

No. 665,711.

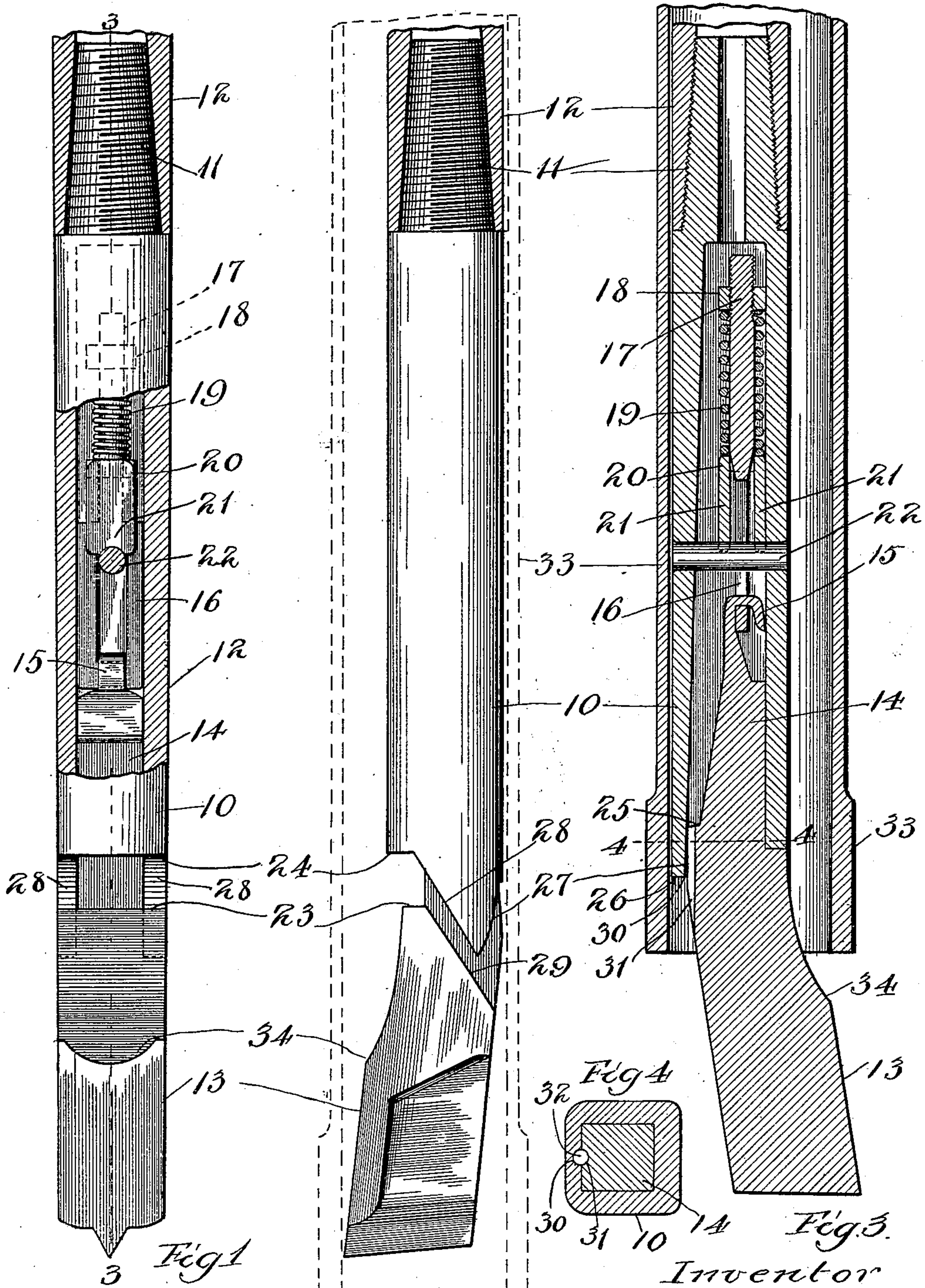
Patented Jan. 8, 1901.

O. G. WORSLEY.

ROCK DRILL.

(Application filed Jan. 2, 1900.)

(No Model.)



Witnesses
W. C. Corlies
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Fig. 2

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UNITED STATES PATENT OFFICE.

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ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 665,711, dated January 8, 1901.

Application filed January 2, 1900. Serial No. 13. (No model.)

To all whom it may concern:

Be it known that I, OTTO G. WORSLEY, a citizen of the United States, and a resident of Newark, county of Kendall, and State of Illinois, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification and which are illustrated in the accompanying drawings, forming a part thereof.

This invention relates to expanding drills; and its objects are to provide suitable means for expanding the drill-cutter as it emerges from the casing through which it is inserted, to provide a positive and certain seat for the cutter when expanded, to provide for the automatic collapse or recession of the cutter when the drill is withdrawn through the casing, and to generally improve the construction of articles of this class. These objects are attained by the construction hereinafter fully described and which is illustrated in the accompanying drawings, in which—

Figure 1 represents an elevation of the drill and drill-stock, partly in section. Fig. 2 is an elevation of the same from a point ninety degrees removed from the point of view of Fig. 1, certain parts being shown in section, the drill-cutter being retracted. Fig. 3 is a longitudinal section on the line 3 of Fig. 1, and Fig. 4 is a transverse section on the line 4 of Fig. 3.

The drill-stock 10 is tubular in form, and at its upper end is tapering and threaded, as shown at 11, to enter the lower end of the drill-rod 12.

