R. N. PRATT. 2 Sheets—Sheet 1.

Combined Heater and Feeder for Boilers.

No. 209,584. Patented Nov. 5, 1878.

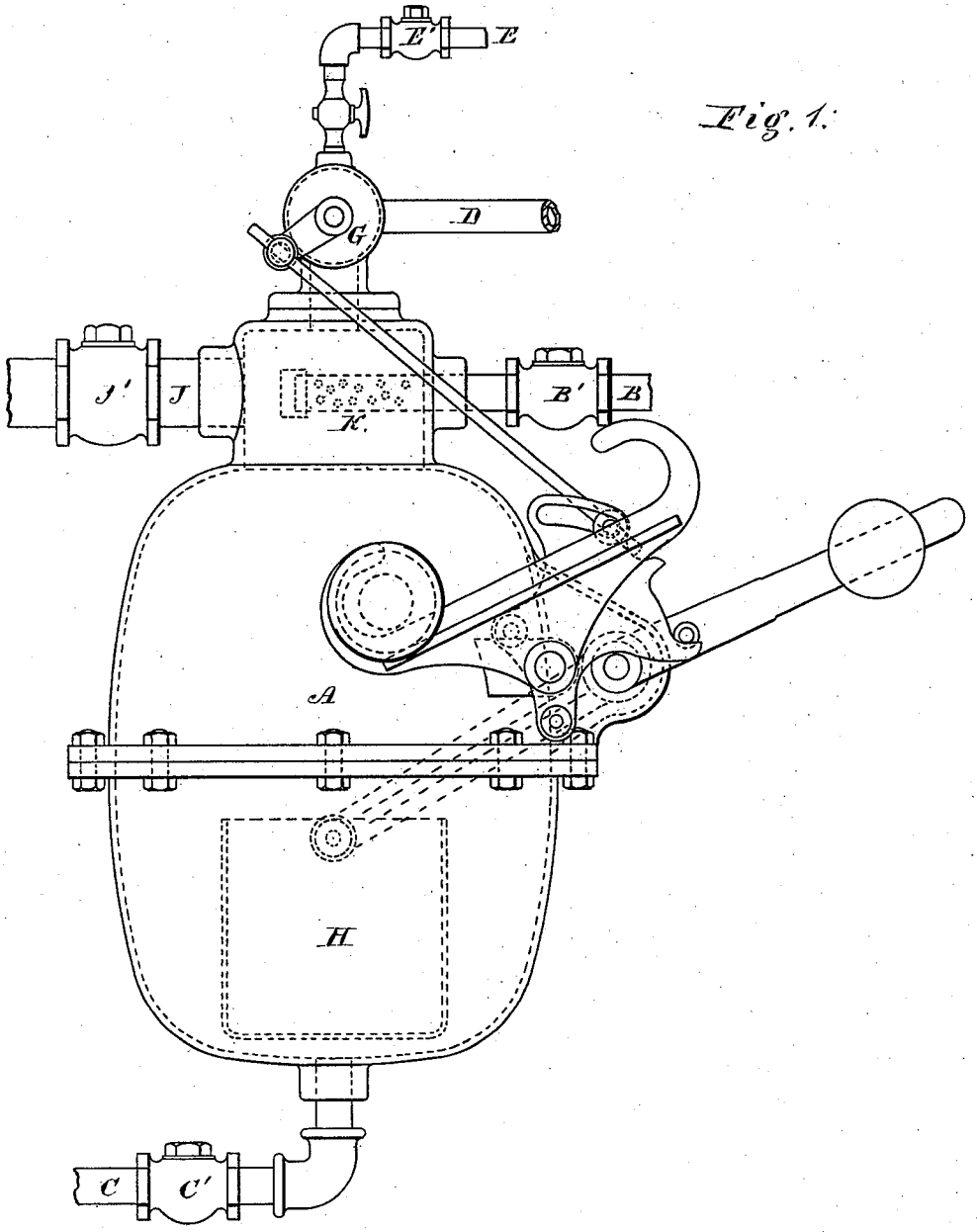


Fig. 1.

Witnesses.

Wendell R. Curtis

Charles H. Bunce

Inventor.

Rufus N. Pratt,

by Thos. G. Ellis, Attorney

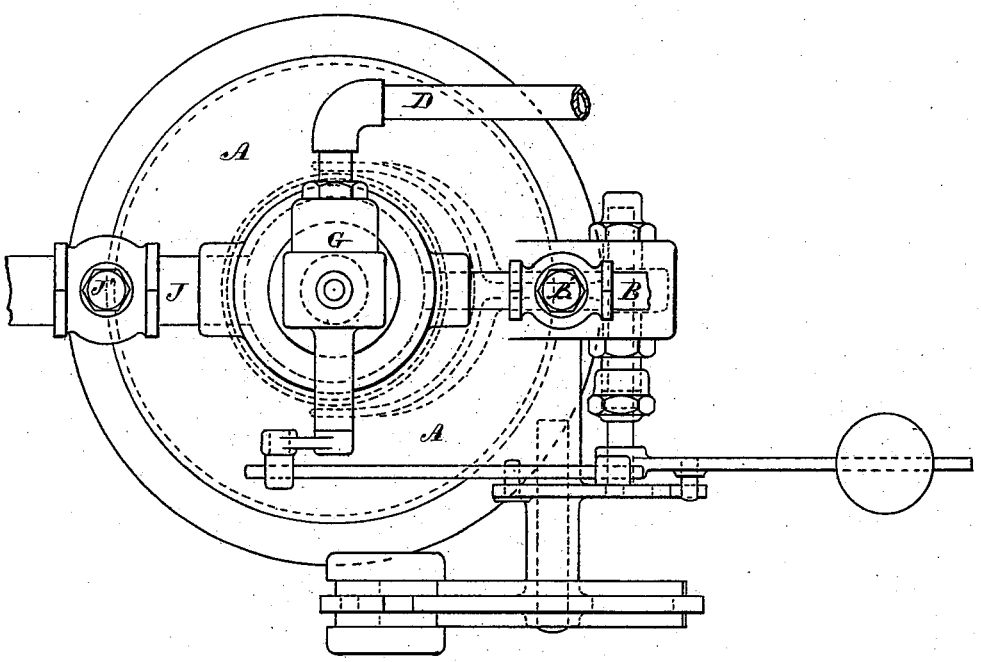
2 Sheets—Sheet 2.

