J. C. GITHENS.

STEAM ROCK-DRILL.

No. 188,045. Patented March 6, 1877.

Fig. 1

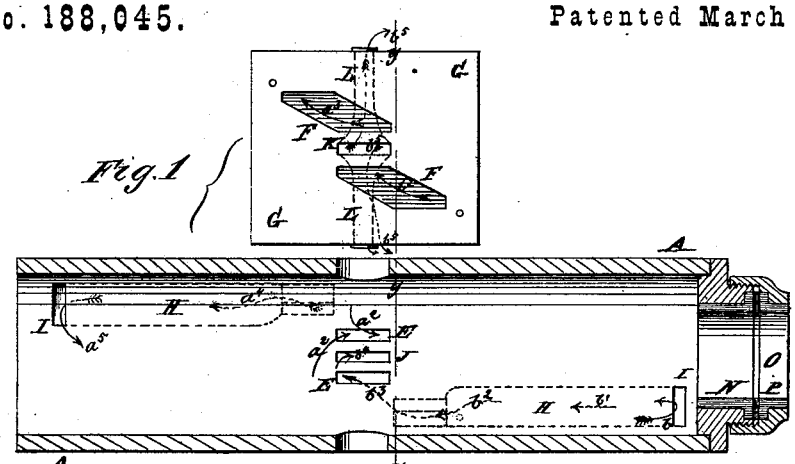


Fig. 1.

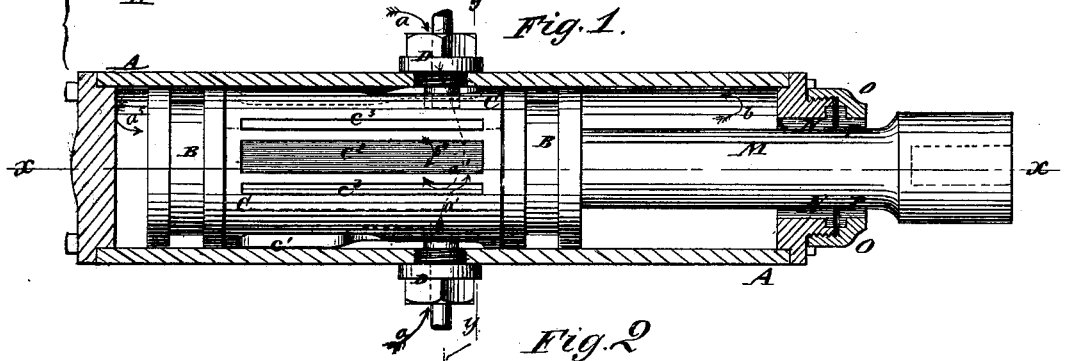


Fig. 2

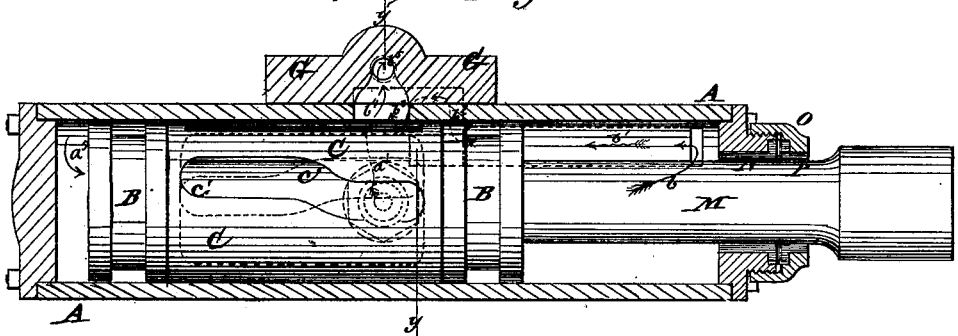
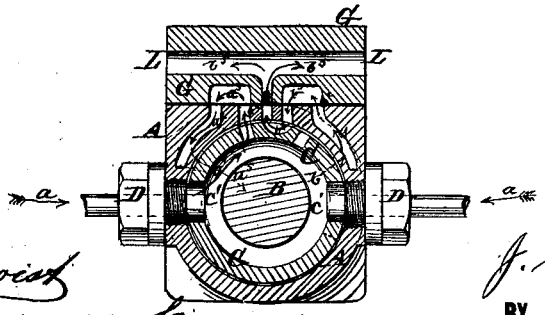


Fig. 3.



