No. 631,712. Patented Aug. 22, 1899.

W. GLEESON.

ROCK DRILLING MACHINE.

(Application filed Nov. 9, 1898.)

(No Model.)

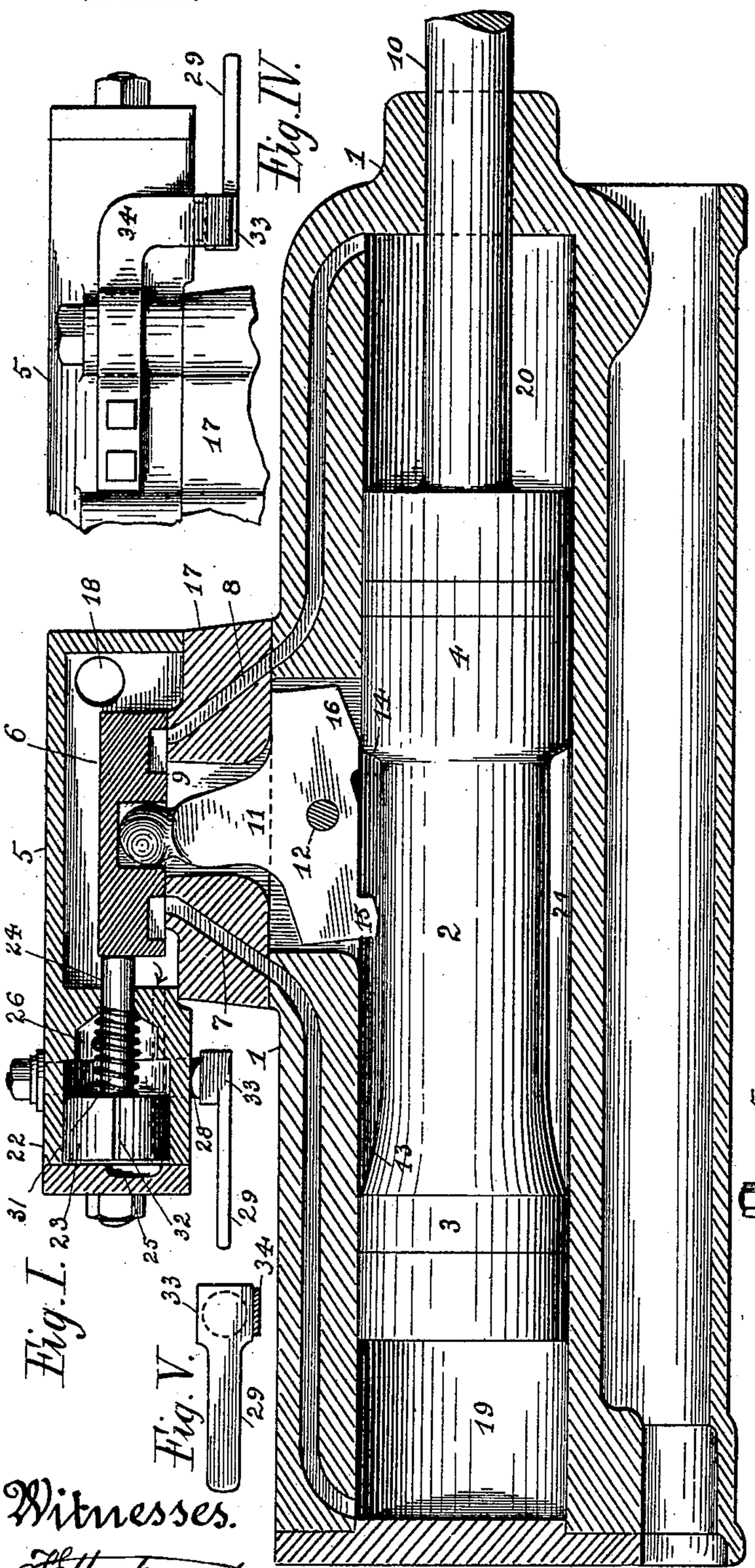

Fig. I.

