H. B. POTTS.

DRILL.

APPLICATION FILED FEB. 28, 1910.

988,503. **Patented Apr. 4, 1911.**

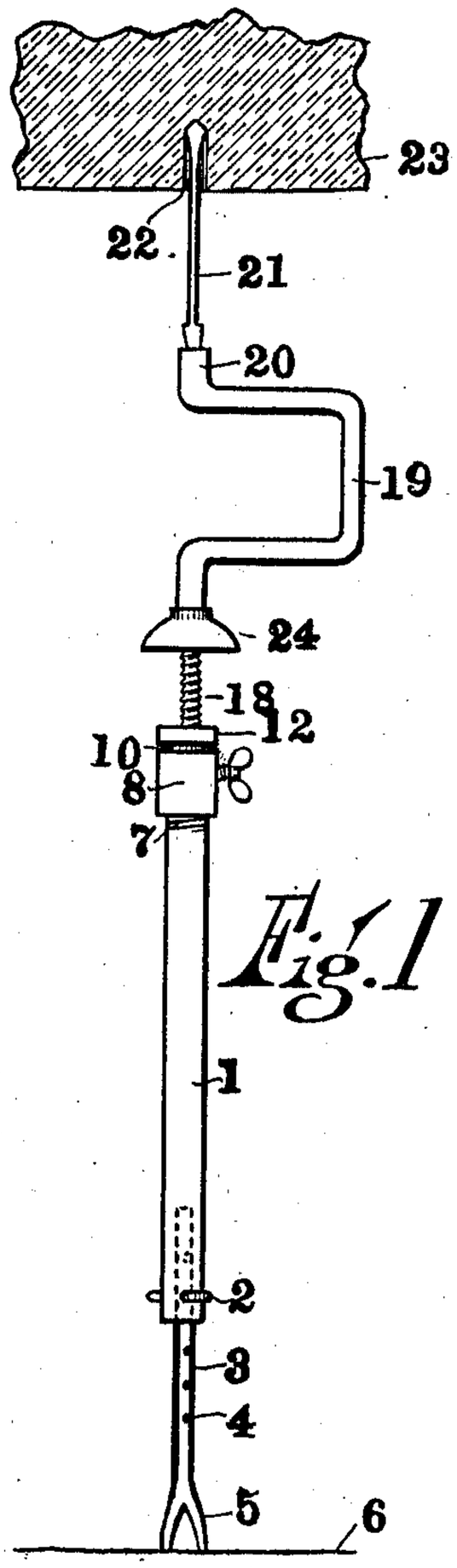

Fig. 1

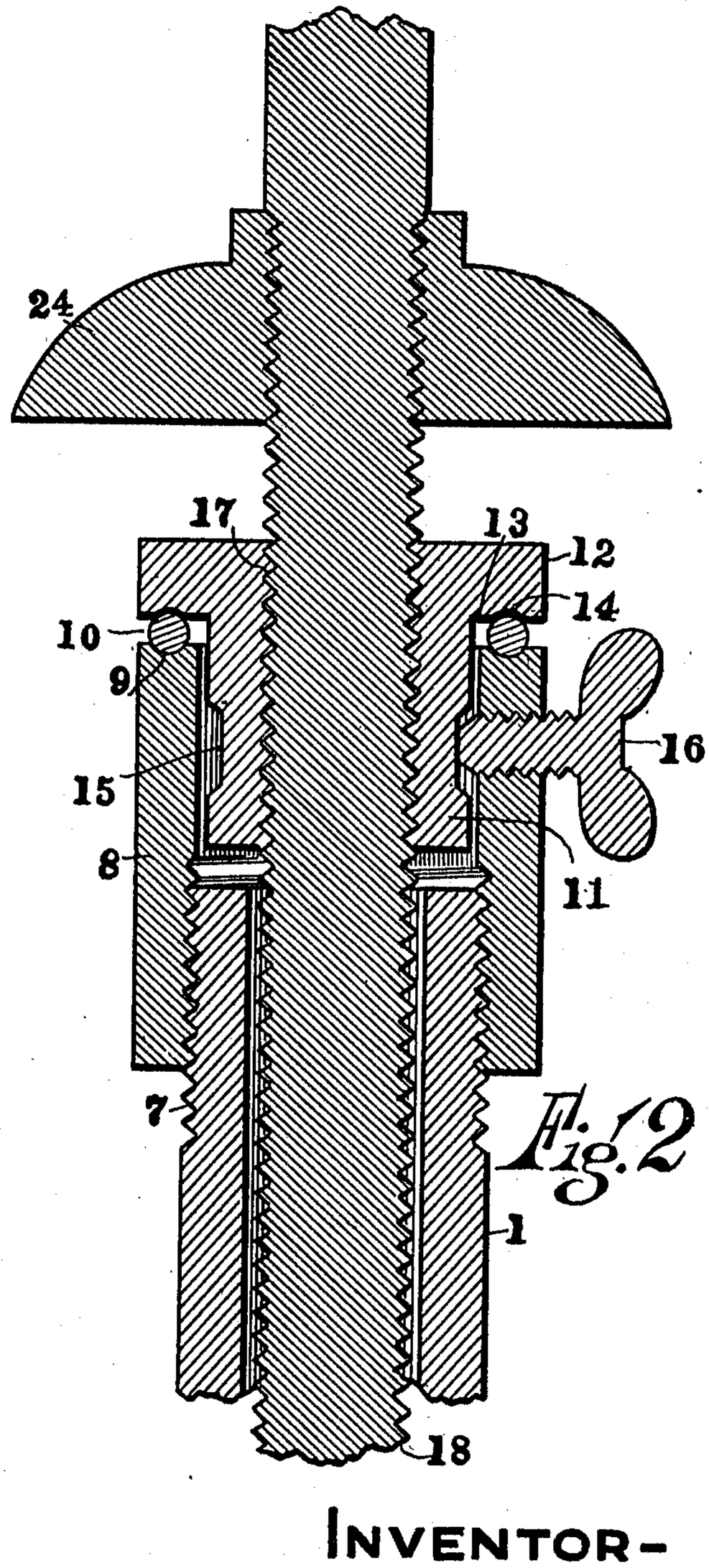

Fig. 2

Witnesses:

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DRILL.

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To all whom it may concern:

Be it known that I, HOWARD B. POTTS, a citizen of the United States, residing at Jackson township, in the county of Guernsey and State of Ohio, have invented new and useful Improvements in Drills, of which the following is a specification.

This invention relates to improvements in drills, especially those used for drilling holes in roofs of mines to provide supporting means for hangers and the like.

The object of the invention is to provide a strong, safe and easily manipulated drill for drilling holes in the roofs of mines constituting supporting means for hangers and the like.

The invention further contemplates so constructing the drill that the adjustment for the same for different heights of mines so as to make the same a generally applicable device in drilling holes in the roof thereof is readily and quickly accomplished, and at the same time it contemplates providing means whereby the drill will be self-feeding if desired, or the feed may be reduced when the tool encounters some hard substance necessitating a slower speed than where the drill is used on material of a comparatively soft nature such as slate.

A further object of the invention is to make the adjustment for changing the feed of the drill such that it may be changed substantially instantaneously, whereby a rapid feed may be imparted to the drill or may be entirely eliminated.

The final object of the invention is to provide a drill which will be comparatively inexpensive and in which the working parts are reduced to a minimum, thereby eliminating excessive wear usually incident to the employment of drills of this general character.

With the foregoing and other objects in view, the invention consists in the novel construction, combination and arrangement of parts constituting the invention to be hereinafter specifically described and illustrated in the accompanying drawings which form a part hereof wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claim hereunto appended.

