

H. A. JAMIESON.

Valves for Direct-Acting Engines.

No. 144,545.

Patented Nov. 11, 1873.

Fig. 5.

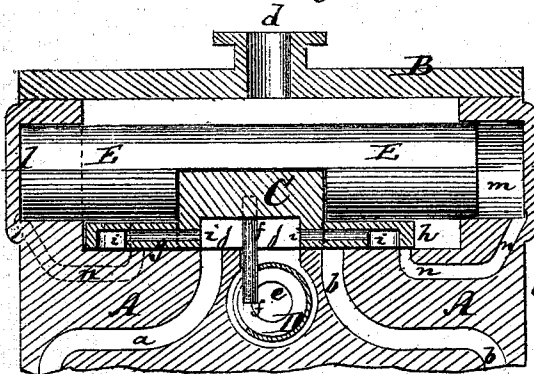


Fig. 4.

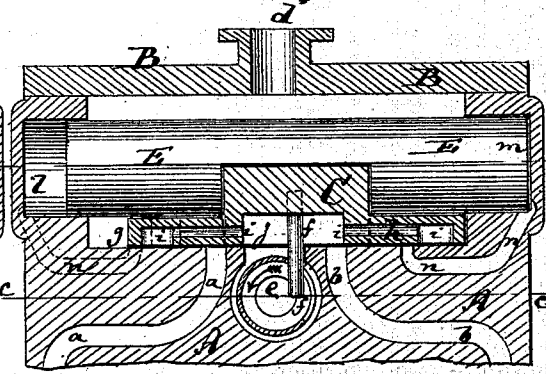


Fig. 2.

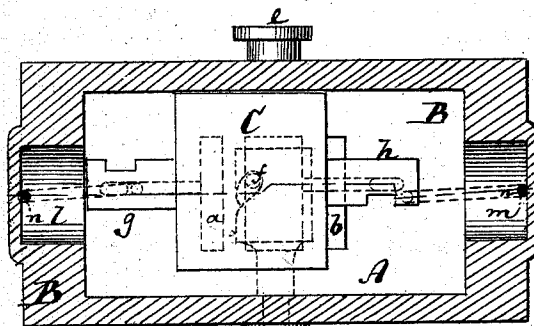


Fig. 1.

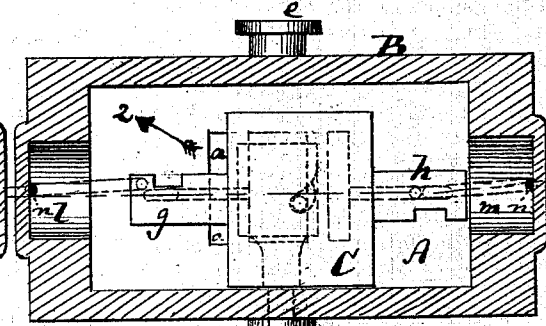


Fig. 3.

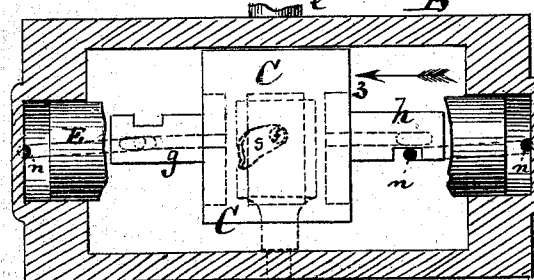


Fig. 6.

