G. F. MEYER.

CUT-OFF VALVE.

No. 177,536. Patented May 16, 1876.

Fig. 1.

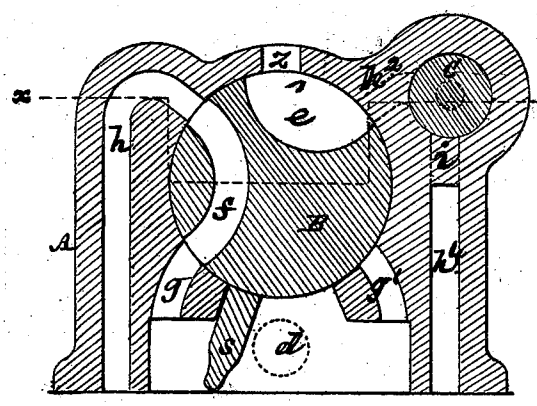


Fig. 2.

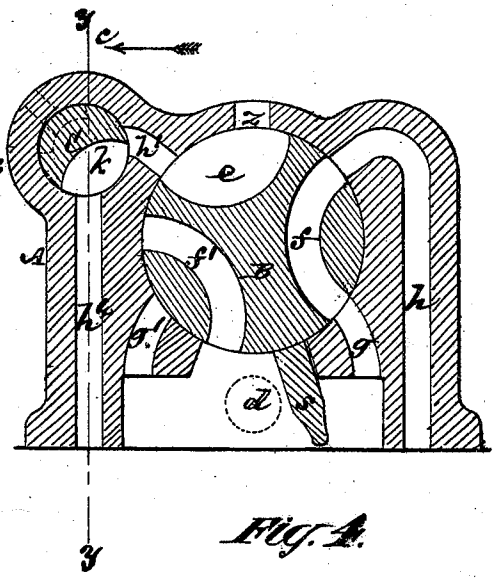


Fig. 3.

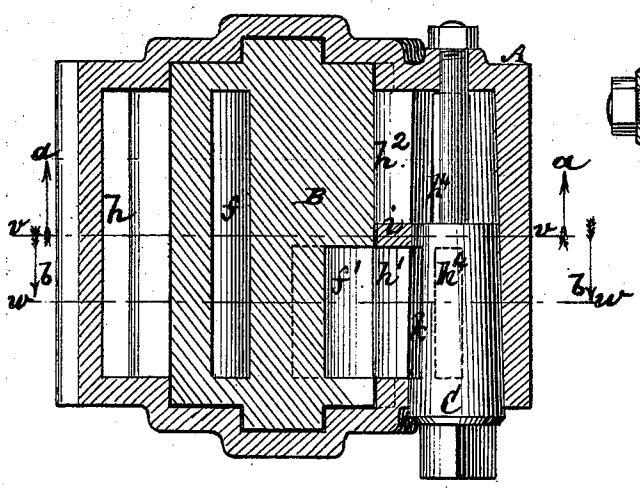
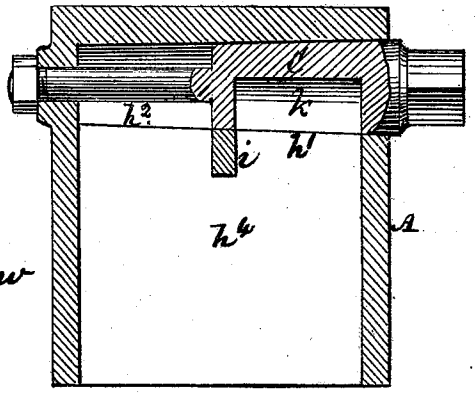


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE F. MEYER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF HIS RIGHT TO CORNELIUS H. DELAMATER AND GEORGE H. ROBINSON, OF SAME PLACE.

IMPROVEMENT IN CUT-OFF VALVES.

Specification forming part of Letters Patent No. **177,536**, dated May 16, 1876; application filed March 16, 1876.

To all whom it may concern:

Be it known that I, GEORGE F. MEYER, of the city, county, and State of New York, have invented a new and useful Improvement in Valves for Rock-Drills and other direct-acting engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification.

This invention is more particularly designed to be applied to rock-drills, and will here be described accordingly. It is, however, equally applicable to other direct-acting engines, in which it is not necessary, or at least always so, to have the propelling-fluid act with the same freedom or force on the piston when moving in the one direction as when moving in the other, and in which it is desirable to vary or increase or diminish the supply of propelling-fluid at the one end of the cylinder as compared with the supply at the other end thereof. The invention relates to means for controlling the admission of the propelling-fluid to either one end of the cylinder, in which an independent valve or plug, adjustable by hand, is combined with the main valve in such manner as to provide for throttling or controlling, as required, the passage to the cylinder by which the propelling-fluid is admitted to the latter through the action of the main valve.

