Feb. 12, 1957 C. K. JENSCH 2,780,894

TWIST DRILL SHARPENING ATTACHMENT FOR TOOL GRINDER

Filed April 28, 1954

3 Sheets-Sheet 1

Fig. 1.

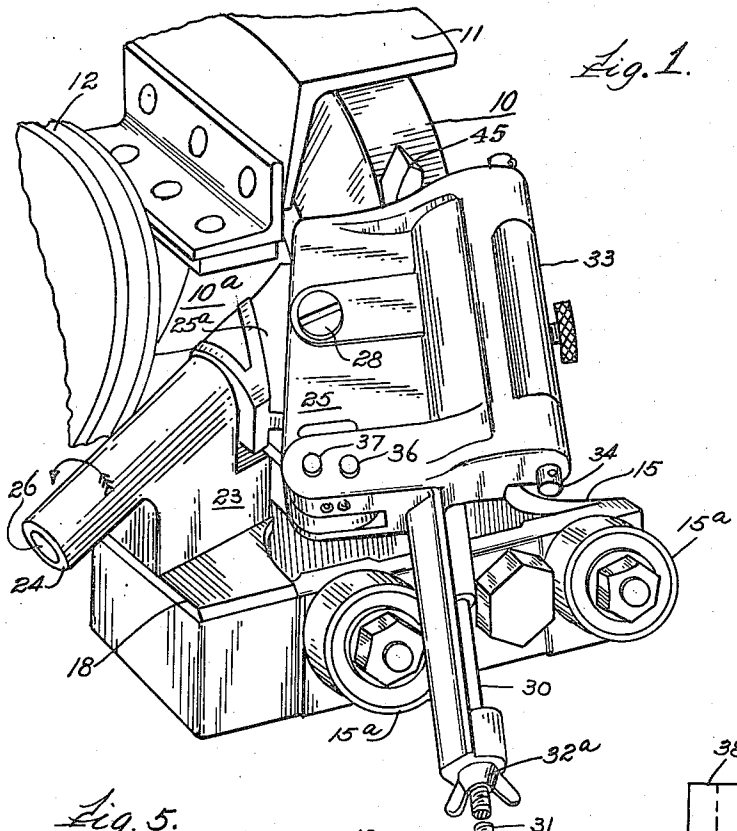


Fig. 7.

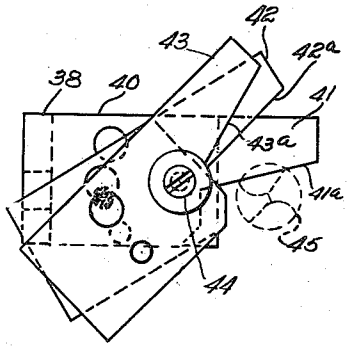


Fig. 5.

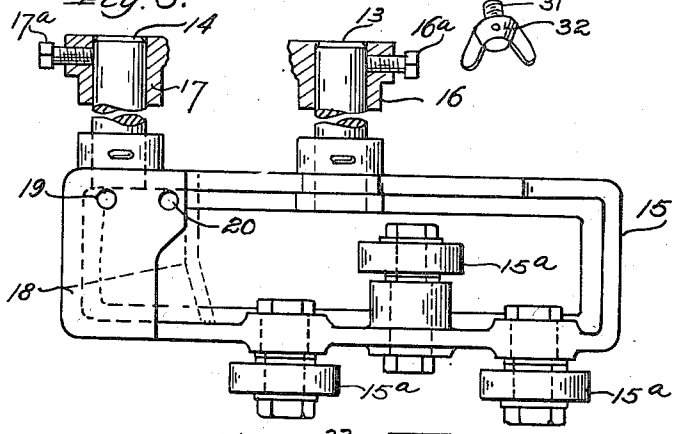
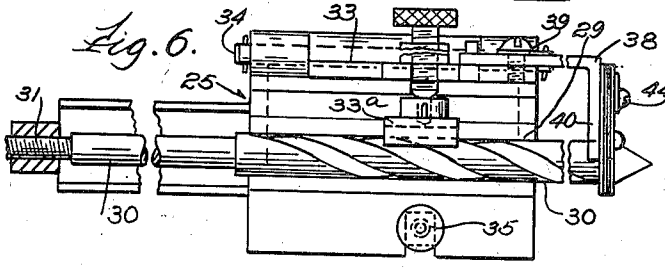


Fig. 6.



