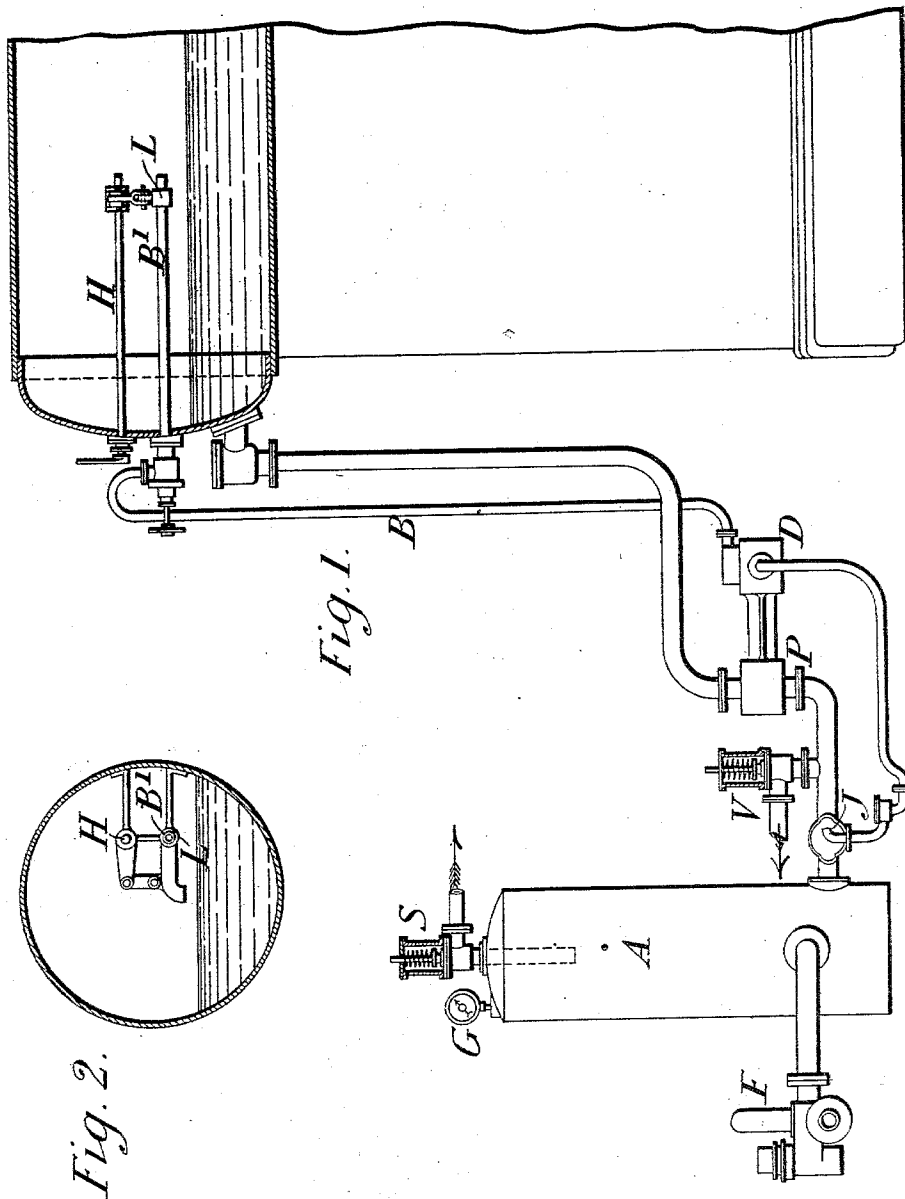


(No Model.)

A. F. YARROW.
APPARATUS FOR FEEDING STEAM BOILERS.

No. 566,644.

Patented Aug. 25, 1896.



Witnesses.
Thos. A. Green
Robert G. Smith

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UNITED STATES PATENT OFFICE.

ALFRED F. YARROW, OF LONDON, ENGLAND.

APPARATUS FOR FEEDING STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 566,644, dated August 25, 1896.

Application filed March 20, 1896. Serial No. 584,147. (No model.)

To all whom it may concern:

Be it known that I, ALFRED FERNANDEZ YARROW, engineer, a citizen of England, residing at the Isle of Dogs, Poplar, London, in the county of London, England, have invented certain new and useful Improvements in Apparatus for Feeding Steam-Boilers, of which the following is a specification.

