Sept. 12, 1944. J. M. MOODY 2,358,241

CHAMFERING DEVICE

Filed March 10, 1943 3 Sheets-Sheet 1

Fig. 1.

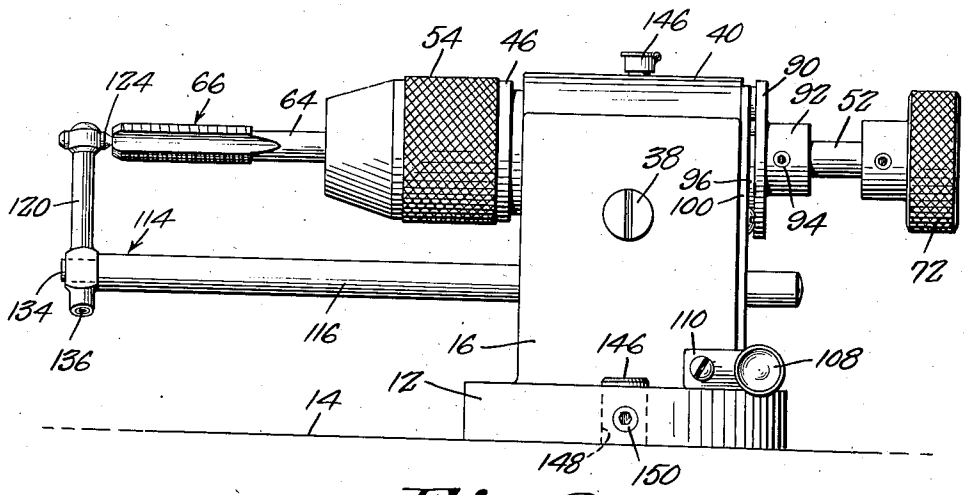


Fig. 2.

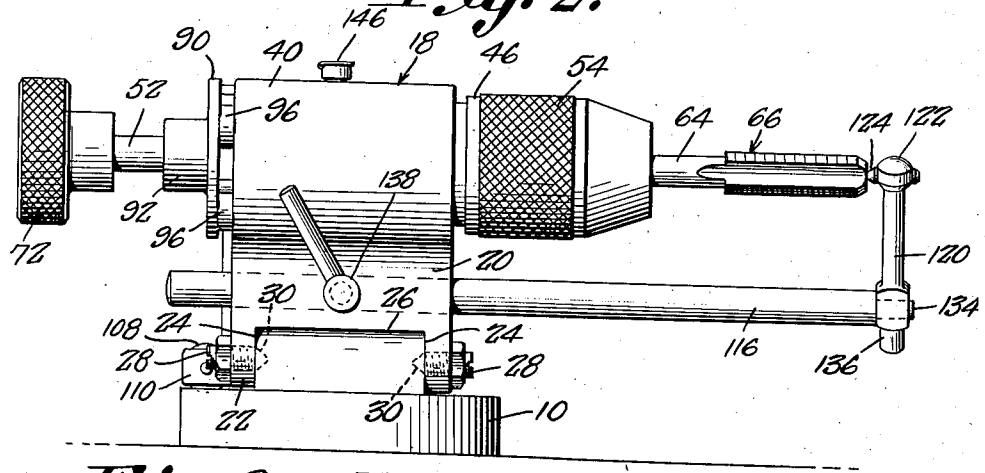


Fig. 9.

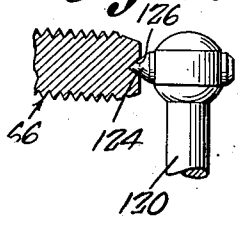
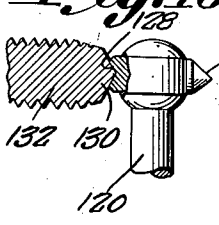


Fig. 10.



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Sept. 12, 1944. J. M. MOODY 2,358,241

CHAMFERING DEVICE

Filed March 10, 1943 3 Sheets-Sheet 2

Fig. 3.

