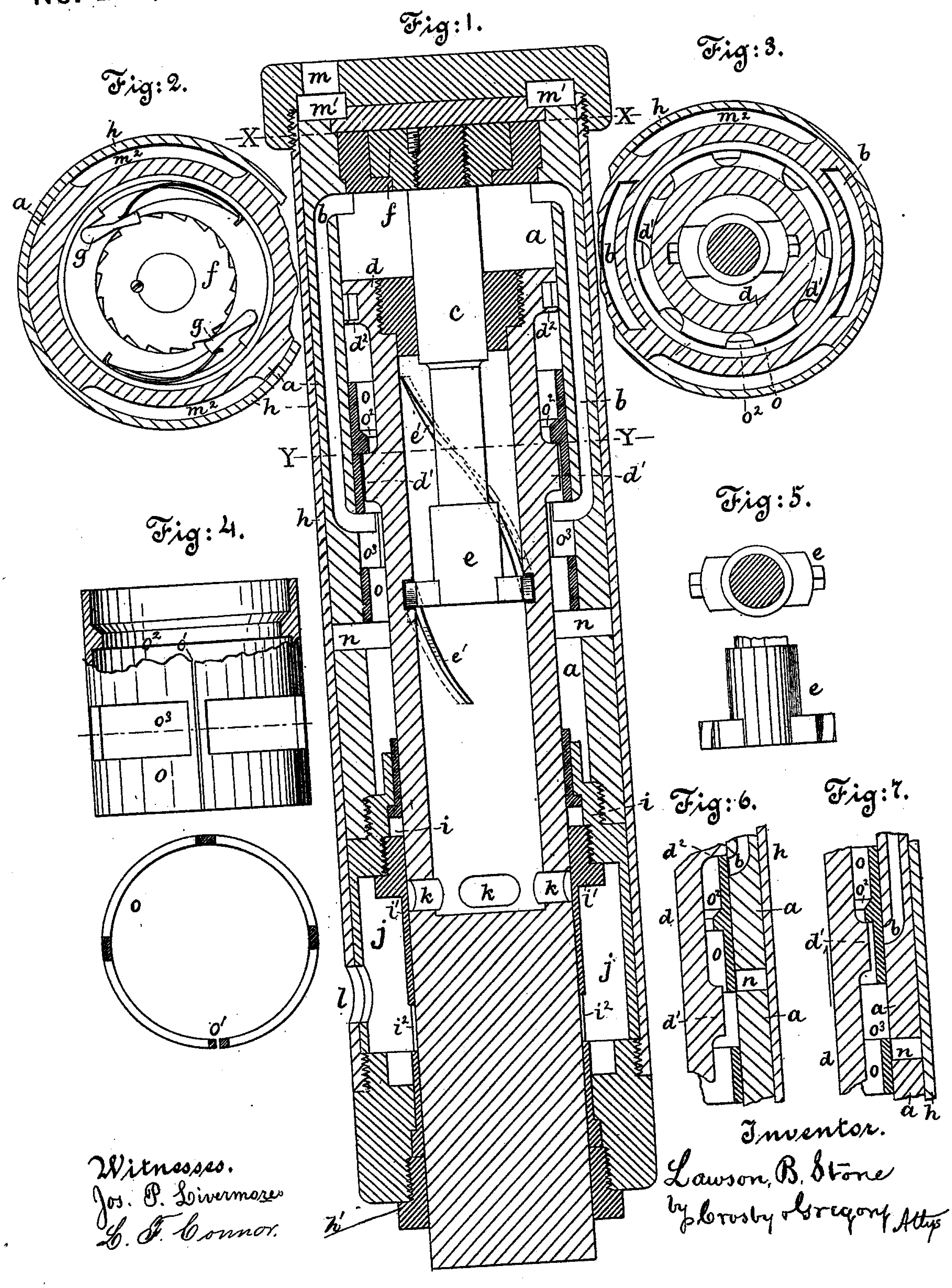
L. B. STONE.
Rock Drill.

No. 229,485.

Patented June 29, 1880.



Witnesses.
Jos. P. Livermore
L. F. Connor.

Inventor.
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by Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

LAWSON B. STONE, OF BOSTON, MASSACHUSETTS.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 229,485, dated June 29, 1880.

Application filed December 15, 1879.

