March 9, 1943. V. N. HOERST 2,313,641

DRILL GRINDING DEVICE

Filed April 9, 1941 2 Sheets-Sheet 1

Fig. 1.

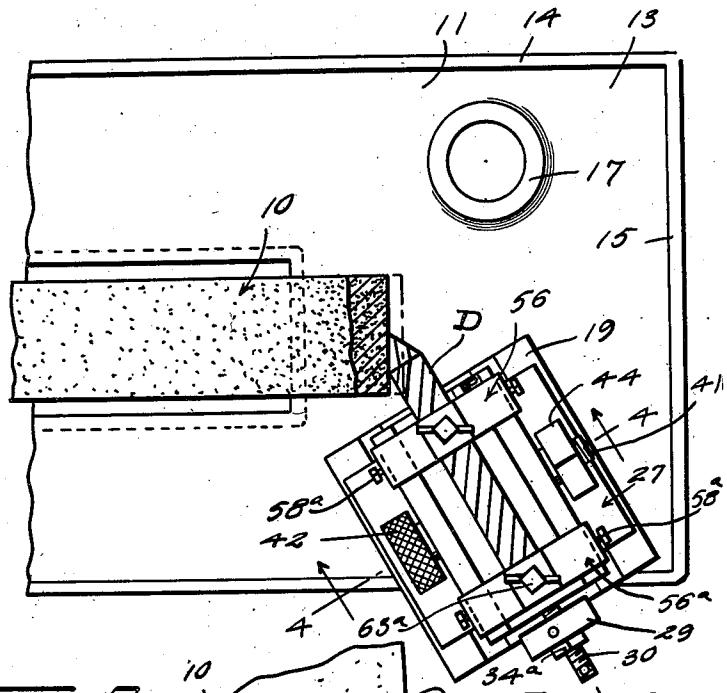
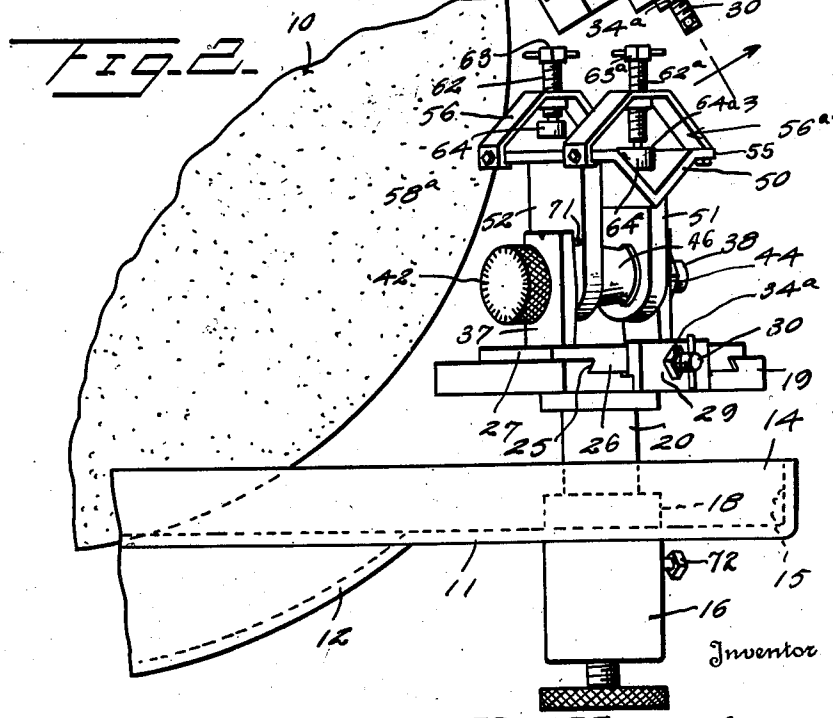


Fig. 2.



