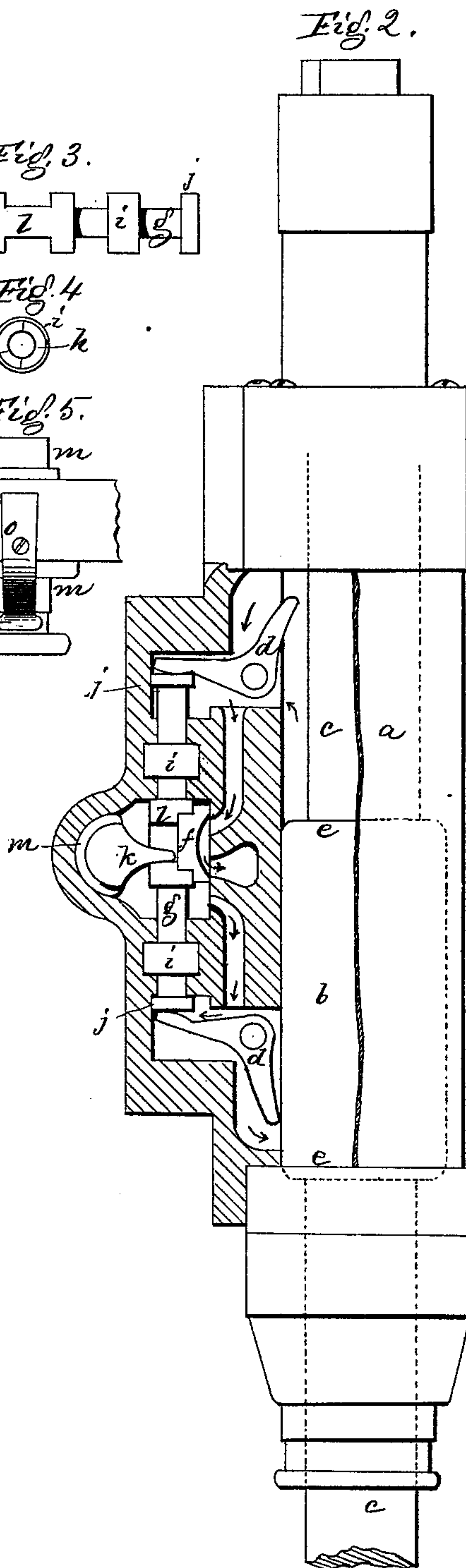
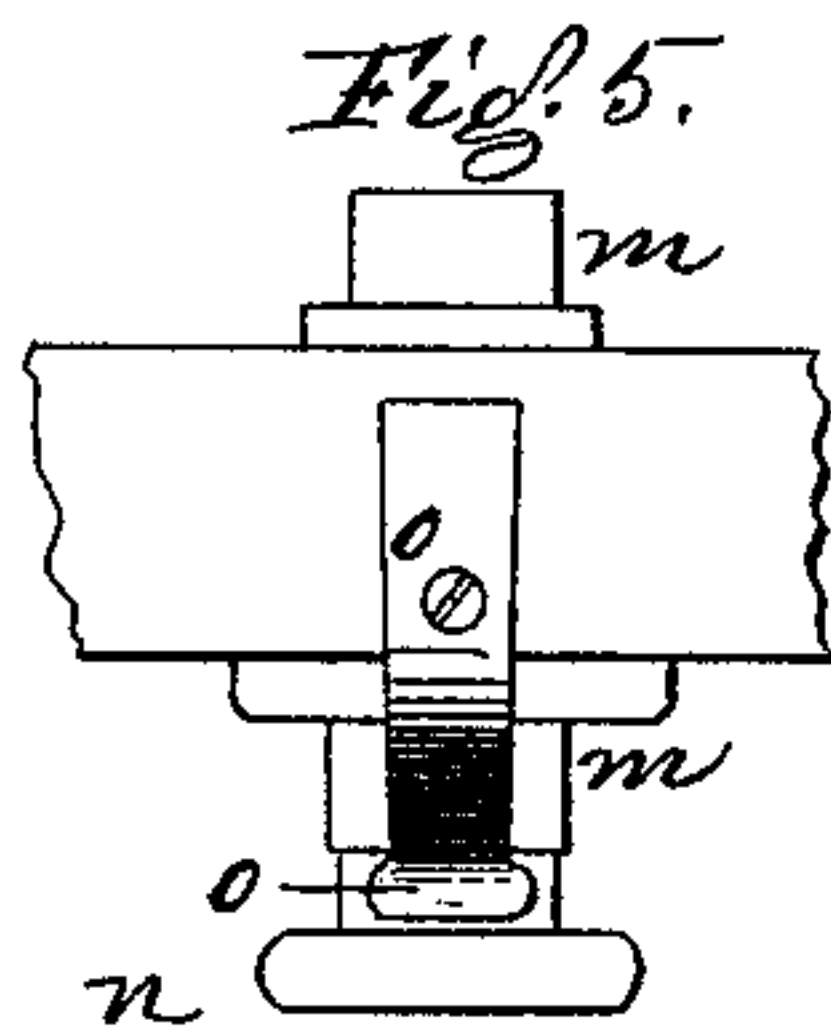
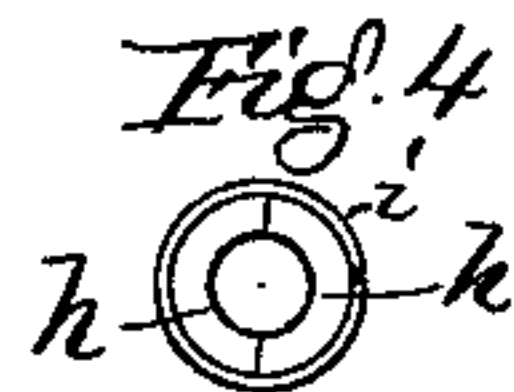