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TWIST DRILL SHARPENING ATTACHMENT FOR TOOL GRINDER

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Fig. 2.

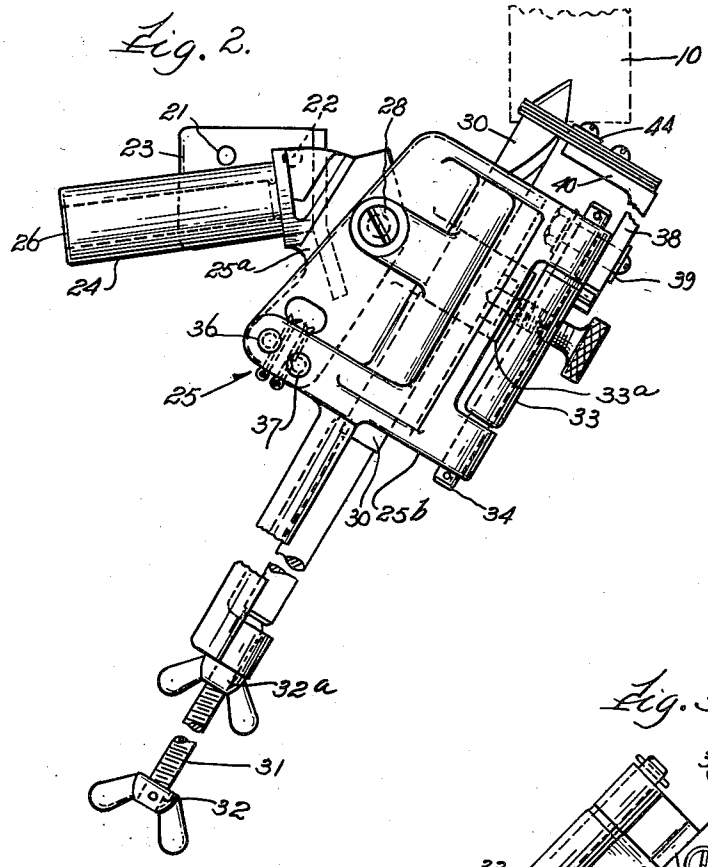


Fig. 3.

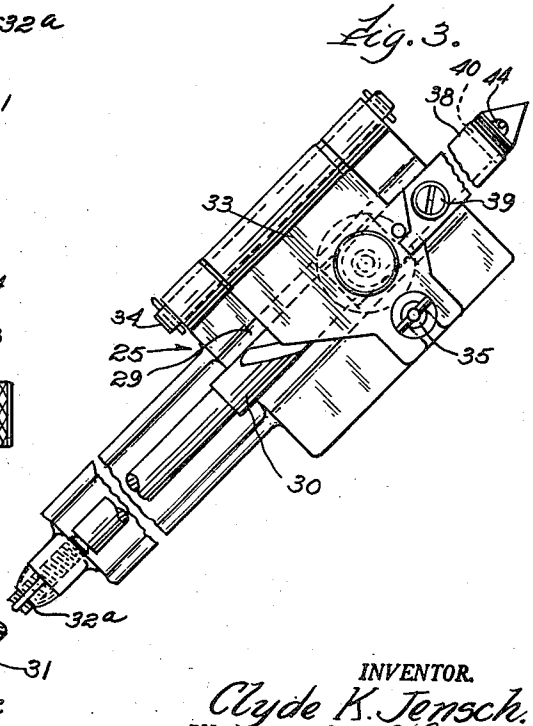
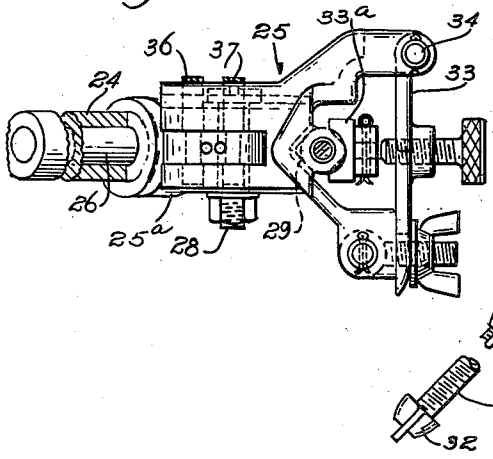


Fig. 4.



