

Oct. 16, 1951

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2,571,395

CHAMFERING TOOL

Filed April 7, 1948

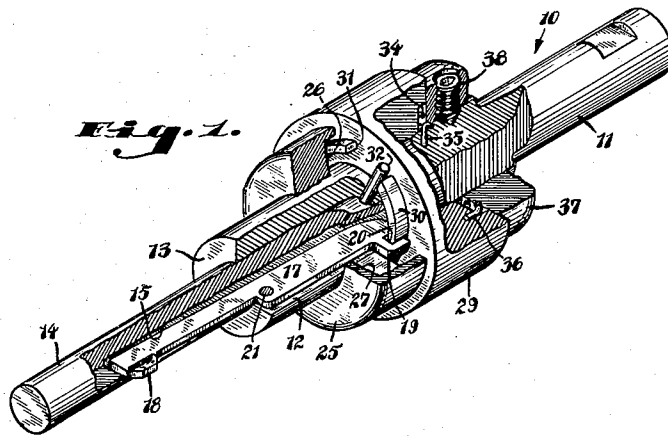


Fig. 2.

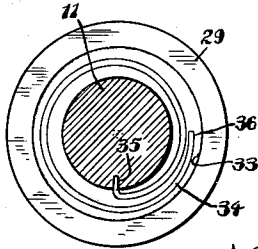


Fig. 3.

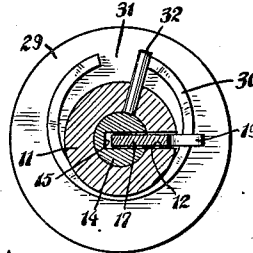


Fig. 4.

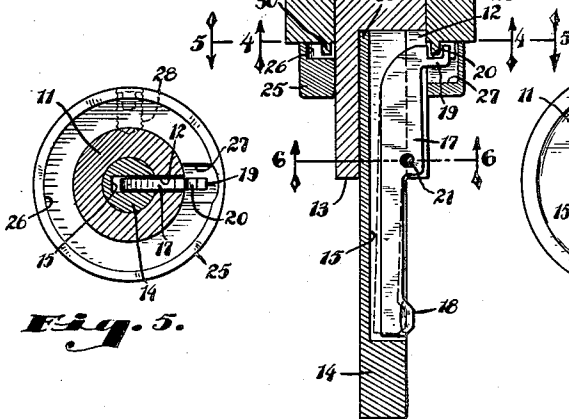


Fig. 5.

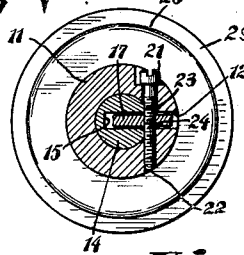


Fig. 6.

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2,571,395

CHAMFERING TOOL

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Application April 7, 1948, Serial No. 19,462.

6 Claims. (Cl. 77-73.5)

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The present invention relates primarily to a chamfering tool, though it is applicable to any type of rotary tool including a bit having an active portion shiftable between a position in which such portion is entirely shrouded, and a position in which such portion projects into a location of action. Since the invention is highly adaptable for use in chamfering tools, it has been so illustrated, and will be so described.

The primary object of the invention is to provide improved means for shifting the bit between inactive and active positions. So far as I am advised, it has been universal practice, prior to my invention, to provide actuating means for the bits of such tools, which must be shifted axially in order to move the bit between active and inactive positions. Such movement requires the exertion of substantial force, and a movement of the operator's hand, in the direction of the axis of the tool; and I have found in practice that accuracy and sensitivity are very difficult to attain in the manipulation of such tools.

According to my invention, actuating means for the bit is provided of such character that the application of a slight braking force to the actuating means, which presents a smooth surface concentric to the axis of rotation of the tool, will result in the desired shifting of the bit. Ancillary objectives of the invention are to provide refinements in the construction of the actuating means for the bit of such a tool.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a perspective view of a chamfering tool constructed in accordance with my invention, parts being broken away or shown in section for clarity of illustration;

Fig. 2 is an axial section through such a tool;

Fig. 3 is a transverse section taken substantially on the line 3-3 of Fig. 2;

Fig. 4 is a transverse section taken substantially on the line 4-4 of Fig. 2 and looking in the direction of the arrows;

Fig. 5 is a transverse section taken substantially on the line 5-5 of Fig. 2 and looking in the direction of the arrows; and

Fig. 6 is a transverse section taken substantially on the line 6-6 of Fig. 2.