Inventor

V.N.Hoerst

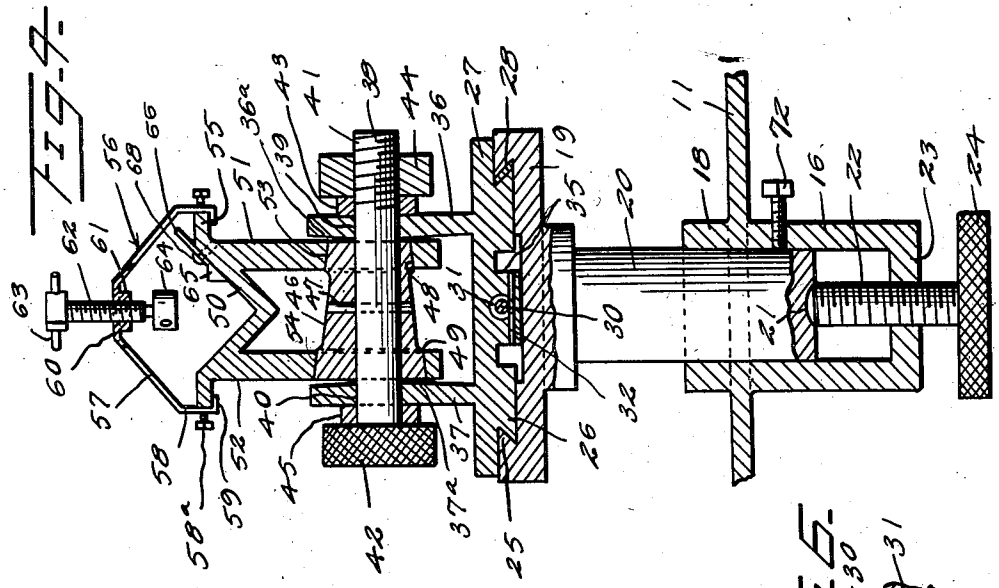
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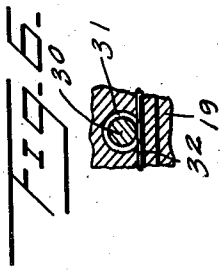
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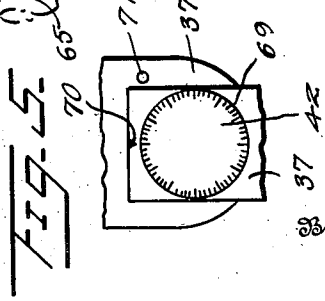
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Inventor

V. N. Hoerst

By Kimmel & Crowell

Attorneys

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UNITED STATES PATENT OFFICE

2,313,641

DRILL GRINDING DEVICE

Valentine Nickolas Hoerst, Cincinnati, Ohio

Application April 9, 1941, Serial No. 387,746

2 Claims. (Cl. 51—219)

This invention relates to a means for grinding or sharpening twist drills.

An object of this invention is to provide an improved holder for a twist drill by means of which the drill can be accurately ground and the desired clearance of the cutting edge formed.

Another object of this invention is to provide a drill grinding apparatus which includes a vertically adjustable support and a horizontally movable carriage on the support, the carriage being provided with means for not only clamping a drill thereto but also with means whereby the drill may be rocked relative to the grinding wheel, the latter means including means whereby the rockable portion of the carriage may be very finely adjusted to obtain the desired uniform sharpening of the drill lips.

A further object of this invention is to provide a grinding structure wherein the drill can be engaged with the periphery of the grinding wheel instead of the side face of the wheel.

A further object of this invention is to provide a structure of this kind which can readily be adapted to either right or left hand drills.

To the foregoing objects and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawings wherein are shown embodiments of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a top plan partly broken away of a drill grinding machine or apparatus constructed according to an embodiment of this invention.

Figure 2 is a detail side elevation partly broken away of the device.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a fragmentary side elevation of the eccentric adjusting wheel or knob.

Figure 6 is a fragmentary sectional view taken on the line 6—6 of Figure 3.

Referring to the drawings, the numeral 10 designates generally an abrading wheel which is adapted to be mounted on a rotary shaft (not shown) and operated from a suitable power means. A combined base supporting plate and collector 11 is provided with a liquid holding pan or reservoir 12 within which the wheel 10 is adapted to rotate. The base member 11 extends laterally of the opposite faces of the wheel 10 and also extends forwardly as at 13 of the wheel 10.

The marginal edges of the base member 11 are provided with upstanding side flanges 14 and opposite end flanges 15 so that the ground material will be retained on the upper surface of the combined collector and supporting member 11. The supporting member 11 is adapted to have a suitable standard or the like (not shown) whereby the base plate 11 may be supported in operative relation with respect to the wheel 10.

The base member 11 is provided on opposite sides of the wheel 10 and slightly forwardly thereof with a pair of sockets or sleeve members 16 and 17. These socket members 16 and 17 are of like construction and each socket member is formed with an upwardly projecting cylindrical extension 18 which extends upwardly above the upper surface of the base plate 11 as shown in Figures 3 and 4.

A carriage supporting plate 19 is disposed above the upper surface of the base plate 11 and has secured thereto a cylindrical solid stem or shank 20 which slidably engages in the extension 18 and in the socket 16. The lower end of the stem or shank 20 has a concave recess 21 therein in which the upper end of a shank adjusting screw 22 is adapted to engage. The screw 22 is threaded through the bottom wall 23 of the socket 16 and is provided with a knurled knob or operating member 24 disposed below the bottom wall 23.

