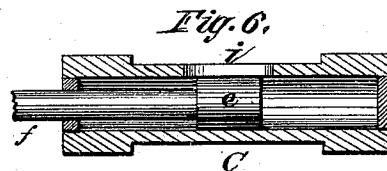
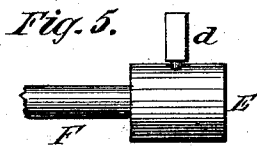
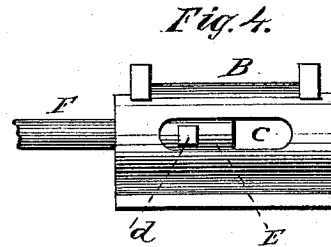
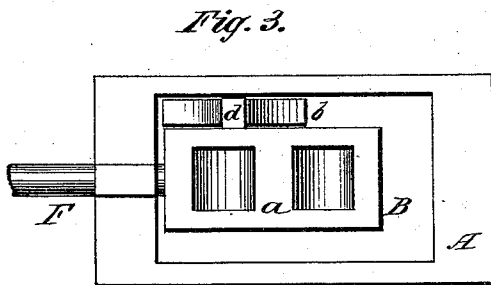
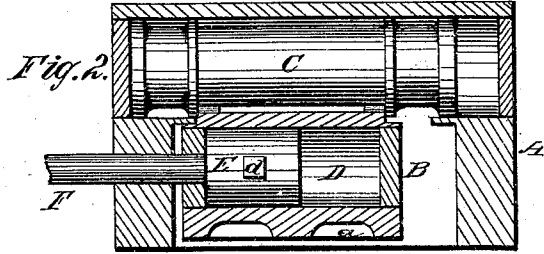
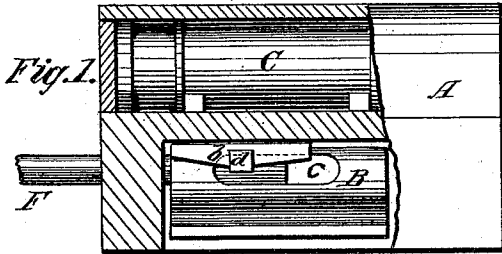


J. L. AGNEW.
STEAM-VALVE.

No. 177,980.

Patented May 30, 1876.



WITNESSES:
Chas. H. West
Chas. Bond

INVENTOR:
John L. Agnew

UNITED STATES PATENT OFFICE.

JOHN L. AGNEW, OF CHICAGO, ILL., ASSIGNOR TO THE CRANE BROTHERS MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN STEAM-VALVES.

Specification forming part of Letters Patent No. 177,980, dated May 30, 1876; application filed November 30, 1875.

To all whom it may concern:

Be it known that I, JOHN L. AGNEW, of the city of Chicago, Cook county, State of Illinois, have invented new and useful Improvements in Steam-Valves, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation, with parts cut away to show the interior. Fig. 2 shows the steam-chest and main valve in section, and the main valve and valve-piston in elevation. Fig. 3 is a bottom view; Fig. 4, a side view of the main valve; Fig. 5, a detail; Fig. 6, a modification.

This improvement relates to slide-valves, and is especially designed for use with steam-pumps, and other purposes where the movement is rapid.

It is customary to move the valve by means of a valve-piston, operated by steam; and when the movement of the piston-head in the cylinder is rapid, the movement of the main valve is sometimes uncertain, and its action is not always sufficiently positive. There are devices in use for overcoming this difficulty, but they are attended with much noise, and, in consequence of the pounding, some part is liable to break.

The object of this invention is to obviate the difficulties suggested, which I accomplish by providing either the main valve or the valve-piston with a cylindrical chamber, in which is placed a short piston, which is operated by tappets in the usual manner, the parts being so arranged that, if the movement of the main valve is uncertain, it will be aided by such secondary piston, as more fully hereinafter described. I also so arrange and construct the parts that a little steam will be trapped between the end of the secondary piston and the end of the valve or valve-piston, as the case may be, for the purpose of preventing noise and pounding.

In the drawings, A represents a steam-chest and valve-chamber. B is the main valve, the face *a* of which rests upon the face of the cylinder, as usual. *b* is the auxiliary valve, which covers ports for the admission of steam to the ends of the valve-piston C, and through which it is exhausted. The ports are not

shown. The main valve engages with projections on the valve-piston C.

Thus far nothing new has been described.

The main valve is provided with a cylindrical chamber, D, in which is a short piston, E, as shown. It is a little longer than one-half the length of the chamber D; but I do not limit myself to this exact length.

In the side of the valve B is a long slot, *c*, opening into the chamber D. This slot does not extend the whole length of the chamber D at either end.

d is an arm secured to the piston E, and it engages with the auxiliary valve *b*. F is a piston-rod, connected with the piston E, which piston is operated by means of an arm connected to the piston-rod of the cylinder and tappets in the ordinary manner.

In use the valve-piston C is operated in the usual manner, and by it the main valve will be moved as usual, when the speed is not great.

In case the valve-piston C does not operate with certainty, or if its action is not sufficiently positive, the movement of the piston E within the valve B will move the valve, aiding the action of the valve-piston C, or, if necessary, acting without the aid of the valve-piston C, though it is my purpose to use the two together. With each movement of this piston E steam will be trapped in the chamber D, and between the end of the piston E and the end of the chamber D, first at one end and then at the other, forming a cushion, and preventing noise and pounding.

The same object can be accomplished by making the valve-piston C hollow, providing it with a piston and rod corresponding with E and F. In such case the auxiliary valve can be operated by a pin or arm connected with the piston in C, and such piston can be operated by tappets, as before described. This piston in C will aid in moving C, when its action is not certain or positive, and, as the main valve is to be connected with C as before, the main valve will be moved with C; so that, whether the piston E be located in the main valve, or in the valve-piston C, the operation will be the same, substantially.

Fig. 6 represents so much of the above-described variation as is necessary to illustrate

the same. In this figure C is the valve-piston. *e* is a secondary piston located in C, and corresponding with E. F is a piston-rod, and *i* is a slot in C, corresponding with the slot *c* in B.

What I claim as new, and desire to secure by Letters Patent, is as follows:

The hollow valve B, provided with a slot, *c*,

and a piston, E, in combination with the valve-piston C and steam chest A, substantially as and for the purposes specified.

JOHN L. AGNEW.

Witnesses:

E. A. WEST,

O. W. BOND.