder therefor may be made of less expensive steel with a view to economizing in the quantity of the more expensive grade of steel. Whenever a cutter becomes so far worn away by use and resharpening that it cannot be used again a new cutter may be substituted for it.

The means whereby the cutter is fastened in the holder is capable of adjusting the cutter relatively to the holder, in this capacity doing away with the necessity of adjusting the holder relatively to its support after once having been set in operative position.

Of the accompanying drawings that illustrate the invention in what I now consider the preferred form:

Figure 1 represents a top plan view including a portion of a holder, a cutter arranged in said holder, means for fastening the cutter to the holder, and broken lines representing a piece of work undergoing a boring operation by said cutter.

Fig. 2 represents an elevation of the tool shown by Fig. 1, viewed in a line parallel to line 3—3 of Fig. 1. This figure is inclined to facilitate projection from Fig. 1.

Fig. 3 represents a sectional view through the structure intersected by line 3—3 of Fig. 1, excepting that the cutter is shown in elevation.

Fig. 4 represents an elevation of the locking shoe that coacts with the cutter to adjust and lock the latter relatively to the holder.

Fig. 5 represents an elevation, on a larger scale, of the adjusting screw and indexing pin included in Fig. 2.

Fig. 6 represents a sectional view through the cutter and holder in the plane indicated by line 6—6 of Fig. 2, the locking shoe and

adjusting screw being represented in elevation.

Fig. 7 represents a cross-section through the structure intersected by line 7—7 of Fig. 6.

The same reference characters indicate the same parts wherever they occur.

The cutter is indicated at 10 and the holder therefor is indicated at 11. In the present instance the cutter is cylindric excepting that it is provided on one side with a series of ribs or teeth 12 that extend nearly at right angles to its axis. The holder 11 is provided with a cylindric socket 13 for the cutter, so located at an angle to the axis of the holder, that the cutter projects laterally and forwardly from the corner formed by the end face and the periphery of the holder. The cutter is capable of endwise movement in said socket excepting when it is locked in one position by means hereinafter explained.

The holder is provided with a cylindric socket 14 that intersects the socket 13, the axes of the two sockets being substantially at right angles to each other although offset one from another as shown by Figs. 2 and 6. A locking shoe 15 is arranged in socket 14, and is provided with ribs or teeth 16 that coact with the ribs or teeth 12 of the cutter, to sustain the end-thrust of the cutter and to lock the cutter relatively to the holder. The shoe is cylindric excepting on the side that has the teeth 16. The axis of the shoe is indicated by lines *a—*a** in Figs. 1, 4, and 6. As shown by Fig. 4 the ribs or teeth 16 are inclined relatively to the axis, in consequence of which endwise movement of the shoe will cause endwise movement of the cutter. This inclination of the teeth, and the consequent capacity of the shoe to impart endwise movement to the cutter are utilized to adjust the latter relatively to the holder, as herein- after described.

Before the shoe and cutter are arranged in their respective sockets a helical compression spring 17 (Fig. 2) is arranged in the socket 14, said socket being closed at one end. Then the cutter is inserted in the socket 13 and held at or near the desired position of adjustment. The shoe is then moved endwise into its socket, the teeth 16 thereof being thereby moved endwise into the spaces between a like number of teeth 12 of the cutter. As the shoe is ad-

vanced toward the spring 17 its teeth 16 retract the cutter slightly, the degree of retraction depending upon the angle of inclination given to the teeth 12 and 16. An
 5 adjusting screw 18 is then screwed into socket 14, the latter being provided with an internal screw thread 19 for this purpose. As the screw is advanced it advances the shoe 15 and the compression
 10 spring 17, the compression of the spring beginning when the leading end of the shoe is just beyond the cutter. From time to time, as the cutter acts upon a piece of work *b*, it may be advanced relatively to
 15 the holder by advancing the adjusting screw 18, thus increasing the diameter of the internal cylindric surface *c* of the piece of work. The effective adjustment of the cutter may be obtained with a relatively great
 20 degree of accuracy by means of screw 18, and thus does not disturb the position of the holder 11. The spring 17 is strong enough to move the shoe 15 in the opposite direction when the adjusting screw 18 is
 25 unscrewed.

Screw 18 is provided with a cylindric head 20 and the latter is provided with a slot 21 for the reception of a screw driver with which to operate the screw. The device may include an index or gage for indicating the degree of rotative movement imparted to the screw. Such gage in the present instance comprises an index pin 22,
 30 and a series of marks such as lines 23 in the periphery of the head 20. The index pin 22 is set into the holder 11 (see Fig. 2) and its outer end, which is within the perimeter of said holder, is beveled so that it will cooperate conveniently with the lines 23.