The invention consists in a novel combination, with a rolling main valve, of a hand plug or valve and certain passages in said valves and in the steam or valve chest, consisting of a passage which serves both for induction and eduction to and from one end of the cylinder, and which is controlled by the hand plug or valve, and a separate eduction-passage for the same end of the cylinder, both of which passages are governed by the main valve. Such combination and construction of parts provide for the most perfect regulation as regards the supply of the steam or propelling-fluid to the end of the cylinder so controlled, with an enlarged or extra freedom of exhaust therefrom, in a simple, compact, and most durable manner. Ordinarily it will not be required to have more than one of such induction-controlling valves for varying the ingress of propelling-fluid at the one end of the cylinder only. Thus, in the application of the invention to a rock drill, to be worked, say, by steam, although no restriction is placed upon the kind of propelling agent or fluid, it will only be necessary to apply the adjustable induction-controlling valve to regulate the induction of steam to the drill-bar end of the cylinder—that is, to that side of the piston on which the drill-bar is situated—to provide for varying the force of the return action of the drill, accordingly as it is being worked in an upward, downward, or any intermediate position, or as other circumstances or conditions may require. Such induction-controlling valve is made adjustable by hand.

In the accompanying drawing, Figures 1 and 2 represent transverse sections of a valve-box and valves in accordance with my invention, and designed to be applied to a rock-drill, said sections being taken in planes parallel with each other—that is, the section in Fig. 1, on the line *v v* in Fig. 3, looking in direction of the arrows *a a*, and the section in Fig. 2 on the line *w w*, looking in direction of the arrows *b b*. Fig. 3 is an irregular section on the line *x x* in Fig. 1. Fig. 4 is a section on the line *y y* in Fig. 2, looking in direction of the arrow *c*.

A is the valve-box, to which steam is admitted, as by an opening, *d*, or otherwise. B is the main valve, which is here represented as circular, and which has a curvilinear reciprocating motion about its axis by means of a tappet, *s*, or otherwise. Said valve has an exhaust-cavity, *e*, in it, which is always in communication, during the rolling of the valve, with the exhaust-outlet *Z*. It is furthermore provided on its one side with an induction-passage, *f*, extending throughout the length of the valve, or thereabout, and serving, when the valve is in the position represented in Figs. 1 and 2, to pass steam from the valve-box, through a fixed induction-passage, *g*, to and through a fixed induction and eduction passage, *h*, which passes the steam to the back of the piston—that is, the side of the piston on

which the drill-bar is not situated. These passages g and h extend across the valve-box, or throughout the length of the valve, or thereabout, to accord with the induction-passage f through the valve. When the valve B is turned to put its exhaust-cavity e in communication with the passage h, then the passage g is closed by the valve. It will thus be seen that there is always a free ingress and egress for the steam to and from that end of the cylinder with which the passage h connects. The opposite end of the cylinder, through which the drill-bar works, is differently controlled. Thus, the valve B has its induction-passage f' wholly near the one end of the valve, or extending only throughout a portion of its length, and the fixed induction-passage g' extends in like manner only partially along the valve-box, in like transverse relation with the valve as the induction-passage f'. The fixed passage h^4, on the same side of the main valve as the fixed passage g', is separated, at or near its outer end, by a partition, i, arranged intermediately of the width of the valve-box, thereby forming two branches or passages, h^1 h^2, both of which are in communication with the seat of the main valve. The passage h^2 is purely an eduction-passage, and is arranged beyond or to one side of the induction-passage f' of the main valve. Such passage h^2 constitutes an independent or additional eduction port or way, and is sufficiently large to give a free exhaust. The passage h^1 is both for induction and eduction to and from the same end of the cylinder as that with which the passage h^2 connects. This passage h^1 is on the same side of the valve-box as the fixed passage g' and the passage f' of the valve. The exhaust-cavity e extends throughout the length of the valve B, or thereabout, so that it communicates with both passages h^1 h^2. C is the induction-controlling valve applied to the passage h^1, and on the same side of the main valve and valve-box as are the passages f' g'. This controlling-valve is represented as a simple plug formed with a longitudinal cavity, k, in it, and is adjustable by hand from the exterior of the valve-box.

Unlike the main valve B, the induction-controlling valve C does not have a constant motion, but is only set from time to time according to the amount of steam it is desired to supply to the engine by the passage h^1. Thus it may be turned or set so that its cavity k will establish full or free communication through the passage h^1 for the steam to the drill side of the piston, when the main valve is turned so that its passage f' connects the passages g' and h^1, or said induction-controlling valve C may be set to more or less contract the passage h^1 by the cavity k in the valve. This mode of controlling the ingress of steam to the one end of the cylinder does not cripple or interfere with the exhaust from such end, but the passage h^1, which is both for induction and eduction, gives an enlarged or extra freedom to the exhaust, through the valve C, over and above the capacity of the exclusively exhaust-passage h^2.

I claim—

The combination, with the rolling main valve B, having an exhaust-cavity, e, and independent induction-passages f f', as described, of the externally-adjustable hand plug or valve C, the induction and eduction passage h^1 in the valve box or case controlled by the hand-valve C, and also by the main valve B, the separate eduction-passage h^2, controlled by the main valve, and the passages h^4 h, substantially as and for the purpose or purposes set forth.

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