No. 810,503. PATENTED JAN. 23, 1906.

J. H. O'DONNELL.

DIAMOND DRILL.

APPLICATION FILED AUG. 6, 1903.

Fig. 1.

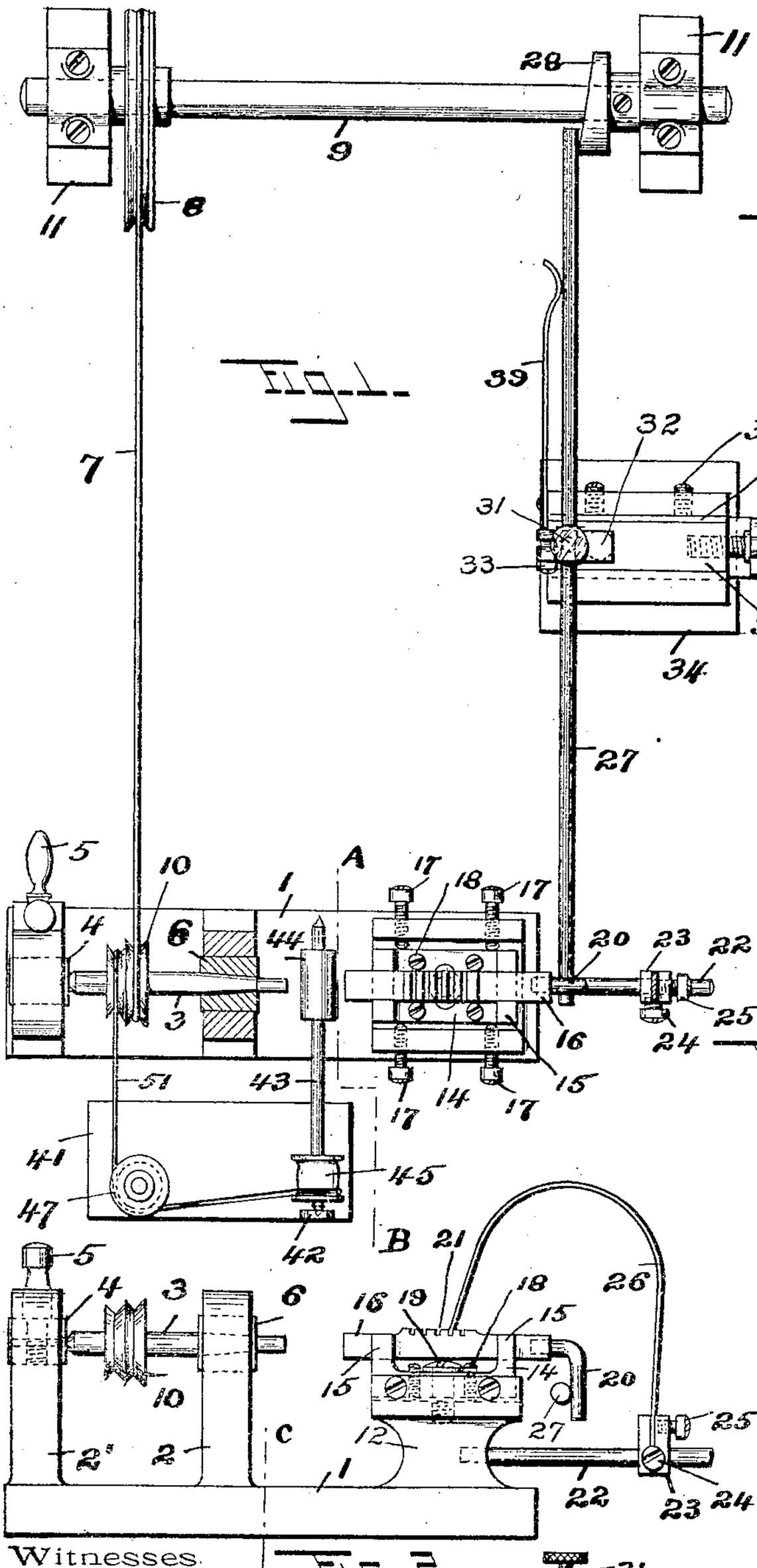

Fig. 2.

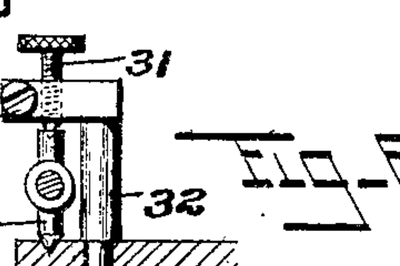

Fig. 3.