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JOSEPH C. GITHENS, OF NEW YORK, N. Y.

IMPROVEMENT IN STEAM ROCK-DRILLS.

Specification forming part of Letters Patent No. **188,045**, dated March 6, 1877; application filed November 25, 1876.

To all whom it may concern:

Be it known that I, JOSEPH C. GITHENS, of the city, county, and State of New York, have invented a new and useful Improvement in Steam Rock-Drills, of which the following is a specification:

Figure 1 is a detail view of various parts of the drill. Fig. 2 is a longitudinal section of the same, the piston-sleeve and piston-rod being shown in side view. Fig. 3 is a cross-section of the same taken through the line *y y*, Figs. 1 and 2.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved rock-drill which shall be so constructed as to avoid the necessity of a large steam-chest upon the outside of the steam-cylinder to enable the drill to be used close to the top of the cutting, and in other places where it could not be used if constructed in the usual way.

The invention consists in the sleeve provided with the curved slots, the longitudinal cavity, and the straight longitudinal slots, in combination with the cylinder, the piston, and the steam-inlet tappets, to adapt it to serve as a valve, as hereinafter fully described.

A represents the cylinder, the heads of which are secured in place in the usual way. B is the piston, the ends of which are packed in the usual way. The middle part of the piston B is made smaller and is surrounded with a sleeve, C, the space between the said middle part and the said sleeve serving as a steam-chest. The steam is introduced through guide-pins D screwed into the opposite sides of the cylinder A, the inner ends of which project so as to enter slots c^1 in the sides of the sleeve C, which slots c^1 are curved, as shown in Fig. 2, so that the said sleeve may be turned to admit and exhaust the steam by the longitudinal movement of the piston B. In the sleeve C, midway between the guide-slots c^1, is formed a longitudinal groove, c^2, which serves as a passage for the exhaust steam. In the sleeve C, upon the opposite sides of the groove c^2, are formed longitudinal slots c^3, to serve as passages for the steam.

The steam enters the space within the sleeve C through the guide-pins D, as indicated by the arrows *a* a^1, and passes thence through one or the other of the slots c^3 into one of the ports E in the shell of the cylinder A, as indicated by the arrows a^2. The steam passes from the port E, through one of the passages F in the block G bolted to the cylinder A, as indicated by the arrows a^3. From the passage F the steam passes through one of the passages H formed in the shell of the cylinder, as indicated by arrow a^4, and is discharged into said cylinder through the port I, as indicated by arrow 5. The ports I are formed at a little distance from the ends of the cylinder so that the steam can never be wholly exhausted, and so that enough steam will always be left to cushion the piston B. As the piston B begins its return stroke, the sleeve C is turned by the ends of the guide-pins D, so that the cavity c^2 may cover one of the ports E and the port J formed midway between the two ports E.

The exhaust steam passes out of the cylinder A, through the port I, into and through the passage H, as indicated by the arrows *b* b^1. From the passage H it passes into and through the passage F, as indicated by the arrow b^3, through the port E, into the cavity c^2, as indicated by the arrow b^4, out through the port J, and thence through the port K, between the passages F in the block G, and escapes through the passages L in said block into the air, as shown by arrows b^5.

With this construction the sleeve C acts as a valve to admit and exhaust the steam, and the space within said sleeve, around the middle part of the piston B, serves as a steam-chest, so that there does not need to be any steam-chest upon the outside of the cylinder, which makes the drill much more compact, and enables it to be used in places where it would be very inconvenient or impossible to use a drill made with an outside steam-chest.

To one end of the piston B is attached, or upon it is formed, the piston-rod M, which passes out through a hole in the head of the cylinder A, and has a drill or cutter attached to its end. In the hole through the cylinder-head is placed a bushing, N, which is fitted to the piston-rod M, and is made in the form of two half rings, so that it can be put in and taken out without removing the said piston-

rod, while enabling the body of the piston-rod to be made smaller, to give a greater steam area within the cylinder. The bushing N is secured in place by a ring-cap, O, which is also provided with a half-ring bushing, P. The bushings N P have flanges formed upon their adjacent ends, between which the packing is placed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The sleeve C, provided with the curved slots c^1, the cavity c^2, and the slots c^3, in combination with the cylinder A, the piston B, and the guide-pins D, to adapt it to serve as a valve, substantially as herein shown and described.

JOSEPH C. GITHENS.

Witnesses:
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