Jan. 22, 1952 N. H. SWANSON 2,583,159

DRILL GRINDING APPARATUS

Filed Oct. 8, 1948 2 SHEETS—SHEET 1

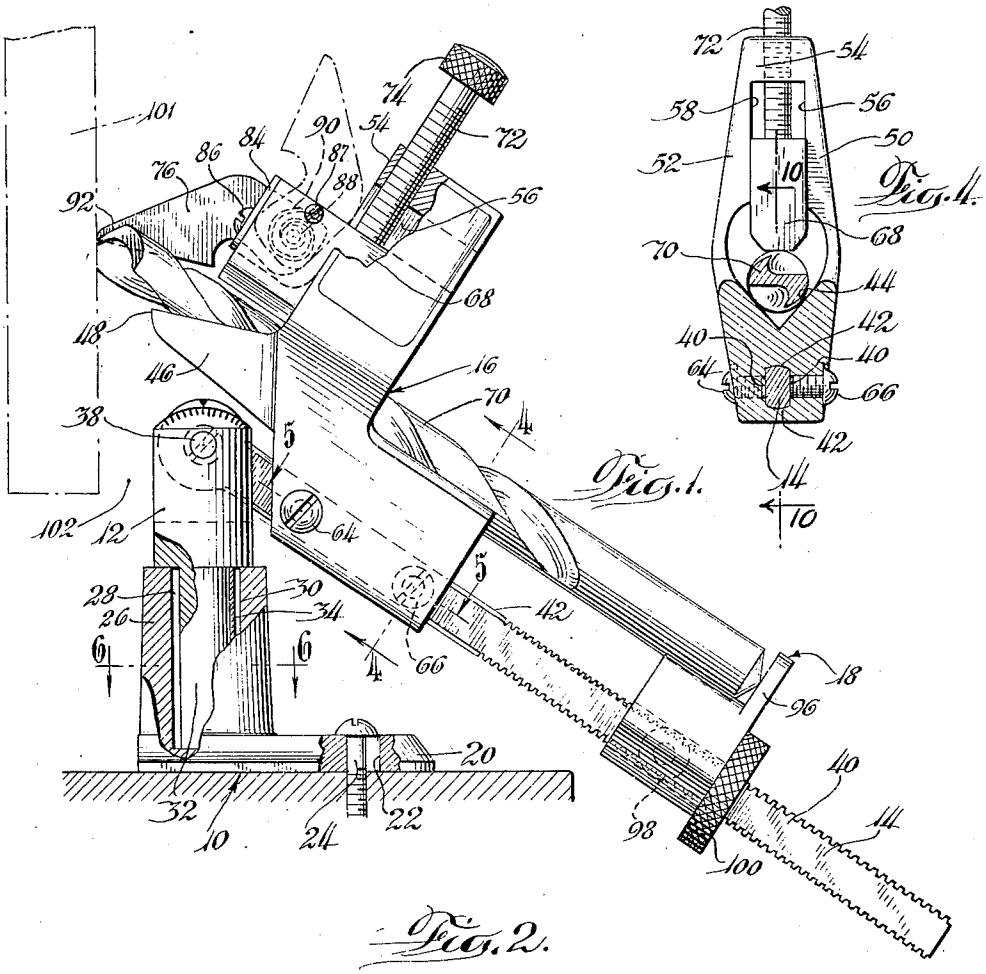
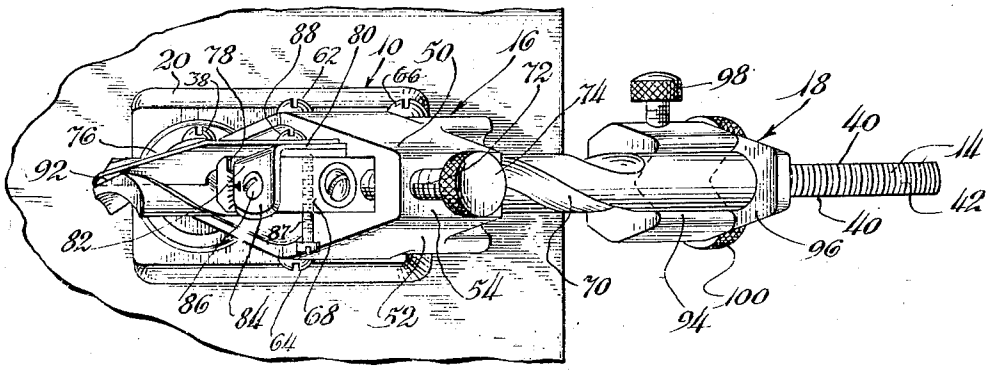


Fig. 1.

