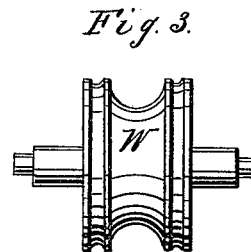
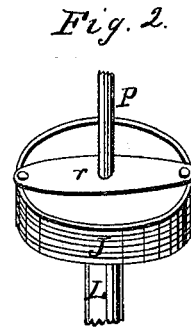
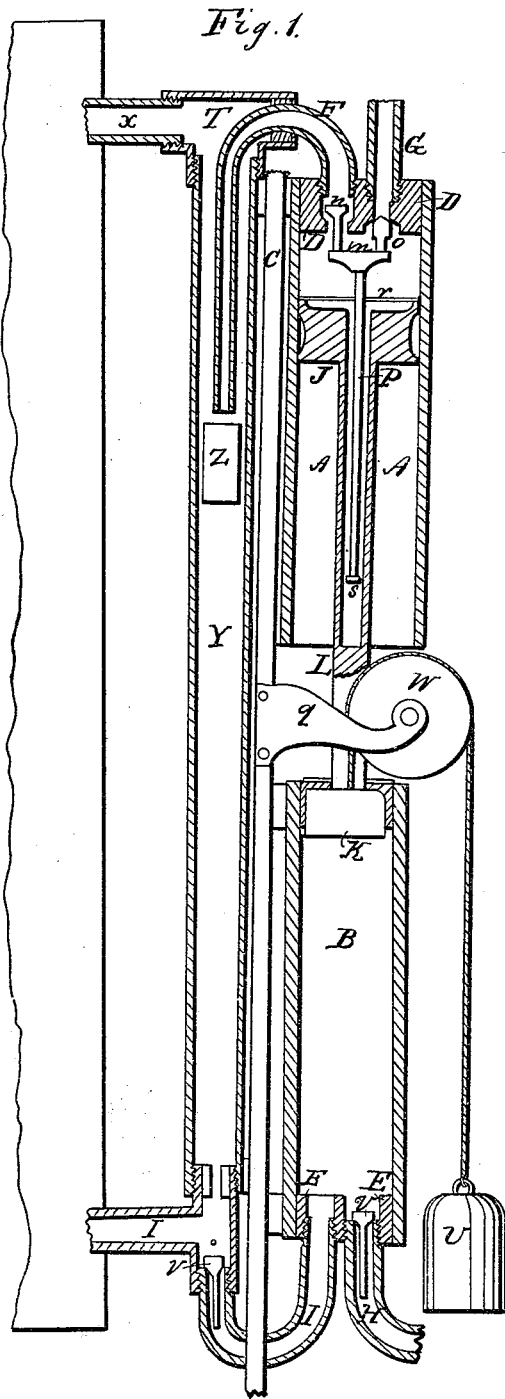


*R. Porter,*  
*Steam-Boiler Water-Feeder,*  
*N<sup>o</sup> 6,589,*      *Patented July 10, 1849.*



# UNITED STATES PATENT OFFICE.

RUFUS PORTER, OF NEW YORK, N. Y., ASSIGNOR TO RICHARD VAN DYKE, JR.

## ARRANGEMENT AND METHOD OF WORKING THE VALVES OF AUXILIARY ENGINES FOR FEEDING BOILERS.

Specification of Letters Patent No. 6,589, dated July 10, 1849.

*To all whom it may concern:*

Be it known that I, RUFUS PORTER, of the city, county, and State of New York, have invented a new and useful Self-Regulating Engine-Pump for Supplying Steam-Engine Boilers with Water; and I do hereby declare that the following is a full and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a sectional side view or elevation, showing the entire construction of the interior machinery, together with the pipes by which the pump is connected to the boiler; Fig. 2 is a perspective view of the steam piston with the plate spring and a portion of the valve rod; and in Fig. 3 is represented, a double grooved pulley.

