C. O. BERT.

HAND OPERATED DRILL.

APPLICATION FILED APR. 27, 1917.

1,267,174.

Patented May 21, 1918.

2 SHEETS—SHEET 1.

FIG. 1.

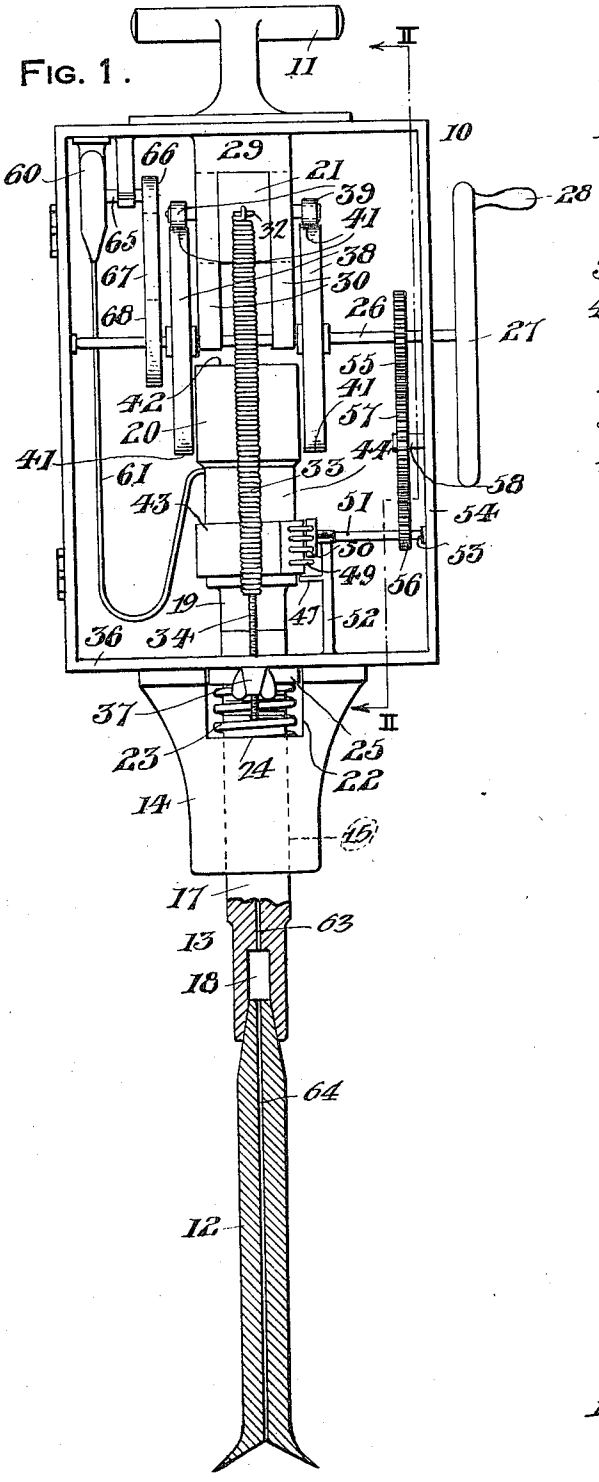
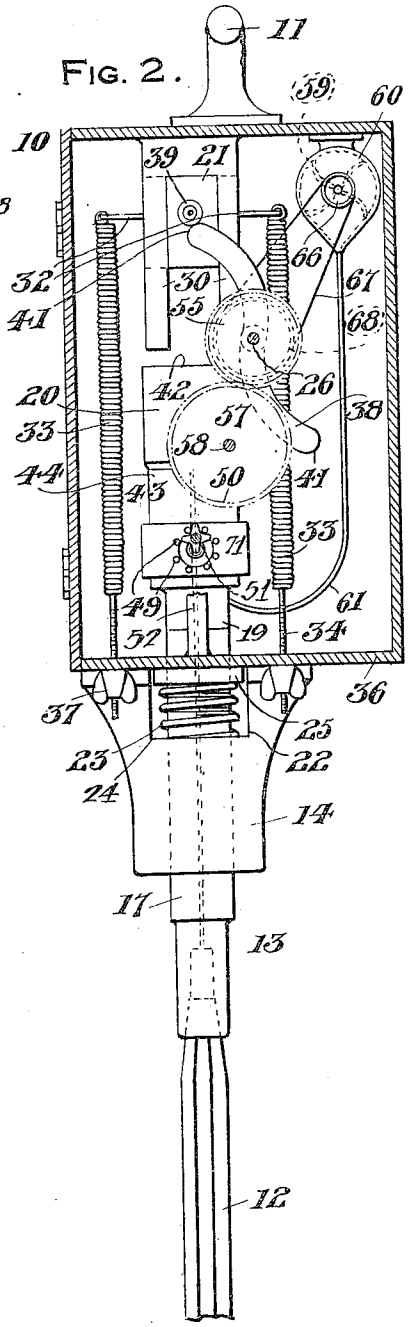


