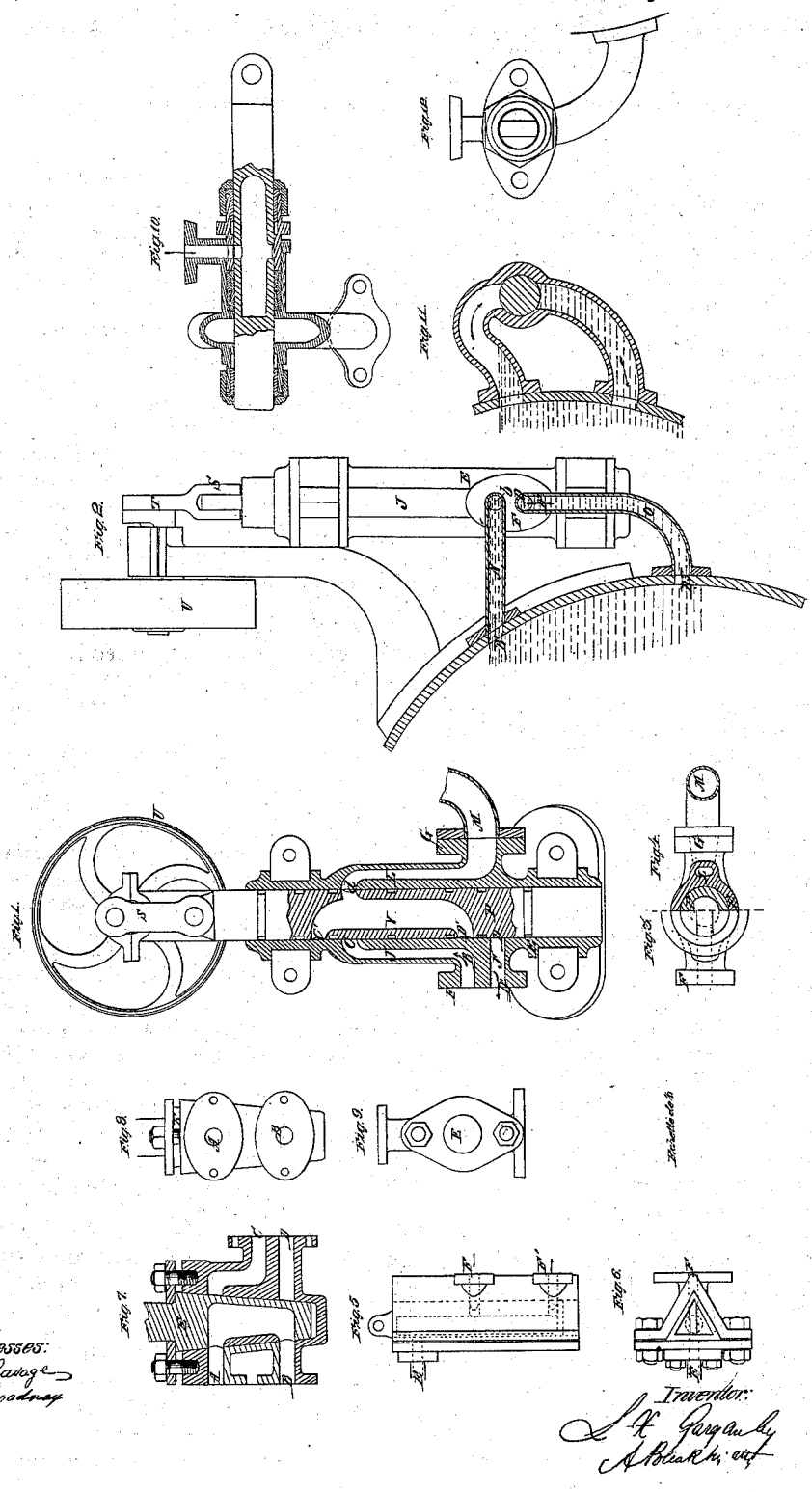
L. X. Gargan,

Steam-Boiler Water-Feeder,

No. 32,061. Patented Apr. 16, 1861.



Witnesses:
J. S. Savage
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UNITED STATES PATENT OFFICE.

LOUIS X. GARGAN, OF PARIS, FRANCE.

IMPROVED FEED-WATER APPARATUS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **32,061**, dated April 16, 1861.

To all whom it may concern:

Be it known that I, LOUIS XAVIER GARGAN, of Paris, in the Empire of France, have invented a new and useful Apparatus for Supplying Water to the Boiler; and I hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

The apparatus I am now going to describe has for its object to keep in steam-generators of any kind, and whether stationary or locomotive, the level of water constantly the same or nearly the same—that is, supposing a boiler filled with water to the required level and the apparatus referred to put in operation, its function will be such as that the level of the water shall be maintained in a permanent manner without requiring any attendance on the part of the engineer or fireman.

Figure 1 is an elevation of the apparatus, showing the plunger and its envelope in section. Fig. 2 is a side view of the same, representing in elevation its attachment to a boiler and in section the tubes of communication. Fig. 3 is a plan view of the plunger and its envelope; and Fig. 4, a horizontal section of the plunger and envelope through the line 1 and 2 in Fig. 1.