Two hollow cylinders A, and B, are arranged in vertical positions, the one directly over the other, with a space of several inches between the two; and they are secured in that position by being attached by iron straps, or otherwise to an upright plate or post C. The two cylinders are of equal length, but the upper cylinder A is about one fourth larger in diameter than the cylinder B. The upper end of the cylinder A and the lower end of the cylinder B, are each furnished with a cylinder head or plug D and E; and to each head or plug are attached two small pipes, F, G, H, I. The pipe F is intended to communicate indirectly with the upper part of a steam engine boiler, and conduct steam therefrom to the cylinder A. The pipe G conducts the steam from the cylinder A to the chimney or to the water reservoir. The pipe H conducts water from a well or reservoir to the cylinder B; and the pipe I communicates with the lower part of the boiler, and conducts water from the cylinder B to the boiler. Each cylinder is furnished with a piston J, K, and the two pistons are connected by a piston rod L. The upper part of the piston rod is hollow, and within the hollow part is a valve rod P to the top of which is attached a cross-head m, and to each end of the cross-head, is attached a puppet valve n o. Both valves are seated within the cylinder head, the steam valve n being seated downward, and the exhaust valve o is seated upward; and their relative positions are such that when the valve n is lifted or raised one eighth of

an inch from its seat, the valve o becomes seated; and vice versa.

The piston J is made concave on the upper side, and a plate spring r extends across this concavity, being loosely connected to opposite sides of the piston by screws or otherwise as shown in Fig. 2. The valve rod passes through the center of the plate spring, and terminates, at the bottom, in a small cap S.

When the valve n is open, steam is admitted from the boiler, and the piston J is thereby forced down till the spring r comes in contact with the cap s whereby the position of the valves are changed, the steam valve being closed, and the exhaust valve opened at the same instant. A grooved pulley W, is mounted between the two cylinders, and near the piston rod, having its bearings in a parallel pair of arms q, which project from the post C.

A cord or chain is attached to the piston K, and passing over the pulley W supports, suspended a weight U which is sufficiently ponderous to elevate the two pistons, till the spring r comes in contact with the cross head m and changes the positions of the valves, opening n and closing o: thus a reciprocating or alternate motion of the piston is continued while the steam has free access to the valve n.

The pipes H and I are each furnished with free puppet valves V V. The first admits the water from the reservoir to the cylinder B, but not to return; the other allows the water to pass freely from the cylinder B to the boiler, but not to return. The pipe F is connected to a branch section called a T, and this T communicates with the boiler by a short pipe x.

In the rear of the post c is a vertical pipe Y which communicates with the T above and the pipe I below. The surface of water in this pipe will invariably indicate the true height of the water in the boiler; and a very small pipe F extends through the T and down into the vertical pipe nearly to the surface of the water, or the point at which the surface should be. A small float Z is placed within the vertical pipe, so that when the surface of the water is at or above its proper height, the head of the float will come in contact with the bottom of the small pipe and so obstruct the passage of the steam to the cylinder A, as to retard the motion of

the piston. If the float is not employed, if the surface of the water rises so high as to reach the bottom of the small pipe, the cylinder will be partly filled with water and the motion of the piston will be thereby sufficiently retarded to prevent the induction of any surplus of water into the boiler.

The pulley W may be furnished with gear-teeth which may take to the teeth of a rack attached to the piston rod, or to a series of rack teeth formed upon the piston rod, and thus avoid the necessity of connecting the cords or chains to the piston K; but the mode above described, of connecting the cords or chains to the piston is believed to be preferable, especially if the pulley is made double, so as to admit of two cords

or chains, as represented in Fig. 3. In some cases, helical or other springs may be used instead of the weight U.

What I claim as my invention and desire to secure by Letters Patent, is—

1. The combination of the valves *n* and *o*, the cross head *m*, the valve rod P, and the hollow piston rod L, arranged in the manner and for the purpose herein described.

2. I also claim the mode herein described, of working the valves *n* and *o* by means of the plate spring *r*.

RUFUS PORTER.

Witnesses:

JAMES DONAHOE,  
I. A. SUTTON.