

B. L. MALLORY.
 DRILL GRINDING ATTACHMENT FOR ABRADING WHEELS.
 APPLICATION FILED APR. 3, 1913.

1,095,338.

Patented May 5, 1914.

2 SHEETS-SHEET 1.

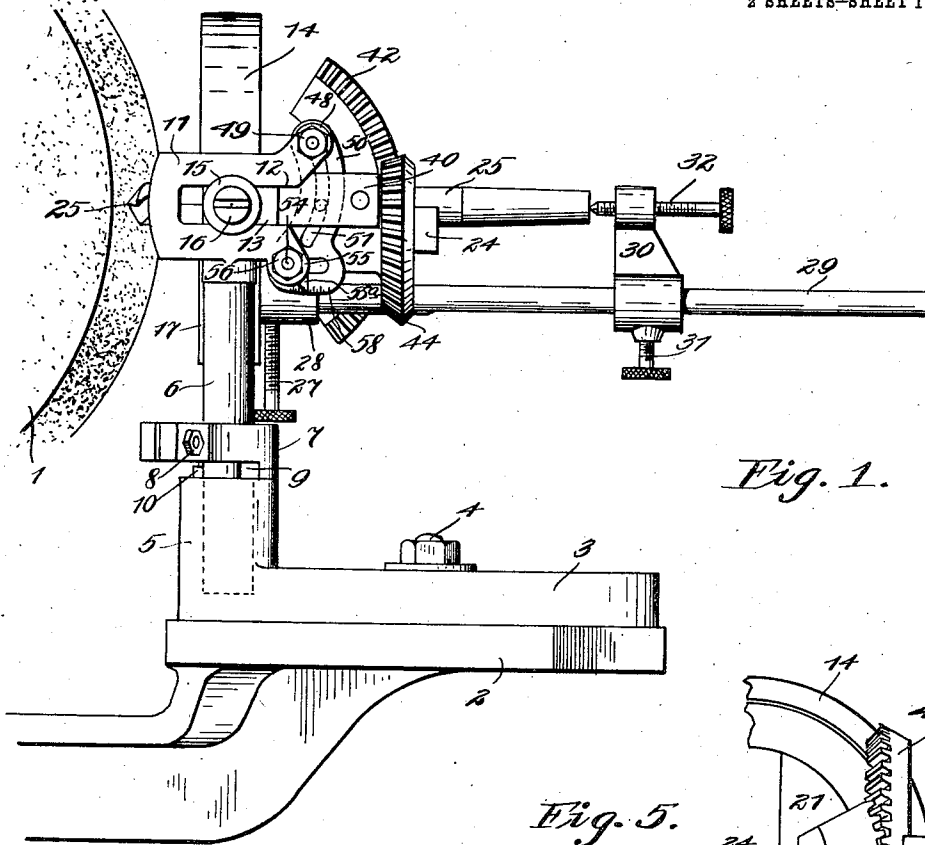


Fig. 1.