Fig. 4.

Fig. 2.



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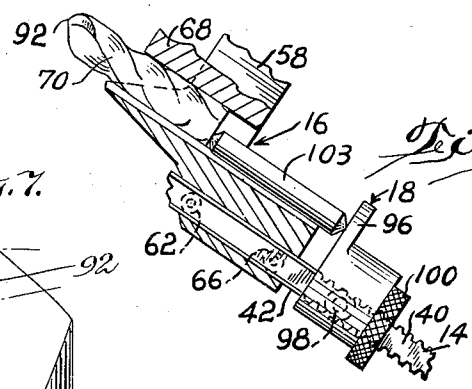


Fig. 10.

Fig. 7.

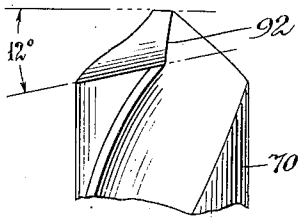


Fig. 5.

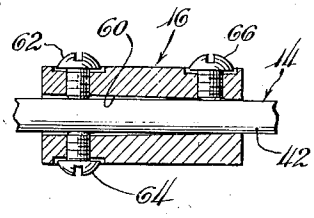


Fig. 3.

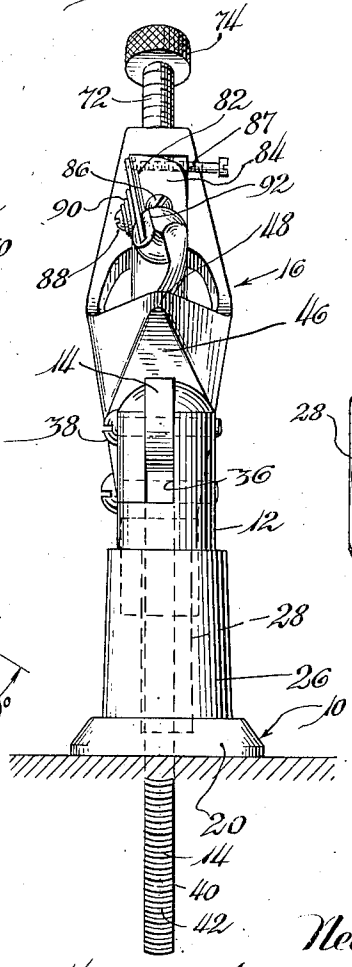


Fig. 8.

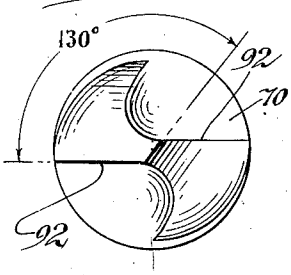


Fig. 6.

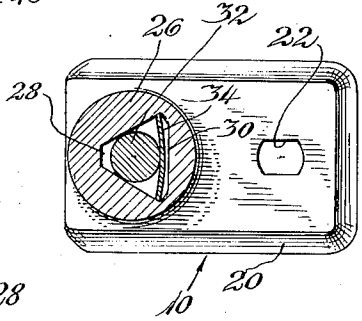
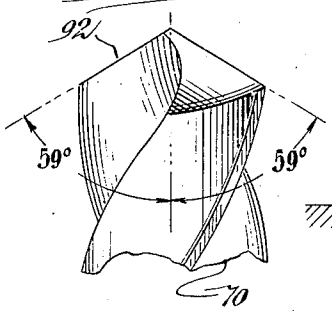


Fig. 9.



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UNITED STATES PATENT OFFICE

2,583,159

DRILL GRINDING APPARATUS

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Application October 8, 1948, Serial No. 53,434

11 Claims. (Cl. 51—219)

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The present invention relates to a device for sharpening the points of twist drills, and more particularly to such a device of generally simplified construction which may be quickly and accurately adjusted to vary the point angle, clearance, and the chisel point angle at which a drill is sharpened.