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TWIST DRILL SHARPENING ATTACHMENT FOR TOOL GRINDER

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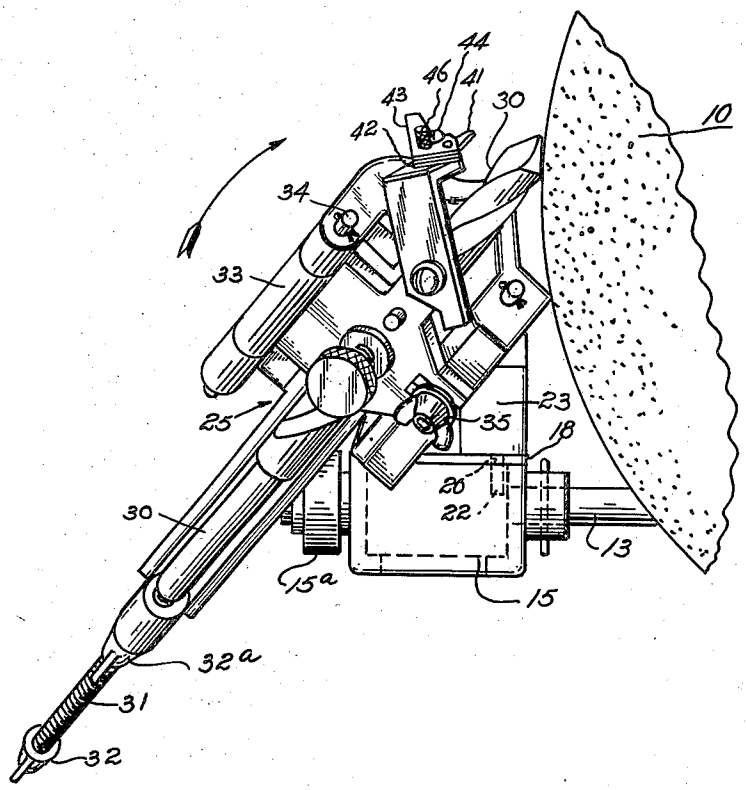
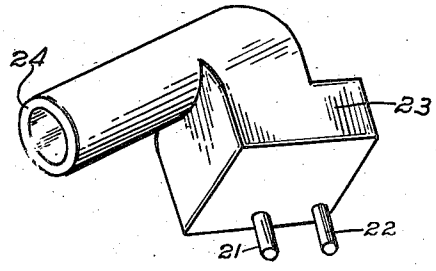


Fig 9.

Fig. 8.



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United States Patent Office 2,780,894 Patented Feb. 12, 1957

2,780,894

TWIST DRILL SHARPENING ATTACHMENT FOR TOOL GRINDER

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Application April 28, 1954, Serial No. 426,157

4 Claims. (Cl. 51—96)

My invention relates to an improvement in tool sharpeners and is particularly directed to a new and improved apparatus for sharpening twist drill bits.

A major purpose of the present invention is the provision of a sharpening attachment for twist drills wherein the attachment is so arranged with respect to the peripheral surface of a grinding wheel as to enable an operator properly to sharpen a twist drill.

One object of the present invention is to provide a guiding assembly in which a twist drill bit to be sharpened or surfaced is manually moved to a predetermined position or at a predetermined angle across the moving peripheral surface of one or more grinding wheels.

Another object of the present invention is the provision of a new and improved apparatus for sharpening twist drill bits which can be simply adjusted or regulated to accommodate various sizes of twist drill bits for sharpening.

Another purpose is the provision of a new and improved sharpening apparatus for twist drill bits in which the required cutting surface for the bit is generated automatically by moving the bit through a predetermined path with relation to the peripheral surface of a rotating grinding wheel.

