No. 707,549. Patented Aug. 26, 1902.

C. A. CHANDLER.

MACHINE FOR GRINDING TWIST DRILLS.

(Application filed Dec. 22, 1899.)

(No Model.)

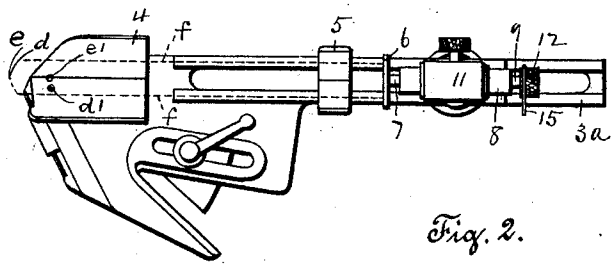


Fig. 2.

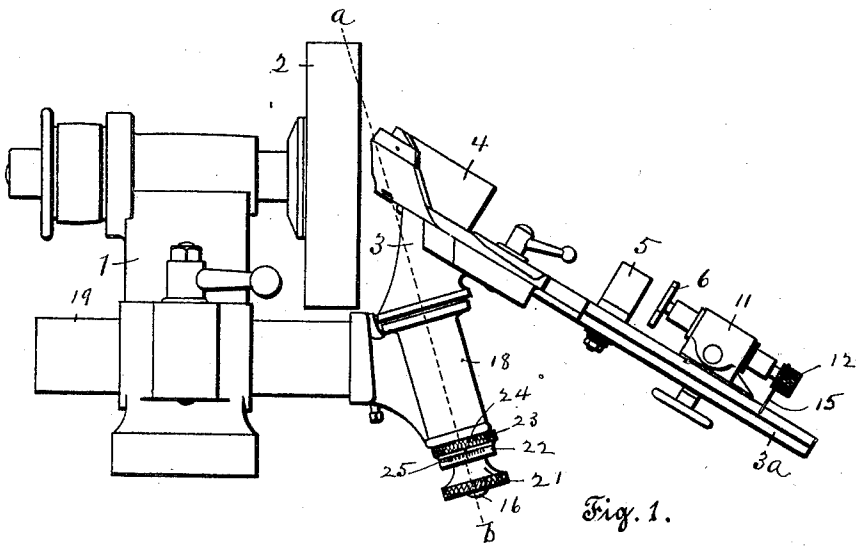


Fig. 1.

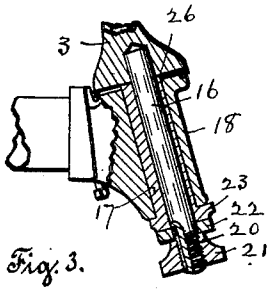


Fig. 3.

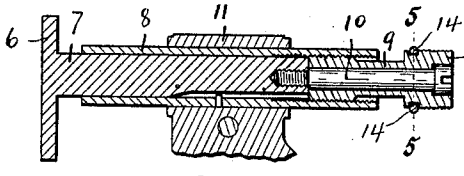


Fig. 4.

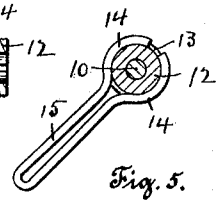


Fig. 5.



Fig. 6.

Witnesses;

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UNITED STATES PATENT OFFICE.

CLARENCE A. CHANDLER, OF WORCESTER, MASSACHUSETTS.

MACHINE FOR GRINDING TWIST-DRILLS.

SPECIFICATION forming part of Letters Patent No. 707,549, dated August 26, 1902.

Application filed December 22, 1899. Serial No. 741,270. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE A. CHANDLER, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in a Machine for Grinding Twist-Drills, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same, in which—

Figure 1 is a side elevation of a machine for grinding twist-drills embodying my invention. Fig. 2 is a plan view of the drill-holder. Fig. 3 is a sectional view of the bracket in which the drill-holder is mounted. Fig. 4 is a longitudinal sectional view of the drill-rest and mechanism for feeding the drill during the operation of grinding, and Fig. 5 is a sectional view of the feed-screw on line 5 5, Fig. 4. Fig. 6 is a transverse sectional view of the spindle 16 and eccentric sleeve 17.

Similar reference figures and letters refer to similar parts in the different views.

The object of my invention is to provide means for varying the amount of clearance given to the lips of the drill and also to provide means for securing greater accuracy in grinding the opposite lips of the drill; and I accomplish these results by the novel features of construction and arrangement of parts, as hereinafter described, and pointed out in the annexed claims.

My present invention relates to that class of machines for grinding twist-drills which is shown and described in Letters Patent of the United States, No. 425,839, granted to Oakley S. Walker, April 15, 1890; and it comprises a supporting-stand 1, on which is mounted a grinding-wheel 2, a drill-holder 3, provided with V-shaped supports 4 and 5, in which the drill to be ground is placed, and a drill-rest 6, held against the shank end of the drill to hold it from longitudinal movement. The drill-rest 6 consists of a plate carried upon a spindle 7, which is adjustable in a sleeve 8 by means of a feed-screw 9, which engages an interior screw-thread in the sleeve 8 and is connected with the spindle 7 by means of a bolt 10. The sleeve 8 is adjustably clamped in a stand 11, which is adjustably attached to the bar 3^a of the drill-holder according to the length of the drill to be ground, with the plate 6 bearing against the shank end of the drill and with the cutting end of the drill in light contact with the grinding-wheel. The above-mentioned parts are substantially the same in construction and operation as the corresponding parts of the drill-grinder shown and described in the Patent No. 425,839 above referred to. During the operation of grinding the screw 9 is advanced a partial revolution by means of its milled head 12 in order to slightly feed the drill forward to compensate for the metal removed in grinding. The head 12 is provided with a circumferential groove 13, in which is sprung the curved ends 14 14 of an elastic wire, which is bent upon itself to form a radial arm 15, which is held from turning on the screw-head 12 by frictional contact. When the feed-screw 9 has been turned to advance the drill in grinding one of its lips, the arm 15 is turned in the same direction and brought in contact with the bar 3^a of the drill-holder to indicate the position of the feed-screw when the grinding is completed. The screw 9 is then reversed a partial revolution, carrying the arm 15, and the drill turned in the drill-holder to present its opposite lip to the grinding-wheel, and during the grinding of the second lip the drill is fed forward by the screw 9 until the arm 15 is again brought into contact with the bar 3^a of the drill-holder, thereby indicating that the drill has been advanced precisely the same distance in grinding each of its lips.

