J. A. MARDEN & T. S. SMITH.

Feed-Regulators for Injectors.

No. 143,988. Patented Oct. 28, 1873.

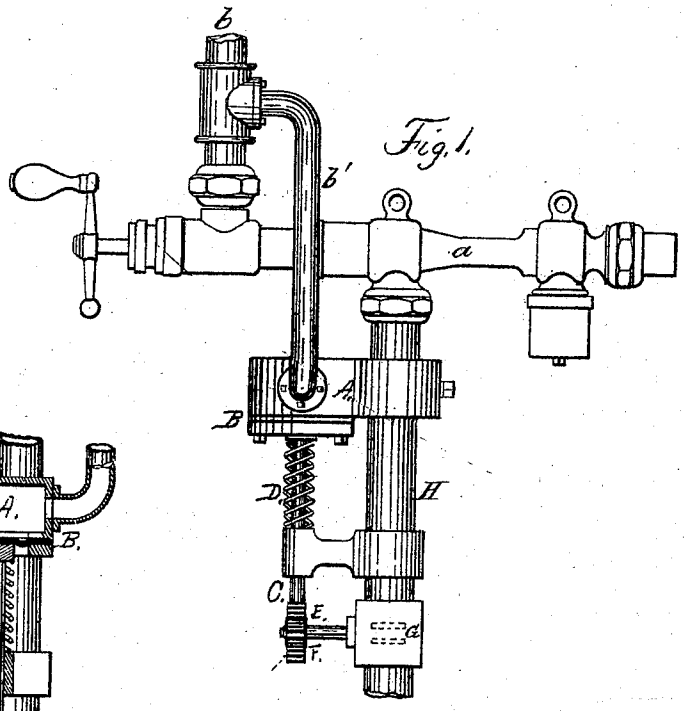

Fig. 1.

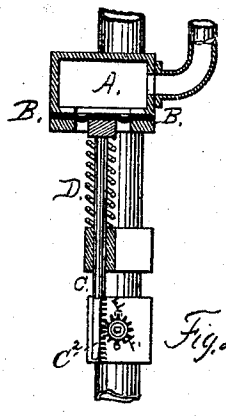

Fig. 2.

Inventors
J. A. Marden
T. S. Smith
By Jos. B. Gardiner
Atty

Witnesses
F. M. Paul
Chas. J. Smith

UNITED STATES PATENT OFFICE.

JEREMIAH A. MARDEN, OF BOSTON, AND THEOPHILUS S. SMITH, OF SOMERVILLE, ASSIGNORS OF ONE-THIRD THEIR RIGHT TO THEOPHILUS GILMAN SMITH, OF SOMERVILLE, MASSACHUSETTS.

IMPROVEMENT IN FEED-REGULATORS FOR INJECTORS.

Specification forming part of Letters Patent No. **143,988**, dated October 28, 1873; application filed November 30, 1872.

To all whom it may concern:

Be it known that we, JEREMIAH A. MARDEN, of Boston, in the county of Suffolk, and THEOPHILUS S. SMITH, of Somerville, in the county of Middlesex, both in the State of Massachusetts, have invented an Improved Feed-Regulator for Injectors, of which the following is a specification:

This invention relates to a method of governing automatically the supply of water in the feed-pipe of an injector, so that it shall correspond with the pressure of steam which is being used to drive the said water, so that the supply shall at no time be too great for the steam-pressure, but shall be regulated to correspond therewith.

It is well known to engineers that, if the feed or suction pipe of an injector be of sufficient size to supply the injector at above a hundred pounds pressure to the square inch, such pipe will be too large, and the supply too great at a pressure much below that point, and the injector will become inoperative unless the supply is regulated to some extent. This regulation of the supply is usually effected by means of a globe-valve applied to the feed or suction pipe, which is operated by hand, and consequently requires constant regulation, according to the fluctuations of the steam-pressure.

The object of our invention is to regulate automatically, and by the pressure of the steam itself, the supply of water in the feed-pipe.

In carrying out our invention we employ a chamber, which is connected with the steam-pipe by a tube, and is provided with a diaphragm of rubber or other suitable elastic material stretched across it. This diaphragm operates one end of a rod, the other end of which is provided with a rack operating a pinion affixed to a shaft, upon which is mounted a valve arranged within the feed-pipe. A coiled spring capable of adjustment is employed to regulate the action of the diaphragm and parts connected therewith; but, that our invention may be fully understood, we will proceed to describe the same more in detail by aid of the accompanying drawings.

Figure 1 shows an external front view of an injector with our improvements applied thereto. Fig. 2 represents a vertical section of parts.

a is the injector, and *b* the steam-pipe, which is provided with a branch pipe, *b'*, in connection with a chamber, A, which has a diaphragm, B, of rubber or other suitable elastic material, stretched across it. C is a rod, one end, C^1, of which is operated by the diaphragm B, and is capable of being moved outward from this chamber B against a spring, D, by means of steam-pressure, which is let into the chamber A by the pipe *b'* upon the opposite side of the diaphragm B. This rod C, at its end C^2, is provided with a rack, E, which operates a pinion, F, fixed on the shaft F', upon which is mounted a regulating-valve, G, arranged within the feed-pipe H. The spring D is so constructed that, by its increased resistance as it is compressed, it shall balance a greater pressure on the diaphragm B, and by adjusting the spring D, and forming it of proper stiffness, the valve G will be opened or closed as the pressure of steam increases or diminishes, thereby regulating the supply of water through the feed-pipe H.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

In combination with an injector, *a*, and pipes *b b'*, the chamber A, diaphragm B, rod C, spring D, rack E, pinion F, shaft F', and regulating-valve G, arranged and operating substantially as and for the purposes specified.

JEREMIAH A. MARDEN.
THEOPHILUS S. SMITH.

Witnesses:
JOSEPH B. GARDINER,
F. M. PAUL.