Feb. 25, 1964 H. W. ENGLISH 3,121,983

DRILL GRINDING ATTACHMENT

Filed Feb. 5, 1959

FIG. 1

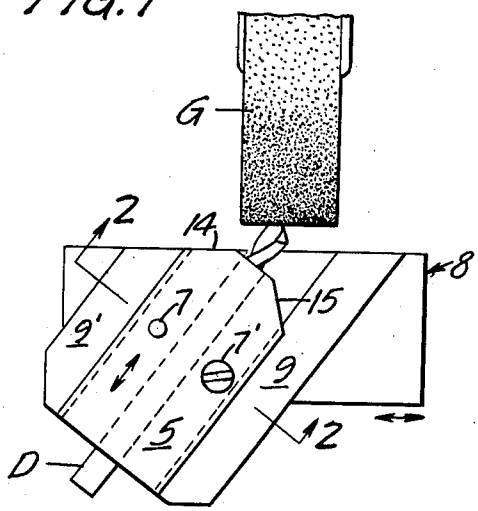


FIG. 3

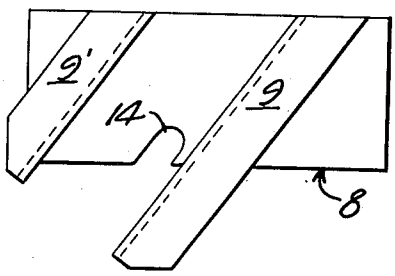


FIG. 2

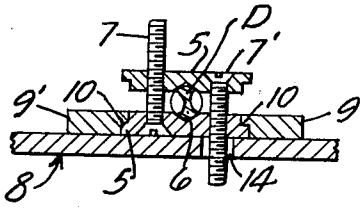


FIG. 4

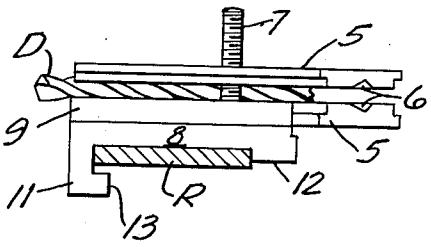
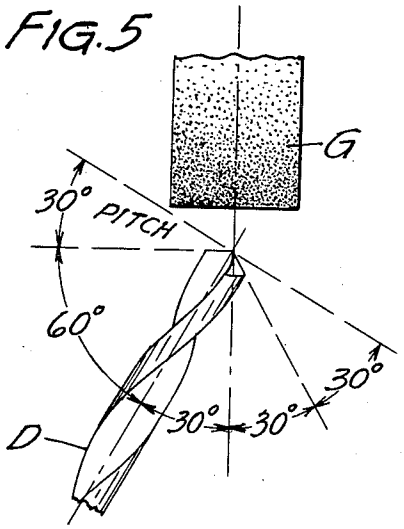


FIG. 5



INVENTOR
HARVEY W. ENGLISH
BY
Williamson, Schroeder & Talmatier
ATTORNEYS

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DRILL GRINDING ATTACHMENT

Harvey W. English, 5831 Nicollet Ave., Minneapolis, Minn.

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This invention relates to apparatus for resharpening or repointing drills, particularly twist drills.

An object of my invention is to provide novel drill sharpening apparatus which is more simple in design and less expensive in construction than similar apparatus presently available and which sharpens the drill accurately and quickly.

Another object is a portable drill sharpening apparatus which readily fits in a mechanic's tool chest and is adapted for detachable mounting on the conventional tool rest normally associated with grinding wheels and requires no additional means of support.

Still another object is a drill sharpening apparatus in which the drill is fixed in proper predetermined angular relationship to the grinding surface to provide the correct pitch to the cutting surface of the drill.

A still further object is a drill sharpening apparatus wherein the drill point is freely movable across the peripheral face of the grinding wheel to achieve uniform wear on the grinding wheel and prevent grooving thereof and is readily movable into and out of engagement with the grinding surface, the entire apparatus being readily manipulated with one hand during grinding to leave one hand free to crank the grinding wheel if it is of the hand operated variety.

A still further object is a drill sharpening apparatus including a cooperatively engaged drill clamp and clamp support wherein both faces of the drill point may be ground without removing the drill from or loosening the clamp.

Still another object is a drill grinding attachment which is particularly suitable for use with the peripheral face of the grinding wheel instead of the radial face thereof which permits not only a safer grinding operation and a less destructive one from the view point of the grinding wheel, but also achieves a hollow ground effect on the drill point which produces a finer cutting edge than when the flat radial sides of the grinding wheel are employed.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is a top plan view of the apparatus of my invention in mounted relationship with a grinding wheel;

FIG. 2 is a vertical section taken on the line 2—2 of FIG. 1;

FIG. 3 is a top plan view of the supporting member only;

FIG. 4 is a left side elevational view; and

FIG. 5 is a diagrammatic view showing the pitch of the cutting surfaces of the drill point and the angle maintained between the drill and the grinding surface.

