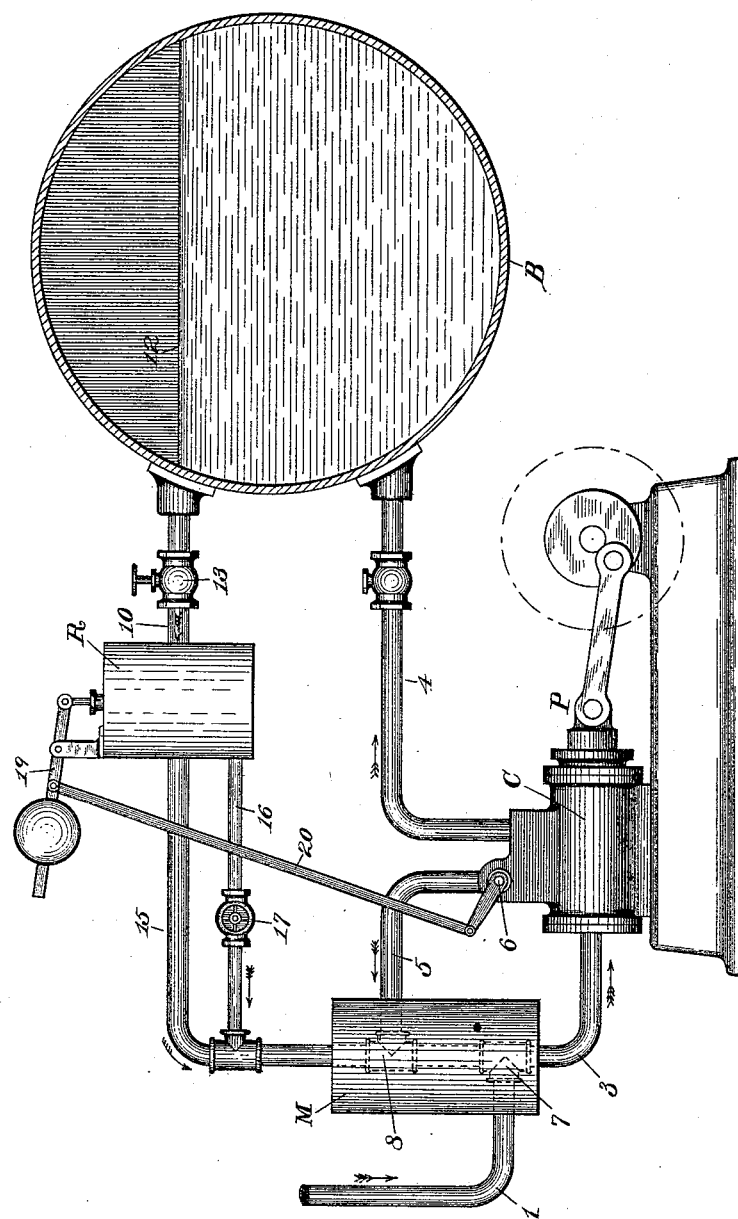


(No Model.)

N. CLUTE.  
METHOD OF FEEDING BOILERS.

No. 454,900.

Patented June 30, 1891.



Witnesses:

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Inventor:

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By his Attorney, F. H. Richards.

# UNITED STATES PATENT OFFICE.

NICHOLAS CLUTE, OF SCHENECTADY, NEW YORK.

## METHOD OF FEEDING BOILERS.

SPECIFICATION forming part of Letters Patent No. 454,900, dated June 30, 1891.

Application filed November 2, 1889. Renewed February 7, 1891. Serial No. 380,560. (No model.)

*To all whom it may concern:*

Be it known that I, NICHOLAS CLUTE, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Methods of Feeding Boilers, of which the following is a specification.

This invention relates to the feeding of boilers by relief-pumping; and it consists in the improved methods therefor hereinafter set forth.

The object of my invention is to properly supply feed-water to boilers requiring a variable supply and to control such supply in a reliable and economical manner.

This invention is, in part, an improvement on the method of feeding boilers described in my application, Serial No. 366,489, filed September 29, 1890.

The drawing accompanying and forming a part of this specification illustrates an apparatus suitable for practicing my present invention, the several portions and principal parts of the apparatus being referred to in the following description by the aid of reference-characters.

In carrying into practice my improved method of boiler-feeding I employ a feed-pump having a working capacity in excess of the supply to be delivered to the boiler, and a regulator which is operated by the accumulation of the oversupply drainage-water, and which is connected to control the discharge of relief-water from the pump. The feed-pump consists in a suitable pump (usually operating continuously) having a capacity sufficient to normally oversupply the boiler B, a suction-pipe 3, supplying the cylinder C of said pump, a discharge-pipe 4, leading to the boiler, a relief pipe or passage 5, which should lead from the pump to the said suction-pipe, and some suitable relief-valve 6, controlling the communication from the delivery-passage of the pump to the said relief-pipe. In practice I ordinarily lead the relief-pipe 5 first to an intermediate receiver M, which discharges into said suction-pipe, and thus completes the connection of said relief-pipe with said suction-pipe. Should the receiver not be employed, the fresh-feed-water-supply pipe 1 may join the suction-pipe 3 at

7, and the relief-pipe 5 may join said pipe 3 at 8.