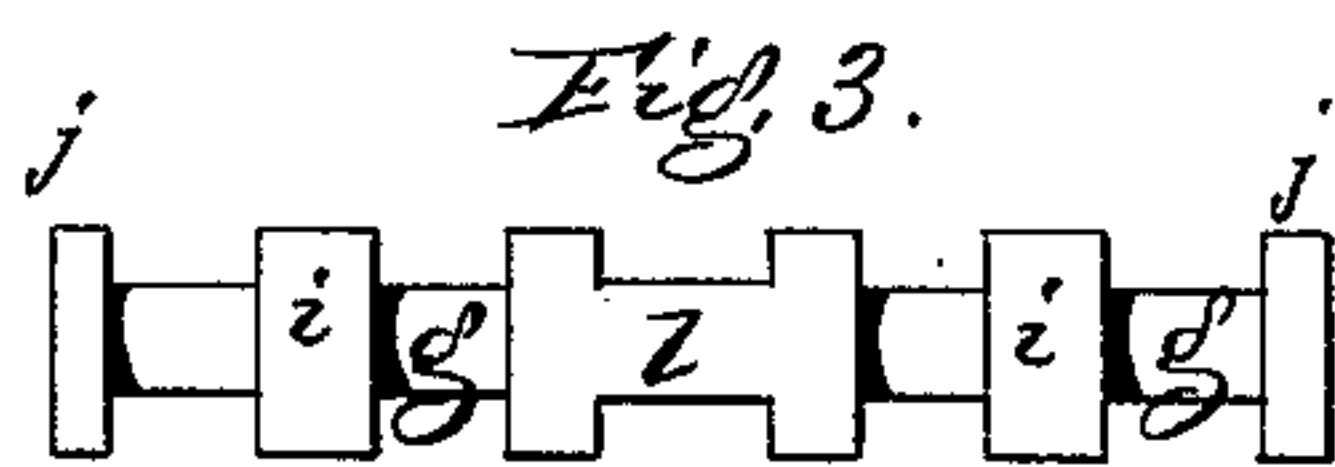
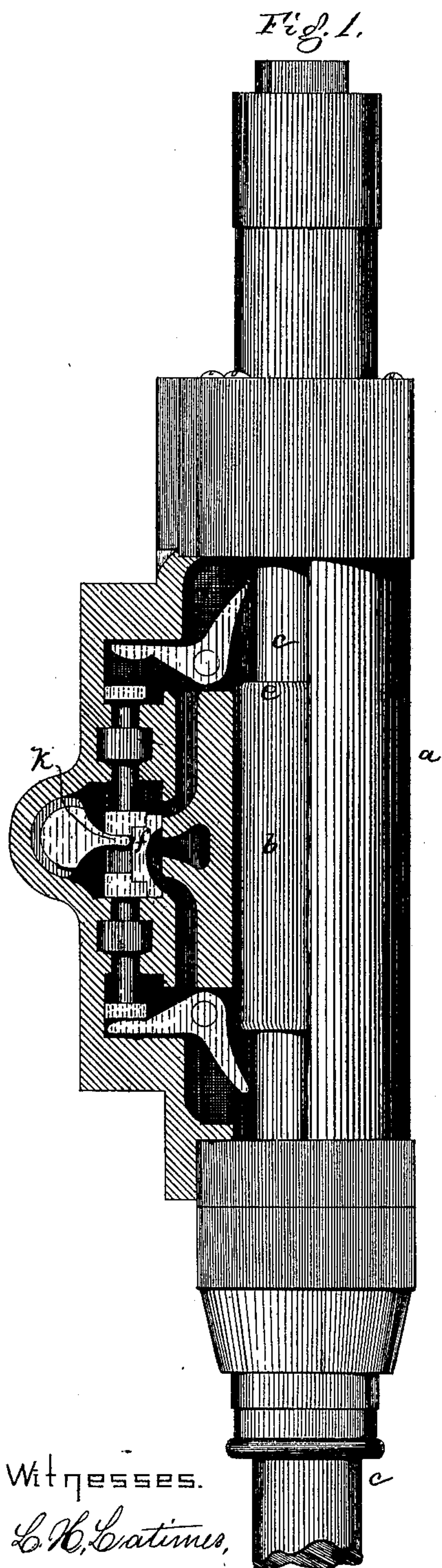