The apparatus of a preferred form of my invention, as best illustrated in the accompanying drawings, comprises a drill clamp consisting of a pair of clamping plates 5, having oppositely disposed longitudinally extending drill seats such as the V-grooves 6 provided on their inner faces

for engaging and clamping the twist drill D therebetween. The V configuration is a preferred one since it is better able to grasp and secure drills of varying thicknesses or diameter.

A pair of fasteners such as clamping screws 7 and 7' extend through the clamping plates in opposite directions through suitably drilled and tapped holes provided in the plates on either side of the drill, and generally towards the center of the plates to provide sounder clamping of the drill, and threadedly engage at least the opposing plates to draw the plates together in clamping engagement with the drill, the heads of the screws being preferably recessed in suitably countersunk holes provided in the plates so as to not interfere with the sliding back and forth motion of the clamp with respect to the clamp support member or bracket 8 hereafter to be described. Although the screws may be of any length sufficent to engage and draw the plates together, they are preferably of a length which will permit different size drills to be accommodated between the plates, which results in the leading portion of the screws extending some distance beyond the outer surface of the plates when smaller sized drills are used, as best seen in FIG. 2. The screws are preferably inserted directly opposite to one another on a line normal to the longitudinal axis of the drill for purposes hereinafter to be described.

The clamp is slidably and removably mounted on the clamp support 8 as by means of a pair of elongate parallel spaced apart guide members 9 and 9' which are carried by the upper surface of the supporting member 8 and cooperatively and guidingly engage either of the clamping plates, as by means of the cooperating tongues and grooves provided on the sides of the clamping plates and the inner sides of the guide members, as best shown at 10 in FIG. 2, the clamp and guide members cooperating to maintain the drill at a fixed angle relative to the grinding surface.

Since the cutting surface or lips of the drill must be swept back or pitched away from the extreme forward tip of the drill at a proper pitch angle, usually approximately 30 degrees (60 degrees from the longitudinal axis of the drill as best shown in FIG. 5), the drill is maintained by the clamp and guide members at an angle of approximately 60 degrees (the complement of the pitch angle) from or relative to the longitudinal axis of the clamp support and the peripheral face and axis of rotation of the grinding wheel G (or is offset from a line perpendicular to the grinding surface at an angle equal to the pitch angle) to assure automatic grinding of the cutting surface of the drill to the proper pitch angle, the drill in the form illustrated being maintained parallel to the guide members.

The clamp support 8 is provided with a depending front marginal flange 11 and a depending rear marginal flange 12, said flanges defining a track on the under side of the clamp support which is mounted in sliding engagement with an elongate base plate such as a tool rest R, the tool rest R being horizontally disposed longitudinally parallel to the axis and peripheral face of the grinding wheel.

The front marginal flange 11 is provided with an inwardly projecting abutment or lip 13 which is spaced some little distance from and beneath the tool rest R to permit limited vertical movement or tilting of the apparatus to round or finish the heel which is that portion of the drill point back of the cutting lips.

Since in my preferred form the leading ends of the clamping screws normally project beyond the face of the

clamping plates, I provide a slot 14 in the clamp support which extends inwardly from the rear marginal edge thereof and receives the projecting portion of the clamping screw. This enables the clamp to be be moved closer to the grinding wheel and reduces the amount of the forward portion of the drill which must extend beyond the clamping plates, and thereby eliminates undue play in the drill point during grinding.

In use, the clamp support is mounted on the tool rest in direct opposition to the peripheral face of the grinding wheel, and the clamp with a drill removably and fixedly mounted therein is slidably engaged with the guide members as best illustrated in FIGS. 1 and 2 to present the drill point to the grinding wheel at the proper angle, care being taken to limit the amount of the drill extending beyond the clamp to prevent an undue amount of play therein during the grinding operation. The clamp is then slid backward and forward, moving the drill point into and out of engagement with the grinding surface, preferably the peripheral face of the wheel, and the supporting member is simultaneously reciprocated laterally back and forth on the tool rest, thereby moving the drill point back and forth across the face of the grinding wheel to prevent grooving and non-uniform wear thereof. When the side of the drill point initially presented for grinding has been properly sharpened to the proper pitch angle, the apparatus is vertically tilted slightly on the tool rest, presenting the heel of the point to the grinding surface for rounding or finishing thereof, the abutment 13 preventing the clamp support from slipping backwardly off the tool rest.

When the grinding on one side of the point has been completed, the clamp is removed from the guide members and reversed or rotated 180 degrees, and remounted on the clamp support in sliding engagement with the guide members, presenting the unsharpened half of the point to the grinding wheel, and the sharpening operation is repeated. The sharpened drill is then easily removed by simply loosening the clamping screws sufficiently to permit removal of the drill therefrom.

