

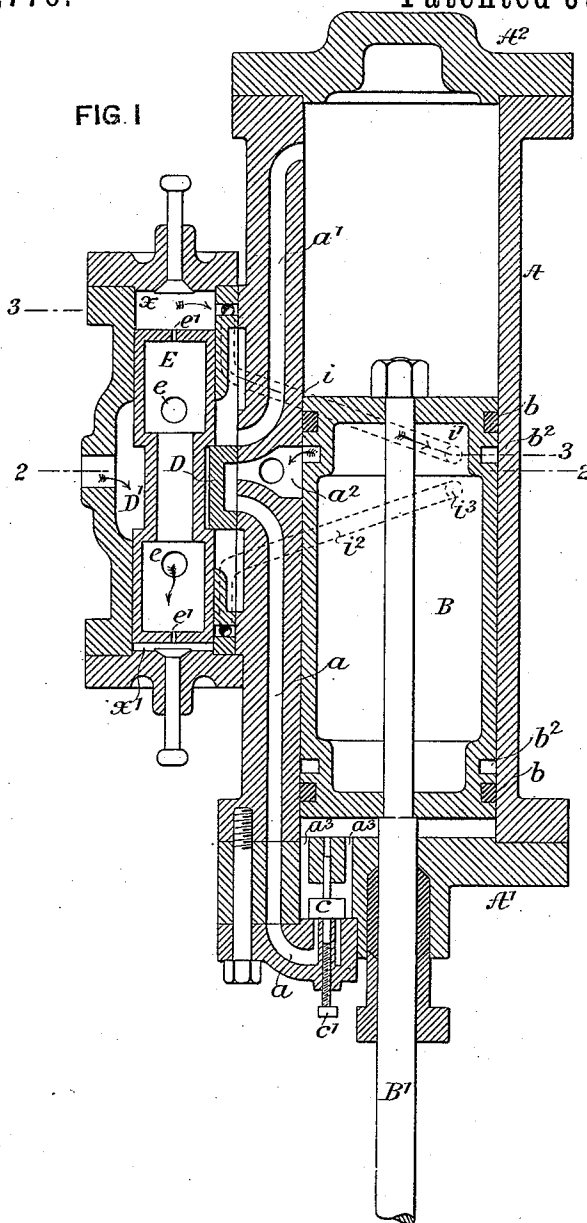
(No Model.)

2 Sheets—Sheet 1.

D. COOPER.
VALVE MECHANISM.

No. 553,776.

Patented Jan. 28, 1896.



WITNESSES

W. R. Goodwin
William A. Davis

INVENTOR

Dyer Cooper
By his Attorneys
Howson & Howson

(No Model.)

2 Sheets—Sheet 2.

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FIG. 2.

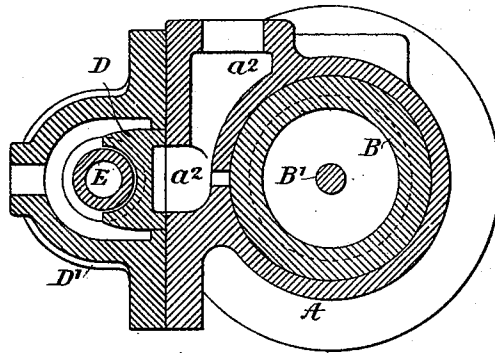
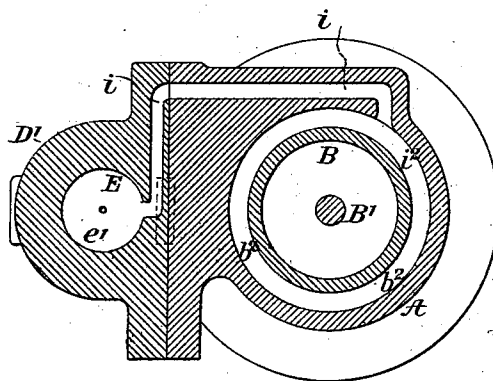


FIG. 3.



WITNESSES.

H. D. Goodwin

William A. Carr

INVENTOR.

Dyer Cooper

By his Attorneys

Howson & Howson

UNITED STATES PATENT OFFICE.

• DYER COOPER, OF PHILADELPHIA, PENNSYLVANIA.

VALVE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 553,776, dated January 28, 1896.

Application filed January 3, 1894. Serial No. 495,497. (No model.)