FIG. 2.



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2 SHEETS—SHEET 2.

FIG. 3.

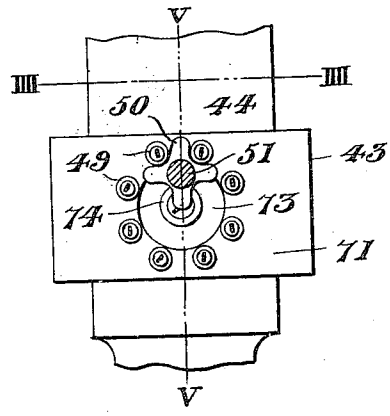


FIG. 4.

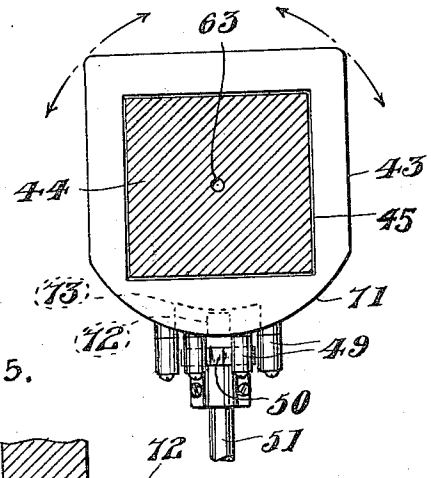
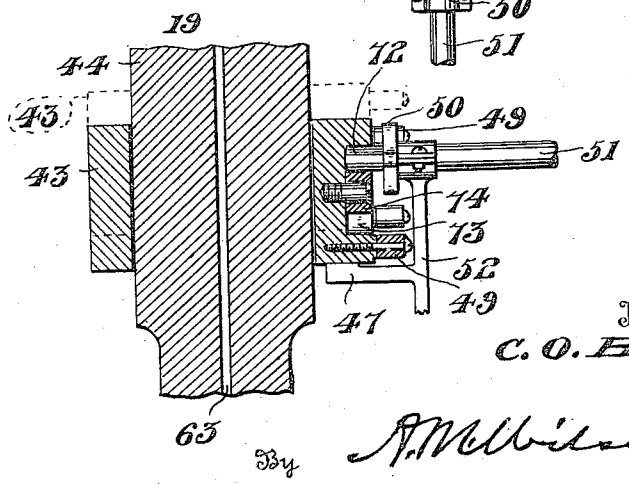


FIG. 5.



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UNITED STATES PATENT OFFICE.

CELEST O. BERT, OF WINOOSKI, VERMONT.

HAND-OPERATED DRILL.

1,267,174. Specification of Letters Patent. Patented May 21, 1918.

Application filed April 27, 1917. Serial No. 164,994.