The sharp tip at the extreme forward end of the drill must be located at the center or axis of the drill. This tip position may be achieved or maintained by visual estimation or trial and error. However, it is within the contemplation of this invention to provide stop means for limiting the forward movement of the clamp so that the forward progress of the clamp is stopped at precisely the same spot, regardless of which side of the drill point is being ground, and regardless of which clamping plate is cooperatively engaged with the guide member. Thus, each cutting surface or side of the drill point may be held against the grinding surface until the forward progress of the clamp and drill are stopped by the stop or control means, thereby maintaining the tips in the center of the drill. In the form illustrated, this is accomplished by locating the clamping screws directly opposite one another on either side of the drill, which arrangement causes the clamp to be stopped in the same spot or location relative to the supporting member regardless of which side of the drill point is being ground, the forward movement of the clamp being stopped when the leading portion of the screw engages or abuts with the supporting member. In the illustrated form, best seen in FIG. 1, the tapered clamp shoulders 14 or 15 are in substantial alignment with the front leading edge of the clamp support when the forward movement of the clamp is stopped, depending on which side of the drill point is being sharpened.

It should also be noted that the portion of the guide member 9 and the clamping plates 5 overlapping or extending beyond the rear marginal edge of the clamp support provide a convenient handle or projection for grasping to reciprocate the drill point back and forth across the grinding surface.

Thus, from the foregoing description, the advantages of my invention are readily apparent. The entire apparatus or attachment may be operated with one hand, leaving one hand free to turn the grinding wheel if necessary. The cutting surfaces are accurately ground to the desired pitch angle, the heel is readily rounded or finished, and the position of the tip is readily maintained. By being particularly adaptable for mounting on the conventional tool rest provided for grinding wheels, no special supporting elements are needed. By utilizing the peripheral face of the grinding wheel rather then the sides thereof, a safer grinding operation is accomplished and the cutting surface of the drill point is hollow ground, thereby achieving a keener edge than is obtainable when the flat sides of the grinding wheel are employed. The face of the grinding wheel is subjected to uniform wear by the movement of the drill across the face thereof, and the removable reversible feature of the clamp permits both sides of the drill point to be sharpened without removing the drill from or loosening the clamp.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What I claim is:

1. A drill sharpening assembly comprising a grinding wheel with a grinding surface, an elongate horizontal tool rest having side walls disposed parallel to said grinding surface and in spaced relationship therewith, an elongate clamp support member of inverted channel cross section slidably disposed on the top of said rest with the side walls of said inverted channel section engaging the side walls of said rest, a pair of spaced guide members secured to the top of said channel section each having a recess on the inner side thereof, said guide members being disposed thereon at an angle with the transverse axis of said clamp support member corresponding to the desired pitch angle of the drill point, and a pair of drill clamping plates for holding a drill therebetween, projecting means on the opposite sides of said plates slidably disposed in said recesses for movement of said plates toward and away from said grinding surface, and pin means disposed in said plates extending below said inverted channel section whereby said pin means abuts said section when said plates are moved toward said grinding surface a predetermined distance.

2. The drill sharpening assembly of claim 1 wherein said channel section has an inwardly projecting abutment on one of the side walls of said channel section extending under said tool rest to permit tilting of said support member without removal form said rest.

3. The drill sharpening assembly of claim 1 wherein said recesses comprise grooves and said projecting means comprises tongues.

4. A drill sharpening assembly comprising a grinding wheel with a grinding surface, an elongate horizontal tool rest having side walls disposed parallel to said grinding surface and in spaced relationship therewith, and elongate clamp support member of inverted channel cross section slidably disposed on the top of said rest with the side walls of said inverted channel section engaging the side walls of said rest, a pair of drill clamping plate members for holding a drill therebetween, cooperating elongate tongue and groove guide means carried by said support member and said plates and disposed at an angle with the transverse axis of said clamp support member corresponding to the desired pitch angle of the drill point for free sliding guided movement of said plates on said support member towards and away from said grinding surface, and stop means mounted on one of said members for engaging the other of said members and thereby limiting the forward movement of said plates towards said grinding wheel.

5. A drill sharpening assembly comprising a grinding wheel with a grinding surface, an elongate horizontal tool rest having side walls disposed parallel to said grinding surface and in spaced relationship therewith, an elon-

gate clamp support member of inverted channel cross section disposed on the top of said rest with the side walls of said inverted channel section engaging the side walls of said rest, a pair of drill clamping plate members for holding a drill therebetween, cooperating elongate guide means carried by said support member and said plates for free sliding guided movement of said plates on said support member in a fixed straight line of movement generally towards and away from the grinding surface, said cooperating guide means holding said plates against lateral shifting movement of said plates relative to said support member and thereby preventing said plates from deviating from said fixed line of movement, said plates and guide

means all cooperating together to maintain the drill in a horizontal plane and at an angle with the transverse axis of said clamp support member corresponding to the desired pitch angle of the drill point, and stop means mounted on one of said members for engaging the other of said members and thereby limiting the forward movement of said plates towards said grinding wheel.

References Cited in the file of this patent

UNITED STATES PATENTS

1,576,311	Des Jardins	Mar. 9, 1926
2,455,562	Crowther	Dec. 7, 1948