Under some operating conditions there is excessive vibration or "chattering" of the tool, and in such cases the adjusting screw 18 may recede in consequence of the pressure exerted against it by spring 17. In order to
 45 overcome such movement on the part of the adjusting screw I provide a friction ring 24, and form a circular groove 25 in the threaded portion of the screw, for the reception of said ring. The ring is made of spring wire and is preferably of helical formation, although it need not comprise more than one
 50 convolution. One end of the ring is bent inwardly toward the center as indicated at 26 in Fig. 7. The screw 18 is bored radially to provide a socket 27 for the reception of the end 26, the ring being thereby anchored to the screw so as to partake of all rotative movement imparted to the screw. The helical formation of the ring coincides with
 55 the leading of the screw thread, and the normal diameter of the ring is such that the ring requires slight compression in order to screw it into the internal thread 19. The ring therefore tends constantly to expand
 60 against the internal thread, and the friction

due to such tendency prevents it from turning excepting when a considerable rotative force is applied to the screw. Inasmuch as the ring is anchored to the screw the latter cannot turn without turning the ring, and
 70 the screw is thereby held in any position of adjustment without liability of being moved from its position by any cause other than intentional adjustment with a screw driver.

I claim:

1. A metal-working tool comprising an elongated cutter, a holder having an elongated socket arranged at an oblique angle thereto and adapted to receive said cutter with the cutter projecting laterally and longitudinally beyond the end of the holder,
 80 said holder having a second elongated socket extending inwardly from its side and intersecting the cutter socket, a shoe adapted to move endwise in said second socket, said shoe and said cutter having interlocking
 85 teeth arranged to sustain end-thrust of said cutter, said teeth being inclined slightly to the axis of said shoe to cause relatively slight endwise movement of said cutter in
 90 consequence of greater endwise movement of said shoe, and means carried by said holder accessible and arranged to impart endwise movement to said shoe.

2. A metal-working tool comprising an elongated cutter, a holder having an elongated socket arranged at an oblique angle thereto and adapted to receive said cutter with the cutter projecting laterally and forwardly, said holder having a second elongated socket extending inwardly and forwardly from the side thereof and intersecting the cutter socket, a shoe adapted to move endwise in said second socket, said shoe and said cutter having interlocking teeth arranged to sustain end-thrust of said cutter, said teeth being inclined slightly to the axis of said shoe to cause relatively slight endwise movement of said cutter in consequence of greater endwise movement of said shoe, a
 100 spring carried by said holder at the inner end of the second-mentioned socket and arranged to move said shoe endwise in one direction, and a screw in alinement with said shoe and carried by said holder and arranged to move said shoe in the opposite direction.

3. A metal-working tool comprising an elongated cutter, a holder having an elongated socket adapted to receive said cutter and to hold it with its cutting end beyond the end of the holder, said holder having a second elongated socket formed in the side thereof and intersecting the cutter socket, a shoe adapted to move endwise in said second socket, said shoe and said cutter having interlocking teeth arranged to sustain end-thrust of said cutter, said teeth being inclined slightly to the axis of said shoe to cause relatively slight endwise movement
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of said cutter in consequence of greater endwise movement of said shoe, a helical compression spring arranged in said socket to act on one end of said shoe, and a screw accessible from the side of the holder and arranged to act on the opposite end of said shoe to advance the latter against the stress of said spring.

4. A metal-working tool comprising an elongated cutter, a holder having an elongated socket adapted to receive said cutter, said holder having a second elongated socket intersecting the cutter socket, a shoe adapted to move endwise in said second socket, said shoe and said cutter having interlocking teeth arranged to sustain end-thrust of said cutter, said teeth being inclined slightly to the axis of said shoe to cause relatively slight endwise movement of said cutter in consequence of greater endwise movement of said shoe, a spring carried by said holder at the inner end of the second mentioned socket and arranged to move said shoe endwise in one direction, a screw in the second mentioned socket and arranged to move said shoe in the opposite direction, and an index element affixed to said holder in contiguous relation to said screw, the latter having a

circular series of indicating marks arranged to coact successively with said index element as the screw is turned.

5. A metal-working tool comprising a holder having two elongated sockets intersecting each other, a cutter arranged in one of said sockets, a shoe arranged in the other one of said sockets, said cutter and said shoe having interlocking teeth arranged to sustain end-thrust of the cutter, said teeth being inclined slightly to the axis of said shoe to cause endwise movement of the cutter in consequence of endwise movement of the shoe, a screw carried by said holder and arranged to impart endwise movement to said shoe, said holder having an internal screw-thread coacting with said screw, said screw having a reduced portion, and a helical spring surrounding said reduced portion and bearing against said internal screw-thread with pressure in a direction away from the axis of said screw, one end of said spring being anchored to said screw to hold the latter against rotation relatively to the spring.

In testimony whereof I have affixed my signature.

FRED P. LOVEJOY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."