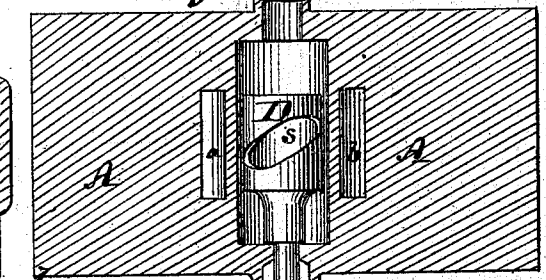
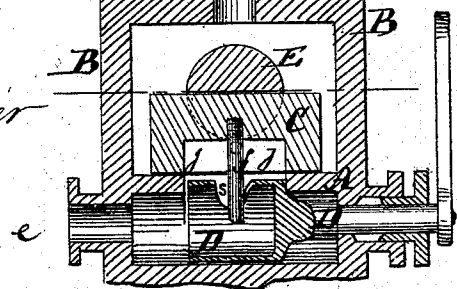


Fig. 7.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY A. JAMIESON, OF BROOKLYN, NEW YORK, ASSIGNOR TO HIMSELF
AND GEORGE WHITTAKER, OF SAME PLACE.

IMPROVEMENT IN VALVES FOR DIRECT-ACTING ENGINES.

Specification forming part of Letters Patent No. 144,545, dated November 11, 1873; application filed
August 4, 1873.

CASE B.

To all whom it may concern:

Be it known that I, HENRY A. JAMIESON, of the city of Brooklyn, in the county of Kings and State of New York, have invented an Improved Valve for Direct-Action Steam-Engines for operating pumps, &c., of which the following is a specification:

Figure 1 represents a horizontal section of a steam-chest, showing my improved valve in top view. Figs. 2 and 3 are similar horizontal sections, showing the parts in different positions. Fig. 4 is a vertical longitudinal section of Fig. 1; Fig. 5, a vertical longitudinal section of Fig. 2; Fig. 6, a horizontal section on the line *c c*, Fig. 4; and Fig. 7, a vertical transverse section through the middle of the steam-chest and valve.

Similar letters of reference indicate corresponding parts in all the figures.

This invention has for its object so to construct a slide-valve for the steam-chest of a steam-pump or other machinery, that the motion of said valve, although in part derived from a link-connection, will be made more effective and absolutely positive by the action of steam thereon.

The invention consists, principally, in applying, in connection with a slide-valve which is regulated by a link-connection, a sliding piston fitted longitudinally into the steam-chest and acted upon by steam, which alternately is carried against the ends of such piston and causes the same to reciprocate. My invention also consists in constructing the oscillating drum or shaft by which the slide-valve is reciprocated with a spiral or oblique groove taking hold of a projecting pin of the valve, so as to impart to the latter a slanting motion while moving it lengthwise, which will cause such valve to properly open and close, at the required intervals, the steam-ports leading to the ends of the aforementioned piston in the steam-chest. By this means a positive action of the slide-valve proper is obtained, and all danger of having it arrested at the moment when all the ports are closed by it during passage is avoided.

In the accompanying drawing, the letter A

represents the top of a steam-cylinder, constituting, also, the bottom of a steam-chest, B. In the cylinder top A are two steam-ports, *a* and *b*, through which steam is alternately carried to the ends of the steam-cylinder from the steam-chest. The steam-chest receives its supply of steam through a pipe, *d*, leading to the boiler. C is the slide-valve, placed on the bottom of the steam-chest, so as to alternately open and close the ports *a* and *b*, and also to alternately connect them with a central exhaust-passage, *e*, the valve C being recessed on the under side for properly connecting one of the ports with such exhaust-opening, in the usual way. From the middle of the valve C extends downwardly into the exhaust-space *e* a pin, *f*, which enters an oblique groove or slot, S, (see Fig. 6,) that is cut or formed in a shaft or drum, D. This shaft or drum enters the exhaust-chamber *e* from one side of the steam-chest, and is, at its outer end—that is to say, outside of the steam-chest—connected with a suitable link mechanism, so that thereby it is oscillated at proper intervals. Owing to the obliquity of the slot S in the drum D the motion imparted to the valve C during and by the oscillation of said shaft or drum D is somewhat slanting or diagonal and not entirely rectilinearly reciprocating.