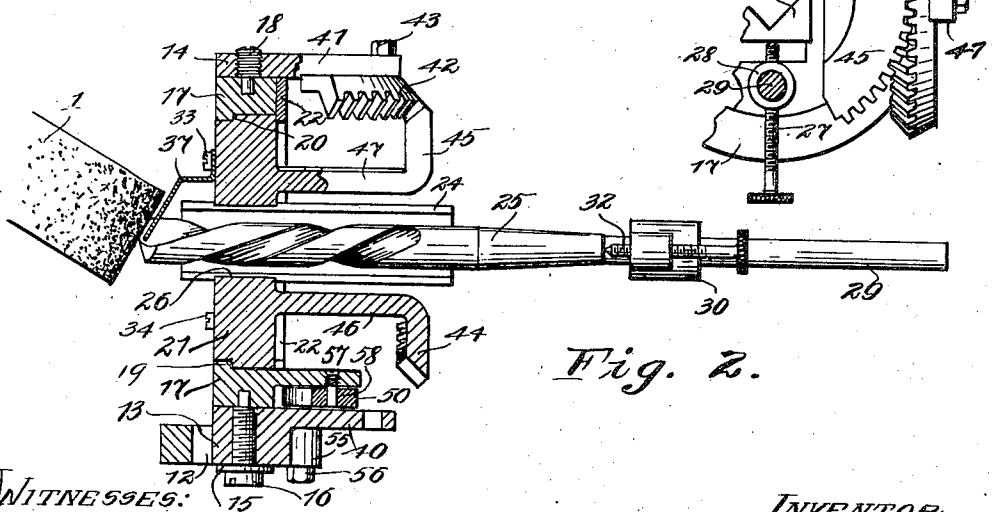


Fig. 2.

WITNESSES:

R. L. Duck.

Brennan B. West

INVENTOR.

Bonnie L. Mallory
 BY Hull & Smith
 ATTYS.

B. L. MALLORY.
 DRILL GRINDING ATTACHMENT FOR ABRADING WHEELS.
 APPLICATION FILED APR. 3, 1913.

1,095,338.

Patented May 5, 1914.

2 SHEETS-SHEET 2.

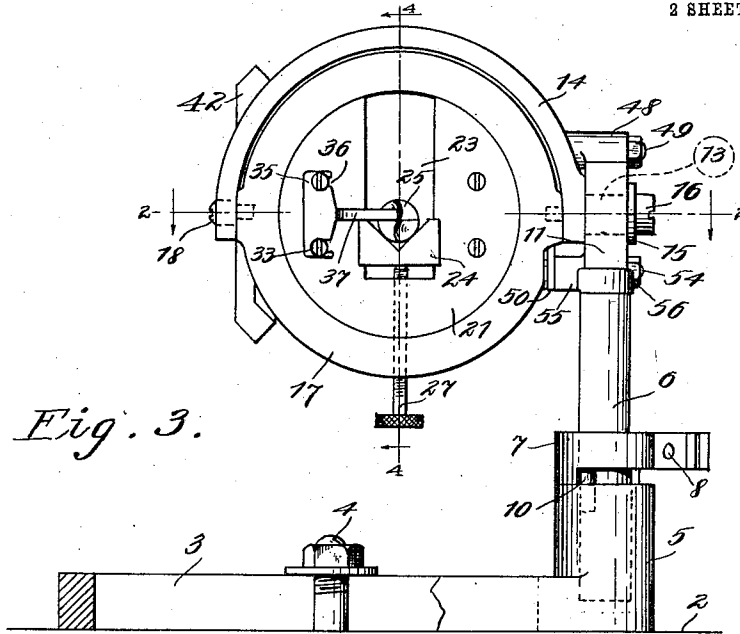


Fig. 3.

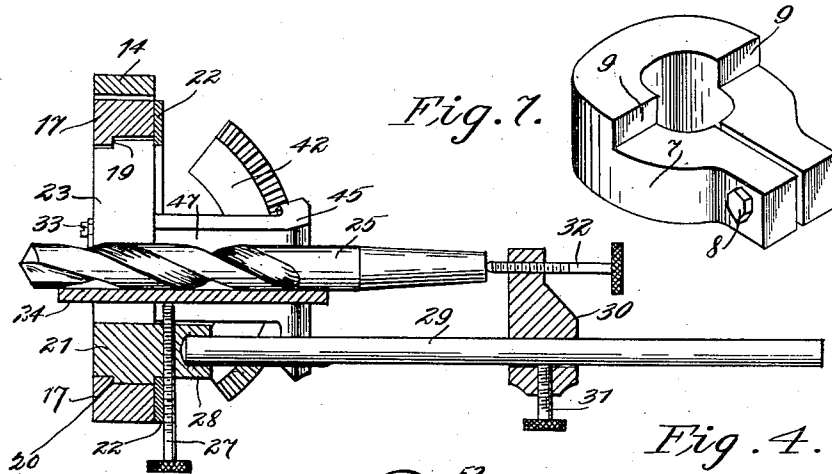


Fig. 7.

Fig. 4.