Holders or attachments for presenting twist drills to grinding wheels to produce a predetermined angularity on a sharpened drill have heretofore been devised but these have all been of relatively complicated construction. It is, therefore, an object of the invention to provide a new and improved drill grinding attachment of simple construction which is inexpensive to manufacture but nevertheless durable and sturdy in use.

Another object of the invention is to provide a drill grinding attachment which has a new and improved base construction and drill holding structure rockable as a unit upon the base to present or feed a drill to a grinding wheel, which drill holding structure is secured in an offset position relative to the pivot axis upon which it is rocked so that the structure rocks upon an eccentric axis and thus produces a predetermined clearance to the rear of the cutting edge of a sharpened drill.

Another object of the invention is the provision of a drill grinding attachment, as set forth in the preceding object, which has new and improved cooperating pivot structure on the base and the drill holding structure supporting the latter for rocking movement upon an eccentric axis, the drill holding structure being also rockable in another plane for varying the point angle at which a drill is sharpened.

A further object of the invention is the provision of a drill grinding attachment having a new and improved drill holding and clamping means which is secured for longitudinal or endwise adjustment to vary the position of the drill holding means relative to a grinder, and which is also bodily shiftable obliquely of its longitudinal axis for varying the clearance at which a drill is sharpened.

A still further object of the invention is the provision of a new and improved drill grinding attachment which has a drill holding and clamping means of the type mentioned above and a cooperating backstop of improved construction for engaging the shank of a drill, which backstop includes an improved microadjustment for adjusting the same accurately to position a drill in an endwise direction and also lock the backstop at a position of adjustment, and which backstop may be reversely positioned to accommodate the drill grinding attachment to drills of relatively short length.

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Yet another object of the invention is the provision of a new and improved guide member for determining the chisel point angle at which a drill is sharpened, which guide member is adjustable so that this angle can be varied.

Another object of the invention is the provision of a new and improved drill grinding attachment which may readily be adjusted for sharpening drills of various diameters and lengths and is equally effective irrespective of variations in these dimensions.

These and other objects, advantages and capabilities of the invention will become apparent from the following description wherein reference is had to the accompanying drawings, in which:

Fig. 1 is a side elevational view, partly in section, of the improved drill grinding attachment of the present invention;

Fig. 2 is a top plan view of the same;

Fig. 3 is a front elevational view of the drill grinding attachment;

Fig. 4 is a vertical sectional view taken in the direction of the arrows on the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 1;

Fig. 6 is a horizontal sectional view through the pedestal base taken on the line 6—6 of Fig. 1;

Fig. 7 is an enlarged view of the point of a drill showing the clearance angle;

Fig. 8 is an end view of the point of the drill showing the chisel point angle;

Fig. 9 is a side elevational view of a drill point showing the point angle; and

Fig. 10 is a fragmentary sectional view taken as indicated on the line 10—10 in Fig. 4.

It will be observed in Fig. 1, which best shows the assembled drill sharpening attachment of the present invention in its entirety in operative position, that the complete attachment includes a pedestal base 10, a swivel post 12 pivotable with respect to the pedestal base, a supporting rod 14 rockably secured to the swivel post, a drill holder or cradle 16 adjustable upon the supporting rod, and a backstop 18 slidable upon the supporting rod.

The pedestal base has a foot 20 of generally rectangular shape (Fig. 6) provided with a short slot 22 extending longitudinally thereof and adapted to receive an attaching screw or bolt 24 (Fig. 1) by means of which the pedestal base is fixedly secured to the top of a work bench or the like. It is not necessary to locate the at-

taching bolt 24 with extreme accuracy because the slot 22 allows for proper positioning of the pedestal base 10 in addition to having other advantages which will be brought out later. Upstanding from the foot 20 is a pedestal 26 which has a vertically extending hole or socket 28 formed therein of generally triangular shape in cross-section, as shown in Fig. 6. One side of this socket is recessed, as indicated at 30 in the latter figure, for a purpose which will appear later.

