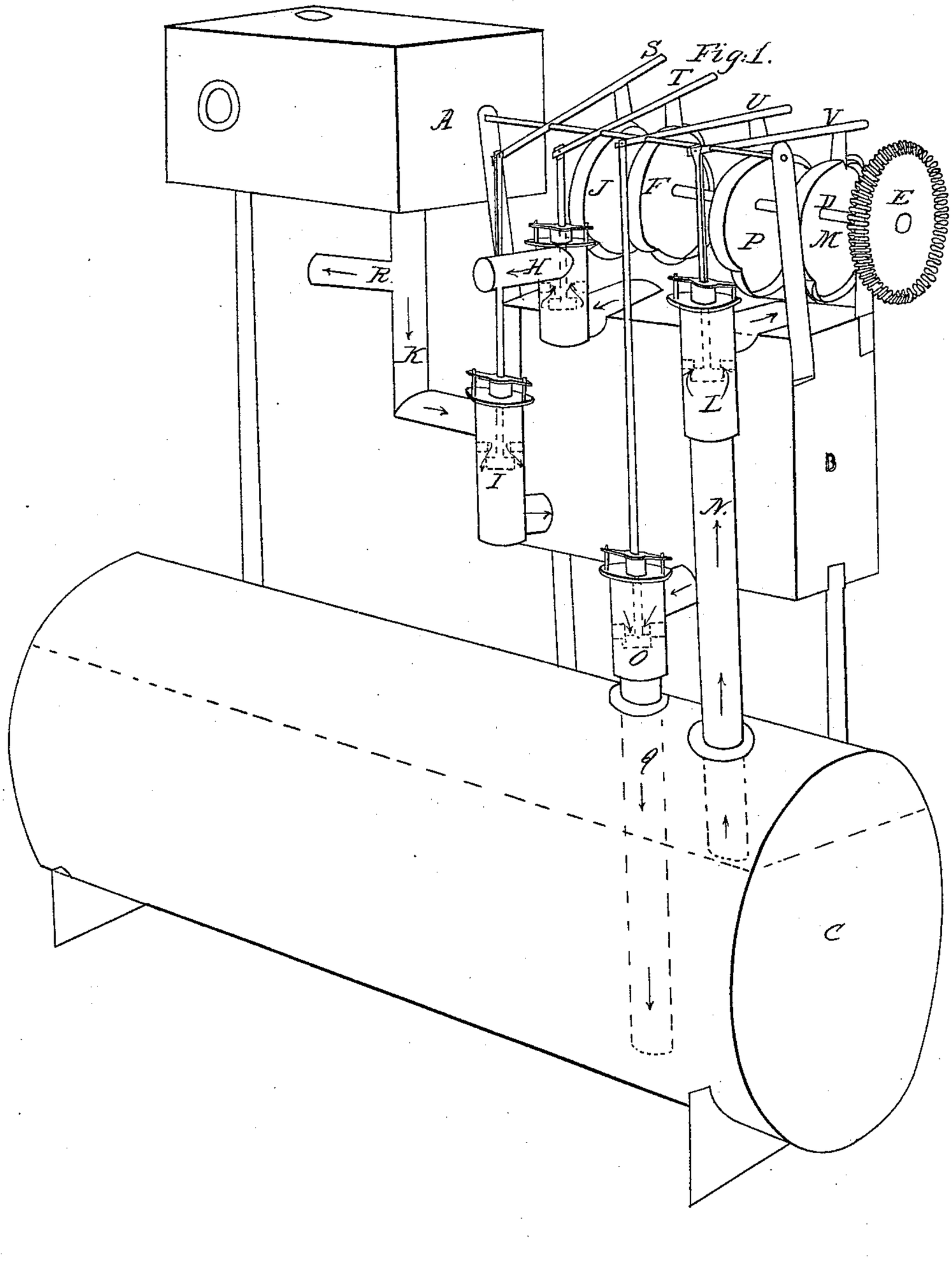
A. J. Vandegrift,

Steam-Boiler Water-Feeder,

No. 16,662. Patented Feb. 17, 1857.

Fig: 1.



UNITED STATES PATENT OFFICE.

ANDREW J. VANDEGRIFT, OF DELAWARE, OHIO.

FEED-WATER APPARATUS FOR STEAM-BOILERS.

Specification of Letters Patent No. 16,662, dated February 17, 1857.