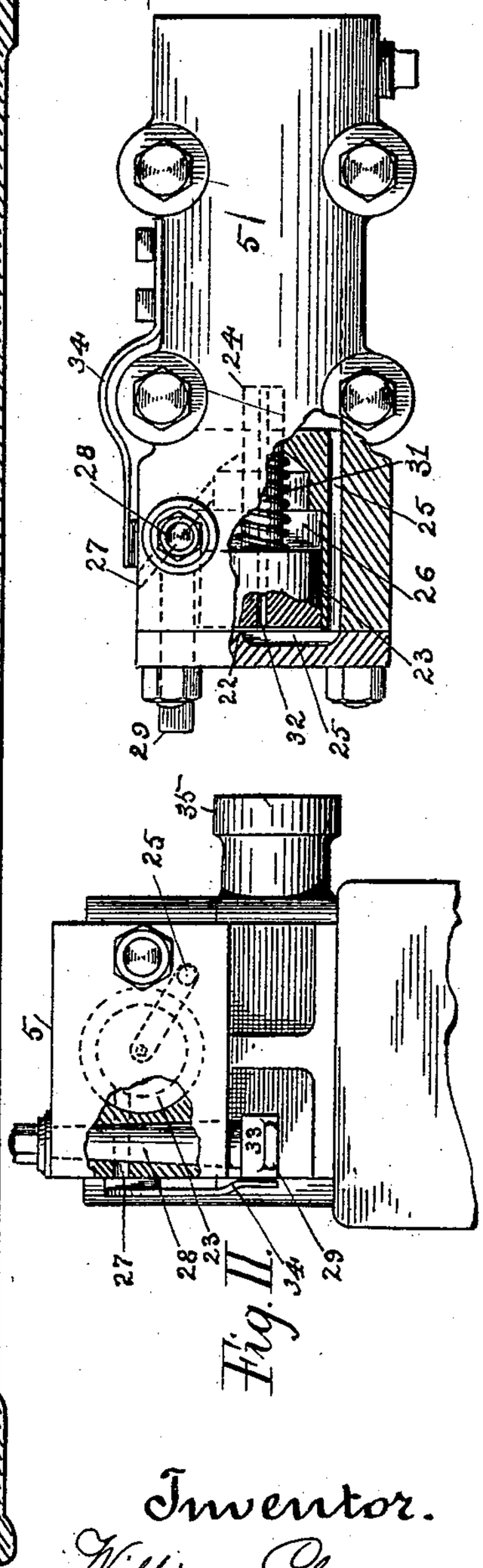

Fig. II.

Fig. V.

Fig. III.

Fig. IV.

Witnesses.

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ROCK-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 631,712, dated August 22, 1899.

Application filed November 9, 1898. Serial No. 695,951. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GLEESON, a citizen of the United States, residing at Unga, in the Territory of Alaska, have invented certain new and useful Improvements in Rock-Drilling Machines; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to an improvement in percussive rock-drilling machines commonly operated by compressed air and to a means of regulating and controlling the strokes of the same.

My improvements consist in providing an auxiliary piston so arranged as to act upon the distributing-valve in addition to the regular or usual means of actuating the same, so the valve can be reversed on the back stroke of the piston and cause short strokes thereof, as circumstances may demand.

The objects of my invention are to enable short strokes to be made at starting the drill, in withdrawing it when choked or jammed in holes, or in any case where such short strokes are required.

To these ends I construct rock-drilling machines as shown in the drawings herewith and forming a part of this specification, in which—

Figure I is a longitudinal section through a rock-drilling machine provided with my improvement. Fig. II is a broken end view of Fig. I, partially in section. Fig. III is a partial plan of Fig. I, a portion being shown in section. Fig. IV is a partial side elevation of the same machine, obverse to Fig. I. Fig. V is a detail showing the lever to operate the cock that controls the stroke of the main piston.

Referring to the drawings and the numerals of reference thereon, 1 is the main cylinder; 2, the main piston, divided into two parts 3 and 4. The valve-box 5, slide-valve 6, induction 7 8, exhaust-way 9, and drill-stem 10 are all of the usual construction and do not require description.

The slide-valve 6 is moved by the oscillating tappet 11, pivoted at 12 and moved each way by the faces 13 14, which come in contact with the tappet 11, impinging at 15 and 16, moving this tappet 11 and the slide-valve 6 right and left, as indicated in Fig. I. The removable intermediate plate 17 is to permit convenient repairing of the valve-seat.

Steam enters the valve-box 5 through an inlet-way at 18 from either side and passes under the ends of the valve 6 to the ports 7 and 8 and into the chambers 19 and 20 as the valve 6 is moved to the right or left, thus producing a reciprocating motion of the piston 2 and of the drill-stem 10. The central or exhaust port 9 communicates with the annulus 21 around the main piston 2, and the air or steam escapes therefrom by nozzle 35 to the open air.

Thus far the parts are in construction and operation similar to rock-drilling machines as commonly made, the slide-valve and piston moving throughout a full range or stroke. My improvement now to be described modifies this range, causing the piston to make short strokes at beginning to drill a hole, in working the drills out when choked, or in any other case when such short movement is desirable.