Other purposes will appear from time to time in the course of the ensuing specification and claims.

I illustrate the invention more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is a perspective view of the grinding assembly of the present invention;

Figure 2 is a plan view partly in section of the attachment shown in Figure 1;

Figure 3 is a side elevation view of the attachment shown in Figure 2;

Figure 4 is an end view of the attachment shown in Figure 2 looking toward the grinding wheel shown in Figure 2;

Figure 5 is a plan view of certain supporting elements for the attachment shown in Figure 1;

Figure 6 is a view similar to Figure 3 but showing another operative position of the elements;

Figure 7 is a detail view of the gauging elements employed in the present invention;

Figure 8 is a detail view of one of the elements used in the present invention; and

Figure 9 is a side elevation view illustrating the relation of a drill bit to the grinding wheel.

Twist drill bits have a body portion which is formed into a plurality of spiral portions which are separated by spaces or flutes throughout a substantial portion of the bit. The spiral portions terminate in end surfaces which are inclined to the axis of the bit and which merge into the tip of the drill bit. A cutting edge for the drill bit is formed on each of these surfaces. During rotation of the bit, the cutting edge is the leading edge of the surfaces. Each of these cutting edges extends generally from the tip of the drill bit to the outer peripheral surface of the spiraled bit portion.

These drill bits are designed so as to have a particular angle formed between the opposed cutting edges or between the cutting edge and the axis of the bit. It is highly important to maintain this angle intact whenever the drill bit is sharpened. Each of the end surfaces also has a trailing edge or heel. The trailing edges, however, have a smaller angle of inclusion with the axis of the drill bit than the included angle between the cutting edge and that axis. The particular apparatus shown and described herein is particularly adapted to maintain the correct included angle between the cutting edge and the axis of the drill bit and to also maintain the correct included angle between the trailing edge or edges and the axis of the drill bit during the sharpening operation.

Referring specifically now to the drawings and in the first instance to Figure 1, **10** represents a grinding wheel which is mounted for rotation on a frame **10***a*. **11** is the customary guard for the grinding wheel **10**. Any suitable means, such as the belt and pulley assembly **12**, may be employed to rotate the grinding wheel. The belt and pulley assembly **12** may be powered by any suitable prime mover, such as an internal combustion engine.

A pair of spaced, generally parallel rods **13** and **14** are formed integrally with a supporting member **15**, which is positioned adjacent the peripheral surface of the grinding wheel. The rods **13** and **14** are adapted for reception within correspondingly spaced bores, formed in frame portions **16** and **17**. Any suitable means, such as the setscrews **16***a* and **17***a*, may be employed to lock the rods at a predetermined position within the bores and thus hold the supporting member **15** in a predetermined spaced relation to the surface of the grinding wheel **10**.

Designated generally at **15***a* are a plurality of roller members which are adapted to receive and support a carriage of a tool holder. The rollers form no part of the present invention. This form of support, which is carried by the grinding wheel assembly, is known to the art and it is illustrated as one form of convenient support for the present attachment invention. The present invention makes use of this form of supporting member in an assembly for sharpening twist drill bits.

A plate **18** is joined to the supporting member **15**. The plate **18** has a pair of spaced bores **19** and **20** formed therein for the reception of a pair of correspondingly spaced rods **21** and **22** of an adapter **23** for a twist drill bit holder (Figure 8). The adapter **23** includes a sleeve **24** which extends generally in the direction of the peripheral surface of the grinding wheel **10**. It may be inclined slightly to the axis of the grinding wheel **10** as will be seen in Figure 2 and also inclined to the plane of the grinding wheel **10**. By the term "plane of the grinding wheel **10**," I mean that plane which is perpendicular to the axis of rotation of the wheel **10** and that which passes through the middle of the peripheral surface of the wheel.