To all whom it may concern:

Be it known that I, ANDREW J. VANDEGRIFT, of Delaware, in the county of Delaware and State of Ohio, have invented a new and Improved Machine for the Purpose of Supplying Steam-Boilers with Water and Gaging the Same Therein to any Desired Height; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a perspective view on which internal parts are represented by dotted lines.

My improvement consists in the addition of a fourth valve and an escape pipe; which are inserted in the top of the exchange chamber, whereby, in place of being condensed by introducing the water sufficiently cool for that purpose, the steam is allowed to escape; which, (by explanation I hope to make plain), is indispensably necessary in order to supply a steam boiler, at no greater expense than is incurred by the use of a force-pump; and at the same time gage the water to a regular height. In order that this may be fully understood there are a few facts necessary to be observed. First that in order to supply a steam boiler with water there must be a proportionate quantity of steam exhausted; thus to introduce one cubic inch of water into a steam boiler where the pressure of steam equals one hundred pounds to the square inch, there must be a force equal to one hundred pounds exerted or one cubic inch of steam exhausted. Whether this steam be first transmitted to an engine and then to, a force-pump, or otherwise it must be considered virtually an exchange; which cannot be more economically effected than by allowing the exchange steam to escape into the air as is done by my machine, thereby making the exchange direct. Therefore even to allow the friction to be as great, (which it is not) relative to supplying, it must be admitted that my machine equals the force-pump; as it introduces the water at the same temperature and only exhausts the same amount of steam, while at the same time it renders the plan of gaging by the difference in the termination or the location of the mouths of the two pipes in the boiler perfectly practicable, and also obviates the necessity of a large, burdensome exchange chamber and reservoir, which are evidently necessary to the condensing of the exchange steam as in all condensing machines considerable capacity is necessary, while in order to supply an ordinary engine, the exchange chamber is only required to hold one gallon, and the heater is no larger than common heaters. Therefore from the above we may readily deduce the following conclusion: first, that in order to introduce one cubic inch of water into a steam boiler by means of a force pump we exhaust one cubic inch of steam, at whatever tension it may be; second, that by my arrangement we allow one cubic inch to escape which is virtually the same; third, that by condensing the steam in the exchange chamber, we not only exhaust one cubic inch for each cubic inch introduced, but as many cubic inches of steam as one cubic inch of cold water will condense, which of course would be several at the tension of one hundred pounds to the square inch.

My machine consists in the arrangement and combination of the following devices, viz., a common heater, an exchange chamber, four pipes, and four valves operated by eccentrics and levers or in any other way substantially the same. The heater A, is elevated above the level of the top of exchange-chamber B, which is elevated above the level of boiler C. Eccentric shaft D, is made to revolve by means of gearing from the engine operating on gear wheel E. Eccentric F and lever T open valve G (see dotted lines) and the steam escapes from exchange chamber B, through pipe H and removes the pressure from valve I, (see dotted line). When valve I is opened by eccentric J, and lever S and the heated water by its own specific gravity descends through pipe K, (see arrows) into exchange chamber, B, when it is filled, and valves I and G close simultaneously, and valve L is opened by eccentric M, and lever V, and the steam ascends through pipe N, (see arrows) into exchange chamber B, and equalizes the pressure on both sides of valve O, when valve O is opened by eccentric P, and lever U, and the water descends through pipe Q to the bottom of boiler C. The steam ascending through pipe N, takes the place of the water in exchange chamber B, and valves O and L close simultaneously. Valves I and G, operate alternately with O and L, and the

exchange of steam for water continues until the water in boiler C rises to the mouth of pipe N, which is inserted at or extends down to "high water mark" when on account of the mouth of pipe N being immersed in the water, and there being no chance for the steam to ascend through said pipe into exchange chamber B, the exchange ceases and the exchange chamber remains full of water until the quantity of water in the boiler is diminished; and the surplus water passing through heater A passes off through waste pipe R, which is inserted in pipe K, at the level of the top of exchange chamber B.

I am aware, that the heater, the exchange chamber and three valves and three pipes have been used for like purposes; these I do not claim, but,

What I do claim and desire to secure by Letters Patent is—

The fourth valve G, and the escape pipe H; in combination with the above described devices, or their equivalents; combined arranged and operated for the purpose and in the manner above set forth, or in any other way substantially the same.

ANDREW J. VANDEGRIFT

Witnesses:

DANIEL BERLEW,

JOSEPH SMITH.