The valve proper, C, shown in Figs. 1, 2, and 3, is of such size that one of the ports *a* or *b* will always be open whenever the other port is connected with the exhaust. From the valve, however, project toward each end of the steam-chest arms *g* and *h*, which, appearing in section, together with the valve proper in Figs. 4 and 5, make the longitudinal central section of the valve longer than the valve proper without such arms would be. Through each of these arms *g* *h* extends a steam-passage or perforation, *i*, into the exhaust-recess *j* of the valve, such perforation *i* terminating near the outer end of the arm in which it is formed into a downward extension, as shown in Figs. 4 and 5. E is a cylindrical or other shaped body, fitted lengthwise into the steam-chest, and entering with its ends correspondingly-shaped chambers *l*

and *m*, that are formed respectively for the reception of such body *E* in the ends of the steam-chest. The length of the body *E* or piston, as it may be termed, is less than the distance between the ends of the chambers *l m*, as appears from Figs. 4 and 5. From the bottom of each of these chambers *l m* extends a steam-passage, *n*, downwardly, and thence upwardly, so as to terminate again in the surface of the bottom *A*. The piston *E* is recessed in such way that the upper part of the valve *C* fits and enters such recess, so that, therefore, the piston *E* straddles the valve. If the parts are in the position shown in Figs. 1 and 4, the steam-port *a* is open to permit steam to enter that end of the lower cylinder toward which the port *a* leads. The other port, *b*, is connected with the exhaust-recess *j* of the valve *C*, and thence to the exhaust-passage *e*. The arm *h* of the valve *C* at the same time extends over the inner end of the one steam-passage *n* leading to *m*, but in such manner that the passage *i* in such arm does not then communicate with such passage *n*, as shown in Fig. 4. The outermost end of the arm *g*, also in that position, covers and closes the end of the other passage, *n*, that leads to the chamber *l*. When the valve is in this position, the shaft or drum *D* is oscillated in the direction of the arrow, shown in Fig. 4, and thereby shifts the valve toward and over the port *a*, but, owing to the obliquity of the slot *s*, the valve is moved not parallel to the axis of the piston *E*, but rather diagonal, in the direction of the arrow 2, shown in Fig. 1. At the end of this motion of the valve, imparted to it by the said shaft or drum *D*, the parts will be found in the position shown in Fig. 3—that is to say, a recess or notch cut into the arm *h* will have been brought over the end of the same passage *n* that leads to the chamber *m*, so that, by virtue of such recess being thus placed, steam will be admitted to the chamber *m*. At the same time the passage *i* in the arm *g* has its end over the steam-passage *n* that reaches the chamber *l*, so that said chamber *l* will thus—

that is to say, by its connection with the passage *i*—communicate with the exhaust. Steam being thus admitted against one end of the piston *E* and exhausted from the other end, it is clear that the piston will be moved in the direction of the arrow 3, shown in Fig. 3, and that being so moved it carries the valve *C* into the position shown in Fig. 2, in which position the port *b* will be opened, and the port *a* connected with the exhaust, the channels *n n* being again closed. The next movement is by the reverse turn of the shaft *D*, which will bring the valve *C* over the port *b*, but open the steam-passage that reaches to the chamber *l*, by bringing the recess of the arm *g* over such passage. The piston *E* will then be moved in the opposite direction to carry the parts back into the position shown in Fig. 1. The piston *E* serves thus to make a positive motion of the valve, and also to guide such valve and keep it at the proper angle within the steam-chest.

It is also evident that while the valve is being moved by means of its connection with the shaft, it also carries the piston *E* partly with it—for example, from the position shown in Fig. 4 to that shown in Fig. 3, giving the steam that is to act against the piston an opportunity of entering the chamber and moving the piston.

What I claim as my invention is—

1. The combination of the steam-valve *C* having the projecting arms *g h*, passages *i*, and recess *j*, with the steam-chest *B* and recessed piston *E*, the steam-chest being wider than the valve to allow a diagonal motion to the same, as set forth.

2. The combination of the steam-valve *C*, constructed as set forth, and provided with a projecting pin, *f*, with the oscillating shaft *D*, having the oblique slot or groove *s*, as and for the purpose described.

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Witnesses:

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