To carry out my invention in a simple manner, I provide at the rear end of the valve-box 5, either integral therewith or attached thereto, a small cylinder 22, with a piston 23 to slide therein. This piston 23 is provided with a stem 24, that passes into the valve-box 5, adapted to bear against the end of the slide-valve 6, as seen in Fig. I. This piston is moved forward or toward the valve 6 by means of the compressed air in the valve-box 5, which passes through a small port 25 (seen in Fig. III) and fills the outer end of the cylinder 22, pressing the piston 23 and the stem 24 inward or toward the valve 6 with a force equal to the pressure of the fluid and the size of the piston, the proportion of the latter being approximately as shown in Fig. I. This produces an action as follows: Supposing the various parts to be in the position seen in Fig. I, the slide-valve 5 admitting air to the chamber 19 and the main piston 2 and the stem 10 to be moving forward, if the piston 23 is not acting the main piston would move on until the curved face at 13 came in contact at 15 with the tappet 11. This would complete the forward stroke; but if the piston 23 is pressing the stem 24 against the valve 6 as soon as the beveled face 14 on the piston-head 4 passes from beneath the beveled face 16 of the tappet 11 the piston 23 will

instantly reverse the slide-valve 6, moving it and the tappet 11 to the opposite position, admitting air or steam to the passage 8 and the chamber 20, thus reversing the motion of the piston 2 and producing a short stroke. The length of such stroke, as will be seen, depends upon the length and inclination of the face 16 on the tappet 11 and can be arranged accordingly. The proportions shown give a good result in working. As, however, such short strokes are required only under certain circumstances I provide for the normal operation of the machine by arresting and reversing the motion of the piston 23 in the following manner: When the piston 23 is in action and the main piston 2 is making short strokes, the chamber 26 in the front of this piston is in communication with the external air by means of a passage 27 (indicated in Figs. II and III) and is thus relieved of pressure on the forward side. When the piston is to cease acting, this passage 27 is closed by a cock 28, operated by a lever 29. As soon as this cock 28 is closed air leaks past the piston 23 and fills the chamber 26, putting the piston 23 into equilibrium, and the spring 31 presses the piston 23 back, holding the stem 24 clear of the valve 6, permitting the latter to move freely, producing full strokes of the main piston 2. In case the piston 23 is fitted so closely as to exclude the compressed air from the chamber 25 or to require too long a time to produce a pressure in this chamber a small hole or groove 32 can be formed in the piston 23 to permit the slow passage of air, but in practice the amount that leaks past the piston 23 is found to be sufficient.

The lever 29 is made with a square head 33, against which bears a spring 34, as seen in Figs. III and IV, that serves to keep the handle 29 in position when it is set to open or close the cock 28. In this manner it will be seen that as soon as the cock 28 is opened the main piston 2 will begin and continue with short strokes until this cock is closed. The machine will then operate normally at full stroke, the only adjustment required being to turn the handle 29 one-fourth of a revolution to the right or left, as may be most convenient. It will be understood that a spring may be substituted for the piston to press the stem 24 against the slide-valve 6 and produce short strokes of the piston and drill in the same manner, but the devices here shown are believed to be the most simple and effective.

Having thus explained the nature and objects of my invention and a manner of applying the same, what I claim as new, and desire to secure by Letters Patent, is—

1. In a rock-drilling machine, in combination, a main cylinder, a piston, a distributing slide-valve, a tappet to move the said valve each way by the movements of the piston, a stem bearing against one end of the valve, and means for applying elastic pressure at will to said stem, whereby short or long strokes of the piston may be produced at will, substantially as specified.

2. In a rock-drilling machine, a cylinder, piston, and distributing slide-valve, a tappet to move said slide-valve, positively actuated by contact with the reciprocating piston, and an auxiliary piston for applying elastic pressure to the slide-valve at one side thereof independently of said tappet, whereby short strokes of the piston are produced, substantially as specified.

3. In a rock-drilling machine, a cylinder, piston and distributing slide-valve, a tappet to move said valve, an auxiliary piston, with retractile spring therefor, and a stem 24 to press upon and move the valve in advance of the tappet action, to shorten the strokes of the piston and of a drill operated thereby, substantially as specified.

4. In a rock-drilling machine, a main cylinder, piston, and distributing-valve therefor, a tappet to move said valve, a supplementary piston adapted to act upon and move the distributing-valve, in one direction, in advance of the tappet for normally actuating the same, whereby the main piston and drill stem will act with short strokes, substantially as specified.

5. In a rock-drilling machine, a main cylinder, piston and distributing-valve therefor, a tappet to move said valve, a passage for air leading from the valve-box and air-supply to the rear side of an auxiliary piston, causing this to press upon and move the distributing-valve to produce short strokes of the machine and the drills operated thereby, substantially as specified.

6. In a rock-drilling machine, a main cylinder and piston, and a distributing-valve therefor, a tappet to move said valve, an auxiliary cylinder and piston to move the distributing-valve in advance of the tappet action, a passage from the inner end of the auxiliary cylinder and inner side of the auxiliary piston to the open air and a cock to open and close this passage, substantially as, and for the purposes specified.

These features I believe to be novel and useful, and ask that Letters Patent be granted therefor.

WILLIAM GLEESON.

Witnesses:
JOHN DELZELL,
JOSEPH H. BAKER.