(No Model.)

H. F. FRISBIE.

PUPPET VALVE.

No. 298,194. Patented May 6, 1884.

Fig. 1.

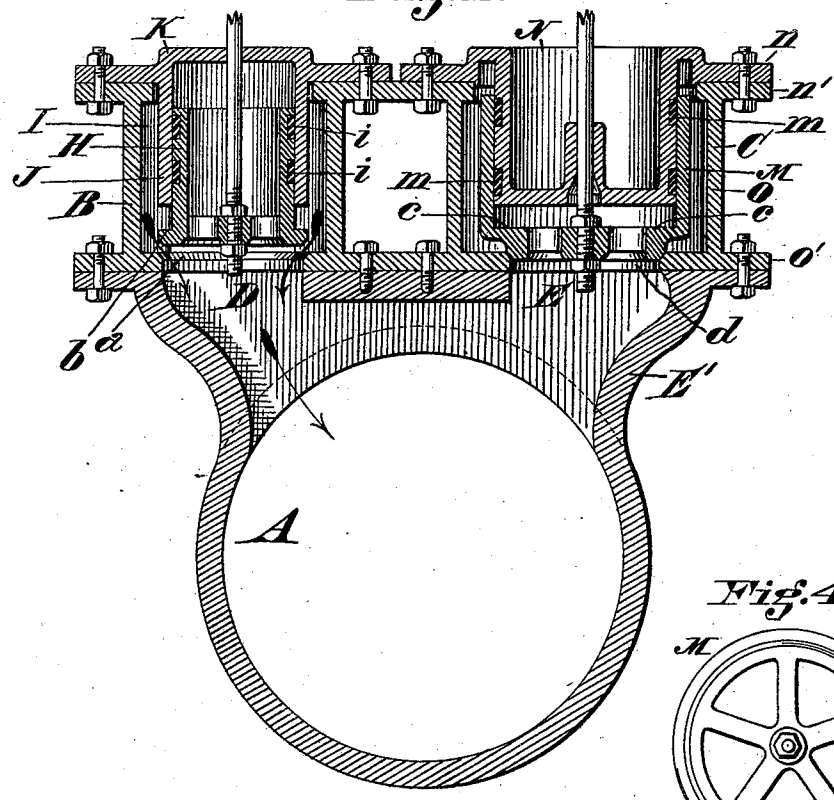


Fig. 4.

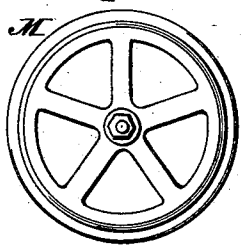


Fig. 2.

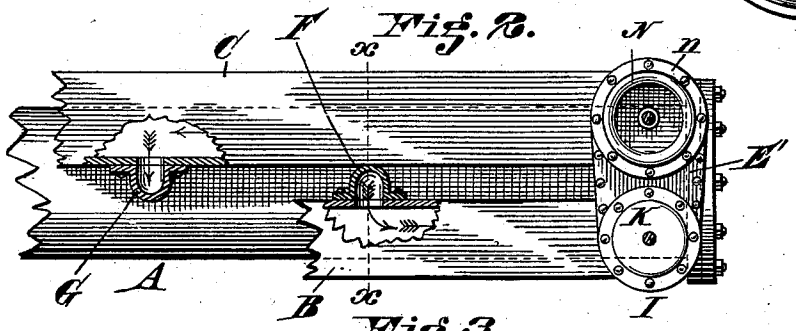
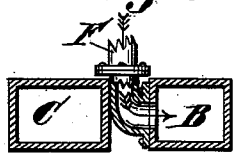


Fig. 3.



Attest

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UNITED STATES PATENT OFFICE.

HAMLIN F. FRISBIE, OF CINCINNATI, OHIO.

PUPPET-VALVE.

SPECIFICATION forming part of Letters Patent No. 298,194, dated May 6, 1884.

Application filed December 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, HAMLIN F. FRISBIE, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Puppet-Valves, of which the following is a specification.

The object of the first part of my invention is to employ two puppet-valves which are so constructed as to be placed over a single opening leading from the steam-chest into the cylinder, and so constructed that one of the valves will act as an exhaust and the other as a supply or feeding valve, each being provided with a suitable annulus, so that the pressure of steam tends to hold both valves normally closed.

The object of the second part of my invention is to construct an outside cylindrical puppet-valve in such a way that the steam in the cylinder tends to hold the valve closed, and allow it to escape from the bottom, thereby allowing it to be seated over the same opening as the supply-valve, yet without any liability of escaping the steam, except when raised by the eccentric or other means for lifting it.