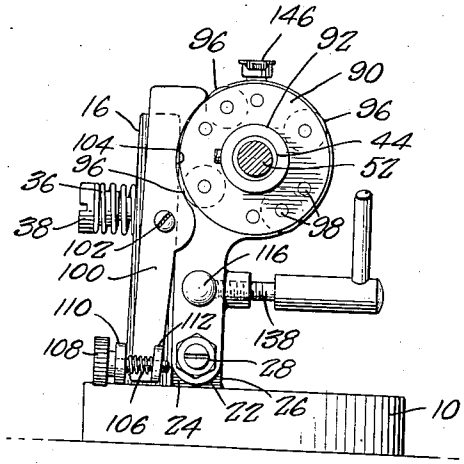


Fig. 4.

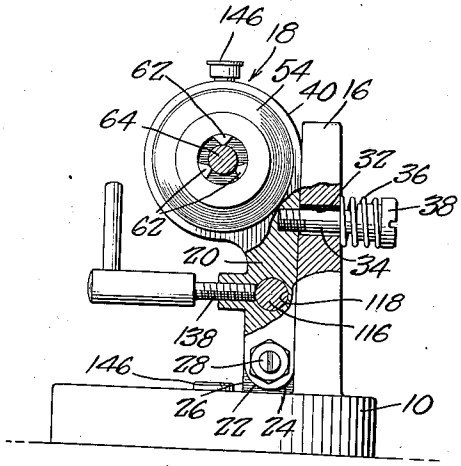


Fig. 5.

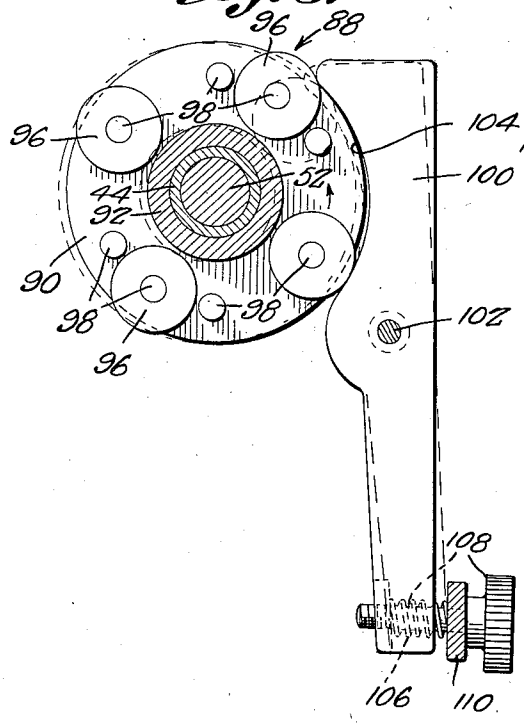
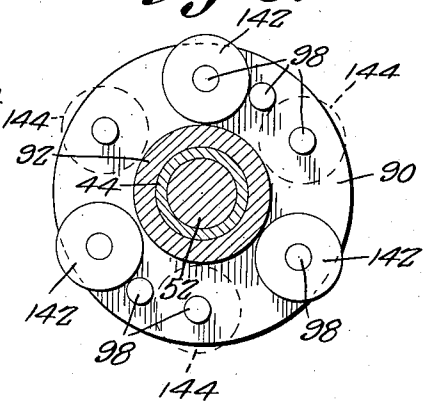


Fig. 6.



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Sept. 12, 1944. J. M. MOODY 2,358,241

CHAMFERING DEVICE

Filed March 10, 1943 3 Sheets-Sheet 3

Fig. 7.

