(No Model.)

W. F. GARRISON.

VALVE FOR GAS PUMPS.

No. 509,158. Patented Nov. 21, 1893.

Fig. 2.

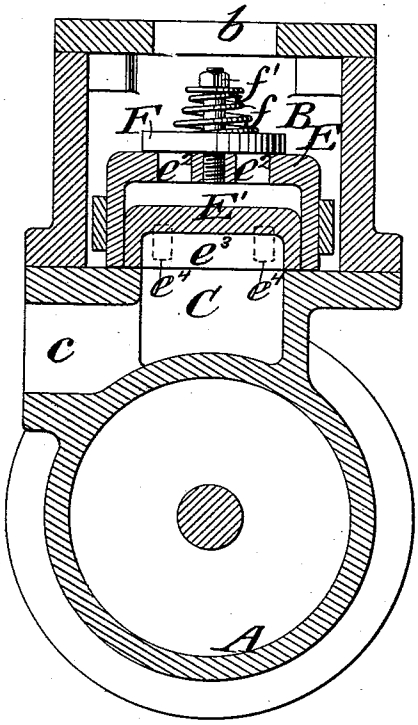


Fig. 1.

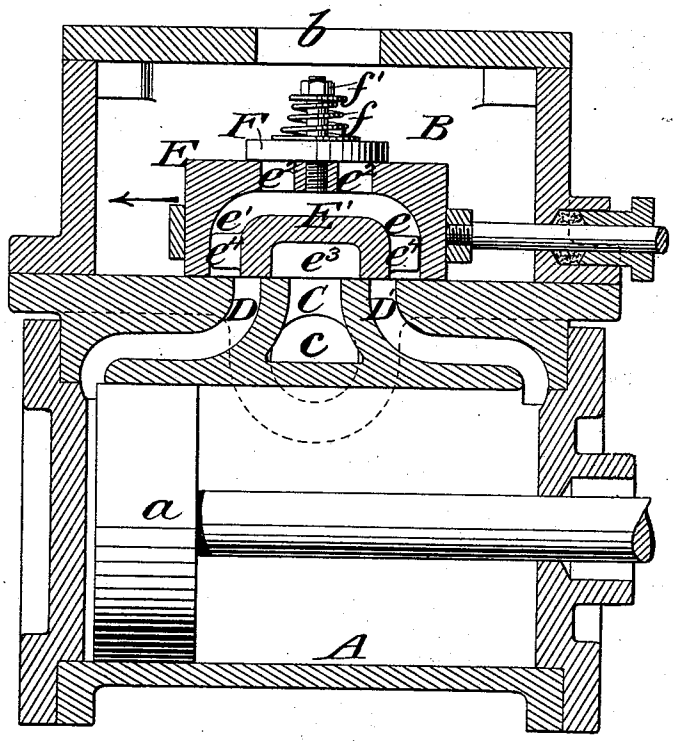


Fig. 3.

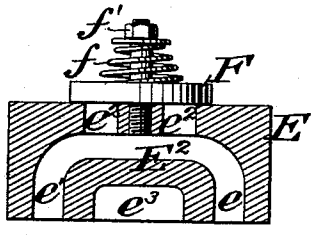


Fig. 4.

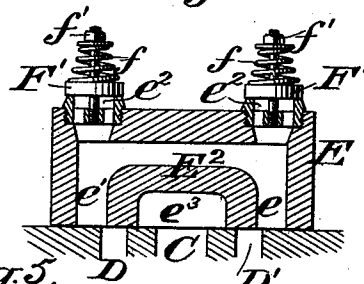
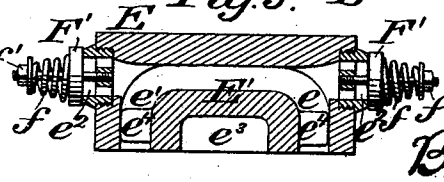


Fig. 5.



Witnesses:
C. L. Sundgren,
George Barry.

Inventor:
William F. Garrison
by attorneys
Brown & Seward

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM F. GARRISON, OF BROOKLYN, NEW YORK.

VALVE FOR GAS-PUMPS.

SPECIFICATION forming part of Letters Patent No. 509,158, dated November 21, 1893.

Application filed June 9, 1892. Serial No. 436,082. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. GARRISON, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Valves for Gas-Pumps, of which the following is a specification.

My invention relates to an improvement in pumps for moving gaseous bodies and more particularly to the structure of the valve which regulates the induction and eduction of the gaseous fluid.

The object is to provide an effective means for equalizing the pressure upon the opposite sides of the piston, or permitting the free escape of the gaseous body in front of the piston, just as it reaches the limit of its stroke at the end of the cylinder, into the opposite end of the cylinder; and to further provide a valve which may be constructed at comparatively small expense and in which the part which controls the inlet or suction ports shall be permitted to seat itself independently of the body portion of the valve.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the valve chamber, cylinder, valve and piston in assembled adjustment; the view representing a longitudinal section through the valve chamber, valve and cylinder. Fig. 2 is a transverse section through the valve chamber, valve and cylinder. Fig. 3 represents the valve, showing its central portion integral with the body portion. Fig. 4 represents the valve provided with a plurality of discharge valves; and Fig. 5 represents the valve provided with discharge valves at its ends instead of at its back.