The carriage supporting plate 19 is formed in the upper surface thereof with a longitudinally extending horizontal keyway 25 in which a key 26 carried by a movable carriage 27 is adapted to slidably engage. The keyway 25 and the key 26 are formed in dovetail fashion and preferably a gib or liner 28 is interposed between one inclined edge of the key 26 and the adjacent face of the keyway 25 as shown in Figure 4. The carriage supporting member 19 is provided at one end thereof with an upstanding lug or ear 29 through which a carriage adjusting shaft 30 is journalled.

The shaft 30 is provided with an annular groove 31, adjacent the forward end thereof, in which a shaft locking pin 32 loosely engages so that the shaft 30 will be held against endwise movement relative to a lug or ear 35 but will be permitted free rotary movement. The outer end of the shaft 30 is formed with a handle 33 and the shaft 30 is also formed with threads 34 which threadably engage the lug member 29 integral with the plate 19. The shaft 30 may be locked

in adjusted position by a lock nut 34a which bears against the lug 29.

The carriage 27 has formed integral therewith a pair of upstanding parallel ears or bearing members 36 and 37 which extend upwardly from the upper surface thereof in substantially the longitudinal center of the carriage 27 and the inner faces of the bearing members 36 and 37 are oppositely tapered as at 36a and 37a respectively. A spindle 38 is disposed in horizontal position and is rotatably mounted through openings 39 and 40, which are formed in the ears 36 and 37, respectively. The spindle 38 is provided with threads 41 at one end thereof and at the opposite end is formed with a knob 42. A washer 43 is disposed about the spindle 38 and is interposed between the outer face of the ear 36 and a spindle locking nut 44 which is threaded onto the threads 41 of the spindle 38.

A second washer 45 is mounted on the spindle 38 and is interposed between the knob 42 and the outer face of the ear 37. A substantially frusto-conical body or eccentric 46 is fixed as by a pin 47 on the spindle 38 between the ears 36 and 37. The eccentric 46 is provided at its smaller end with a frusto-conical bearing surface 48 and is also provided with a frusto-conical bearing surface 49 at its larger or base end. The frusto-conical bearing surfaces 48 and 49 are of slightly greater diameter than the outer surface of the frusto-conical body 46. The eccentric member 46 is annular in transverse section and the axial center of the spindle 38 is disposed at one side of the axial center of the body 46. A V-shaped drill holder, or cradle 50 is disposed above the carriage 27 and has formed integral therewith a pair of downwardly extending ears 51 and 52. The shaft 38 is locked against rotation by a set screw 38a which is threaded through the ear 36.

The ear 51 is provided with a tapered or frusto-conical opening 53, in which the frusto-conical bearing member 48 engages and the ear 52 is provided with a tapered or frusto-conical opening 54 in which the frusto-conical bearing surface 49 engages. The holder 50 is rotatable or swingable on the bearing members 48 and 49 so that a drill D which is positioned in the V-shaped holder 50 may be rocked relative to the peripheral surface of the abrading member 10. The bearing members 36 and 37 are provided on their inner faces with tapered or oppositely inclined faces 36a and 37a respectively, so that the ears 51 and 52 may move relative to the shaft 38 when the cradle 50 is rocked on the eccentric 46. The holder 50, on its opposite longitudinal edges, is provided with a pair of horizontally disposed and outwardly extending flanges 55 with which a pair of drill clamp holding members, generally designated as 56 and 56a are adapted to engage. The holding members 56 and 56a are of identical construction and each comprises a truncated V-shaped clamping body 57 which is formed at its divergent ends with vertical extensions 58 terminating in inwardly projecting lugs 59 which are engageable beneath the flanges 55, as shown in Figure 4. Set screws 58a engage through the extensions 58 for locking the holding or supporting members in adjusted position.

The truncated top 60 of each clamping member 56 and 56a is provided with a nut member 61 and threaded shafts 62 and 62a threadably engage through the nut members 61 and are provided at their upper ends with operating members 63 and 63a. The lower end of the shaft 62 has fixedly mounted thereon a drill clamping jaw 64 which is disposed in vertical alignment with the apex of the V formed by the holder 50 so that when the jaw 64 is lowered to a clamping position, the drill D will be tightly held in the holder 50 with the axial center thereof in vertical alignment with the axial center of the shaft 62 and in the vertical plane of the apex of the V formed by the holder 50.

The shaft 62a has swivelly mounted thereon a swivelled head or floating center 64a having a drill center engaging pin 64b. If desired the head 64a may be turned about 90 degrees so that the head 64a will abut the end of the drill D without engaging in the center of the drill.

The holder 50 on the inner surface thereof and on one side has a drill positioning member 65 mounted thereon which is of substantially V-shape in transverse section and which is adapted to engage in the groove of a twist drill.