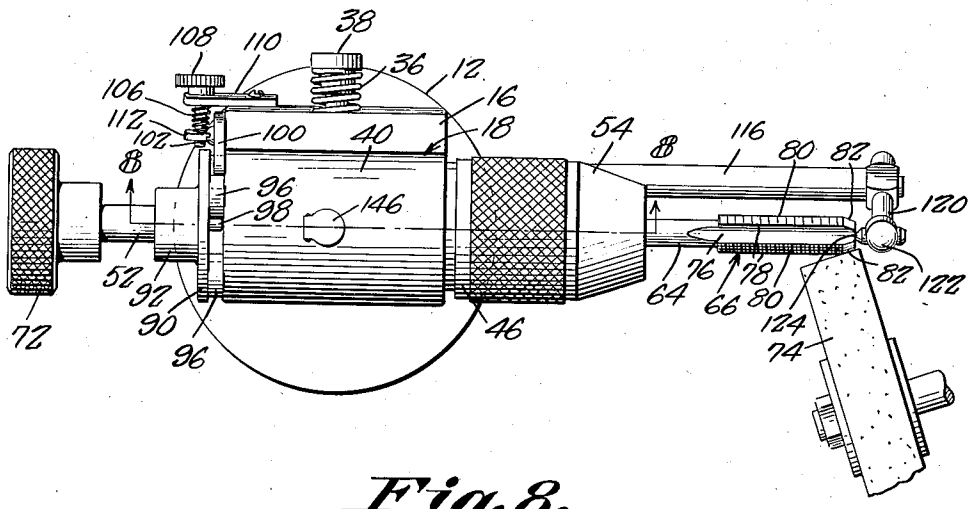


Fig. 8.

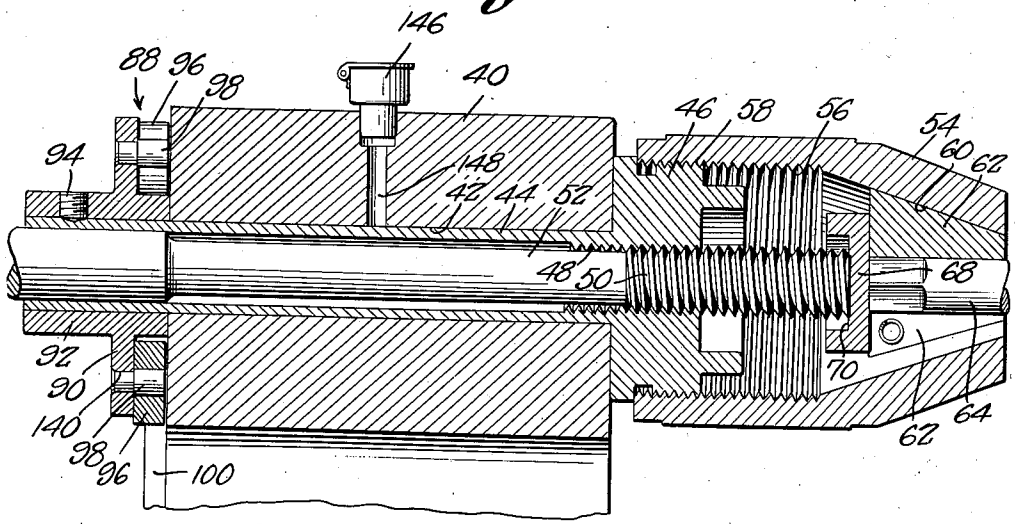
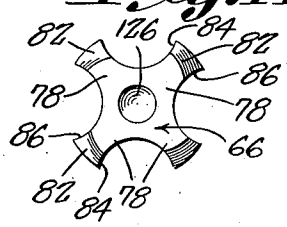


Fig. 11.



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Patented Sept. 12, 1944 2,358,241

UNITED STATES PATENT OFFICE

2,358,241

CHAMFERING DEVICE

J. Martin Moody, Arlington, Va.

Application March 10, 1943, Serial No. 478,715

1 Claim. (Cl. 51—225)

My invention relates to the grinding of taps and similar tools, and has among its objects and advantages the provision of an improved chamfering tool designed to facilitate such operations.

In the accompanying drawings:

Figure 1 is a side view of the invention.

Figure 2 is a view of the opposite side.

Figure 3 is an end view.

Figure 4 is a partial sectional view of the opposite end of the tool.

Figure 5 is an enlarged sectional view of a grinding feed cam mechanism.

Figure 6 is a view of a part of the structure of Figure 5 illustrating the manner in which the cam operation may be modified to suit the needs of different types of tools.

Figure 7 is a top view of the tool illustrating its association with a grinder.

Figure 8 is an enlarged sectional view along the line 8—8 of Figure 7.

Figure 9 is a view illustrating a pin type centering device for the tap.