To all whom it may concern:

Be it known that I, LAWSON B. STONE, of Boston, Suffolk county, State of Massachusetts, have invented an Improvement in Rock-Drills, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to improvements in valves for rock-drills, as hereinafter specified and claimed.

I have herein shown and described that form of rock-drill cylinder to which my invention is best adapted.

Figure 1 is a longitudinal section of a rock-drill provided with my improvements; Figs. 2 and 3, cross-sections thereof on lines *x x* and *y y*, respectively; Fig. 4, an elevation, partly in section, and a cross-section of the valve detached; Fig. 5, top and side view of the spiral head for rotating the drill; and Figs. 6 and 7 details, showing the relative positions of the ports and valve in different positions of the stroke.

The cylinder *a*, ports *b*, exhaust-valve *c*, piston *d*, and spiral head *e* are all constructed and operate substantially as in the patent of J. B. Johnson, No. 213,663, dated March 25, 1879.

The ratchet *f*, connected with the spiral head *e* by the exhaust-valve *c*, permits said spiral head to be rotated by the spiral grooves *e'* of the piston in the downstroke, but, in connection with the pawls *g*, prevents rotation of the spiral head in the reverse direction, thereby causing it to rotate the piston and connected drill in its upstroke.

I do not claim the devices for rotating the drill, as they are now in common use. They are, however, shown in detail in the drawings, Figs. 2 and 5, and their relation to the other parts indicated in Figs. 1 and 3.

The outer casing, *h*, contains a chamber for live steam, (shown as taking steam at the passage *m* in the upper head of the casing,) the steam being received in an annular space, *m'*, at the top of the casing and passing down through the channels m^2, (see Figs. 2 and 3,) cut in the outside of the cylinder *a*, to the induction-port *n*, through which it enters the said cylinder *a* to act on the piston. The port *n* is controlled by the valve *o*, which is operated substantially as in the patent referred to. This valve *o*, constituting my invention, consists of an elastic ring split on one side, as at *o'*, and sprung into the cylinder *a*, where it remains stationary in any position on account of its pressure against said cylinder, except when positively moved in the upward direction by the projections *d'* of the piston *d* engaging the internal projecting ring, o^2, of the valve *o*, and in the downward direction by the shoulder d^2, which forms the effective area on the under side of the piston *d*, acting on the upper edge of the valve *o*. The valve *o* is made much longer than in the patent referred to, and is provided with openings o^3.

In Fig. 1 the piston is shown near the end of its upstroke, the live steam entering at the ports *n* and passing through the openings o^3 of the valve and the ports *b* into the cylinder *a* above the piston, to check the momentum of its upstroke and cause the downstroke, the ports *b* thus remaining open and the steam following the piston in its downstroke until the shoulder d^2 strikes the valve, causing it to simultaneously close the ports *b* and induction-port *n*, the piston completing its downstroke by the expansion of the steam above it and by its own momentum until, at the bottom of its stroke, the ports are in the position shown in Fig. 6, both ports *b* and *n* being closed by the upper part of the valve. When in this position a sufficient quantity of steam is trapped in the cylinder *a* below the piston to begin its upstroke by its expansion or to cushion its downstroke if the drill-point does not meet the rock.

As soon as the projections *d'* meet the ring o^2 steam is admitted from the port *n*, through the openings o^3, to the space below the piston, and follows it in the upstroke until the parts arrive at the position shown in Fig. 7, when the induction-port *n* is closed by the lower part of the valve *o*, and the upstroke is completed by expansion, bringing the parts to the position shown in Fig. 1, when the operation is repeated.

In practice, when working on the rock, the drill-point will meet the rock and terminate the downstroke before the upper blank portion of the valve *o* closes the induction-port *n*.

When the piston in its downstroke passes over the end of the exhaust-valve *c* the exhaust steam passes through the piston and laterally out of the ports k into the exhaust-chamber j, whence it may be conducted away as desired. The lower end of the casing h is provided with the usual stuffing-box h'.

I claim—

1. A rock-drill valve composed of a split metal tube adapted by its inherent elasticity to remain stationary until positively operated by external means, and provided with ports or openings and an internal ring, substantially as described.

2. In a rock-drill, a valve composed of a split metal tube provided with ports or openings and an internal ring, and adapted to fit closely, by its inherent elasticity, to the cylinder, in combination with an operating-piston, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LAWSON B. STONE.

Witnesses:
JOS. P. LIVERMORE,
N. E. C. WHITNEY.