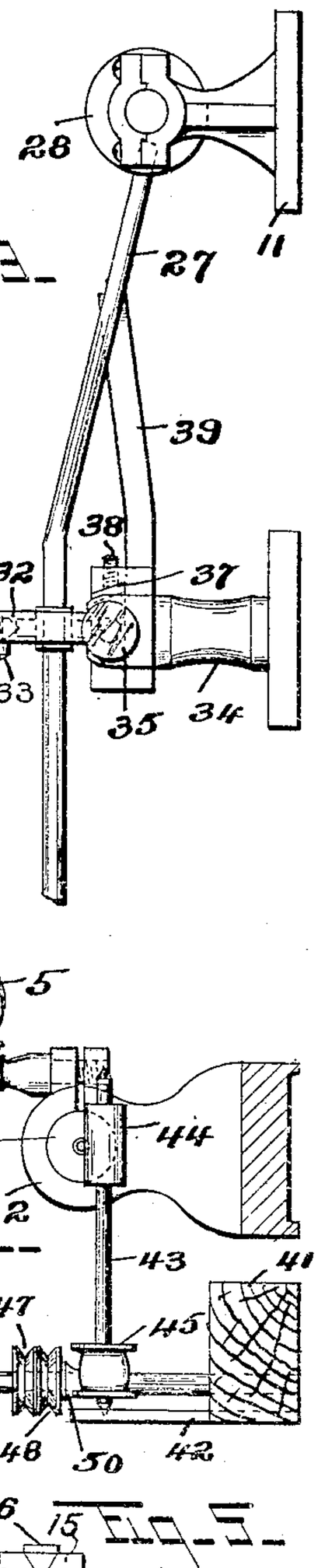

Fig. 4.

Fig. 5.

Fig. 6.

Witnesses.

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UNITED STATES PATENT OFFICE.

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DIAMOND-DRILL.

No. 810,503. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed August 6, 1903. Serial No. 168,542.

To all whom it may concern:

Be it known that I, JOHN H. O'DONNELL, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Diamond-Drills, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to new and useful improvements in diamond-drills, and has for its object, among other things, the construction of a tool by which a hole can be accurately drilled through a diamond quickly and expeditiously, and, further, to construct the device of few parts, which can be economically constructed and readily assembled.

To these and other ends my invention consists in the diamond-drill having certain details of construction and combination of parts, as will be hereinafter described, and more particularly pointed out in the claims.

Referring to the drawings, in which like numerals of reference designate like parts in the several figures, Figure 1 is a plan view of a diamond-drill constructed according to my invention. Fig. 2 is a front elevation thereof. Fig. 3 is a side elevation of a portion thereof. Fig. 4 is a transverse sectional elevation of Fig. 1 upon line A B. Fig. 5 is a transverse sectional view of the parts shown in Fig. 2 upon line C D, and Fig. 6 is a fragmentary detailed elevation of the pivot mechanism for the slide-rod.

In carrying out my invention I provide a head 1, having uprights 2 and 2′ thereon, and within which are the bearings 4 and 6, the bearing 4 being shiftable endwise and fastened in its adjusted positions by the screw 5, which clamps together the split portions of the upright 2′. The spindle 3 is pointed at its rear end and held within the bearing 4 and tapered for a portion of its length adjacent to its forward end and journaled within the bearing 6. A hole is drilled in the forward end of this spindle to accommodate the drill or needle, which is secured to said spindle by wax or other similar means. In my machine I prefer to use the ordinary sewing-machine needle, which is rotated at a high rate of speed and, with the aid of diamond-dust, forms a very effective drill. The spindle is rotated by the belt 7, connecting the cone 10 with the pulley 8 upon the shaft 9, which is mounted within the standards 11 and rotated by any of the common methods well known to the art. Forming part of said head is the standard 12, which is provided with a slot 13 in its upper surface and within which is mounted the slide-rest 14, having the bearings 15 thereon for the slide 16. The slide-rest 14 is adjustable laterally by the screws 17 and vertically by screws 18 and held rigid in its adjusted positions by the screw 19, which passes through the base thereof and is threaded into the standard 12. Slide 16 is preferably triangular in cross-section, although not necessarily limited to such shape, and has a plurality of transverse slots 21 in its top side and a downwardly-projecting arm 20 at the rear end.

