(Model.)

R. HARRISON.

INJECTOR.

No. 480,921. Patented Aug. 16, 1892.

Fig. 1.

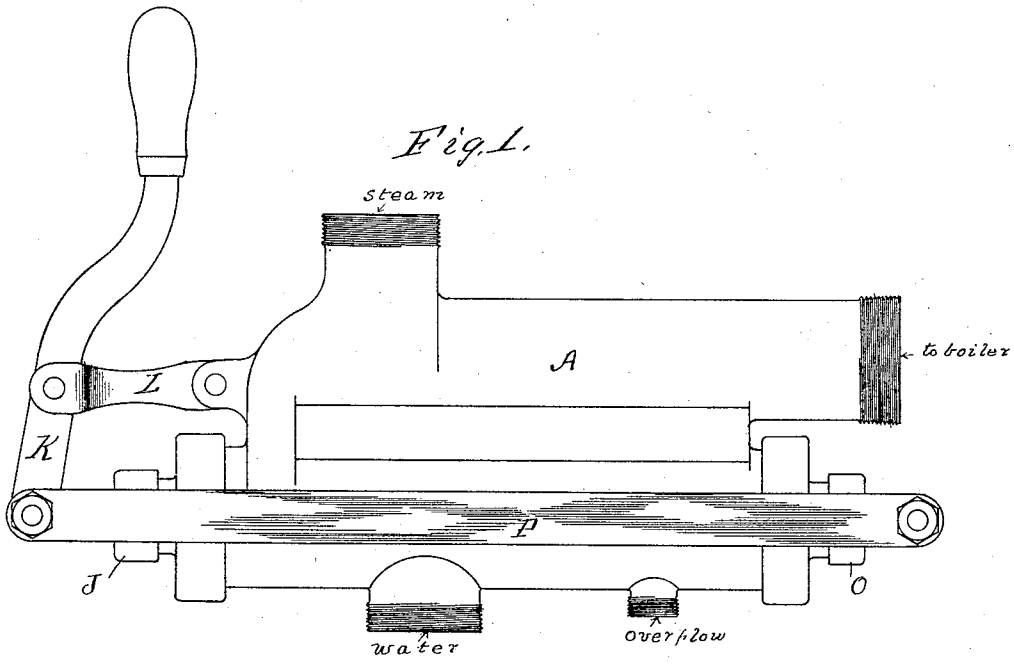
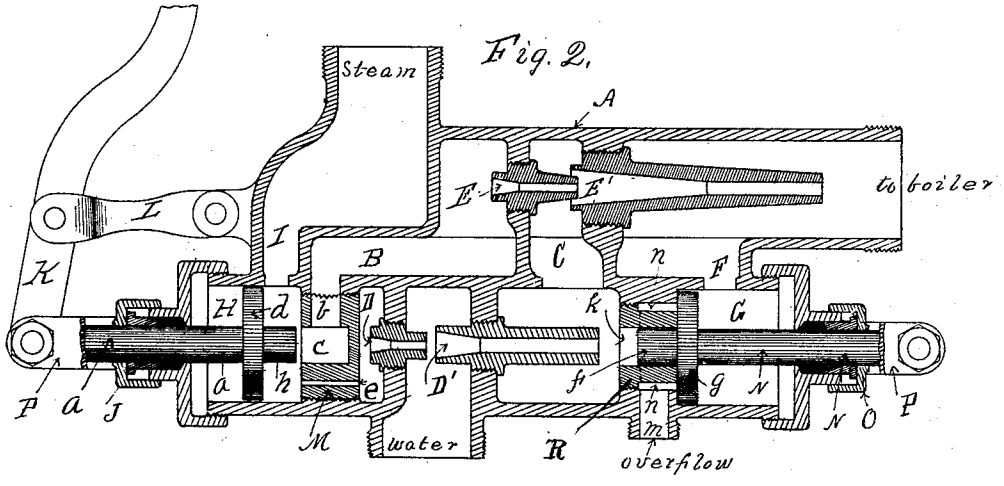


Fig. 2.



Witnesses
F. J. Barnett
G. J. Mead

Inventor
Robert Harrison
By H. B. Sluyter
Atty.

UNITED STATES PATENT OFFICE.

ROBERT HARRISON, OF ERIE, PENNSYLVANIA.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 480,921, dated August 16, 1892.

