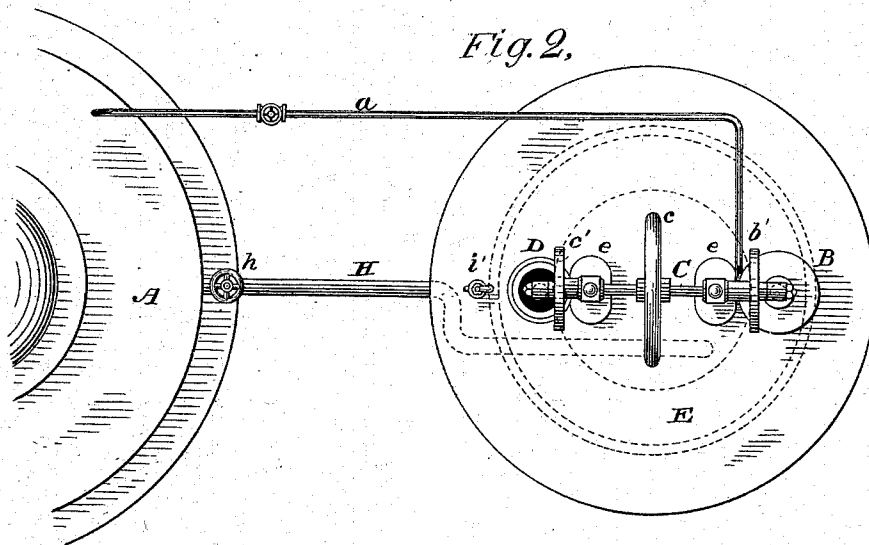
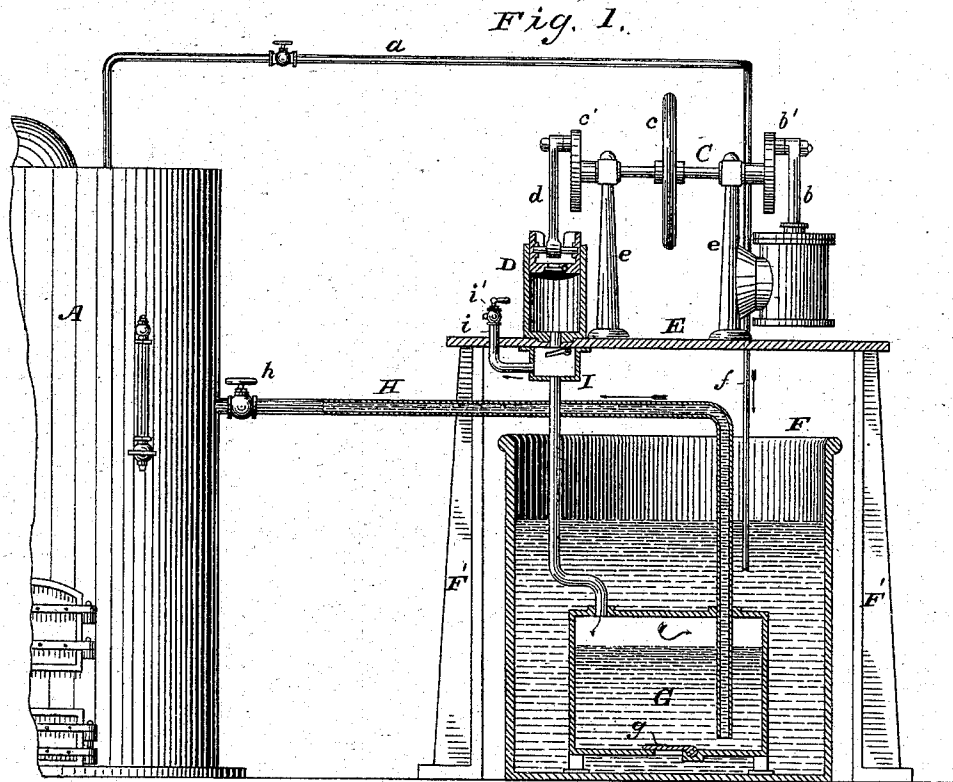


(No Model.)

J. A. AYRES.
BOILER FEEDING APPARATUS.

No. 274,104.

Patented Mar. 20, 1883.



WITNESSES
Wm A. Shinkle
Ernest Abshagen

INVENTOR
Jared A. Ayres,
By his Attorneys
Panclison & Panclison

UNITED STATES PATENT OFFICE.

JARED A. AYRES, OF MYSTIC RIVER, CONNECTICUT, ASSIGNOR TO THE
PNEUMATIC ENGINE COMPANY, OF SAME PLACE.

BOILER-FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 274,104, dated March 20, 1883.

Application filed June 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, JARED A. AYRES, of Mystic River, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Boiler-Feed Apparatus, of which the following is a specification.

My invention, although adapted to a large class of engines, is more especially intended for use in connection with those (small in size and light running) now frequently employed in furnishing power for domestic or household purposes; and I have chosen to illustrate it in connection with one type of such, which, however, may at the same time be taken to represent any auxiliary engine or motor mechanism moved from the main engine for the purpose of operating the feed devices.