Figure 10 illustrates a socket type centering device for the tap, and

Figure 11 illustrates an end view of a tap showing the manner in which the chamfer is cut.

In the embodiment of the invention selected for illustration, I make use of a base 12 which may be attached to a support 14. The base is provided with an upstanding wall or bracket 16, which may be made in one piece with the base. A tool support 18 is mounted on the base. This support includes a web 20 having projections 22 lying adjacent end faces 24 on a body 26 formed integrally with the base 12 adjacent the bracket 16. Screws 28 are threaded through the projections 22 and are provided with tapered ends receivable in correspondingly tapered recesses 30 in the end faces 24 to pivotally connect the tool mount 18 with the base 10.

In Figure 4, the bracket 16 is provided with an opening 32 for loosely receiving a screw 34 threaded into the tool mount 18. A compression spring 36 is mounted on the screw 34 and is interposed between the bracket 16 and the screw head 38 to yieldingly hold the tool mount against the bracket 16.

Referring to Figures 7 and 8, the tool mount 18 includes a cylindrical body 40 provided with a bore 42 in which is rotatably mounted a sleeve 44 provided with a head 46 having internal threads 48 for connection with threads 50 on a spindle 52 rotatably mounted in the sleeve 44.

A chuck member 54 is internally threaded at 56 for connection with external threads 58 on the head 46, which chuck member may be of conventional design with respect to its tapered face 60 and the coacting dogs 62 to be clamped on the shank 64 of a tap 66. A pressure member 68 is interposed between the spindle 52, the dogs 62 and the shank 64. This member is recessed at 70 to provide a depression for the abutting end of the spindle 52.

A knob 72 is fixed to the spindle 52 to facilitate rotation thereof. While the sleeve 44 is mounted for rotation in the bore 42 and the spindle 52 may be rotated relatively to the sleeve, the sleeve and the spindle are fixedly related when the chuck member 54 is turned to the position of Figure 8, which frictionally locks all the parts so that rotation of the spindle 52 will also cause rotation of the sleeve 44 to impart rotary motion to the tap 60, as when the tap is being chamfered by a grinding stone 74 in Figure 7.

The tap 66 is conventional and includes the usual flutes 76 which divides the circumferential face of the tap longitudinally to provide ribs 78, these ribs being provided with the usual cut threads 80 and chamfered or ground threads 82. The present invention is concerned with chamfering the threads 82. Figure 11 illustrates an end view of the tap 66, the tap having four ribs 78. The tap is rotated counterclockwise and the chamfered faces of the tap are progressively deepened from their leading edges 84 to the trailing edges 86. My tool operates to advance the tap 66 against the stone 74 as the chamfer is being cut from the leading edge 84 to the trailing edge 86.

The means for advancing the tap 66 comprises a cam mechanism 88, best illustrated in Figures 3, 5, 7 and 8. In Figure 8 a flange 90 is fixedly related to the sleeve 44, which flange includes a hub 92 fixed to the sleeve 44 by a set screw 94. This hub abuts one end of the body 40, while the head 46 abuts the other end of the cylindrical body to restrain the sleeve 44 from relative axial movement.

The flange 90 is spaced sufficiently far from the cylindrical body 40 to provide accommodation for four rollers 96 rotatably mounted on pins 98 fixed to the flange 90. These rollers are spaced 90 degrees apart and are of a common diameter. A cam arm 100 is pivoted intermediate its ends at 102 to one end of the bracket 16. This cam arm lies in the plane of the cam rollers 96.

In Figure 5, the cam arm 100 is provided with a cam face 104 arranged for contact with the cam rollers 96 through rotation of the flange 90. This flange is rotated clockwise when view-

ing Figure 3, but counterclockwise in Figure 5. With the cam rollers 96 positioned according to Figure 5, two cam rollers lie in engagement with the cam arm 100, and one cam roller 96 lies in engagement with the face 104 to shift the flange 90 and its cam rollers 96 to the left through rotation of the flange. Such lateral shifting of the flange imparts pivotal movement to the tool mount 18 to advance the tap 66 against the grinding stone 74.