In the drawings, in which similar reference numerals indicate like parts in the different figures: Figure 1 is a view in side elevation of a drill embodying this invention, showing the same in use in a mine while drilling a hole in the roof thereof; and, Fig. 2 is a view in vertical, longitudinal, central section of the feeding mechanism of the drill.

Referring to the drawings in detail, the reference numeral 1 denotes a tubular upright post having near the lower end thereof a transversely-extending opening to receive a key 2. Mounted on the lower end of the member 1 is a member 3 of a diameter to be readily inserted in the member 1 and provided with spaced transverse apertures 4 through which the key 2 may be passed. The lower end of the member 3 also preferably terminates in a fork 5 to obtain a firmer grip upon the floor of the mine, designated by the reference numeral 6. The exterior surface of the upper end of the member 1 is provided with threads 7 to receive a sleeve 8 which is interiorly-threaded to engage with the threads 7. The sleeve 8 preferably projects upwardly beyond the upper end of the member 1 and its upper end is preferably (although not necessarily) provided with an annular groove 9 in which are placed balls 10 for a purpose to be later described. Positioned within the recess in the interior of the sleeve 8 is a nut 11 having an enlarged head 12 the under face of which is connected with the body of the nut by a shoulder 13. The under face of the head 12 is also provided with an annular groove 14 corresponding in dimensions to the groove 9 in the upper end of the sleeve 8, the two grooves 9 and 14 constituting a race for the balls 10 for the purpose of reducing the friction when the nut 11 is revolved. The body of the nut 11 is also provided with a circumferentially-extending shallow groove 15 which is engaged by the inner end of a thumb-screw 16 suitably-mounted in a transversely-extending threaded aperture in the side wall of the sleeve 8 for a purpose to be later described. The nut 11 is also provided with a longitudinally-extending threaded opening 17 arranged centrally therein.