The drill holding means of my improved attachment is supported upon the pedestal base 10 for rocking movement in a horizontal plane by means of the swivel post 12 which has a reduced end 32 adapted to be freely received in the socket 28 formed in the pedestal base 10. Rocking movement of the swivel post is restrained by means of a flat leaf spring 34 (Fig. 6) in the socket 28 interposed between the reduced end 32 of the swivel post and the recessed side of the socket. This result is obtained by proportioning the relative cross-sectional dimensions of the socket and the reduced end of the post so that the spring 34 is slightly tensioned transversely when the end 32 is forced into the socket. As a result of this novel construction, movement of the swivel post, either rotatably or axially, is restrained without being completely impeded and no other means for securing the parts together is needed.

Referring to Fig. 3, it will be noted that one end of the supporting rod 14 is secured to the upper end of the swivel post in a plane offset from the plane of the axis of the reduced extension 32 and, therefore, of the axis of rotation of the post. As a result, the supporting rod 14 rocks upon an eccentric vertical axis when the swivel post 12 is rocked in the socket 28. The beneficial results obtained thereby will be explained later in the discussion of the operation of the attachment. Offset mounting of this rod is preferably secured by providing the upper end of the swivel post with an offset bifurcation 36 adapted to receive the end of rod 14. The rod is fixed in the bifurcation by suitable means such as a screw 38 which passes freely through apertures in one arm of the bifurcation and the rod and is threaded into the other arm of the bifurcation. This screw forms an axis upon which the supporting rod 14 may be tilted in a vertical plane for varying the point angle at which the drill is sharpened, as will be explained hereinafter. By tightening the screw 38, the rod 14 can be locked at any desired angle with respect to the horizontal.

The supporting rod 14 has oppositely disposed flattened sides 40, best seen in Figs. 1 and 4, connected by opposite arcuate shaped sides 42 which are provided with screw threads extending from the free end of the rod over the major portion of its length.

Support for a drill to be sharpened is provided by the drill holder 16 previously mentioned. This holder, which may be of cast construction, has a generally V-shaped seat or cradle 44 (Fig. 4) formed therein against which a drill is held during a sharpening operation. The cradle extends longitudinally of the body of the holder from a forward extension 46 (Figs. 1 and 3) on the body, having a tip 48 to the rear end of the body. The body of the drill holder 16 is also provided with oppositely disposed side wall structure 50 and 52 (Fig. 4) extending from opposite edges of the cradle along an intermediate part

of the sides thereof. This side wall structure is connected at its upper end by a top or connecting wall 54 integral with the side wall structure. Spaced somewhat above the cradle 44, this side wall structure is conformed to provide parallel oppositely disposed inner side walls 56 and 58 which preferably are machined to present smooth surfaces for a purpose that will appear hereinafter.

Another feature of the present invention is to be found in the relatively simple means which I have devised for mounting the drill holder 16 for slidable adjustment lengthwise of the supporting rod 14 and for adjustment obliquely of the longitudinal axis of the rod. By means of this latter adjustment, the clearance angle at which the heel of the drill is ground may readily be varied. This mounting is best seen in Figs. 1, 4 and 5. As there indicated, the drill holder has a slot 60 extending longitudinally of the body below the cradle for receiving the supporting rod 14. This slot is of approximately the same height as the supporting rod and tapers from a width adjacent the rear end of the body corresponding approximately to the thickness of the rod between the flat sides 40 (Fig. 4) to a width at its front end somewhat greater than the thickness of the rod. As a result, the drill holder may be bodily rocked at its forward end transversely of the longitudinal axis of the supporting rod so as to shift its longitudinal axis and the axis of the drill carried thereby into a plane oblique to the plane of the longitudinal axis of the supporting rod. In this manner the clearance at which the drill is ground may be varied.

The drill holder may be locked at any particular position of oblique adjustment by means of a pair of set screws 62, 64 (Fig. 5), one engaged in each of the opposite side walls of the slot 60 adjacent its forward end. It will be understood that by retracting one screw a certain distance and advancing the other an equal distance, the forward end of the drill holder will be shifted transversely relative to the axis of the supporting rod 14. In addition to the screws above mentioned, a third set screw 66 may also be provided in the side wall of the slot 60 adjacent its rear end for locking the drill holder against movement longitudinally of the supporting rod. It will be apparent that the pair of set screws 62, 64, first mentioned, when tightened against the sides of the rod, assist in locking the drill holder against endwise movement upon the rod.