A compression spring 106 is mounted on a screw 108 extending loosely through a lug 110 fixed to the bracket 16 and is threaded through a lip 112 attached to the lower end of the cam arm 100. While the screw 108 is loosely mounted in the lug 110, the screw restrains the arm 100 from clockwise rotation, when viewing Figure 5.

To chamfer the top 66, the cam mechanism 88 is first adjusted to the position of Figure 5, which position is easily determined by the sense of touch, since two cam rollers 96 engage the cam arm. The tap 66 is then made secure in the chuck in the position of Figure 7. The position of the tap with respect to rotation about its longitudinal axis is determined by bringing the tap to a position where one of the flutes 76 faces directly upwardly, as shown in Figure 7. The chuck member 54 and the tap 66 are then held against rotation and rotation is imparted to the spindle 54 to fixedly relate the parts.

With the parts fixedly related, the tap 66 may be rotated relatively to the grinding stone 74. Since the cam rollers 96 are the same in number as the ribs 78, each rib will be cut progressively deeper from its leading edge to its trailing edge, since the tap is set in a predetermined position with respect to the cam rollers and the cam arm 100. The cam arm is restrained from pivotal movement by the screw 108, and the spring 106 imparts sufficient pressure to restrain the screw from accidental rotation. The oscillatory movement of the tool mount 88 may be varied through adjustment of the cam arm 100 by the screw 108.

To facilitate precise positioning of the tap 66 in the tool mount, an aligning device 114 is employed. This device comprises a shaft 116 adjustably mounted in a bore 118 in the web 20 and paralleling the axis of the spindle 52. To one end of the shaft 116 is fixed a right angular arm 120 provided with a head 122. This head is provided with a tapered centering pin 124 for reception in a tapered recess 126 in the end of the tap 66. The recess 126 lies at the axial center of the tap, and the pin 124 has its axis paralleling the axis of the spindle 52 and is coaxial therewith. Thus the pin 124 may be brought snugly within the recess 26 and supported therein while the tap 66 is being clamped in the chuck.

Some taps are provided with pointed ends. To support such a tap, the head 122 is provided with a tapered socket or recess 128 for receiving the tapered end 130 on a tap 132. The arm 120 is removably mounted on a pin 134 at one end of the shaft 116, and the arm is made secure against accidental displacement by a set screw 136. Thus the arm 120 may be reversed to present either the pin 124 or the recess 128 to the tap being ground. A set screw 138 is threaded in the web 20 to fixedly secure the shaft 116. This shaft, however, may be adjusted to different positions to accommodate taps of different lengths. After placement of the tap in the chuck, the shaft 116 is adjusted to bring its pin or socket aligning means into engagement with the end of the tap. The shaft is then retracted to exert pressure on the end of the tap, after which the set screw 138 is tightened.

Figures 5 and 6 illustrate the flange 90 as being provided with extra pins 98. These pins are so spaced as to accommodate different arrangements of the cam rollers 96. Figure 5 illustrates four cam rollers 96, while Figure 6 illustrates three cam rollers 142. These cam rollers are spaced 120 degrees apart for service in connection with a tool having three ribs to be ground. In servicing a six-ribbed tool, additional cam rollers 144 may be mounted on the flange. An oil cup 146 is mounted on the cylindrical body 40 to supply oil to a bore 148 leading to the sleeve 44.

The support 14 is provided with an upstanding pin 146 receivable in a bore 148 in the base 12. The base may be fixed against rotation by a set screw 150 threaded in the base for connection with the pin 146.

Without further elaboration, the foregoing will so fully explain by invention, that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

In grinding mechanism of the character described, a support, a body pivotally mounted on the support and spring biased to a retracted position thereon, a spindle rotatably extended through the body having a tool carrying chuck at one end, said spindle having its axis parallel with the pivot axis of the body, a flange disposed circumferentially about and mounted to turn with the spindle, a plurality of pins fixed in circumferentially spaced relation to and extending axially from one face of the flange, said pins being disposed on a circle concentric with the axis of the spindle, a roller rotatably mounted on each pin, and a cam member mounted on the support in position to engage the circumference of the respective rollers to effect transverse movement of the spindle during rotation thereof.

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