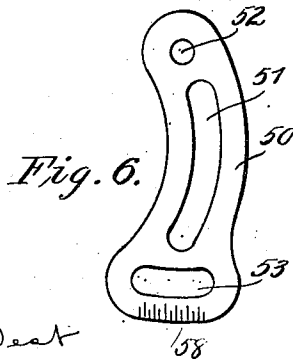


Fig. 6.

WITNESSES:

R. L. Buck.

Brennan B. West

INVENTOR.

Bonnie L. Mallory

BY Hull & Smith

ATTYS.

UNITED STATES PATENT OFFICE.

BONNIE L. MALLORY, OF CLEVELAND, OHIO.

DRILL-GRINDING ATTACHMENT FOR ABRADING-WHEELS.

1,095,338.

Specification of Letters Patent.

Patented May 5, 1914.

Application filed April 3, 1913. Serial No. 758,547.

To all whom it may concern:

Be it known that I, BONNIE L. MALLORY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Drill-Grinding Attachments for Abrading-Wheels, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to improvements in drill grinding attachments for emery wheels, and has for its general object, the production of a device of this character which may be readily applied to abrading wheels of ordinary type, and whereby the cutting edges or lips of either right or left hand drills may be presented to the convex or rounded surface of the wheel.

Further objects of the invention are the production of a device of the above stated character within which a drill may be conveniently placed and effectively held in proper position; which imparts the required movement to the drill to effect the desired clearance to the rear of its cutting edges or lips; which may be easily adjusted to produce various degrees of clearance required in drills which are used for boring different kinds of metal; which may be conveniently adjusted for various sizes and lengths of drills; and which may be readily altered to accommodate either right or left hand drills.

Still further objects are to provide a drill grinding attachment which may be used in connection with emery wheels of various sizes; which is simple of operation; of substantial construction, and economical of production.

More broadly stated, the object of my invention is to provide a drill grinding attachment by means of which an unskilled workman may correctly and scientifically grind a drill; and it may be defined, generally, as consisting of the combinations of elements set forth in the claims annexed hereto and illustrated in the accompanying drawings forming part hereof, wherein—

Figure 1 is a side elevation of my improved drill grinding attachment applied to the stand of an emery wheel; Fig. 2 is a central horizontal section through the drill grinding attachment, a portion of the emery wheel being shown therein; Fig. 3 is a front elevation of the attachment as it

would appear if viewed from the emery wheel; Fig. 4 represents a central vertical section of the attachment, corresponding to the line 4—4 of Fig. 3 and looking in the direction indicated by the arrows; Fig. 5 is a partial rear elevation of the attachment; Fig. 6 is a detail of the cam plate which effects the movement for producing the clearance of the drill; and Fig. 7 is a perspective of the split collar.

Describing the parts by reference characters, 1 represents an abrading wheel to the stand 2 of which is clamped a slotted bracket 3, by a bolt 4. One end of the bracket 3 has a vertically extending cylindrical boss 5 which is provided with a central bore for the reception of the post 6 of the drill grinding attachment. A split collar 7 which may be clamped by the bolt 8 at any point along the post 6, maintains the proper elevation of said post by its engagement with the upper surface of the boss 5. As will be seen particularly in Fig. 7, the collar 7 is reduced in thickness throughout a portion of its circumference to provide shoulders 9 which are adapted to engage a stop 10 which protrudes from the upper surface of the boss 5, the object of which will be mentioned hereinafter. The upper end of the post 6 carries a head 11 having a horizontal slot or guideway 12, within which is adapted to reciprocate a rectangular boss 13 which projects from the side of the semi-circular yoke 14 and which provides a support therefor. The boss 13 is retained within the slot or guideway 12 by a washer 15 and a screw 16 which extends through the boss and the adjacent portion of the yoke and projects a slight distance therebeyond where it is reduced to form a trunnion for the retaining ring 17, the other trunnion whereof is provided by the reduced end of the screw 18 which is threaded through the end of the yoke 14 diametrically opposite the screw 16, it being understood, of course, that both screws are in axial alinement.