A plate 66 is formed with the drill positioning member 65 and is provided with an elongated slot 67 in which a fastening member 68 engages. The fastening member 68 is constructed in the form of a machine screw which is threaded into the adjacent side of the holder 50 so that the drill positioning member 65 may be shifted inwardly or outwardly with respect to one side of the holder 50. When the clamping members 56 are in clamping position, they will be disposed as shown in Figures 1, 2 and 3 adjacent the opposite ends of the holder 50 so as to tightly clamp the drill D in the holder 50 with at least one end of the drill D projecting forwardly of the holder 50 for contact with the periphery of the abrading member 10.

The two ears 51 and 52 are arranged so that when the holder 50 is rocked on the eccentric bearing members 48 and 49, the ears 51 and 52 may move so as to thereby move the holder 50. This movement will provide a slight clearance on the cutting end of the drill back of the cutting edge thereof, the amount of the clearance depending on the relative position of the eccentric body 46 as determined by circumferential adjustment of this body 46 through the adjustment of the spindle 38 and the knob 42. The outer face of the knob 42 is provided with a plurality of circumferentially arranged graduations 69 and the ear 37 at the upper portion thereof is provided with a stationary pointer 70 by means of which the user of this device will be able to determine the relative position of the eccentric 46.

The two sockets 16 and 17 are disposed with the axial centers thereof on an angle of thirty degrees with respect to the cylindrical peripheral surface of the abrading member 10 so as to thereby grind the forward end of the drill D on the desired angle. The ear 52 may be provided with an outwardly projecting stop member 71 which, in one position of the ear 52, is adapted to engage the ear 37 so as to thereby limit the rocking movement of the holder 50 in one direction. This limit of the rocking movement of the holder 50 may be at the point where the forward end of the drill D swings out of contact with the peripheral surface of the abrading wheel 10.

In order to provide a means whereby the holder 50 with the carriage 27 may be disposed at the desired angle with respect to the peripheral surface of the abrading wheel 10, the sockets 16 and 17 may be provided with set screws 72 which engage the shank 20. In this manner the shank 20 is held against rotary movement with respect to the socket member 16 and the tightening of

the set screw 72 will firmly hold the shank or stem 20 in the adjusted position within either of the sockets 16 or 17. The two sockets 16 and 17 are provided so that both right and left hand drills D may be ground or sharpened, the socket 17 being used for left hand drills.

In the use and operation of this structure the drill is tightly clamped in the holder 50 by the clamping member 62 and the positioning member 62a and is positioned by adjustment of the positioning member 65 so that one lip of the drill will be disposed in a position for contact with the peripheral surface of the abrading member 10. The height of the carriage holder 19 and the carriage 27 is adjusted by means of the carriage adjusting screw 22 and when this position has been obtained with the axial center of the drill D about ten or fifteen degrees below the axial center of the abrading member 10, the locking screw 72 is tightened. Adjustment of the spindle 38, by means of the knob 42, will regulate or control the amount of movement of the holder 50 as it is rocked relative to the abrading member 10 through the grinding zone so as to thereby form the desired clearance back of the cutting edge of the drill lip. The holder 50 may be adjusted toward or away from the abrading member 10, by turning the threaded shaft 30 which will move the carriage 27 toward or away from the abrading wheel 10. When the drill is disposed in the desired position for contact with the periphery of the abrading wheel 10, the shaft 30 may be locked by the lock nut 34a so as to prevent accidental shifting of this carriage. In this manner one lip of the drill D may be sharpened to the desired degree and after this one lip has been sharpened, the drill D may be loosened in the holder 50 and turned to position the other lip of the drill for engagement with the abrading wheel 10.

What I claim is:

1. A drill grinding means comprising a support, a stem adjustably carried by said support, a plate carried by said stem, a carriage mounted for horizontal adjustment on said plate, a pair of upstanding spaced apart ears carried by said carriage, said ears having axially aligned bores therethrough, a rotatable spindle journaled in said ears, means for locking said spindle against rotation, a pair of spaced apart eccentric rigidly secured to said spindle between said ears, a drill clamping cradle, and a pair of spaced apart downwardly extending ears carried by said cradle, said ears having bores therethrough for the journaling therein of said pair of eccentrics whereby rotation of said eccentrics will effect a predetermined movement of said cradle.

2. A drill grinding means comprising a support, a stem carried by said support, means for vertically adjusting said stem, a plate carried by said stem, a carriage mounted for horizontal adjustment on said plate, a pair of upstanding spaced apart ears carried by said carriage, said ears being provided with axially aligned bores therethrough, a rotatable spindle journaled in said ears, means for locking said spindle against rotation, an eccentric rigidly secured to said spindle, and a drill clamping cradle rockably journaled on said eccentric whereby rotation of said eccentric will effect a predetermined movement of said cradle.

VALENTINE NICKOLAS HOERST.