To all whom it may concern:

Be it known that I, CELEST O. BERT, a subject of the King of Italy, residing at Winooski, in the county of Chittenden and State of Vermont, have invented certain new and useful Improvements in Hand-Operated Drills, of which the following is a specification.

The primary object of the invention is the provision of a drill especially serviceable as a rock drill although adaptable for boring in wood, salt or other material, the arrangement being such that the boring tool is automatically rotated and cleaned during the operative longitudinal impulses imparted thereto.

In the drawings forming a part of this application and in which like designating characters refer to corresponding parts throughout the several views:—

Figure 1 is an elevational view of the device with the casing lid removed and the bit and a portion of the tool holder shown in section.

Fig. 2 is a sectional view taken upon line II—II of Fig. 1 with the bit and a bracket partially broken away.

Fig. 3 is a detail elevational view.

Fig. 4 is a sectional view upon line IIII—IIII of Fig. 3, and,

Fig. 5 is a vertical sectional view taken substantially upon the line V—V of Fig. 3.

The present drilling machine is adapted for hand operation and provides a casing 10 for the mechanism while a handle 11 upon the top thereof is utilized for positioning the device to place the bit 12 carried by a tool holder 13 in proper position for operating upon the work.

A depending sleeve 14 is arranged upon the bottom of the casing 10 having an axial bore 15 in alinement with an opening in the bottom of the casing and through which bore and opening the bit holder 13 is longitudinally slidably arranged. The tool holder 13 is formed with a lower portion 17 having a receiving socket 18 in its lower end for removably retaining the bit 12 while the upper portion 19 of the holder has an upper head or anvil 20 adapted for successive engagement by a hammer 21 for depressing the holder and bit.

A slot 22 is provided through the sleeve 14 within which an expansion spring 23 is mounted surrounding the holder portion 17 and tensioned between the bottom 24 of the slot and a shoulder 25 upon the holder portion 17. It will be understood that the spring 23 normally maintains the holder 13 and bit 12 elevated while the hammer 21 successively projects the said members to be automatically retracted by said spring.

A power shaft 26 is journaled through the casing 10 and has a turn wheel 27 arranged thereon outwardly of the casing and provided with a handle 28. The hammer 21 is substantially cubical in form consisting of a solid weight formed of metal such as iron, and slidably arranged within a bracket 29 having four depending legs 30 seating within corner recesses of the hammer.

Oppositely-projecting arms 32 are provided upon the hammer 21 to the free ends of which are attached the upper ends of lowering springs 33 having threaded bolts 34 at their lower ends projecting through perforations in the bottom 36 of the casing 10 and provided with winged nuts 37 adapted for regulating the tension of the springs 33. Substantially S-shaped double cams 38 are secured to the shaft 26 adapted to engage rollers 39 journaled upon stub shafts projecting from the hammer 21 at the opposite sides thereof unprovided with the arms 32. It will be understood from this description of the elements that by turning the wheel 27, the shaft 26 and cams 38 are revolved, bringing the latter into engagement with the rollers 39, thereby elevating the hammer 21 against the action of the springs 33. When the rollers 39 pass off of the ends 41 of the cams, being released thereby, the hammer 21 will descend with great rapidity and force by reason of both its weight and action of the springs 33 violently contacting the upper face 42 of the anvil 20 and forcing downwardly the holder 13 and bit 12 against the action of the spring 23 and accomplishing the operative impulse of the tool. It will be understood that the spring 23 retracts the holder and bit after each impulse of the hammer 21, the mechanism operating with great rapidity during the turning of the wheel 27.