Application filed November 10, 1891. Serial No. 411,526. (Model.)

To all whom it may concern:

Be it known that I, ROBERT HARRISON, a citizen of Canada, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Injectors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention consists in the improvements in injectors hereinafter set forth and explained, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved injector. Fig. 2 is a longitudinal central section of the same.

The construction of my improved injector (shown in the drawings) embodies both water lifting or ejector mechanism and injector mechanism placed side by side in a shell or body A, having passages therein connecting the ejector and injector mechanism together, B being the steam-passage, C a water-passage from the ejector mechanism D D′ to the injector mechanism E E′, and F a passage from the injector E E′ to the overflow-valve chamber G. The ejector-tube mechanism D D′ and the injector-tube mechanism E E′ are of usual and ordinary construction.

Above the steam-jet tube D of the ejector I make a valve-chamber H, to which steam is supplied through a passage I. In this chamber H there is a combined piston and disk valve *h d*, from which a valve-stem *a* extends out through a stuffing-box J to the end of an operating-lever K, to which it is pivoted, this lever K being fulcrumed upon a standard L, pivoted to the body A. The piston portion *h* of this valve fits into the chamber *c* in the valve-seat M, so as to close the lateral steam-passage *b*, communicating with the steam-passage B leading to the steam-jet tube E of the injector, and the disk portion *d* of this valve fits down upon the face of the valve-seat M, so as to close the passages *e* (only one of which is shown) through the valve-seat M, leading to the steam-jet tube D of the ejector, so that when the disk portion *d* of the valve *h d* is first raised off of its seat steam is admitted to the ejector only; but when it is raised far enough to withdraw the piston portion *h* thereof out of the chamber *c* then the steam is also admitted to the injector. The valve-chamber G, into which the overflow-passage F leads, is also provided with a combined piston and disk overflow-valve *f g*, having a stem N passing out through a stuffing-box O, and is pivoted to a connecting-bar P, which extends to and is pivoted to the end of the valve-stem *a*, so that the steam-valve *h d* and the overflow-valve *f g* are adapted to be moved simultaneously by means of the lever K, as hereinafter set forth. The piston portion *f* of the overflow-valve fits into and closes the overflow-passage *k* through the valve-seat R when the steam-valve *h d* is open, as illustrated in Fig. 2; but when the steam-valve is closed or only open a sufficient distance to supply steam to the ejector D D′ then the piston portion *f* of the overflow-valve *f g* is entirely withdrawn from the overflow-passage *k*, so that the overflow from the ejector passes through it and over the top of the valve-seat R and down through the annular passage *n*, around the valve-seat R to the overflow-discharge passage *m*; but when the steam-valve *h d* is raised far enough to commence to admit steam to the injector E E′ the piston *f* enters and closes the overflow-passage *k* and forces the water discharged from the ejector to flow through the passage C to the mouth of the injector-tube E′. Meanwhile the disk portion *g* of the overflow-valve *f g* is still sufficiently above the face of the valve-seat R to allow the overflow from the injector passing through the passage F into the valve-chamber G to pass down around the periphery of the disk *g* and down through the annular passage *n* in the valve-seat R and out through the overflow-outlet *m*, this continuing until the steam-valve *h d* is fully open, which operation closes the disk *g* of the overflow-valve down tightly upon the face of the valve-seat R, entirely closing the overflow and forcing the water discharged from the injector to pass on to the boiler. When, however, the steam-valve *h d* is closed, the operation of closing it simultaneously opens the overflow-valve *f g*, so as to open both the overflow-passage *k* from the ejector and the overflow-passage from the in-

jector, so as to completely drain the water out of both the ejector and injector.

Having thus fully described my invention, so as to enable others to construct and operate the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in an injector, of a combined piston and disk steam-inlet valve with a combined piston and disk overflow-valve, a bar connecting said two valves together, so that they will move in unison, and a lever pivoted thereto for operating said valves, substantially as and for the purpose set forth.

2. The combination, in a combined ejector and injector, of a combined piston and disk steam-inlet valve adapted to admit the steam into the ejector first and afterward into the injector, with a combined piston and disk overflow-valve adapted to control the overflows of both the ejector and injector, a bar connecting said valves together, and an operating-lever connected therewith, whereby both of said valves are moved simultaneously, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT HARRISON.

Witnesses:
J. C. STURGEON,
WM. P. HAYES.