As will be seen upon referring to Figs. 2 and 4, the inner cylindrical wall of the retaining ring 17 comprises portions of different diameters which produces an annular shoulder 19 against which is adapted to slide a shoulder 20 which extends circumferentially about the circular cradle 21 and which is retained within the ring 17 by a pair of semi-circular plates 22 which are

secured to the rear surface of said ring and overhang the edge of the cradle 21.

Within a notch 23 which extends from the upper edge of the cradle 21 to within a short distance of its lower edge, is a V-block 24 within the trough of which is adapted to rest the drill 25. A pair of shallow grooves 26 which are formed in the sides of the V-block, near its forward end receive the side walls of the notch 23, thereby effectively guiding the block as it is adjusted vertically by the knurled headed screw 27 which engages the bottom of the V-block and which is threaded through a boss 28 extending from the rear face of the cradle beneath the notch 23. Secured within the same boss 28 is a rod 29 upon which is adapted to be clamped, at any desired location, a tail-block 30 by a screw 31. Threaded through the upper end of the tail-block parallel with the rod 29 is a screw 32 for engagement with the end of the drill 25 as it rests within the V-block, and provides a stop for the drill which may be very accurately adjusted to advance the drill as it is ground.

Adapted to be secured to the front face of the cradle 21 by either of the pairs of screws 33 or 34, is a plate 35 having notches 36 formed in its inner edge for the shanks of the screws, and which carries a gage finger 37 for correctly locating the drill 25, in a manner that will be brought out during the description of the operation of the device.

Extending rearwardly from the end of the yoke 14 adjacent the boss 13 is an arm 40, and a similar arm 41 projects rearwardly from the opposite end of said yoke. An interchangeable beveled gear segment 42 is adapted to be secured to the outer end of either of the arms 40 or 41 by a cap screw 43, where it is engaged by either of the beveled gear segments 44 or 45, carried by the outer ends of the plates 46 and 47, respectively, which project from the rear face of the cradle 21 on either side of the notch 23. The segments 44 and 45 with their respective plates 46 and 47 are preferably cast integral with the cradle 21.

Extending upwardly and rearwardly from the head 11 is a transverse boss 48 through which passes a bolt 49 having pivoted upon its inner end a plate 50 which has a cam slot 51 extending throughout the greater part of its length. A second slot 53 occupies the lower end of the plate 50 and is curved concentric with the hole 53 in the upper end of the plate which is occupied by the bolt 49. A bolt 54 passes through a transverse boss 55 which extends downwardly and rearwardly from the head 11, and projects through the slot 53 where its head is adapted to engage the rear surface of the plate 50 adjacent said slot and effec-

tively clamp the plate 50 in any adjusted position, against the inner end of the boss 55 when the nut 56 is tightened. A lug 57 extends from the rear of the retaining ring 17 alongside the arm 40 and is spaced a sufficient distance therefrom to provide space for the plate 50. The reduced end of a screw 58 which is carried by the outer end of the lug 57 extends into the slot 51 of the plate 50.

Before taking up the operation of the drill grinding attachment, it might be well to consider what movements of the drill, relative to the grinding surface of the abrading wheel, are necessary to produce the clearance to the rear of the cutting edges or lips of the drill. In the first place, the line of contact between the drill and the abrading wheel should be substantially in a plane with, or slightly above the horizontal axis of the wheel when the drill is in initial position prior to the grinding operation. The end of the drill is then swung upwardly and toward the wheel and at the same time given a partial rotation, the extent of movement toward the wheel determining the amount of clearance, and as previously stated, this varies in different drills according to their class of work or the quality of the metal upon which the drills are adapted to operate.

