(No Model.)

F. SNEDEKER, H. POE & O. G. RICHEY.

FEED WATER HEATER.

No. 306,358. Patented Oct. 7, 1884.

Fig. 1.

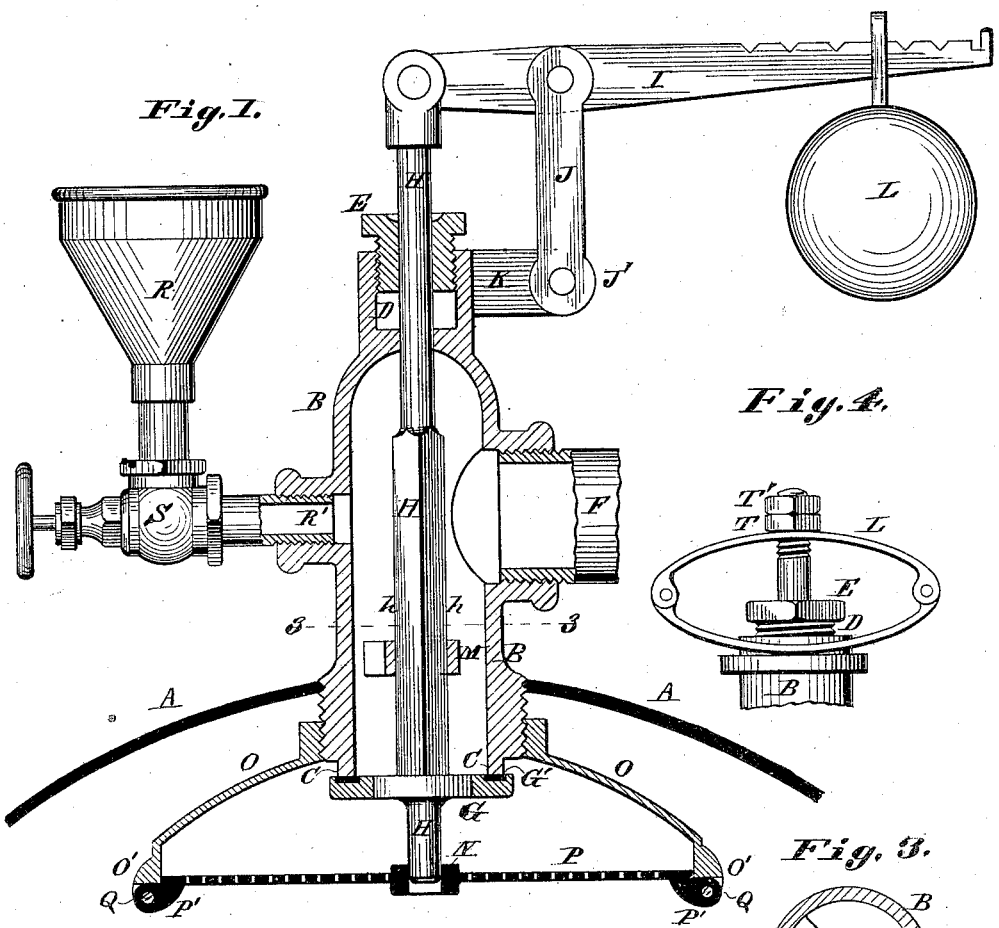


Fig. 4.

Fig. 3.

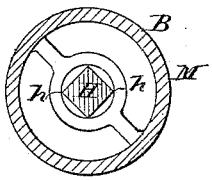
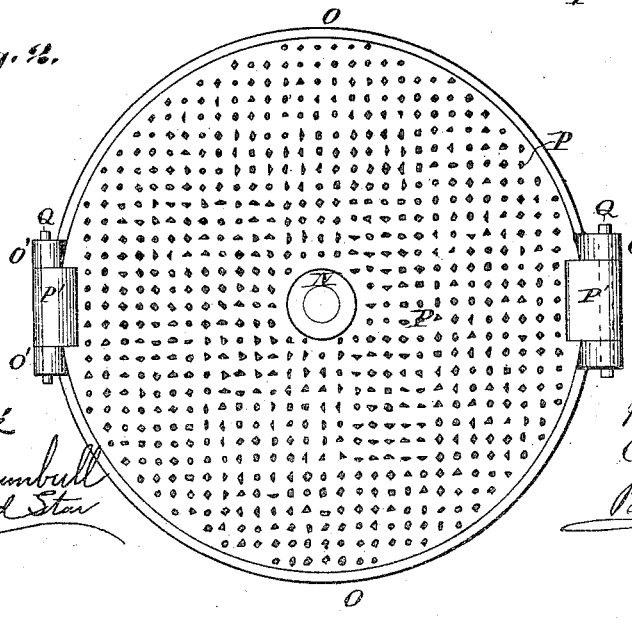


Fig. 2.



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FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 306,358, dated October 7, 1884.

Application filed April 5, 1884. (No model.)

To all whom it may concern:

Be it known that we, FRANK SNEDEKER, HAMILTON POE, and OLIVER G. RICHEY, all of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Feed-Water Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention applies to a spray attachment for boiler-feeders, and relates especially to the described devices by which the closing force upon the check-valve can be adjusted according to circumstances, the position of the valve seen from outside the boiler, the valve opened and closed from the outside, and a feed device by which acid or other material may be fed to prevent corrosion or to dislodge corroded matter from the parts. The invention also embraces a deflector that prevents the spray coming in contact with the boiler-shell and forming the spray.