It consists in the combination, with the boiler, of a supply-pipe leading to a closed water-box below the level of the water therein, a continuously-driven air-forcing pump communicating directly by pipe with said box, and a blow-off tap between said pump and the water-box to give vent to the compressed air when the boiler is full; in the combination, with the boiler and engine, of a supply-pipe leading to a closed water-box below the level of the water therein, a tank or hot-well surrounding said box and communicating therewith by a valve, an exhaust-pipe delivering exhaust-steam from the engine to said tank to raise the temperature of the water therein, an air-forcing pump communicating by pipe with said closed water-box, and means for intermitting the action of said pump upon the water in the box; in the combination, with the boiler and engine, of a supply-pipe leading to a closed water-box below the level of the water therein, a tank or hot-well, warmed by exhaust-steam from the boiler, surrounding said box and communicating therewith by a valve, an air-forcing pump connected by pipe with said water-box, and a blow-off tap between said pump and the water-box to relieve the pressure upon the water therein when the boiler is full; and in the various other combinations and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation,

partly in section, of mechanism embodying my invention in the most compact form known to me; and Fig. 2 is a plan view of the same.

A is a boiler, connecting by pipe *a* with an engine, B, in the present instance an oscillating engine. This engine, by means of pitman *b* and crank *b'*, drives a shaft, C, provided with fly-wheel *c*, and, if desired, with suitable means for communicating motion to machinery near at hand or at a distance. A second crank, *c'*, upon this shaft operates through pitman *d* the piston of an air-forcing pump, D.

For convenience and economy of space, I prefer to support the engine and shaft upon brackets *e*, rising from a base-plate, E, and to place the air-pump upon this base-plate; further, to mount the base-plate upon a frame or standards, F', and in the space beneath to arrange the tank or hot-well and the closed water-box heretofore alluded to. This is not essential, but is desirable.

F is the tank or hot-well, into which the exhaust-steam of the engine is discharged through pipe *f*, said pipe discharging for most perfect effect below the surface of the water, whether the tank is open or closed. Within this tank is placed a closed water-box, G, having communication, however, with the contents of the tank by means of clack-valve *g*, preferably arranged in its bottom. From beneath the water-level in this water-box a pipe, H, leads to the boiler to supply water thereto, a stop-cock, or, it may be, a back-pressure valve, *h*, cutting the pipe at a suitable point between the boiler and box.

An air-pipe, I, leads from the air-forcing pump to the top of the water-box to conduct the compressed air thereto, and at a point intermediate between the pump and box has a branch, *i*, provided with a valve-tap or controllable blow-off, *i'*, whereby the pressure upon the water in the box, due to the action of the pump, may be at any time partially or entirely relieved. This tap may be operated by hand or automatically, according to circumstances. For the latter purpose any suitable mechanism may be used—as, for instance, that shown and described in my application filed in the Patent Office of the United States on

the 7th day of December, 1881, and numbered 47,278, or in another application filed by me concurrently herewith. I have shown it herein as adapted to be controlled by hand.

5 In operation, supposing the boiler to be sufficiently supplied with water, and the engine to serve no purpose but that of motor for the feed mechanism, the valve between the boiler and water-box is opened, the blow-off tap
10 closed, steam is let on, and the engine started. The air-pump will then supply air under pressure to the water-box, and the water therein, being prohibited by the check-valve from escaping into the surrounding tank, will be forced
15 through pipe H into the boiler. The piston of the air-pump is made of less diameter than the piston of the engine, so that it may force water into the boiler whatever the head of steam. When the boiler is full the engine is
20 stopped, the valve *h* is closed, and the blow-off tap opened, allowing the compressed air to escape from the water-box, which then refills from the water-tank.

In case the engine is intended to drive other
25 machinery, as for household and domestic purposes, it will of course be run continuously. In this case a clutch can be interposed between it and the air pump to throw the latter out of action if deemed advisable. Ordinarily,
30 however, this pump may also be run continuously, and the blow-off tap, being left open, will afford a vent for its whole volume of discharge, and to relieve the pressure in the water-box to permit the latter to refill. The operation,
35 with the exception that the engine is not started and stopped each time water is to be pumped, will be the same as the foregoing—that is, it will be controlled and determined by the opening and closing of the valve *h* and the blow-off
40 tap in the order stated.

A leading advantage of my invention, apart from the simplicity of the mechanism employed, is that water of any degree of heat may be supplied to the boiler, since it does not
45 pass through the pump itself or come in contact with any part susceptible to injury, but is led entirely through ordinary conduits.

I claim—

1. In combination with a boiler, a supply-pipe leading to a closed water-box, a continuously-driven air-forcing pump, delivering directly by pipe to said box, and a blow-off tap between said pump and box to give vent to the stream of compressed air when the boiler is full and relieve the pressure in the box. 50 55

2. In combination with a boiler and an engine or motor supplied with steam therefrom, a feed-pipe communicating between the boiler and a closed water-box, a tank or hot-well surrounding said box, and communicating there-
60 with by a valve; an exhaust-pipe delivering exhaust-steam from the engine to said tank to raise the temperature of the water therein, an air-forcing pump delivering by pipe to said water-box, and means for intermitting the
65 action of the pump upon the water in the box.

3. In combination with a boiler and an engine supplied with steam therefrom, a feed-pipe communicating between the boiler and a closed water-box, a tank or hot-well warmed by
70 exhaust-steam from the boiler and supplying the water-box through a valved opening, an air-forcing pump delivering by pipe to said water-box, and a blow-off tap between said pump and the box to relieve the pressure upon the water in the box when the boiler is full. 75

4. The combination of the boiler, the steam-pipe, the oscillating engine, the shaft driven by the piston of said engine, the air-forcing pump, and its blow-off hole, the closed water-
80 box, and the feed-pipe leading therefrom to the boiler.

5. The combination, with the boiler, of the closed water-box communicating therewith by a feed-pipe, the tank or hot-well surrounding
85 said box and supplying it; the engine, and an air-forcing pump, and the base-plate for the two latter supported directly above and over the tank, substantially as described.

JARED A. AYRES.

Witnesses:

LEMUEL CLIFT,
- PARMENAS HOERY.