The cylinder is denoted by A, the piston by *a*, and the valve chamber, which in the present instance is also the eduction chamber, is denoted by B and is provided with an outlet opening *b*.

The induction chamber C is formed in the valve seat and connects with the supply of the gaseous body to be moved through an inlet *c*. The ports D and D′ upon opposite sides of the induction chamber C, extend through the valve seat from the eduction chamber B and communicate with the opposite ends of the cylinder A.

The outer shell or body of the slide valve is denoted by E and eduction ports *e* and *e′* lead from its face to the passage way e^2 which is opened and closed by means of a self-acting valve F.

In Figs. 1, 2 and 3, I have shown the ports *e*, and *e′*, communicating with the passage way, closed by a single valve F, while in Figs. 4 and 5, I have shown a plurality of self-acting valves F′.

In Fig. 5, I have shown a plurality of self-acting valves located at the opposite ends of the valve instead of at the back of the slide valve, as in the other figures. The valves F, F′, &c., may be normally pressed toward their seat by springs *f* inserted between their backs and an abutment *f′* on their guides. The valve E is provided on its face with a cove e^3 through which communication is established between the induction chamber C and the ports D and D′ in the valve seat as the slide valve reciprocates.

In Figs. 1, 2 and 5, I have shown the portion E′ of the valve in which the cove e^3 is formed as separate from the outer shell or body portion of the valve, while in Figs. 3 and 4, I have shown the corresponding portion E^2 as formed integral with the outer shell or body of the valve. Where such portion E′ is formed separate from the valve body, it may be spaced therefrom at its ends by means of lugs e^4 and at its sides it may rest in close proximity to the side walls of the outer or body portion E of the slide valve.

The structure in which the portion E′ is formed separate from the outer shell or body portion of the valve has the advantages of simplicity and a saving of time and labor in that it requires simply that the body portion E be provided with a hollow face and the separate portion E′ provided with a cove in its face and placed in position within the hollow face of the body portion E leaving a sufficient space between the ends and top or back of the portion E′ and the inner wall of the body portion E to form the ports *e* and *e′* leading to the outlet passage e^2, e^2. The part E′ will also, when independent of the body

portion E, be permitted to seat itself notwithstanding any slight derangement of the body portion E, and hence the joint which surrounds the induction or suction passage may be kept thoroughly sealed, a result of the highest importance.

In the position shown in Fig. 1, the slide valve is at the middle of its stroke and the piston in the cylinder A is approximately at the end of its stroke. In this position it will be observed that there is free communication between the parts of the cylinder A in front of and back of the piston *a*, through the induction ports D and D′ and the eduction ports *e*, *e*′. As the piston *a* moves on its stroke toward the opposite end of the cylinder, the slide valve E will move over in the direction of the arrow so as to bring the induction chamber C into communication with the induction port D, through the cove e^3 and the gaseous body within the cylinder A back of the piston will be forced through the port D′ and thence through the port *e* and the passage way e^2 lifting the valve F and thence escaping into the chamber B. As the piston *a* nears the opposite end of the cylinder, the valve E will have returned to the position shown in Fig. 1 and the opposite ends of the cylinder will be again in free communication through the ports D, D′, *e*, *e*′ as before.

It will be observed that by the above structure and arrangement of parts I utilize the eduction ports *e*, *e*′ for the double purpose of discharging the gaseous body and also for equalizing the pressure upon opposite sides of the piston as the latter reaches the limit of its stroke in either direction. It will further be observed that by varying the space between the ends of the inner or cone valve section and the outer or body section the relative lead of the eduction over the induction may be varied as desired.

What I claim is—

1. The combination with a cylinder and a slide valve for controlling the inlet and outlet of the fluid to and from the cylinder, of a valve seat having ports in communication with the opposite ends of the cylinder, the valve and the valve seat being provided the one with an induction passageway and the other with an eduction passageway, and a self acting valve for opening and closing communication between the passageway in the slide valve and the space exterior to the slide valve, the passageway in the slide valve serving at the same time in conjunction with the ports in the valve seat to open communication between the opposite ends of the cylinder as the piston nears the limit of its stroke, substantially as set forth.

2. The combination with a cylinder and a slide valve for controlling the inlet and outlet of the fluid to and from the cylinder, the central or cove portion of the face of the slide valve being separate from and free to move toward and away from its seat independently of the outer shell or body portion, and the ends and top of the said cove portion being spaced from the inner wall of the body portion, of a valve seat having ports in communication with the opposite ends of the cylinder, the distance between the farthest separated walls of the said ports at the face of the valve being less than the length of the said cove portion of the valve, substantially as set forth.

WILLIAM F. GARRISON.

Witnesses:
FREDK. HAYNES,
GEORGE BARRY.