C. BURLEIGH.
Rock-Drill.

No. 200,690.

Patented Feb. 26, 1878.



Witnesses.

L. H. Coates,
W. J. Pratt.

Inventor Charles Burleigh
per *brooks & company attys.*

UNITED STATES PATENT OFFICE.

CHARLES BURLEIGH, OF FITCHBURG, MASSACHUSETTS.

IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. **200,690**, dated February 26, 1878; application filed January 29, 1876.

To all whom it may concern:

Be it known that I, CHARLES BURLEIGH, of Fitchburg, in the county of Worcester and State of Massachusetts, have invented an Improvement in Rock-Drills, of which the following is a specification:

This invention relates to improvements in rock-drills adapted to be operated by steam or compressed air.

In United States Letters Patent, No. 162,528, heretofore granted to me, the levers in the steam or air passages are operated by the annular cam-surfaces carried by the piston-head, have their outer ends placed in openings or compartments in the valve-rod, and the levers move the valve-rod and always move with it. It is desirable to move the valve-rod as quickly and with as little expenditure of power as possible, and in this instance I have dispensed with the outer sides of the so-called compartments of the valve-rod, and have made provision whereby the air or steam admitted into a passage wherever a valve-moving lever is situated will act immediately on the head of the valve-rod and move it in advance of the action of the lever, after the lever shall have started the valve, so as to permit the free steam to meet that end of the lever.

In that patent the stem of the valve-rod extended outside the cylinder through a stuffing-box, and one end of the rod is subjected to atmospheric changes; but in the present invention the valve-rod is entirely within the casing, and the surfaces at its ends against which the steam works are equal, and the end of the valve-rod, heretofore extended into the atmosphere through a stuffing-box, is dispensed with, reducing the weight of the valve-rod, its friction, and lessening the power required to move it; and both ends of the valve-rod are always of the same temperature, and the valve-rod is not liable, by an accidental blow, to be bent or broken.

The hand-lever adapted to move the valve-rod to start the machine is, in the patent, passed through a hole in the extended valve-rod; but in the present instance a finger on a shaft or pin enters a slot in the back of the valve, such construction enabling me to dispense with the extended end of the rod and

greatly reduce its weight and operate it in a better and more satisfactory manner.

Figures 1 and 2 represent the casing and piston, or drill-carrier, and valve-mechanism, the latter being in section, and with the valve-rod in its two extreme positions. Fig. 3 represents the valve-rod and packing-segments removed; Fig. 4, an end view of the packing-segments; and Fig. 5, a top view of the shaft or pin that carries the finger adapted to move the valve-rod.

The bed-plate or frame of the machine and the feeding-screw to advance the drill and mechanism to rotate the piston-rod, (neither shown in the present case,) and the cylinder *a*, piston *b*, piston-rod *c*, valve-moving levers *d*, annular portions *e* on the piston, and the valve *f*, are all substantially as represented in the patent before mentioned. The valve-rod *g* reciprocates in packing segments *h*, inclosed within a contractile steel or metal ring, *i*, both placed in openings to receive them in the case and adapted to keep the segments close against the rod; and each end of the valve-rod is provided with a head, *j*, against which the air or steam acts whenever the rod and valve are moved a little by the lever; for the steam, rushing into the passage in which the lever just operated or slightly moved by the annular projection is situated, acts against the head *j*, and throws the valve-rod and valve quickly into its opposite position, the entire stroke to move the valve in either direction being a pushing stroke, and subjecting the valve-rod only to contractile strain.

The valve-rod *g* is arranged entirely within the casing, and is protected from the action of the atmosphere and the liability of accidents from blows, and is made as short and light as possible, and the steam, in moving the valve, presses at each end on heads of like area. The finger *k* to engage the valve-rod to start the machine, enters a slot at the back of a block, *l*, on the valve-rod, the block carrying the valve *f*, which is removable therefrom. This finger projects from a rocking arm or shaft, *m*, mounted in close bearings in the case, and provided with a thumb-nut, *n*, or lever by which to turn it and the finger to start the machine should the valve not be in the proper

position; and a spring, *o*, bearing on a square or flat portion of the shaft, turns it, when released, immediately back to its central position, where it is not moved by the valve-rod during its reciprocations.

The air or steam inlet and exhaust passages are as described in my other patent, and the piston-rod and its attached drill are operated in the usual and well known way.

I claim—

1. In a rock-drill, a rigidly-connected valve and valve-rod, arranged entirely within the case, in combination with levers adapted to be moved by the piston to start the valve-rod, substantially as and for the purpose described.

2. In a rock-drill, a valve-rod arranged entirely within the casing, in combination with a finger arranged within the casing and adapted to be engaged with and to operate the valve-rod, with spring to hold the finger in central position, substantially as described.

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

CHARLES BURLEIGH.

Witnesses:

R. L. ROBERTS,
L. H. LATIMER.