To all whom it may concern:

Be it known that I, DYER COOPER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Valve Mechanism, of which the following is a specification.

The object of my invention is to simplify the construction of valve-operating mechanism of steam-pumps, &c., by making the piston open and close exhaust-ports, allowing steam to exhaust from either side of the valve-piston, as fully described hereinafter.

A further object of my invention is to cushion the piston when used especially in a vertical pump or drill.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of sufficient of a pump illustrating my invention. Fig. 2 is a transverse section on the line 2 2, Fig. 1; and Fig. 3 is a transverse section on the line 3 3, Fig. 1.

I have shown in the drawings the pump arranged in a vertical position, but it will be understood that it can be arranged in a horizontal position without departing from my invention.

A is the cylinder having heads A' A², and in the cylinder-casting are ports a a', through which the steam enters and escapes.

a² is the exhaust-passage, which is open to either port as dictated by the slide-valve D, and is open direct into the cylinder, this opening being covered by the piston B. This piston is preferably elongated, as shown, and secured thereto is a piston-rod B', which is attached to the pump-piston of the ordinary construction. In grooves in this piston are suitable packing-rings b b, and beyond the packing-rings at each end of the piston are exhaust-grooves b' and b², which align with passages from the steam-chest D' as well as with the exhaust-port a², as fully described hereinafter.

In the port a, extending in the present instance into the head A' of the cylinder, is a valve c, which closes the port more or less when steam is exhausted, so as to cushion the piston on its downward stroke. This valve is regulated by an adjusting-screw c', by means of which more or less opening can be given to the port. The area of the passages a³ beyond the valve is equal to the area of

the port a, so that the steam in its admission to the cylinder is not wire-drawn, the valve c simply controlling the exhaust. The valve is a disk-valve having stems which are guided in ways in the head of the cylinder.

The slide-valve D is controlled by a piston E, made hollow in the present instance and having openings e to allow steam to enter the valve from the steam-chest D', and in each end of this piston are small holes e', through which steam is wire-drawn and enters the spaces x x' at each end of the steam-chest. The space x communicates with a passage i, which extends some distance below the exhaust-port a² and enters the cylinder at i', so that when the piston B is in the position shown in Fig. 1 at the end of its stroke the groove b² will align with this opening i' and at the same time with the exhaust-port a² and consequently exhaust the steam from the space x at one end of the valve-piston B, and steam at the opposite end of the piston will consequently force the piston and its valve in the direction of the arrow, shifting the slide-valve D, and the piston B will then move in the opposite direction. The piston will immediately cut off the communication between the space x and the exhaust-passage a², and steam will flow into the space x from the steam-chest D'. When the piston travels to the opposite end of the cylinder, the groove b' will align with the opening i³ of the passage i², which will exhaust the steam from the space x' at the opposite end of the valve-piston E, and thus reverse the slide-valve.

By the above-described mechanism it will be seen that the valve-operating mechanism is contained within the steam-chest and is not liable to be injured or become disarranged. This valve mechanism, it will be understood, can be used for other purposes than operating steam-pumps.

I claim as my invention—

1. The combination in valve mechanism, of the cylinder having a steam-chest, ports a a' extending from the ends of the cylinder to the steam-chest, a central exhaust-passage opening into the steam-chest and opening into the cylinder, a piston adapted to the cylinder and having grooves which alternately communicate with the exhaust-passage, a slide-valve controlling the admission of steam to

and exhaust of steam from the cylinder, a similar piston controlling said valve and having passages therein communicating with the steam-chest and with spaces beyond each end
5 of the piston, said passages being of such diameter as to wire-draw the steam, and passages extending from each end space to a central point in the cylinder some distance from the opening into the exhaust-passage so that
10 when the piston in the cylinder reaches either of the extreme positions one of the grooves in the piston will form a communication between said passages and the exhaust-passage, substantially as described.

15 2. The combination of the cylinder A, pis-

ton B, admission-ports *a a'*, a valve controlling the admission of steam into these ports, a valve *c* in the port *a* which will allow the free passage of steam into the cylinder, but will reduce the area of the passage when steam
20 is exhausted therefrom so as to form a cushion and an adjusting-screw for regulating the valve, substantially as described.

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

DYER COOPER.

Witnesses:

FRANK BECHTOLD,

JOSEPH H. KLEIN.