The drill-cutter 13 has a blade of any desired form and is inclined laterally as to its shank 14 and is provided with a shoulder 23, adapted to seat itself against a similar shoulder 24 at the end of the stock 10. The shank 14 of the drill-cutter is adapted to enter the lower end of the drill-stock 10 and terminates at its upper end in a hook 15, adapted to engage a link 16, the upper end of which is secured to a threaded stem 17, to which is applied a nut 18. A coiled expanding-spring 19 is mounted upon the shank 17 and reacts between the nut 18 and an apertured cross-head 20, through which the shank 17 may freely slide, and this cross-head is provided with depending arms 21 21, adapted to bear upon a cross-bar 22, set through the drill-stock 10 and passing through the eye of the link 16. By the

action of the spring 19 the cutter 13 is drawn upwardly or inwardly with reference to the stock 10 until its shoulder 23 is seated upon the shoulder 24. The cross-bar 22 is preferably upset at each end, so as to remain permanently in place. The tension of the spring 19 may be adjusted by turning the nut 18 up or down.

The wall of the drill-stock 10 opposite the shoulder 24 is prolonged somewhat beyond such shoulder, and at the side of the cutter 14 adjacent to such wall there is formed a slightly-beveled shoulder 25, adapted when the cutter is withdrawn somewhat against the resistance of the spring 19 to rest upon the similarly-inclined end 26 of this prolonged portion of the wall. The rearward face of the cutter 13 is inclined outwardly somewhat for a short distance from the shoulder 25, as shown at 27, so that when such shoulder is displaced from the end 26 of the wall of the drill-stock and the cutter is consequently drawn into the socket of this stock it is forced laterally, so as to bring the shoulder 23 in line with the shoulder 24. The side walls of the drill-stock are inclined, as shown at 28, backwardly from the shoulder 24 to the end of the stock, and the cutter has similarly-inclined shoulders 29, adapted to contact with the inclined portions 28 of the walls of the stock when the shoulders 23 24 are in contact, thereby effectually preventing, in conjunction with the rearward face of the cutter, any lateral movement due to concussion.

Registering channels 30 and 31 in the inner face of the rearward wall of the stock 10 and the rearward face of the cutter 13 form a duct 32, through which water may descend for the purpose of washing out the pulverized material.

In the use of this tool the casing 33 may be forced down almost to the point at which the drill is at work, so as to effectually prevent any caving when passing through soft material and need not be withdrawn for the purpose of withdrawing and reintroducing the drill. In the drawings the drill is shown as in position for use and as emerging from the lower end of the casing 33 as it does in actual practice. As rapidly as the shaft is sunk the casing may descend, allowing merely a sufficient clearance at its lower end

to permit the raising of the cutter a proper distance to secure an effective blow. When it is desired to withdraw the drill, it is simply pulled up, and as its forward face 34 comes in contact with the lower end of the casing it is held until the spring 19 is compressed sufficiently to allow the end 26 of the wall of the stock 10 to pass the shoulder 25. The inclined form of the face 34 now causes the cutter to swing inwardly and assume the position shown in Fig. 2, so that it may freely pass upwardly through the casing 33. The drill is of course reintroduced by a reverse action, and the cutter is automatically thrown outwardly as it emerges from the lower end of the casing by the action of the spring 19, the inclined shoulder 25 slipping from the end 26 of the wall of the stock.

Should there exist any un-reduced material immediately at the center of the shaft upon which it may be desired to operate with the drill not laterally extended, the casing 33 may be sunk entirely to the bottom of the shaft, so as to throw the cutter 13 inwardly to the position shown in Fig. 2, and while in this position the drill may be reciprocated, the shoulder 25 furnishing a sufficiently secure seat to admit of a blow of considerable force being struck.

When it is desired to remove the cutter from the stock, pressure may be applied to the upper end of the rod 17 to press the spring 19, when the hook 15 may be readily disengaged from the link 16.

Should it become necessary to replace the spring or its appurtenances, the bar 22 may be readily removed by the use of a cold-chisel.

I claim as my invention—

1. In a rock-drill, in combination, a tubular stock having a portion of its end squared

to form a positive seat; a cutter having a shoulder adapted to engage such seat and having an inclined face for bearing against the wall of the stock to direct the shoulder to the seat; a stem projecting from the cutter into the chamber of the stock; an expansible spring coiled upon the stem and having its inner end engaged thereby, the stock being provided with a seat for the outer end of the spring.

2. In an expansible rock-drill, in combination, a tubular stock; a cutter having a stem for entering the stock; a spring for drawing the stem into the stock; a shoulder on the cutter for engaging the end of the stock when the cutter is extended laterally; an inclined face on the cutter for forcing the cutter laterally as the spring draws it into the stock; and an inclined shoulder for engaging the stock end when the cutter is retracted.

3. In a rock-drill, in combination, a tubular stock; a cutter having a shank adapted to enter the chamber of the stock, such shank having a hooked end; a link in engagement with the hook and having an inwardly-projecting stem; a coiled expansible spring upon the stem; a nut in threaded engagement with the stem for bearing upon the spring; a cross-bar spanning the chamber of the stock and passing through the link for receiving the pressure of the spring; a shoulder on the cutter for engaging the end of the stock; and an inclined face on the cutter for engaging the wall of the stock to force the cutter laterally so as to bring its shoulder into engagement with the stock end.

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Witnesses:

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