Referring more particularly to the drawings, it will be seen that my tool comprises a shaft indicated generally by the reference numeral 10. In the illustrated embodiment of the invention, and for facility of manufacture, the shaft 10 is made in two parts, comprising a major section 11 having an axially-extending, radially-opening slot 12 therein opening through the end 13 of the section 11; and a minor section 14, formed

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with a longitudinally extending, substantially radially-opening slot 15, opening through the end 16 of said section. The end 13 of the major section 11 is bored to receive the end 16 of the section 14, with the slots 12 and 15 in registry. It will be perceived that the shaft 10 might comprise an integral piece, but that the formation of the slot 12-15 is facilitated by the illustrated arrangement, and that the two-part arrangement further makes it possible to harden the minor section 14, which is subjected to primary wear, and to replace only that section when it does become worn.

A bit 17 is received in the slot 12-15. Adjacent one end, said bit is formed with an active portion or blade 18 which is adapted to be shifted between the projecting, solid line position and the retracted, dotted line position. Adjacent its opposite end, the bit is formed with a radially projecting portion 19, always located outside the slot 12, and bifurcated to form a notch 20, in the manner clearly illustrated in Figs. 1 and 2.

A screw 21 is received in a chordal bore 22 formed in the shaft section 11, and a transverse notch 23 in the shaft section 14 registers with said bore, so that the screw 21 engages in said notch to hold the shaft section 14 rigidly with respect to the section 11. The screw 21 also passes freely through an aperture 24 in the bit 17, whereby said screw constitutes a pivotal mounting for said bit, permitting rocking movement of said bit between the solid line and dotted line positions of Fig. 2.

A collar 25 is sleeved on the shaft section 11 to overlie the upper end of the bit 17, and is formed, in its upper end surface, with an annular recess 26 having an enlargement 27 for the accommodation of the bit portion 19. A set screw 28, or other equivalent means, is provided for fixing the collar 25 rigidly in position upon the shaft section 11.

Loosely sleeved on the shaft section 11 is a second collar 29 provided with a smooth cylindrical exterior surface concentric with said shaft section. At one end, the collar 29 firmly but loosely abuts the upper end surface of the collar 25 to close the recess 26; and said end of the collar 29 is formed with an axially extending, peripherally elongated, eccentric rib 30 which projects into the recess 26 of the collar 25. As is clearly to be seen in Figs. 2 and 4, the rib 30 is received in the notch 20 of the bifurcated portion 19 of the bit 17, so that the furcations of said bit portion bear against the inner and outer peripheral surfaces of the rib 30. Since the rib 30 is eccentric, as is clearly shown in Fig. 4, rotary or oscillatory movement of the collar 29 relative to the shaft section 11 will obviously result in radial movement of the portion 19 of the bit 17, to rock said bit about the axis of the screw 29, to shift the active portion 18 of said bit between the positions illustrated in solid lines and in dotted lines in Fig. 2.

The rib 30 is interrupted, as at 31; and a pin 32, which projects substantially radially from the shaft 11, is located within the interruption 31, where it is engageable by the ends of the rib defining the interruption 31, to limit relative oscillatory movement between the collar 29 and the shaft section 11.

The upper end surface of the collar 29 is formed with an annular socket 33 in which is received a coiled torsion spring 34, which is sleeved on the shaft section 11 with one end 35 thereof anchored upon said shaft section and the other end 36 thereof anchored upon the collar 29. Thus, the spring 34 will resist clockwise movement of the collar 29, as viewed in Fig. 3, relative to the shaft section 11 and, whenever no external force is applied to said elements, will hold the collar 29 in the position illustrated in Fig. 4, wherein the bit 17 assumes the position illustrated in solid lines in Fig. 2.