Fixed within the standard 12 is the rod 22, having a block 23 slidable thereon and secured in any intermediate position thereon by the screw 24. This block is slotted, and in said slot is secured by the screw 25 one end of a spring 26, the other end of which enters one of the slots 21 in the slide 16. The normal tendency of this spring 26 is to throw the slide 16 forward toward the spindle 3, and its tension may be varied indefinitely by adjustment of the block 23 upon the rod 22 and by inserting the end of the spring into any one of the numerous slots 21 in slide 16.

The diamond to be drilled is held on the front face of the slide 16 with wax or other similar material in line with the drill or needle in the spindle 3, and the adjustment of the slide 16 through the slide-rest 14 enables the diamond to be placed in any desired position in relation to said drill or needle, so that a hole can be drilled through the diamond at any angle. The slide is moved rearwardly by the slide-rod 27, the forward end of which engages the arm 20 and the rear end of which is held against a cam 28 by the spring 39 and moved laterally thereby. This rod is pivotally mounted midway of its length in the vertical rock-spindle 29, whose lower end is pointed and has a bearing in the slide 30 and into the upper end of which projects the pointed end of the thumb-screw 31 and forms a bearing. This thumb-screw is threaded through the lateral arm of the post 32 and is held in any of its adjusted positions by the screw 33 in the slotted end of said lateral arm.

Slide 30 is mounted within the standard 34 and is adjustable therein by means of the thumb-screw 35, which is threaded into one end of said slide and held against movement within the bracket 36, forming part of said standard. A plate 37 and the screws 38, threaded through the standard 34, hold the slide rigidly in any of its adjusted positions.

By my construction the forward movement of the slide 15 is spring-actuated, making the contact between the diamond and the end of the drill or needle yielding and without shock, at the same time permitting the drill or needle to have its boring effect upon the diamond, and the slide is returned positively by the spring-rod 27. It will be noted also that the speed of the forward movement of the slide 16 will always be controlled in a limited degree by the movement of the spring-rod 27, the arm 20 always bearing against said rod, which effectually prevents a violent spring blow. I have also illustrated a device for sharpening the drills or needles after they have become dull. This mechanism comprises a base 41, preferably made of wood and having a plate 42 projecting upwardly therefrom and upon one side thereof, within which is rotatable one end of a spindle 43, having a lap-block 44 and a pulley 45 thereon. Also fixed within said block 41 is a vertical rod 46, upon which is rotatable the pulleys 47 and 48 between the collars 49 and 50.

To sharpen a drill, the block 41 is placed in position with a belt 51 passing over the cone 10 upon the spindle 3 around the idler-pulley 47, pulley 45, and back around the idler-pulley 48. Diamond-dust is then placed upon the surface of the lap-roll, and the outer end of the spindle 43 is supported by the finger of the operator. Now by shifting the position of the block 41 so that a slight tension is placed upon the belt 51 a rapid rotary movement is imparted to the spindle 43, and the lap-block 44 being supported by the finger can be adjusted to any position, and a quick and rapid method of sharpening the drills or needles is obtained.

There are many minor changes and alterations that can be made within my invention aside from those herein shown and suggested, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of my invention.

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

1. In a machine for drilling diamonds, the combination with a rotating spindle and a slide, for holding a drill and the diamond, of a spring for moving said slide in the direction of said spindle, for causing a yielding contact between said drill and diamond, and means in contact with said slide for moving the same away from said spindle.

2. In a machine for drilling diamonds, the combination with a rotating spindle and a slide, for holding a drill and the diamond, of a spring for moving said slide in the direction of said spindle, for causing a yielding contact between said drill and diamond, and positively-actuated means for moving said slide away from said spindle.

3. In a machine for drilling diamonds, the combination with a rotating spindle and a slide, for holding a drill and the diamond, of a spring for moving said slide in the direction of said spindle, for causing a yielding contact between said drill and diamond, a pivotally-mounted member engaging said slide, and means for actuating said pivotally-mounted member, whereby said slide will be moved against the tension of said spring.

4. In a machine for drilling diamonds, the combination with a rotating spindle and a slide, for holding a drill and the diamond, of a bow-spring for moving said slide in the direction of said spindle, for causing a yielding contact between said drill and diamond, a pivotally-mounted rod having frictional contact with said slide, and means for swinging said rod upon said pivot-mounting.

5. In a machine for drilling diamonds, the combination with a rotating spindle and a slide, for holding a drill and the diamond, of a spring for moving said slide in the direction of said spindle, for effecting a yielding contact between said drill and diamond, a pivotally-mounted rod contacting with said slide, and a cam for actuating said rod upon its pivot-mounting.