A further feature of the invention resides in the relatively simple but effective means which I have devised for clamping a drill in the cradle. Referring to Figs. 1 and 4, it will be seen that this clamping means comprises a relatively flat, generally rectangular shaped, metal block 68 secured between the finished inner side walls 56, 58 in the body of the drill holder for sliding movement vertically into and out of clamping engagement with the upper side of a drill 70 in the cradle. If desired, the block may be beveled along the edges of the side which engages the drill, and the block is moved into and out of engaged position by means of a clamping screw 72 extending through a tapped hole in the top wall 54 of the drill holder. On its outer end the screw may be provided with a knurled head 74 to facilitate manipulation thereof, and at its other end it is secured to the block for free rotational movement, but in a manner to lock the

same against linear movement with respect to the block. As a result, the block may be moved between engaged and disengaged position relative to a drill in the cradle merely by turning the screw 72 in the proper direction.

Adjacent its forward end the clamping block 68 carries a flat sheet metal gauge piece 76 (Figs. 1 and 2) for use in setting the chisel point angle at which the drill is to be sharpened. This forms another of the novel features of the present drill grinding attachment. In Fig. 2 it will be observed that the forward end of the clamping block 68 has an inwardly tapering recess 78 into which one arm or flange 80 of a mounting bracket 82 extends. A second arm 84 on this bracket has an aperture extending therethrough which loosely receives a mounting screw 86 threaded into a tapped hole in the end of the clamping block. An adjustable stop to limit pivotal movement of the bracket 82 is provided by a screw 87. The first mentioned arm 80 of the bracket has a headed pin or stud 88 fixedly secured thereto and this pin forms a pivot axis for the sheet metal gauge piece 76. The latter is loosely received on the pin so that it may be moved from the operative position shown in full lines in Fig. 1 to the inoperative position shown in phantom. A compression spring 90 is secured on the pin 88 between its head and the outer side of the gauge piece frictionally to resist pivotal movement of the gauge piece so that it will remain in raised position when moved thereto.

In Figs. 1 and 2 it will be noted that when the gauge piece is in its lowered operative position, the inner side of its forward end is positioned in proximity to the cutting edge or lip 92 on the upper side of the drill secured in the drill holder. In this position the gauge piece forms a guide with which the cutting edge 92 may be aligned to insure sharpening of the drill at the desired chisel point angle. This angle is shown in Fig. 8 and may vary between approximately 117° and 135°, depending upon the type of material which is to be drilled with the drill, and the hardness of the material.

By loosening the mounting screw 86, it is possible to rock the mounting bracket 82 bodily on an axis parallel to the axis of the drill in the cradle. This causes the gauge piece 76 to be rocked in the same manner so that the angle which it makes with the vertical may be varied at will by rocking the bracket inwardly or outwardly. The recess 78 in the side of the clamping block allows for inward rocking movement of the bracket. The gauge piece 76 thus forms a guide for setting the drill to sharpen the same at any predetermined chisel point angle which angle may be varied as conditions require. If desired, the front arm 84 on the mounting bracket, and the front end of the clamping block, may be provided with cooperating indicia to show the setting of the gauge piece in degrees, generally as indicated in Fig. 2.

To provide support for the shank end of a drill, I have devised the new and improved backstop 18, seen in Figs. 1 and 2. This backstop, which may be of cast construction, has a V-shaped seat 94 formed on its upper side adapted to receive the shank of a drill. An abutment 96 extends upwardly from one end of the seat to provide a stop which is engaged against the end of the drill to prevent endwise movement of the same during sharpening. The backstop is provided with a longitudinally extending slot for supporting the same on the rod 14 with the seat

94 in alignment with the seat 44 in the drill holder and adapting the backstop for slidable movement upon the supporting rod 14. It is locked at a position on the rod by means of a thumb set screw 98 which may be threaded into engagement with one of the flat sides 40 of the supporting rod.

In order to secure accurate adjustment of the position of a drill abutting against the backstop and positively to lock the same against endwise movement, a micro-nut 100 is provided which is threaded upon the supporting rod 14. This nut, which may be disc-shaped, has a knurled periphery, and, by turning the same in one direction or the other, the position at which the backstop may be located may be moved either forwardly or backwardly. Furthermore, when the micro-nut is engaged against the back side of the backstop, the latter is positively locked against backward movement upon the supporting rod.