The drill-holder 3 is provided with a spindle 16, which is cast in or otherwise attached to the drill-holder. The spindle 16 is held in an eccentric sleeve 17, which is journaled in a bracket 18 on the end of a spindle 19, adjustably held in the stand 1 by means of a suitable clamping mechanism, by which the distance between the drill-holder and the side of the grinding-wheel can be varied. The spindle 16 is provided on its end with a screw-thread 20 to receive the nut 21, and between the nut 21 and the end of the sleeve 17 which projects below the bracket 18 is a collar 22, having a spline connection with the spindle 16. The lower projecting end of the sleeve 17 is provided with a milled flange 23, on which is placed an indicator-mark 24, and the collar 22 is provided with a graduated surface 25. The upper end 26 of the sleeve 17 bears

against the drill-holder 3, so that by tightening the nut 21 the sleeve 17 and collar 22 become clamped between the drill-holder and the nut 21, and thereby caused to oscillate with the drill-holder as a part thereof during the operation of grinding the drill, which is accomplished by oscillating the drill-holder in the bracket 18 and rocking the point of the drill held in the drill-holder 3 against the side of the grinding-wheel.

When the twist-drill is held in the V-shaped support 4, its axis lies in a plane coinciding with the apex of the V-shaped support, and its axis of oscillation in the bracket 18 coincides with the line *ab*, drawn concentrically with the axis of the sleeve 17. If the plane containing the axis of oscillation coincided with the axis of the drill as held in the holder, the cutting-lip of the drill would be ground without any clearance; but if the axis of oscillation be placed at one side of the axis of the drill, as shown in Fig. 1, where the line *c* indicates the plane of the drill-axis and the point *d* indicates the axis of oscillation, then the oscillating motion of the drill in the bracket 18 will carry the point of the drill toward the grinding-wheel, thereby producing a clearance to the point of the drill by grinding the surface on a curve which is concentric with a point at one side the axis of the drill, and the amount of clearance will be varied according to the distance between the plane of the axis of the drill and the plane of its axis of oscillation. In order to vary the plane of the axis of oscillation I loosen the nut 21, thereby releasing the eccentric sleeve 17 and allowing it to be turned on the spindle 16 by means of a milled flange 23 until the desired position of the axis of oscillation is obtained, which will be indicated by the graduated collar 22. The nut 21 is again tightened, thereby clamping the eccentric sleeve 17 and causing it to oscillate with the spindle 16, thereby varying the axis of oscillation relatively to the axis of the drill in order to vary the clearance upon the lip of the drill.

In Fig. 2 the broken lines *f f* indicate the position in the holder, and the line *e* indicates the curvature of the drill-point when the drill is oscillated about an axis corresponding with the point *e'*, and the line *d*, lying in the plane of the axis of the drill, indicates the curvature of the drill-point when rocked about an axis corresponding with the point *d'* at one side of the plane of the axis of the drill.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a drill-grinding machine, the combination of a supporting-stand for a drill-holder and provided with a journal-bearing, an oscillating drill-holder provided with a spindle passing through said journal-bearing, an eccentric sleeve inclosing said spindle and journaled in said bearing, means for adjustably attaching said sleeve to said spindle, substantially as described.

2. In a drill-grinding machine, the combination with a supporting-stand, a grinding-wheel, and a drill-holder journaled in said stand, whereby it is capable of an oscillating motion to rock the lip of the drill in contact with the grinding-wheel, of a sleeve journaled in said supporting-stand and adjustably attached to the drill-holder, whereby the axis of oscillation of the drill-holder is varied, substantially as described.

3. The combination of a supporting-stand, a drill-holder having a screw-threaded spindle, an eccentric sleeve held on said spindle and journaled in said stand, a clamping-nut on said spindle, whereby said sleeve is held from rotating on said spindle, and a graduated collar having a spline connection with the spindle and held between said nut and said sleeve, whereby the position of said sleeve relatively to said spindle is determined, substantially as described.

4. The combination of a stand, a drill-holder provided with a spindle, an eccentric sleeve adjustably held on said spindle and journaled in said stand, means for rotating said sleeve on said spindle and means for holding said sleeve from rotation on said spindle, and allowing it to oscillate in said stand, whereby the axis of oscillation of the drill-holder is varied, substantially as described.

In testimony whereof I have signed my name to this specification, in presence of two subscribing witnesses, this the 2d day of December, 1899.

CLARENCE A. CHANDLER.

Witnesses:
RUFUS B. FOWLER,
AVA T. MURPHY.