6. In a machine for drilling diamonds, the combination with a rotating spindle and a slide, for holding a drill and the diamond, of a spring for moving said slide in the direction of said spindle, for effecting a yielding contact between said drill and diamond, a pivotally-mounted rod engaging said slide at one end, a cam for actuating said rod upon its pivot-mounting, and means for yieldingly holding said rod in engagement with said cam.

7. In a machine for drilling diamonds, the combination with the spindle; of a slide; a spring for moving said slide in the direction of said spindle; a pivotally-mounted rod engaging said slide at one end; and means for shifting the position of said pivot-mounting.

8. In a machine for drilling diamonds, the combination with a spindle; of a slide 16; a spring 26 for moving the said slide in the direction of said spindle; means for shiftably securing said spring to said slide whereby the tension thereof may be varied; a rod 27 pivotally mounted between its ends and engaging a part upon said slide; a rotary cam; and a spring 39 for normally holding said rod against said cam.

9. In a machine for drilling diamonds, the combination with the spindle; of a slide; a

bow-spring, one end of which is fixed and the other engaging said slide, for moving said slide in the direction of said spindle; means for connecting said spring to said slide under varying tensions and positively-actuated means for moving said slide in the opposite direction.

10. In a machine for drilling diamonds, the combination with the spindle; of a slide; a bow-spring, one end of which is fixed and the other engaging said slide, for moving said slide in the direction of said spindle; and means for shifting the position of the fixed end of said spring.

11. In a machine for drilling diamonds, the combination with the drill; of a slide having a plurality of shoulders upon one side thereof; and a spring for actuating said slide in one direction, said spring being arranged with one end fixed and the other to engage any of said shoulders.

12. In a machine for drilling diamonds, the combination with the drill; of a slide 16 having the notches 21 in one side thereof; of the flat spring 26; and the adjustable spring-block 23.

13. In a machine for drilling diamonds, the combination with a spindle; of a head member; a slide-rest; means for adjustably securing said slide-rest; a slide mounted within said slide-rest; a spring mechanism for moving said slide in the direction of said spindle; and means for connecting said spring to said slide under varying tensions.

14. In a machine for drilling diamonds, the combination with a spindle; of a head member having a recess therein; a slide-rest within said recess; means for adjusting said slide-rest within said recess; means for securing the same in any of its adjusted positions; a slide mounted within said slide-rest; spring mechanism for moving said slide in the direction of said spindle; and means for varying the tension of said spring.

15. In a machine for drilling diamonds, the combination with a head member; of a rotary spindle mounted therein carrying a drill or needle, a slide-rest adjustably secured to said head member; a slide movably mounted within said slide-rest; spring mechanism for moving said slide toward said spindle; means for varying the tension of said spring upon said slide; and positively-actuated means for moving the slide in the opposite direction.

16. In a machine for drilling diamonds, the combination of a rotating spindle, a slide having a projecting part thereon, the said spindle and slide adapted to hold a drill and the diamond, a spring for moving said slide in the direction of said spindle to effect a yielding contact between said drill and diamond, and a rod member and means for moving it in the path of said projecting part for moving the slide away from the spindle.

17. In a machine for drilling diamonds, the combination of a rotating spindle, a slide having a projecting part thereon, the said spindle and slide adapted to hold a drill and the diamond, a rod member and means for moving it in the path of said projecting part, and a spring for moving said slide in the direction of said spindle for effecting a yielding contact between the drill and the diamond, and holding said projecting part in contact with said rod member.

18. In a machine for drilling diamonds, the combination with the rotary spindle carrying a drill or needle; of means for sharpening said drill or needle, said means comprising a lap-roll; and means for rotating the same at an angle to said spindle, said means being actuated from said spindle.

19. In a machine for drilling diamonds, the combination with the rotary spindle carrying a drill or needle; of means for sharpening said drill or needle; said means comprising an auxiliary spindle having a lap-roll thereon, supported at one end manually and the other in a fixed part; and a belt connecting a pulley upon said spindle with a pulley upon said auxiliary spindle.

20. In a machine for drilling diamonds, the combination with the rotary spindle 3 having a cone 10 thereon and carrying a drill or needle therein; of means for sharpening said drill or needle, said means comprising an auxiliary spindle 43 having a lap-roll 44 and pulley 45 thereon; a plate 42 forming a support for one end of said spindle; a rod 46 having the idler-pulleys 47 and 48 thereon; and the belt 51 connecting said cone 10 with said pulley 45.

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

JOHN H. O'DONNELL.

Witnesses:
FREDERICK E. CHAPMAN,
ROGER S. WOTKYNS.