When drills of normal length are to be sharpened, the backstop is positioned on the supporting rod 14 in the manner shown in Fig. 1 with the seat extending toward the drill holder. If drills of short length are to be sharpened, the position of the backstop may be reversed so that the abutment 96 is next to the drill holder as shown in Fig. 10. When extremely short drills are to be sharpened, a back-up rod 103 may be inserted in the cradle between the shank end of the drill to be sharpened and the backstop. In case the drills are so short that the back-up rod lies in part under the clamping block 68, as shown, then a back-up rod of less diameter than the drill should be used so that the clamping block will firmly engage the drill.

To secure the most satisfactory operation of the drill sharpening attachment, it is necessary that it be properly mounted relative to the grinding wheel, indicated in phantom at 101 in Fig. 1. In order to provide clearance for the lower end of the supporting rod 14, as that rod is rocked upon the swivel post 12, it is best to mount the grinder and the attachment on blocks elevated approximately 3 inches above the bench top level. The slot 22 in the foot of the pedestal base 10, through which the attaching screw or bolt 24 passes, permits of limited adjustment of the spacing between the swivel post 12 and the grinding wheel, this spacing being indicated by the number 102 in Fig. 1. For $\frac{3}{32}$ inch drills this spacing should be $\frac{3}{32}$ inch, and for $\frac{3}{4}$ inch drills the spacing should be approximately $\frac{3}{16}$ inch, and for intermediate size drills the pedestal can of course be placed between these settings. These variations in spacing may be accommodated for by the slot 22 in the foot of the base.

To adjust the point angle at which a drill is sharpened, the screw 38 securing the supporting rod 14 to the swivel post 12 is loosened and the rod tilted in a vertical plane on the axis of the screw. If desired, suitable graduations may be placed upon the upper edge of the swivel post along with a mark on the head of the supporting rod cooperable with the graduations for indicating the point angle at which a drill in the holder will be sharpened, generally as shown in Fig. 1. This angle may vary from 45° to 75°.

When this adjustment has been made and the device tested to make certain that the tip 48 on the drill holder is at the proper distance from the side of the grinding wheel, a drill may be placed in the holder. The backstop 18 is then adjusted relative to the supporting rod 14 so

that the drill is held in light contacting engagement with the working side of the grinding wheel when the supporting rod and drill holder are in a plane normal to the plane of the grinding wheel and the lips or cutting edge on the drill are in a substantially upright or vertical plane.

While the drill in the holder is lightly engaged by the clamping block 68, the chisel point gauge member 76 is rocked upon its axis to its lower position, shown in full lines in Fig. 1, and the upwardly facing cutting edge 92 on the drill is carefully aligned with the flat side of the gauge member. The clamping block is then brought into firm clamping engagement with the drill and the gauge piece raised to its inoperative position, shown in phantom in Fig. 1. Grinding of the drill point may then proceed by rocking the entire structure upon the pedestal base 10.

After one side of the drill point has been ground, the clamping block 68 is loosened and the drill turned through an angle of 180°. The lip on the upper side of the drill is then aligned with the gauge piece 76, as previously described, and grinding may proceed in the same manner. If more grinding is required, after both sides of the drill have been ground in this manner, then the clamping block 68 and thumb set screw 98 are loosened and the backstop 18 is moved up approximately 0.003 inch by turning the micro-adjustment nut 100. Thereafter, the clamping block and thumb screw are tightened. Grinding of both sides of the drill point may then proceed in the manner described above.

If it is desired to change the clearance at which a drill is to be ground, it is merely necessary to loosen one of the opposite set screws 62, 64, and tighten the other the same amount. This shifts the forward end of the body of the drill holder transversely of the axis of the supporting rod 14. In this manner the clearance angle at which the drill is sharpened can be varied between 6° and 15°.

The chisel point angle at which the drill is sharpened can readily be varied by loosening the screw 86 and rocking the supporting bracket 32 slightly inwardly or outwardly and then again tightening the screw. Normally the chisel point angle will vary between approximately 117° and 135°.

As previously explained, the point angle can be varied by rocking the supporting rod 14 in a vertical plane, and an adjustment from 45° to 75° may be obtained in this manner. The degree of angularity of these various adjustments will vary with the type of material to be drilled and its hardness so that it will be seen that the drill grinding attachment of the present invention may readily be adapted for sharpening drills of various types and of various sizes.