A twist drill bit holder **25** includes a rod **26**, formed unitarily with a plate like portion **25***a*, and insertable within the sleeve **24**. The holder includes a second portion **25***b* pivotally connected with the rod **26** as at **28** and a generally elongated groove **29** formed therein. The axis of the groove **29** is disposed in the same general plane as the axis of the rod **26**. The groove **29** is adapted to receive a twist drill bit **30**. An adjusting screw **31** is mounted in one end of the portion **25***b* and has one end portion bearing against the end portion of a twist drill bit **30** lying in the groove **29**. Indicated at **32***a* is a lock nut to hold the screw **31** at any desired position of adjustment.

The holder also includes a member **33** which is hingedly mounted on the portion **25***b* as at **34** to clamp the drill bit **30** in the desired position of adjustment. Any suitable locking means **35** (Fig. 9) may be carried by the member **25***b* and engageable with the member **33** to hold the member **33** in its closed position. The member **33** carries an adjustable abutment **33***a* (Fig. 4), which cooperates with the groove **29** to hold the bit in any desired position of adjustment.

According to the principles of the invention, the axis of the sleeve **24**, axis of the drill bit **30** and extension of the drill bit **30** with relation to the holder **25** and wheel **10** are so arranged that in the initial or normal position, the axis of the drill bit is inclined to the plane of the grinding wheel but spaced from the peripheral surface of the grinding wheel **10**. In this position it is important that the drill bit end face opposed to the surface of the grinding wheel has the cutting edge thereof disposed upwardly and away from the grinding wheel. The drill bit must also be rotated to an initial position such that during rotation about the axis of the sleeve **24** the trailing edge of the end face will first make contact with the wheel to form an angle between the axis of the bit and the line of intersection of the end face with the wheel less than the desired angle of the cutting edge with the axis. Thus, as the holder is rotated about the axis of the sleeve **24**, the trailing edge of that end face will first make contact with the peripheral surface of the grinding wheel and the end face will be ground to the correct configuration.

As the holder is rotated upwardly, from the position shown in Figure 1, about the axis of the sleeve **24**, the grinding wheel makes progressive contact with the entire end face of the drill bit. As the holder is rotated, and as material is removed from the end face, the line of intersection between the grinding wheel and the end face moves downwardly on the grinding wheel to a point where the angle formed between the axis of the drill bit and the line of intersection is equal to the desired angle of inclusion between the cutting edge and the axis of the drill bit. The invention takes advantage of the curvature of the peripheral grinding surface to form both the correct cutting angle of the bit and an end face which falls away from the cutting edge.

Suitable locking means designated generally at **36** and **37** may be employed to maintain the correct included angle between the axis of the sleeve **24** and the axis of the drill bit **30**. As shown, the locking means **36** is adapted to lock the holder **25** at the proper position for a 5/8" drill bit and 1/2" drill bit and the locking means **37** may be employed to lock the holder **25** at the proper position for a 9/16" drill bit. The bores in the plate **25***a* are spaced a smaller distance apart than the spacing of the pins **36** and **37** so that only one of the pins may be engaged at a single time. The spacing corresponds to a slight angular difference between the axis of the sleeve and the axis of the bit for the various sizes of bits. For convenience, I have shown the locking means in the form of pins selectively received within spaced bores formed in the portion **25***a*.

The invention includes gauging means for setting up the proper extended position of the drill bit within the holder and to also set up the proper angular position of the drill bit within the holder. The gauging means includes a bracket **38** pivotally mounted upon the portion **25***b* as at **39**. The bracket includes a portion **40** adapted to extend transversely of the axis of the drill bit **30**. Indicated generally at **41**, **42** and **43** are individual flute positioners each of which is pivotally mounted upon the transverse portion **40** as at **44**. As shown, these flute positioners **41**, **42** and **43** are for use with 9/16", 1/2" and 5/8" drills respectively. As shown, the flute positioners are positioned so that when the junction of the cutting edge and peripheral surface of the drill bit indicated at **45** are aligned with the flute positioner, the drill bit is at its proper extended position. Each of the flute positioners

includes a lower surface **41***a*, **42***a* and **43***a*. These surfaces are adapted to rest upon the opposite edges of the flutes in the drill bit. When the drill bit is in its proper extended position, the operator rotates the drill bit until the gauging edge of the particular flute positioner for the particular drill bit contacts the edge at each side of the flute. The drill bit is then in its proper angular position for the sharpening operation.