Figure 1 is an axial section of the device. Fig. 2 is a bottom view of perforate plate through which the spray-water descends. Fig. 3 is a transverse section at 3 3, Fig. 1. Fig. 4 shows a modification, (in elevation.)

A is part of the boiler-shell.

B is the valve case or body, having a seat, C, for a flat valve at the lower end, and a stuffing-box, D, at the upper end.

E is the gland of the stuffing-box.

F is the feed-water pipe leading from the "doctor" or injector and entering the side of the case B.

G is a flat valve closing upwardly (with the pressure of the steam) against the valve-seat C.

G′ is a soft-metal facing to the valve G. We do not, however, confine ourselves to this construction of valve as far as relates to the facing G′. The valve-stem H is connected at the upper end to a weighted lever, I, fulcrumed on a post, J, that we prefer to hinge at J′ to the bracket-arm K, thus allowing slight vibration to the post to avoid the cramping of the valve-stem in the stuffing-box.

L is a weight suspended from the free end of the lever I, its suspending-bail resting in any one of the notches in the upper edge of the lever, according to the amount of lifting-force it is desired to apply to the valve. The valve-stem passes through the guide M within the case B, and also works in a guide socket or box, N, beneath the case. The part of the stem working in the guide M is made prismatic, or is so formed that only narrow edges *h* bear therein. The purpose of this construction is to give small lines of bearing to prevent the stem sticking in the guide by corrosion, the friction of the edges against the sides of the circular guide-hole of guide M keeping the parts clean.

O is the deflector or breaker, made in form of an inverted bowl, with a central aperture occupied by the lower part of the case B, as shown. The mouth of the bowl is closed by a strainer, P, at whose center is the guide-socket N. The breaker O has lugs O′ at opposite sides, and the strainer has lugs P′ resting between the lugs O′.

Q is a pintle-pin passing through the lugs O′ and P′, thus forming a hinge at each side, so that when either one of the pins Q is drawn out of the lugs the strainer will fall open on the hinge at the opposite side.

R is a funnel to receive any liquid that it is desired to feed into the case B, the funnel ending in a feed-pipe, R′, that enters the side of the case.

Between the funnel and pipe R is a valve, S, by which the lower end of the funnel may be closed, and by which it is closed whenever the spray apparatus is in operation.

Any lubricant may be fed through the funnel R, or an acid to loosen any scale of corrosion on the metal, and in general any liquid may be fed into the boiler by this means to prevent corrosion or loosen scales.

In Fig. 4 a spring, L, is shown in place of the lever and weight I L, the spring being shown of elliptical form, with lower leaf bearing upon the stuffing-box, and the upper leaf bearing against the under side of a nut, T, screwing upon the valve-stem.

T′ is a jam-nut screwing on the valve-stem to bind fast the nut T. The pressure of the feed-water will open the valve G, and the water will be thrown out in a thin horizontal sheet or spray, that will come in contact with the breaker O and become finely divided into small drops, that will fall upon the strainer

and percolate through the perforations of the strainer. It will be seen that whether more or less water is fed it will be spread out in a thin sheet by pressure between the valve and its seat. It will be also seen that in case of two or more boilers, each of which is supplied with one of our apparatuses, the amount of feed-water entering the different boilers may be equalized, although the pressure of the feed-water may vary. For instance, ordinarily the pressure at the boiler nearest to the doctor would be greater than at the boiler at a greater distance from the doctor or injector; consequently at the boilers more distant from the doctor the weight L would be placed nearer the fulcrum of the lever I, or the nuts T T′ would be screwed upward on the stem to lessen the lifting-force on the valve G.

The purpose of the breaker or deflector O is twofold: first, to break up the water into a fine spray; second, to prevent the impingement of the cool water against the shell of the boiler, thus avoiding rapid changes of temperature in the metal, such changes causing crystallization of the iron and consequent weakening of the boiler-sheet.

As the valve-stem H extends up into plain sight it can be seen by its position whether the doctor or injector is working by indicating whether or not the valve is open. As the stem is in sight, and especially in the form shown in Fig. 1, it can be moved by hand to ascertain whether the apparatus is in working condition.

The strainer divides the water into numerous small streams that fall upon a large surface.

In the use of the feeder R the flow of feed-water is stopped and the valve G closed. Then the valve S is opened to establish communication between the funnel and the interior of the case B. Then if the liquid in the funnel has greater specific gravity than water it takes the place of so much water in the case. Where the material in the funnel is lighter than water, it would be necessary to make way for it by exhausting the water in more or less degree from the case. This is readily done by stopping the doctor and opening the valve G, so that steam would take the place of water in the case B.

We claim—

1. The combination of case B with valve G, seated at the inner end thereof, the feed-water pipe F, and valve-stem having a portion with edges or ribs *h* working in a round guide, M, substantially as set forth, and connected to lever I outside the case.

2. The combination of case B, having flat bottom C, valve G, made flat and seated on the flat bottom of the case B, and breaker or deflector O, constructed to receive the impingement of the sheet of water thrown out between the valve and its seat.

3. The combination of case B, valve G, breaker O, and strainer P with a feed-water pipe, F, substantially as set forth.

4. The combination of case B, valve G, and breaker O with a feed-water pipe, F, substantially as set forth.

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Witnesses:
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