In the use of the device, the bracket 3 is secured to the stand 2 of an abrading wheel by the bolt 4. A drill is then placed within the trough of the V-block and the adjusting screw 27 turned to shift the block vertically until the lip of the drill engages the gage finger 37. The tail block 30 is then moved along the rod 29 until the screw which is carried by the upper end thereof is in engagement with the end of the drill shank. When the tail block is locked in such position by the thumb screw 31, the screw 32 may be turned to move the drill forwardly until the lip of the drill projects slightly beyond the front surface of the gage finger. With the drill in such position, the bracket 3 is adjusted upon the stand 2 until the lip of the drill is in the vertical plane of the grinding surface of the abrading wheel and the gage finger 37 is parallel to said plane. The post 6 is then adjusted vertically to bring the lip of the drill coincident with, or slightly above the horizontal center of the wheel and this elevation is maintained by the clamping of the collar to the post with its lower segmental face in engagement with the adjacent circular face of the boss 5, and when in this position, that shoulder 9 of the collar 7 which is nearest the abrading wheel should be in contact with the stop 10. The operator now grasps the end of the rod 29 with one hand while he allows the fingers of his other hand to rest upon the drill to hold it against dis-

placement. By bearing down upon the rod 29, he rocks the retaining ring 17 upon its trunnions, and the pin 58 which is carried by the lug 57 projecting from the rear of said ring, traverses the cam slot 51 in the plate 50 and causes the ring 17 and the yoke 14 to be moved forwardly toward the emery wheel, the boss 13 sliding within the slot or guideway 12. This movement provides for the clearance of the drill, which may be altered by the shifting of the lower end of the plate 50 upon the loosening of the nut 56. After shifting the plate 50 any desired number of degrees which is indicated by the index finger 55^a carried by the boss 55 and cooperating with the marks of graduation 58 upon the lower end of the plate, it may be clamped in such position by the tightening of the nut 56. As previously stated, besides the forward movement of the drill, it is necessary that the drill be rotated in order to produce a spiral effect upon the face thereof, and this movement is accomplished through the beveled gear segments 45 and 42.

By referring to Figs. 2 and 5, the action can be readily understood, it being seen that when the retaining ring 17 is rocked upon its trunnions the segment 45 which is carried by the cradle 21 rides over the teeth of the fixed segment 42, thereby causing the cradle 21 to rock upon its longitudinal center which is coincident with the center of the drill. The rod 29, after being elevated to normal or horizontal position is again depressed, and this operation is repeated until the lip of the drill is sufficiently ground to clear the face of the wheel. The attachment is then swung away from the wheel when the drill may be conveniently turned over to bring its other lip beneath the gage finger 37. The attachment is now returned to operative position and operated to grind the second lip of the drill precisely as the first was ground. If further grinding is necessary in order to produce a satisfactory result, the drill may be advanced by the adjustment of the screw 32 and the grinding of each lip of the drill repeated when in such adjusted position.

As shown in the drawings, the attachment is assembled for the grinding of left hand drills, although it can be readily altered to grind right hand drills by the changing of the gage finger 37 to the opposite pair of screws 34, the parts being symmetrical and permitting of such change without altering their effectiveness to the slightest degree. The segment 42 is also shifted from the arm 41 to the arm 40 where it cooperates with the segment 44 to rock the cradle 21 in a direction opposite to that previously described.

Having thus described my invention, what I claim is:—

1. In mechanism of the character set forth,

the combination, of a frame, an abrading device, a ring trunnioned therein, a cradle rotatably mounted in said ring, connections between the cradle and the frame whereby the cradle is oscillated by the rocking of the ring, and connections whereby the rocking of the ring will move the frame toward and from the abrading device.

2. In mechanism of the character set forth, the combination, of an abrading device, a cradle, a drill support carried thereby, a segment projecting laterally from the cradle at one side of said drill support, a segment cooperating with the first mentioned segment to oscillate the cradle, and means whereby said cradle may be moved toward and from the abrading device.

3. In mechanism of the character set forth, the combination, of a cradle, a drill support carried by said cradle, segments projecting laterally from the cradle on opposite sides of the drill support, supporting members adjacent to said segments, and a gear segment adapted to be connected to either of said members and to mesh with either of the first mentioned segments to oscillate the cradle.

4. In mechanism of the character set forth, the combination, of an abrading device, a cradle, a drill support carried by said cradle, segments projecting laterally from the cradle on opposite sides of the drill support, supporting members adjacent to said segments, a gear segment adapted to be connected to either of said members and to mesh with either of the first mentioned segments to oscillate the cradle, and means whereby said cradle may be moved toward and from the abrading device.