In use, the flute positioners which are not employed for the particular drill bit are swung out of position and held there by means of any suitable locking pins or screws **46** (Fig. 9).

After the drill bit is correctly positioned, the flute positioners, along with the bracket, are swung to the inoperative position about the pivot **39**.

Whereas I have shown and described an operative form of my invention, I wish it to be understood that this showing and description is to be taken in an illustrative or diagrammatic sense only. There are many modifications of the invention which will fall within the scope and spirit of the invention which will be apparent to those skilled in the art. The scope of the invention, therefore, should be limited only by the scope of the hereinafter appended claims.

The use and operation of my invention are as follows:

I disclose a method and an apparatus for sharpening twist drill bits which requires only a simple movement for the sharpening cycle. The twist drill bit is initially positioned with its axis inclined to the general plane of the grinding wheel. In this initial position the cutting tip or end of the bit is spaced from the peripheral surface of the grinding wheel and the trailing edge or heel of the end surface of the bit is closest to the grinding wheel.

The bit is then bodily rocked about an axis (as defined by the axis of the sleeve **24**) which is located in the same plane as the axis of the bit but inclined thereto and inclined to the general plane of the grinding wheel. The bit is rocked in a direction such as to bring the end face of the cutting tip of the bit into contact with the peripheral surface of the grinding wheel. As the bit first makes contact with the grinding wheel and as it moves through the sharpening cycle it describes generally a helical path of intersection between the end surface and the grinding wheel and grinds the end face to the proper configuration. Thus with a simple rocking movement the operator or person performing the method can sharpen the bit.

The attachment has been found particularly advantageous in connection with sharpening of twist drill bits with an included angle on the order of 70 degrees between the cutting edges of the bit.

When the attachment is used the holder is first inserted in the sleeve **24** and a drill bit is inserted in the groove **29**. Assuming, for example, that the operator wishes to sharpen a 1/2" drill bit, he moves the holder about the pivot **28** and engages the locking means **36**. The gauge and the bracket are swung to the position indicated in Figure 2 and the flute positioner **41** is positioned transversely of the groove **29**. The adjustment screw **31** is rotated until the drill bit moves to its proper extended position. The drill bit is then rotated to a position where the lower surface **41***a* of the flute positioner **41** contacts the edge at each side of the flute of the bit.

After thus positioning the drill bit, the operator rotates the holder **25** about the axis of the sleeve **24**. During this rotational movement, the end face of the drill bit contacts the peripheral surface of the grinding wheel and grinds the end surface, forming a sharp cutting edge between the end face and the flute. The operator then returns the holder to the initial inoperative position. The clamping means for the drill bit may then be loosened and the bit rotated to present the other face of the drill bit for a similar sharpening operation.

I claim:

1. A twist drill bit sharpening assembly including a grinding wheel and means for rotating it about a pre-

determined axis, a support positioned adjacent said wheel, a twist drill bit holder including pivotally connected portions, one of said portions including a rod insertable in a sleeve on said support, said sleeve having its axis inclined to the general plane of the grinding wheel and extending toward the peripheral surface of said wheel, the other portion of said holder having a trough adapted to receive a twist drill bit, the axis of said trough lying in the same plane with the axis of said rod, means cooperating with said trough to hold a twist drill bit therein at a predetermined position, means cooperable with said portions for holding the axis of said trough at a predetermined inclination to the axis of said rod and a gauging element pivotally mounted on a bracket and presenting a surface extending perpendicular to the axis of said trough, said surface being adapted for contact with opposed edges of the flute of a drill bit in said trough, said bracket being pivotally mounted on said other portion.

2. The assembly set forth in claim 1 wherein said locking means includes pins carried by said second named portion and selectively insertable in spaced apertures in said first named portion.

3. The assembly set forth in claim 1 wherein said sleeve is removably mounted on said support.

4. The assembly set forth in claim 1 characterized by including a plurality of gauging elements carried by said bracket portion, each element having a surface alignable with opposed edges of a drill bit flute carried by said trough, each of said elements being movable into and out of contacting relation with a drill bit positioned in said trough.

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