A third collar 37 is located on the shaft section 11 in abutment with the upper end face of collar 29, to close the socket 33, and said collar 37 is rigidly fixed to the shaft 11 by a set screw 38, or other equivalent fastening means.

The shaft section 11, of course, is adapted to be located in the chuck of any rotating engine, wherein it will be rotated in a counter-clockwise direction as viewed from the lefthand end of Fig. 1. So long as no braking force is applied to the collar 29, the parts will maintain their illustrated relative positions, wherein the blade 18 projects radially beyond the confines of the shaft section 14. If, however, the periphery of the collar 29 is grasped by an operator, or braked in any other manner, the retarding effect will cause the shaft 11 to run ahead of the collar 29, whereby the pin 32 will be moved through the interruption 31 in the rib 30, to engage the rib end which is remote from said pin, as shown in Fig. 1. Thereby, the rib 30 will be caused to move relative to the bit 17 to shift a portion of said rib more remote from the shaft axis into registry with the straddling furcations of the bit portion 19, and the bit will be shifted to the position illustrated in dotted lines in Fig. 2.

The moment braking force is withdrawn from the collar 29, however, the spring 34 will act to return the parts to their relative positions illustrated in Fig. 1.

The action of the bit-actuating means of the present disclosure is substantially instantaneous, positive, and substantially effortless, from the standpoint of the operator. Once he has grasped the collar 29, it is not necessary for the operator to move his hand at all. A slight squeezing action upon the collar 29 positively results in shifting of the bit blade 18 to its inactive position; and said blade will be returned to active position instantaneously and automatically upon release of the collar 29.

I claim as my invention:

1. A tool comprising a shaft adapted to be rotated upon its axis, said shaft being provided with a substantially radial, axially-elongated groove opening through its periphery, a bit received in said groove, fulcrum means engaging said bit intermediate the ends thereof to mount the same in said groove, said bit having an active portion adjacent one end shiftable, as said bit rocks about said fulcrum means, between a position within said slot and a position projecting therefrom, a collar sleeved on said shaft, means restraining said collar against axial movement relative to said shaft, means limiting rotary

movement of said collar relative to said shaft, resilient means resisting such rotary movement in one direction, and cam means operatively connecting said collar and said bit to rock said bit about said fulcrum means in response to rotary movement of said collar relative to said shaft.

2. The tool of claim 1 in which said resilient means normally holds said collar in a position in which said active portion of said bit is projected.

3. The tool of claim 1 in which said cam means comprises an axially-extending trackway at one end of said collar, eccentric relative to said shaft axis and elongated peripherally thereof, and in which the other end of said bit has a two-way positive engagement with said trackway.

4. The tool of claim 1 in which said cam means comprises an axially-elongated rib at one end of said collar, eccentric relative to said shaft axis and elongated peripherally thereof, and in which the other end of said bit bears against a peripheral surface of said rib.

5. The tool of claim 4 in which said other end of said bit is bifurcated and bears against the inner and outer peripheral surfaces of said rib.

6. A tool comprising a shaft provided with an axially-elongated, substantially radially-opening slot, a bit received in said slot, pivot means traversing said slot and engaging said bit intermediate the ends thereof to support said bit for rocking movement about said pivot means, said bit having an active portion adjacent one end projectible from, and retractable into, said slot upon such rocking movement of said bit, a collar fixed to said shaft, overlying the other end of said bit and formed to provide an annular recess in its face remote from said first-named bit end, said other end of said bit being provided with a portion projecting into said recess, a second collar loosely sleeved on said shaft and abutting the recessed end of said first-named collar, said second collar having, on its face abutting said first-named collar, a peripherally-extending, axially-projecting, interrupted rib projecting into said recess, said projecting bit portion being bifurcated to straddle said rib, means projecting substantially radially from said shaft into said recess and located within the interrupted portion of said rib to limit relative movement between said second collar and said shaft about the axis of said shaft, the other end face of said second collar being provided with an annular socket, a coiled spring sleeved on said shaft within said socket with one end anchored on said shaft and its other end anchored on said second collar, and a third collar fixed on said shaft and abutting said last-named face of said second collar to close said socket.

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