The regulator R is located at one side of the boiler B, and is connected thereto by the drainage-pipe 10, which enters the boiler (or a stand-pipe thereof) at the height of the normal water-line 12. In the pipe 10 there should be a suitable valve 13 for adjusting the drainage-outlet. A waste-pipe 15 leads from the regulator (at about the height of pipe 10) to convey the used drainage-water to the receiver M when this is employed, or to join the relief-pipe 5 at 8 when no receiver is employed. From a point lower than pipes 10 and 15 a vent-pipe 16 leads from the regulator R to the waste-pipe, and a suitable valve 17 is provided in said pipe 16 to adjust the said regulator vent or drip, which vent during the operation of the machine is continuously open and of a less capacity than the inlet from the boiler to the chamber of said regulator R.

The feed-pump P is operated by any convenient motive power to normally oversupply the boiler. The water-line 12 rising above the normal height thereof, the oversupply is slowly drained through the pipe 10 into the regulator R, which is supposed to comprise the usual float or devices for actuating the arm or lever 19 thereof, which lever is connected by a rod 20 to the relief-valve 6 of the pump. The vent-valve 17 being set to give a lesser rate of discharge than valve 13, the drainage-water accumulates in the regulator and, by acting on the float thereof, actuates the arm 19 and rod 20; thus operates the relief-valve to return some of the pumped water to the suction-pipe 3 through the relief-pipe 5, and thereby reduces the quantity pumped into the boiler. When the water-line is lowered, only steam or steam and water pass through pipe 10, and the drainage being thus reduced the vent 16 discharges the accumulation of drainage-water in the regulator, which then operates to close to a greater or less extent (according to the extent of such discharge) the relief-valve and thus cause more of the pumped water to be delivered through pipe 4 into the boiler. The drainage-water on being discharged from the regulator is conducted to a point intermediate to the regulator and the pump, and is

there commingled with the relief-water, (which is ordinarily colder,) the commingled waters being then returned to the pump. By this means both the drainage-water and the heat thereof are utilized. The said drainage and relief waters may be commingled, as stated, and also they may be further commingled with the fresh feed-water and these three waters all supplied to the pump together. For properly effecting this I prefer to employ a suitable receiver or chamber M, into which each of said waters is conveyed, there to be commingled and then supplied by the suction-pipe to the pump. This method and arrangement is especially desirable where the said fresh feed-water has been previously somewhat heated, since then the warm feed-water, the warmer relief-water, and the drainage-water are better commingled and utilized.

By the term "boiler-supply," as used herein, I mean the whole quantity of water delivered into the boiler from the pump, thus including the water which is converted into steam for use, together with the oversupply water that is drained from the boiler for operating the regulator to control the discharge from the pump of the excess of pumped water.

For practicing my present invention I may use the boiler-feeding apparatus described and claimed in Letters Patent of the United States No. 404,683, granted to me June 4, 1889.

Having thus described my invention, I claim—

1. The herein-described method of maintaining the water-level in boilers by relief-pumping, consisting in pumping to normally oversupply the boiler, draining the oversupply from the boiler at the water-line into a regulator having a continuously-open discharge-outlet of less capacity than the inlet thereto and regulating the pump-relief by the accumulation of the said drainage-water, substantially as described.

2. The herein-described method of feeding boilers by relief-pumping, consisting in pumping to normally oversupply the boiler, drain-

ing the oversupply from the boiler at the water-line into a regulator having a continuously-open discharge-outlet of less capacity than the inlet thereto, regulating the pump-relief by the accumulation of the drainage-water, and returning said drainage-water to the pump, whereby the water-level is maintained and the drainage-water returned to the boiler, substantially as described.

3. The herein-described method of feeding-boilers by relief-pumping, consisting in pumping to normally oversupply the boiler, draining the oversupply from the boiler at the water-line, regulating the pump-relief, substantially as described, by the accumulation of the drainage-water, commingling the drainage-water and the relief-water immediately to the regulator and the pump, and returning said commingled waters to the pump, substantially as described.

4. The herein-described method of feeding boilers by relief-pumping, consisting in pumping to normally oversupply the boiler, draining the oversupply from the boiler at the water-line, regulating the pump-relief, substantially as described, by the accumulation of drainage-water, commingling the drainage-water, the relief-water, and the fresh feed-water immediately to the regulator and the pump, and supplying the pump by the said commingled waters, substantially as described.

5. The herein-described method of feeding boilers requiring a variable boiler-supply, consisting in pumping in excess of the required boiler-supply, draining the oversupply from the boiler at the water-line into a regulator having a continuously-open discharge-outlet of less capacity than the inlet thereto, and controlling the discharge from the pump of said excess of pumped water by the accumulation of said oversupply drainage, substantially as described.

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Witnesses:

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