R. N. PRATT.

Combined Heater and Feeder for Boilers.

No. 209,584. **Patented Nov. 5, 1878.**

Fig. 2.



Witnesses.

Wendell R. Curtis

Charles H Bunce

Inventor.

Rufus N. Pratt

by Theo. G. Ellis, Attorney.

UNITED STATES PATENT OFFICE.

RUFUS N. PRATT, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN COMBINED HEATER AND FEEDER FOR BOILERS.

Specification forming part of Letters Patent No. **209,584**, dated November 5, 1878; application filed May 29, 1878.

To all whom it may concern:

Be it known that I, RUFUS N. PRATT, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Combined Heater and Feeder for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, whereby a person skilled in the art can make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Like letters in the figures indicate the same parts.

My improvement relates to automatic boiler-feeders, and it has for its object the production of an automatic mechanism which shall heat the feed-water at the same time that it regulates the supply.

My invention consists in attaching to an automatic boiler-feeder suitable devices for heating the water, so that the same chamber serves both as a heater and feeder.

In the accompanying drawings, on two sheets, Figure 1 shows a side view of an automatic boiler-feeder having my improvements. Fig. 2 shows a top view of the same.

The automatic feeder, aside from my improvements, (shown in the drawings,) is that patented to Francis A. Pratt on the 31st of October, 1876. The peculiar mechanism, however, shown in the said patent is not essential to my invention, my improvements being adapted to any automatic boiler-feeder that operates upon the same principle.

The feeding mechanism consists essentially of a chamber or reservoir, A, which is alternately filled and discharged into the boiler. The reservoir is filled through the pipe B, furnished with a check-valve, B′, and is discharged through the pipe C, furnished with a check-valve, C′. D is a steam-pipe leading from the boiler, and E is a small outlet-pipe to the atmosphere.

G is a valve which, in one position, (that shown in the drawing,) opens communication between A and E, and at the other end of its throw closes E and opens communication between A and D. This valve is operated by a system of levers connecting with a float in the chamber A, which by rising and falling throws the valve, as fully described in the said patent.

The position of the parts shown in the drawing is when the contained water has just been discharged and the valve reversed to allow the chamber to fill. The water then flows in by the pipe B and raises the float, the contained air and steam escaping by the pipe E. When the chamber is full the valve G is reversed by the levers, and the steam entering through D forces the water out through the pipe C.

In order to adapt this apparatus to feeding hot water to the boiler, and to heat the water in the chamber A without heating it by a separate mechanism, as has always heretofore been done, I provide a steam-pipe, J, leading from the exhaust-pipe of the cylinder, or other waste steam, and entering the top of the chamber A, in juxtaposition to the cold-water pipe B. The pipe J is furnished with a check-valve, J′, to prevent the reflux of steam through it when the pressure of the boiler-steam is admitted through the pipe D. I also furnish the end of the cold-water pipe B with a rose or sprinkler, K, so that the steam entering through the pipe J shall meet it in fine jets or spray, and thereby heat it more effectually.

After the water is forced out of the chamber A, by the pressure of steam from the boiler through D, and the valve G is reversed, the pressure in A, which has closed the check-valves B′ and J′, is relieved, and the water enters through K. This condenses the remaining steam in A, and as this partial vacuum is desirable in my improvement to draw in the steam through the pipe J, I provide the check-valve E′, in the pipe E, so as to prevent the reflux of air to destroy the vacuum.

In the operation of my improved heater and feeder the discharge of the water from the chamber A is effected essentially in the same manner as described in the patent before referred to, the pipe J being closed by the check-valve J′. In filling, however, the water is heated by my improved appliances instead of entering cold, or heated by another apparatus, as heretofore. The pressure of the atmosphere is excluded by the check-valve E′, and the waste steam flows or is drawn through

the pipe J, so as to come in contact with the spray from the sprinkler K and heat it to a high temperature as it flows into the chamber A to fill it.

In this manner my improved apparatus becomes at once both an automatic feeder and an automatic heater. The supply of water to the heating part of the mechanism needs no regulating as to quantity, as in other feed-water heaters, as the feeding part of the mechanism regulates the supply to the boiler, and consequently the quantity heated.

What I claim as my invention is—

1. The combination of the waste-steam pipe J, having a check-valve, J′, and the pipe B, having the sprinkler K, with an automatic boiler-feeding mechanism, constructed and arranged for operation substantially as shown, and for the purpose described.

2. The combination of the check-valve E′ with the air-escape pipe E of the automatic heating and feeding mechanism for steam-boilers, constructed and arranged substantially as herein shown and described.

RUFUS N. PRATT.

Witnesses:

WENDELL R. CURTIS,

CHARLES H. BUNCE.