Mounted in the threaded opening 17 of the nut 11 is the lower end or shank 18 of the supplemental portion of the drill which extends upwardly and is provided with a laterally-turned sweep or crank-arm 19 and with a socket-forming end 20 the center of

which is in alinement with the axis of the shank 18. Mounted in the socket-forming end 20 is a drill 21 of ordinary construction, shown in Fig. 1 in the operation of drilling a hole 22 in the roof 23 of a mine. Mounted in the upper end of the threaded portion of the shank 18 is a shield 24 used for preventing the rubbish and dust which falls from the hole 22, during the operation of drilling from falling into the mechanism below the shield 24 and interfering with the perfect manipulation thereof.

In operation, the drill is set up with the fork 5 on the floor of the mine and the drill adjusted to bring the point of the tool 21 against the under surface of the roof, and this is ordinarily accomplished by first withdrawing the key 2 and shifting the position of the drill 1 with respect to the member 3 and reinserting the key 2 through one of the apertures 4 in the member 3. The thumb-screw 16 is then tightened and the crank-arm or sweep 19 revolved, and as this crank-arm 19 is preferably integral with the shank 18 and moves in unison therewith the drill will be gradually fed upwardly, due to the revolution of the threaded shank 18 in the threaded opening in the nut 11, this operation is maintained until a hole of sufficient depth is drilled in the roof, the dust and particles from the roof cut loose by the tool in falling to the ground are deflected from the mechanism of the drill by the shield 24.

If the roof of the mine is composed of comparatively soft material the feed of the drill may be maintained throughout the progress of the operation, but if an unusually hard substance is encountered by the tool 21 which would prevent the drill from being fed constantly with a normal feed, the thumb-screw 16 is released from engagement with the grooved portion 15 of the nut 11, thus temporarily arresting the feed of the drill, and the frictional engagement between the shank 18 and the nut 11, due to the force exerted by the tool during the operation of drilling, will cause the nut 11 to rotate in unison with the shank 18, and this is further aided by the balls 10 in the grooves 9 and 14. If, however, the balls 10 and grooves 9 and 14 are not employed, the under face of the head 12 will rest upon the upper end of the sleeve 8 and the same effect will be secured. As the hard substance encountered by the tool 21 is gradually worn away the thumb-screw 16 may be slightly tightened to exert a desired amount of frictional engagement on the grooved portion 15 of the nut 11 to slightly retard its rotation, causing the shank 18 to gradually feed forward and force the tool 21 into the recess and cause a consequent cutting away of the harder substance.

In dismantling a drill after the operation of drilling, the sweep or crank-arm 19 is given a reverse rotation which withdraws it from the recess, or the key 2 may be removed permitting the member 1 to telescope the member 3 until the tool 21 has been withdrawn completely from the recess, after which the drill is moved to another position and again set up.

From the foregoing it will be apparent that as soon as the thumb-screw 16 exerts a sufficient frictional engagement with the grooved portion 15 of the nut to retard the rotation thereof, the drill, when the crank-arm 19 is revolved will feed upwardly and with a movement equivalent to the pitch of the threads on the exterior of the shank 18; and if the pressure on the thumb-screw 16 on the grooved portion 15 of the nut 11 is entirely withdrawn, no feed will be imparted to the drill and any decrease of feed may be obtained by changing the degree of frictional engagement exerted by the thumb-screw 16 on the grooved portion 15 of the nut 11.

I claim:

In combination a hollow post having one end provided with peripheral threads, means for adjustably supporting the post, an interiorly-threaded sleeve mounted upon the screw-threaded end of the post and provided with a laterally-extending opening having the wall thereof threaded, a threaded shank extending in said post, a nut engaging with the threads of the shank and provided with a laterally-extending annular flange extending over one edge of said sleeve, said nut further provided with a peripheral groove, ball bearings interposed between the flange of the nut and said edge of the sleeve, said nut extending in said sleeve, a thumb screw extending through said opening and engaging the wall of said groove for normally holding the nut against rotation, a bit, and a crank arm connecting the bit to said shank.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HOWARD B. POTTS.

Witnesses:
J. B. SHAFER,
JOE SELIG.