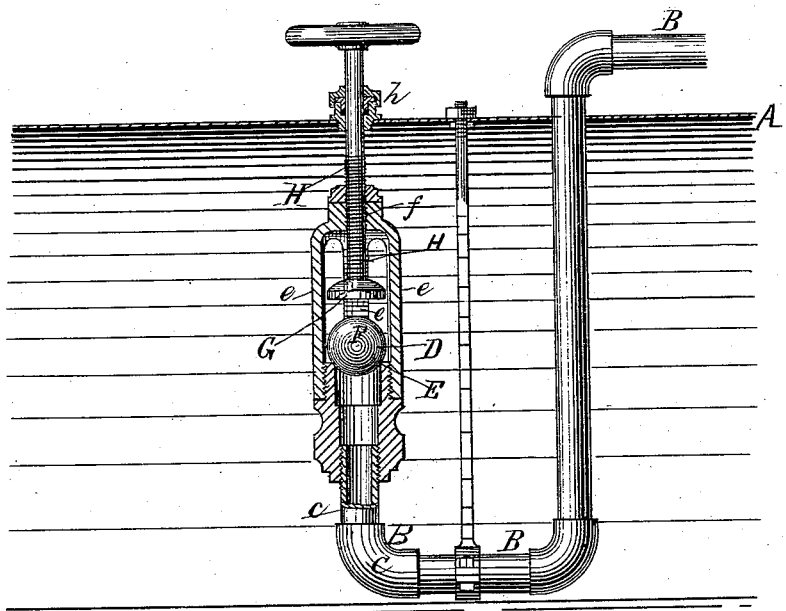
G. W. MOORE.

Heater and Feeder for Steam-Boilers.

No. 208,194. Patented Sept. 17, 1878.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE W. MOORE, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN HEATERS AND FEEDERS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **208,194**, dated September 17, 1878; application filed January 23, 1878.

To all whom it may concern:

Be it known that I, GEORGE W. MOORE, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Water-Feed and Heating Apparatus for Steam-Boilers, which improvement is fully set forth in the following specification and accompanying drawing.

My invention relates to, and has for its object, first, the heating the water by its direct contact with the steam in the steam-room of the boiler; second, to prevent the steam from entering the feed or supply pipe, and to securely close the mouth or outlet of said pipe inside the boiler whenever desired, also to adjust the area of the outlet to the capacity of the supply pump or pipe. This I accomplish by entering the boiler at the top with the feed or supply pipe, which passes down, then bends at a right angle above the water-line, and extends horizontally a short distance, terminating in an elbow and nipple, the mouth of which is directly upward. On the upper end of this nipple or short pipe is mounted a ball check-valve. Inside of the bars of this valve, and above the ball, is a small disk, concave on its under surface, to correspond to the diameter of the ball, and convex on its upper surface, to correspond to arch formed by the meeting and union of the valve-bars. A hole is drilled through the center of this arch and screw-threaded. Through this hole passes a rod having a corresponding screw-thread cut on it, and extends up and out of the boiler through a hole tapped in the shell for its passage, the concave disk being attached to the lower end of this rod. This valve portion of the apparatus is preferably located directly above the mud-drum or stand-pipe of the boiler. The apparatus is held in place in the boiler by the descending portion of the feed-pipe and by a stay-bolt, which is attached to the boiler-shell by its upper end, and at the lower end has a compound collar, which surrounds or clasps the horizontal portion of the feed-pipe near the elbow.

The invention is illustrated in detail in the drawing, in which A is a horizontal section of a boiler; B B, the feed or supply pipe, the opening through which it enters being secured against leakage of steam in the usual manner. C C is the elbow and nipple. D is a ball check-valve. This valve is similar in construction to the upper part of the well-known ball-valve for pumping deep wells. It is, however, very short, the barrel portion being only long enough to screw in or on the nipple, receive the cage, and furnish a seat for the ball. E is the valve-seat; *e e e*, the bars of the cage. F is the ball; G, the concave disk inside of the bars *e e e* and above the ball. H is the actuating screw-rod, which screws in the hole *f* in the arch of the cage, and extends up through the shell of the boiler and the stuffing-box *h*. I is the mud-drum or stand-pipe.

Operation: The pump being put into action, the water is conducted into the boiler through the supply or feed pipe B B. When it reaches the mouth of the valve it lifts the ball of the valve from its seat and flows down through the steam, and by contact with it is heated, the water being delivered immediately over the mud-drum or stand-pipe. Mineral substances in the water, which separate from it when heated, pass down to said drum or pipe, and are not scattered over a large surface, as would be the case if the water were thrown into the boiler in the form of a spray or fine jets. At each stroke of the pump the ball of the valve rises and falls, thus allowing the water to enter and promptly shutting out the steam from the feed-pipe, and stops the mouth of the pipe or valve whenever the pump ceases to act. Thus the steam cannot reflect back on the pump or on any check-valves outside of the boiler. If the area of the valve is greater than that of the pump or feed-pipe, the throw of the valve is decreased by screwing the disk and rod down, and the reverse when it is desired to increase. When from any cause muddy water has to be used, as is frequently the case, the area of the valve is increased by raising the disk, so that the mud will have a free passage and will not clog the pipe. When the pump from any cause becomes deranged the adjusting rod and disk are screwed down on the ball and confine it on the valve-seat, thus converting the check-valve into a stop-valve.

I do not wish to be understood as confining myself to the use of the ball check-valve described, as it is obvious that other forms of

check-valves might be used, all of which I claim as mechanical equivalents, yet inferior to the valve above described.

Having thus described my invention and its operation, what I claim, and desire Letters Patent for, is—

1. The combination of the upturned end of the feed-pipe B, passing through the steam-space of a boiler, with a check-valve, F, arranged as shown, and for the purpose described.

2. The combination of the upturned end of the feed-pipe B and check-valve F with the concave disk G and adjusting-rod H, all constructed and arranged as shown, and for the purpose set forth.

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Witnesses:
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