While I have shown and described a preferred embodiment of my invention, it will be apparent that numerous variations and modifications thereof may be made without departing from the underlying principles of the invention. I, therefore, desire by the following claims to include within the scope of the invention all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. A drill sharpening attachment for supporting a drill in operative grinding relation with a grinding wheel comprising a base, a drill supporting cradle, means for supporting said cradle upon said base to control the point angle and clearance angle at which a drill in the cradle is sharpened including a supporting member pivotable with respect to the base to feed the drill to said grinding wheel, a flat sided gauge piece movable between an inoperative position and an operative position in which said flat side is contiguous to and forms a guide with which a cutting lip of the drill in said cradle may be aligned to insure sharpening of the drill at a desired chisel point angle, and means mounting said gauge piece on the cradle for rocking adjustment upon an axis parallel to and extending in the same axial direction as the axis of said drill for varying the angular position of the flat side of said gauge piece and thereby varying the chisel point angle at which the drill is sharpened.

2. A drill sharpening attachment for supporting a drill in operative grinding relation with a grinder comprising a pedestal base having a generally triangular socket formed therein, a drill holding cradle, a swivel post having a portion oscillatable in said socket, supporting means for said cradle secured to said post in a plane offset from the axis of oscillation of the post and oscillatable therewith about the said axis for presenting a drill in the cradle to said grinder eccentrically to effect sharpening of the same with a predetermined clearance at the heel portion thereof, and wall forming means interposed between one wall of said socket and the portion of the swivel post received in said socket, said wall forming means including a part flexed by said swivel post when the latter is engaged in said socket so as firmly to engage the post and frictionally to resist movement of said post relative to said base.

3. A drill sharpening attachment for supporting a drill in operative grinding relation with a grinder comprising a pedestal base having a generally triangular socket formed therein with a recess in one wall thereof, a drill holding cradle, a swivel post having a portion oscillatable in said socket, supporting means for said cradle secured to said post in a plane offset from the axis of oscillation of the post and oscillatable therewith about the said axis for presenting a drill in the cradle to said grinder eccentrically to effect sharpening of the same with a predetermined clearance at the heel portion thereof, and a flat leaf spring interposed between the portion of the post received in said socket and the recessed wall of the socket frictionally clamping said post and retarding movement thereof.

4. A drill sharpening attachment for supporting a drill in operative grinding relation with a grinder, comprising a supporting base, a drill holder, means for supporting said drill holder including a slide rod supported at one end for rocking movement in a direction to feed a drill in the drill holder to the grinder for sharpening the same with a predetermined angularity, said drill holder being adjustable longitudinally of said slide rod, a backstop movable longitudinally of the slide rod and having a seat adapted to extend toward said drill holder for supporting the shank of said drill and an upstanding abutment for engaging its end, said backstop being adapted to be reversely positioned on said slide rod for locating the abutment relatively close to the rear end of the drill holder when drills of short length are being sharpened, and releasable means for fixing said backstop at a position on said rod.

5. A drill sharpening attachment for support-

ing a drill in operative grinding relation with a grinder, comprising a base, a slide rod rockably supported upon said base for effecting grinding of a drill at a predetermined clearance, a drill holder having a slot extending therethrough for receiving said rod to provide a slidable connection between said parts, said slot being tapered from end to end in a direction transverse to its axis to permit oblique shifting of said drill holder with respect to the axis of said rod for varying the clearance at which said drill is sharpened, means for locking said drill holder at a position on said rod, said means being adjustable to vary the direction and amount of divergence of said drill holder from alignment with said rod, and means for controlling the point angle at which the drill is sharpened.

6. A drill sharpening attachment for supporting a drill in operative grinding relation with a grinder, comprising a base, a slide rod rockably supported upon said base for effecting grinding of a drill at a predetermined clearance, a drill holder having a slot extending therethrough for receiving said rod to provide a slidable connection between said parts, said slot being tapered from end to end in a direction transverse to its axis to permit oblique shifting of said drill holder with respect to the axis of said rod for varying the clearance at which said drill is sharpened, means for locking said drill holder at a position with respect to said rod including set screws threaded into each side of said slot adjacent its larger end for engaging opposite sides of said rod, the relative position of said screws determining the divergence of said drill holder from the axis of said rod, and means for controlling the point angle at which the drill is sharpened.