Figure 1 is a vertical central section of my improvement applied to a steam-cylinder. Fig. 2 is a top plan view of the same; Fig. 3, a cross-section on line *x x*, Fig. 2; Fig. 4, a bottom plan view of the escape-valve.

A represents a cylinder.

B represents the steam-chest on side pipe from which the piston is supplied at each end alternately.

C represents the exhaust-pipe, which is preferably made parallel with the steam-chest B and placed above the cylinder A. The steam-chest B and the exhaust-pipe C are each provided with an opening, D E, at each end, which communicates directly with the ends of the cylinder A, as shown in Fig. 1, forming a side-pipe nozzle. Each end of the cylinder is provided with the same valves, connecting with the exhaust and steam chests or pipes in the same manner as shown in Fig. 1.

F represents the supply-pipe, connected to the steam-chest B, as shown in Fig. 3. G represents the escape-pipe, connected to the pipe *c* in a similar manner.

H represents an inside cylindrical valve, suitably supported in the valve-chest I by means of the piston-cap J K. These parts are secured to the flange of the valve-chest I by bolts in the ordinary manner.

i i represent packing-rings fitted in grooves around the cylinder-valve.

a represents the valve-seat above the port D, leading into the cylinder A. In order to hold this valve to the seat under steam-pressure during the period of exhausting, I provide an annular projection, *b*, upon the outside of the valve H and below the cap J, of a larger area than the exposed area of the bottom of the annulus or ring inside of the valve-seat, so that the pressure of the steam on the valve will hold it to its seat. These areas are so constructed in connection with the annular seat that when the valve H is opened the areas are the same and the valves balanced under the pressure of the steam.

M represents an outside cylindrical valve; N, a cylindrical piston-cap projecting downward inside of the valve M; *m*, packing-rings placed on the cap N.

n n represent an annular flange secured to the cap N, and fitting a corresponding flange, *n'*, formed on the valve-chest O. Similar flanges, O', are provided at the bottom of the cylinder O, so as to secure the cap N to the valve-chest, and the valve-chest O to the cylinder-nozzle E'.

In order to hold the valve M down to its seat during the period of supplying steam to the piston, I provide an annulus, *c*, above the annular seat *d*, of a larger area than the annulus formed inside of the seat at *d*. This annulus *c*, being greater than the annulus inside of the seat exposed to the action of the steam, is subject to the direct pressure of the steam in the cylinder A; and it thus holds the valve M down upon its seat, preventing any tendency to rise under the steam-pressure while the steam is admitted into port D. When the valve M is raised, the annulus *c* has the same exposed area as the bottom of the valve, and it is balanced when open, so as to be moved freely. This mode of constructing the exhaust valve and port connecting into the same cylinder-opening as the feed-valve effects a very important saving in the condensation of steam, and occupies a more direct action in exhausting, and lessens the cost of con-

struction. This mode of connecting two valves through one opening is much more simple, cheap, and direct than the improvements hitherto used for that purpose.

It is obvious that the valves and valve-chests, ports, and cylinder-openings are duplicated upon each end of the cylinder of the engine and work through proper mechanism. It is evident that these valves may be used with any other form of engine as well as with steam. Instead of the annulus *b c*, other projections to furnish the proper amount of pressure-surface might be employed.

I claim—

1. In combination with the cylinder A, the cylindrical valve H, provided with an annulus, *b*, and the cylindrical valve M, provided with the annulus *c*, adapted to operate as supply and exhaust valves, communicating directly with the cylinder A, substantially as herein set forth.

2. In combination with the cylinder A, the ports D E, communicating at one side with an inside valve, H, and annulus *b*, and on the other side an outside valve, M, provided with the inside annulus, *c*, whereby the valves are adapted to act as supply and exhaust valves, to be held in the seats by steam-pressure, substantially as herein set forth.

3. The outside annular cylindrical valve, M, in combination with the inside cylindrical cap, N, and provided with an inside annulus, *c*, of greater area than the annulus inside of the annular seat *d*, and adapted to act as an exhaust-valve and to be held in its seat by steam-pressure, substantially as described.

4. The cylindrical exhaust-valve M, of greater area than its port, and provided with projecting flanges *c* on its inside, so as to hold the valve to its seat by steam-pressure, substantially as herein set forth.

In testimony whereof I have hereunto set my hand.

HAMLIN F. FRISBIE.

Witnesses:
JNO. E. JONES,
A. GLUCHOWSKY.