5. In mechanism of the character set forth, the combination of a frame, a member trunnioned in said frame, a supporting device having a guideway, said frame having a projection mounted in said guideway, means connected with said device and said trunnioned member whereby the rocking of said members will cause the aforesaid projection to traverse the guideway, and a drill support carried by the trunnioned member.

6. In mechanism of the character set forth, the combination of a supporting frame, a retaining ring trunnioned in said frame, a post having a guideway, said frame having a projection mounted in said guideway, a cam carried by said post, a projection carried by the ring and engaging said cam, means for rocking said ring, a cradle rotatably mounted in said ring, and a drill support carried by the cradle.

7. In mechanism of the character set forth, the combination with an abrading device, of a drill supporting device, means for oscillating said drill supporting device, and means controlled by the rocking movement of the drill supporting device for causing relative movement between the two devices.

8. In mechanism of the character set forth, the combination with an abrading device, of a drill supporting device, means for oscillating the last mentioned device about the axis of the drill supported thereby, a retaining ring wherein the drill support is rotatably mounted, and means whereby the oscillation of the drill supporting device will produce a rocking of said ring about an axis at substantially right angles to the axis of the drill, and connections whereby the rocking of said ring will cause relative movement between the drill support and the abrading device.

9. In mechanism of the character set forth, the combination with an abrading device, of a cradle, a retaining ring wherein said cradle is rotatably mounted, a drill supporting device carried by said cradle and vertically adjustable therein, means for oscillating said cradle in said ring, means for rocking the cradle about an axis substantially at right angles to the axis of the drill, and means controlled by the rocking movement of the ring for moving the cradle toward and from the abrading device.

10. In mechanism of the character set forth, the combination of a post having a guideway, a frame having a projection slidably mounted in said guideway, a ring trunnioned in said frame, a cradle rotatably mounted in said ring, connections between the cradle and the frame whereby the cradle may be oscillated, and connections between the ring and the frame whereby the rocking of the frame on its trunnion will move the frame projection along said guideway.

11. In mechanism of the character set forth, the combination, of a cradle, a vertically adjustable drill support in said cradle, a gage having an inclined finger adapted to overhang a lip on the drill on said support, means for supporting said gage on either side of said support whereby said gage is adapted for both right and left hand drills.

12. In mechanism of the character set forth, the combination of a frame having a pair of opposed arms, a ring trunnioned in said frame, a cradle rotatably mounted in said ring and having a vertically extending guideway therein, a drill support adjustably mounted in said guideway, said cradle being provided with laterally projecting segments

arranged on opposite sides of the guideway, a segment adapted to be applied to either of the arms of the frame and to engage either of the first mentioned segments, means connected with said cradle for rocking said ring, a support for the frame, and connections whereby the rocking of the ring will reciprocate the frame.

13. In mechanism of the character set forth, the combination, with an abrading device, of a frame movable toward and from said device and having a pair of opposed arms, a ring trunnioned in said frame, a cradle rotatably mounted in said ring and having a vertically extending guideway therein, a drill support adjustably mounted in said guideway, said cradle being provided with laterally projecting segments arranged on opposite sides of the guideway, a segment adapted to be applied to either of the arms of the frame and to engage either of the first mentioned segments, means connected with said cradle for rocking said ring, and connections whereby the rocking of the ring will reciprocate the frame.

14. In mechanism of the character set forth, the combination of a socketed standard, a post rotatably mounted in said standard, a collar adjustably mounted on said post and adapted to support the same on top of said standard, cooperating stops carried by the collar and the standard, a drill supporting device carried by said post, and means whereby said post and drill support may be rotated.

15. In mechanism of the character set forth, the combination of a socketed standard, a post mounted in said standard, a collar adjustably mounted on said post and having at its lower end a segment bearing on the standard, said standard having a projection interposed between the ends of said segment to limit the rotary movement of the collar and post, a drill support carried by said post, and means whereby said support and the post may be rotated.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

BONNIE L. MALLORY.

Witnesses:

BRENNAN B. WEST,
J. B. HULL.