7. A drill sharpening attachment for use in conjunction with a grinder in the sharpening of drills, comprising base structure, a drill holder carried by said structure for adjustment in one plane to vary the point angle at which a drill is sharpened and for oscillation in another plane to feed a drill to the grinder, said drill holder having a seat for receiving a drill to be sharpened, a drill clamping block adapted to be moved into engagement with a drill in said seat for locking the same in position in said holder, and a flat guide member carried by said clamping block and adapted to occupy an operative position with one side thereof contiguous with a cutting lip on the drill in said seat to form a guide with which said lip is aligned in setting the chisel point angle at which the drill is sharpened.

8. A drill sharpening attachment for use in conjunction with a grinder in the sharpening of drills, comprising base structure, a drill holder carried by said structure for adjustment in one plane to vary the point angle at which a drill is sharpened and for oscillation in another plane to feed a drill to the grinder, said drill holder having a seat for receiving a drill to be sharpened, a drill clamping block adapted to be moved into engagement with a drill in said seat for locking the same in position in said holder, a mounting bracket carried by said clamping block, a flat guide member pivotally secured to said bracket for movement between an inoperative position and an operative position in which one side of the guide member forms a guide with which a cutting lip of a drill in said holder is aligned to set the chisel point angle at which the drill is to be sharpened, said bracket being rockable to vary the tilt of said guide member in a plane parallel to

the axis of the drill in said holder for varying the chisel point angle at which the drill is sharpened.

9. A drill sharpening attachment for use in conjunction with a grinder in the sharpening of drills, comprising a base, means for supporting a drill in operative relation to said grinder including a longitudinally extending member rockable upon said base for feeding a drill to the grinder, a drill holder mounted on said longitudinally extending member, said drill holder having a longitudinally extending seat adapted to receive a drill, drill clamping means for releasably locking a drill in said drill holder, a backstop movable longitudinally of the supporting member and having a seat aligned with the seat on said drill holder for supporting the shank of a drill and an upstanding abutment for preventing endwise movement of the drill, said backstop being adapted to be reversely positioned on said supporting member for locating the abutment relatively close to the rear end of the drill holder when drills of short length are being sharpened, and releasable means for fixing said backstop at a position on the supporting member including a micro-nut engaged upon said supporting member and adapted to abut against said backstop.

10. A drill sharpening attachment for supporting a drill in operative grinding relation with a grinding wheel comprising a base, a drill supporting cradle, means adjustably to support said cradle upon said base to control the point angle and clearance angle at which a drill in the cradle is sharpened including a supporting member pivotable with respect to the base to feed the drill to said grinding wheel, a gauge piece having a flat side, said gauge piece being movable between an operative position in which said flat side forms a guide with which one cutting lip of a drill in said cradle may be aligned to insure sharpening of the drill at a desired chisel point angle and an inoperative position, resilient means to restrain movement of the gauge piece between operative and inoperative positions, and means supporting said gauge piece for rocking movement on an axis parallel to and extending in the same axial direction as the axis of said drill to vary the angular position of the flat side of said gauge piece and thereby vary the chisel point angle at which the drill which has been gauged thereby is sharpened.

11. A drill sharpening attachment for supporting a drill in operative grinding relation with a grinder comprising a longitudinally extending supporting member, a drill holder having an elongated bed for receiving a drill and a slot disposed substantially parallel to the longitudinal axis of said bed and loosely receiving said supporting member, said drill holder being adjustable longitudinally of said supporting member for positioning said drill holder relative to said grinder, means to support said supporting member for rocking movement relative to said grinder effective to sharpen a drill in said holder with a predetermined clearance, releasable means cooperating to lock said holder at a desired position longitudinally of the supporting member including means cooperating to shift one end of the drill holder transversely relative to the longitudinal axis of said supporting member angularly to adjust the longitudinal axis of said bed and the drill therein relative to the longitudinal axis of said supporting member for varying the predetermined clearance at which said drill is sharpened when the supporting member is rocked, and

means for controlling the point angle at which the drill is sharpened.

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