A turn collar 43 surrounds a rectangular portion 44 of the holder section 19 being longitudinally slidably positioned thereon against relative rotation thereto by means of the rectangular form of the portion 44 and the opening 45 provided in the collar 43. A star wheel 50 is carried by the inner end of a shaft 51 journaled between a suitable

bracket 52 and a bushing 53 upon the adjacent side 54 of the casing 10. The shaft 51 is operatively connected to the shaft 26 by means of a train of gears consisting of gears 55 and 56 secured to the shafts 26 and 51 respectively, and an intermediate idler gear 57 journaled upon a post 58 carried by the casing side 54. The gear ratio between the power shaft 26 and star wheel shaft 51 may be suitably altered as desired to accomplish the required speed of rotation for the holder 13 and bit 12, it being understood that during the actuation of the hammer 21 when the wheel 27 is turned, the star wheel 50 simultaneously revolves the holder and bit whereby the drilling operation is facilitated.

As shown clearly in Figs. 3, 4 and 5 an arcuate side 71 is provided on the sleeve 43 adjacent the star wheel 50 carried adjacent the end of the shaft 51, said shaft having a projecting free end 72 freely positioned within a circular guide-way 73 of the said sleeve face 71. A plurality of pins or rollers 49 are arranged in spaced relations around the guide-way 73 and adapted to be operatively engaged by the star wheel 50 during the turning of the shaft 51 whereby oscillation will be given to the sleeve 43 which will be imparted to the drill holder 13. A central hub 74 in the form of a journaled roller is arranged intermediate the rollers 49 while the bracket 52 carried by the bottom 36 of the casing 10 supports the shaft 51 and has a stop finger 47 positioned beneath and supporting said sleeve 43. It will be understood that the shaft 51 is revolved by means of the gears 55 and 56 as heretofore explained, and that the movements of the sleeve 43 impart a substantially circular movement to the hub 74 while the sleeve will be elevated during its movements to the position illustrated by dotted lines in Fig. 5, the turning movement of the sleeve as indicated by the arrows in Fig. 4 effecting back and forth, alternate partial rotations to the drill holder and consequently to the drill itself.

A blower is usually employed with the structure consisting of a fan 59 journaled within a blower casing 60 arranged within the main casing 10 and having a flexible tube 61 secured to the holder portion 19, an axial conduit 63 being provided through the holder and communicating with the tube 61 as well as the bit socket 18. The bit 12 is also provided with an axial conduit 64 whereby air from the fan 59 will be forced through the bit, thus blowing the dust and drillings out of the hole where the bit is operating. A shaft 65 is provided for the fan 59 having a pulley wheel 66 thereon which is operatively connected by means of a belt 67 with a pulley wheel 68 upon the power shaft 26.

The complete operation of the device will be apparent from the foregoing description of the operation of the drill propelling and revolving mechanism as well as the cleaning blower, all of which are simultaneously actuated by turning the shaft 26 upon turning the wheel 27 with the machine held in operative position by means of the handle 11.

What I claim as new is:—

1. A drilling machine comprising a casing, a drill holder mounted for reciprocatory movement therein, a sleeve slidably mounted upon the holder and having an arcuate side provided with a circular guide slot, spaced rollers carried by the sleeve and located around the slot, an operating shaft having an end located in the slot, and a star-wheel mounted on the shaft and adapted to engage the rollers during the reciprocations of the holder.

2. A drilling machine comprising a holder mounted for reciprocatory movement and having a rectangular portion, a sleeve mounted for oscillatory movement and slidable on the holder, spaced rollers arranged in a circle upon the sleeve, and a rotatable operating star-wheel for the sleeve arranged within the circle of rollers and adapted to engage the rollers successively during the operation of the device.

3. A drilling machine comprising a reciprocable drill holder having a rectangular portion, an oscillating sleeve for the said holder slidably arranged thereon, spaced rollers arranged in a circle upon the sleeve, an operating star-wheel for the sleeve adapted to engage the rollers successively during the operation of the device, a circular guideway located within the series of rollers, the hub centrally journaled in the guideway, a shaft having its end portion located within the guideway, and a star-wheel mounted on the shaft and adapted to engage the rollers.

In testimony whereof I affix my signature.

CELEST O. BERT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."