Steam-boilers, especially those used for marine engines, are often arranged to be fed each by a separate steam-pump or several of these independent of the main feed-pump worked by the main engine or by a separate engine.

My invention relates to means of supplying these separate feed-pumps with heated and purified feed-water and of automatically determining their action by the water-level in the boiler. For this purpose I arrange the feed-pumps and their communication with the boiler as I shall describe, referring to the accompanying drawings, of which—

Figure 1 is an elevation of these parts with the steam and water drum shown in section. Fig. 2 is a transverse section of the water-drum.

Although I have shown this drum as it would form part of a water-tube boiler, it is to be understood as representing part of the upper part of the water-space and the lower part of the steam-space in any boiler. I lead all the water of condensation discharged by the air-pump and main feed-pumps F into a closed vessel A, in which it is retained under pressure, such, for instance, as thirty or forty pounds per square inch. The vessel is of such capacity as to allow for all variations of the quantities drawn from it for feed, that is to say, it is usually large enough to accommodate all the water pumped into it while the boilers which it has to supply are receiving little feed and to furnish all the water which they require when they are receiving great feed.

The vessel A is provided at the top with a pressure-gage G and a loaded valve S, which operates as a safety-valve and allows escape of air, and the interior of the vessel is preferably furnished with a filter for the water passing through it, which filter may be of any known kind. From the vessel A the water

passes to the suction-valves of the separate pumps P, being heated on its way by jets of steam J blown into it, this steam being taken direct from the boiler or from the main or any auxiliary engine, or it may be, as shown, exhaust-steam from the donkey feed-engine D when it is of sufficient pressure to overcome that of the feed-water. There may also be in the course of the pipe leading to the pump P an adjustable loaded valve V for escape of surplus water which is not required for feed, this surplus returning to the tank from which the main pump F draws the feed-water or being conducted elsewhere, as may be required. Owing to the fact that this feed-water is supplied under pressure to the separate feed-pumps it may be at a high temperature when it reaches them, and yet the feed-pumps will not fail to draw the water, which would be the case if it were at high temperature, without being under pressure sufficient to prevent it from becoming partly converted into steam when it is drawn into the pump.

The steam for working the steam-engine D of each boiler is taken by a pipe B, the part B' of which within the boiler is adjusted to such a level as to take steam not from the highest part of the steam-chamber, but from a place between the highest and lowest levels which the water usually attains. When the water rises above the mouth of this steam-pipe B', water, instead of steam, goes to the feed-engine D, thereby retarding it and also constituting by its discharge from the engine an overflow from the boiler, until the water is again below the mouth of the steam-pipe B', whereupon the feed-engine D resumes its usual working. In this way the water-level in the boiler automatically determines the supply and the overflow.

The level of the inlet to the steam-pipe B' may be adjusted in various ways, one of which is shown in the drawings. In this case it is closed at the end and has a lateral opening to a sleeve L, which has a side branch with its mouth directed downward. This sleeve can be turned more or less on the pipe B' by turning a spindle H, which has an arm linked to the sleeve and passes through a stuffing-box to an external handle. In order to provide against water entering the pipe B'

in case of ebullition or priming, suitable deflectors may be arranged above and below the mouth of the pipe. Obviously this mode of automatically controlling the feed is applicable whether the feed-water be heated or not.

5 Having thus described the nature of my invention and the best means I know for carrying it out in practice, I claim—

10 1. The combination with a steam-boiler and with a main feed-pump for said boiler, of a closed vessel with which said feed-pump and an air-pump are connected, said vessel having a capacity to receive the water of condensation and contain the feed-water, a donkey-engine the exhaust-pipe of which enters
15 the pipe connecting said vessel with the main feed-pump, a steam-supply pipe for the donkey-engine having its end arranged within the boiler between the highest and lowest
20 water-levels, a connection between the said closed vessel and the pipe which connects it to the main feed-pump, and a loaded valve

to close communication through said connection, substantially as described.

2. The combination with a steam-boiler and 25 with a main feed-pump, of a closed vessel with which said main feed-pump and an air-pump have connection, a donkey-engine to operate the feed-pump, its steam-pipe being arranged in the boiler between the highest 30 and lowest water-levels, a side branch sleeved upon said pipe within the boiler, and means for adjusting said side branch so that the open end shall be at any required level, substantially as described.

35 In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 10th day of March, A. D. 1896.

ALFRED F. YARROW.

Witnesses:

OLIVER IMRAY,
GERALD L. SMITH.