In said figures, E is a cylinder containing a plunger, P, to which a reciprocating up-and-down motion is imparted by the connecting-link S through the short crank or eccentric T, that receives its rotary motion from a pulley, U, driven by the steam-engine or otherwise. Two branch tubes, F and G, arranged at either side of the cylinder, communicate with the interior of said cylinder, the former by means of two channels, J J′, each of which is provided with a brass tube, (see Fig. 2,) N and O, which communicate with the boiler.

The proper level of the water in the boiler is determined by the position of the tube N, the intrados line or the horizontal plane tangent to the interior upper arch of said tube corresponding to the level of the water. The branch tube G communicates by means of a hose or pipe, M, with a tank placed on a level sufficiently elevated to keep the conduit L always filled with water, and so that it may penetrate the cavity V in the plunger. Supposing, now, motion being given to the plunger, the apparatus being in position represented in Figs. 1 and 2, it will be seen that the plunger by descending will close the port or opening A, while the port or opening C′ and D′ will be brought into juxtaposition, respectively, with the openings C and D of the conduits J and J′.

If the water-line in the boiler be such as to be above or in a line with the upper side of the opening of the tube N, as shown in Fig. 2, then there will be no displacement of liquid, and the water will remain in the cavity V during the ascending motion of the plunger. If, on the contrary, by evaporization or other cause the water is allowed to fall below the proper level, and thereby partly or wholly uncover the orifice C of the tube N, it will be understood that upon the plunger descending the water contained in the cavity V of the plunger will penetrate the boiler. This effect is explained and takes place in the following manner:

The steam entering the cylinder, as indicated by arrows B B′ in Figs. 1 and 2, will press upon the surface of the volume of liquid in the cavity V and cause, according to the well-known law of hydrostatics, the fluids of same density to assume the same level in both the boiler and the cavity in the plunger. The water in the plunger is thus transferred into the boiler until the equilibrium between the densities of fluids is effected—*i. e.*, the level of the water in both vessels communicating with each other established. This will take place at every stroke of the plunger unless the level of the water in the boiler be such as to cover the orifice of the tube N and to render any addition to the water in the boiler unnecessary.

This apparatus having no valves, cocks, or any other equivalent devices, it will be conceived that it will operate with permanent regularity and greatest reliability and safety.

The mechanism for imparting motion to the plunger may be varied to suit circumstances. Thus, instead of a crank and connecting-rod, an eccentric may be used, so shaped as to afford time at the end of each stroke of the plunger for its being filled and emptied, as described.

In Figs. 5 and 6 the piston is shown con-

structed of prismatical form, being in cross-section triangular. Its internal construction is substantially the same as that shown in Figs. 1, 2, 3, and 4. E is the tube connecting the apparatus with the tank or water-reservoir under atmospheric pressure; F, the orifice through which the steam is allowed to enter to press on the liquid mass contained in the cavity. F′ is the orifice through which the water flows from the cavity into the boiler or the medium under pressure.

In Figs. 7, 8, and 9 the apparatus assumes the general appearance of a cock with its plug rotating upon its vertical axis. This plug performs the functions of the plunger in Figs. 1, 2, 3, and 4. It has a cavity with outside orifices, which alternately correspond with the tubes of admission of water and the tubes of admission of steam and emission of water. The water is admitted at B, air escaping at A. The steam-channel is at C, and D is the channel through which the water enters the boiler. The plug E may receive a rotary motion or a reciprocating rotary motion, as convenient.

Figs. 10, 11, and 12 represent the plunger moving horizontally in a cylinder provided with two stuffing-boxes, which is here shown as produced by metallic rings, the packing of which is effected by tapering screw and nut arrangement.

The advantages of this my apparatus are obvious. I may, however, mention the following: First, constant and uniform supply of water, which may be effected at all temperatures; second, effectual avoidance of the lowering of temperature and pressure in the boiler, which is necessarily the case when the boiler is fed by means of pumps or other means having intermittent action; third, suppression of trap, conical, spherical, butterfly, and other valves, all of which are liable to get out of order; fourth, requiring no attendance on the part of the engineer when once put in operation; fifth, economy of fuel, inasmuch as the waste heat from the furnace and the exhaust-steam may be utilized for heating the feed-water; sixth, economy of motive power, since the boiler is fed without necessitating impulsive force sufficient to overcome the pressure in the boiler.

I claim—

1. The apparatus for feeding boilers, constructed and arranged substantially as herein shown and described, the same consisting of a hollow cylindrical or prismatical valve sliding within a correspondingly cylindrical or prismatical body provided with three independent channels that communicate, respectively, with a water and steam space in the boiler and the supply-tank, as described, and are disposed in relation to the three ports in the valve so as to come when in operation in simultaneous juxtaposition with the steam and water channels while closing that of the supply channel, and vice versa, as set forth.

2. The combination and arrangement of the feeding apparatus as herein shown and described, the same consisting of a hollow plug with side openings capable of rotation upon its axis within a body provided with four channels, as described, so that the said openings shall come opposite to the steam and water channel and the water-supply and air or steam escape channels, successively, as set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

L. X. GARGAN.

Witnesses:
S. RICHARD,
GEO. HUTTON.