

(No Model.)

2 Sheets—Sheet 1.

W. A. MORSE.
FEED WATER HEATER.

No. 460,483.

Patented Sept. 29, 1891.

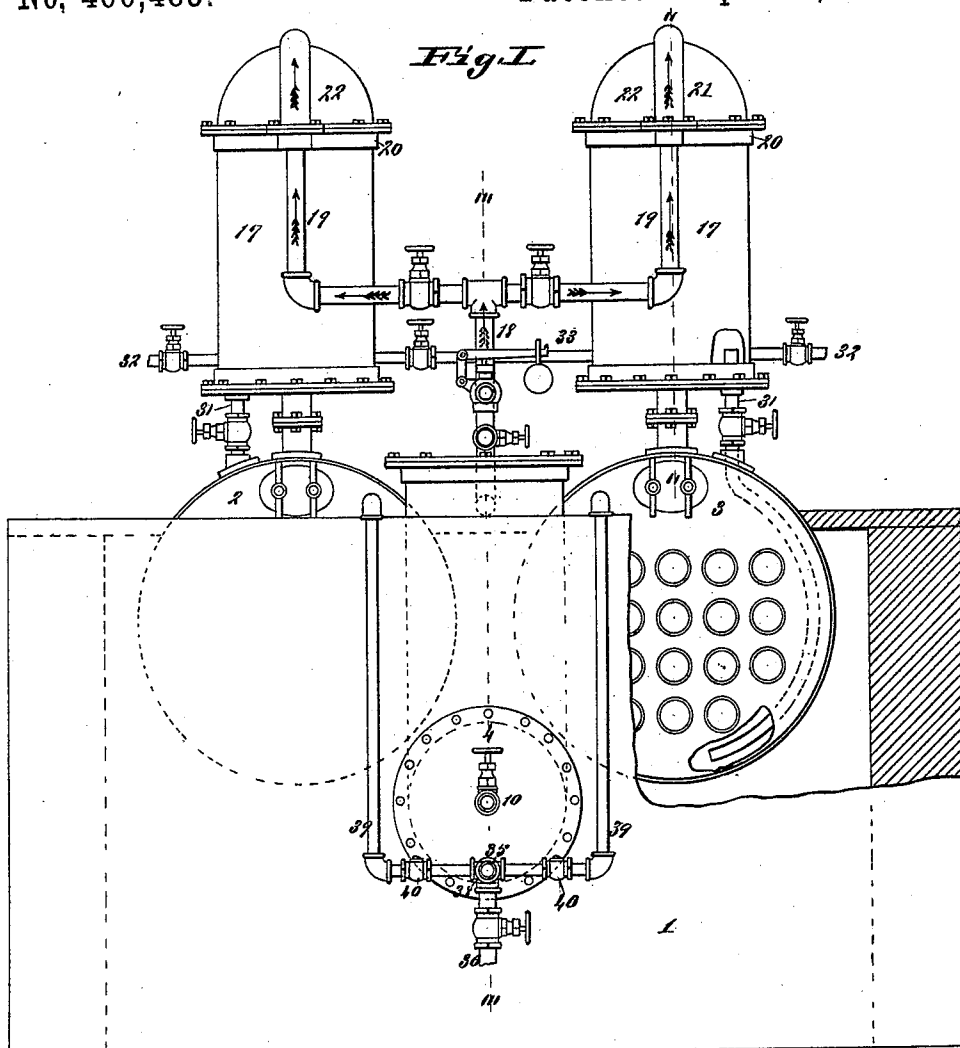
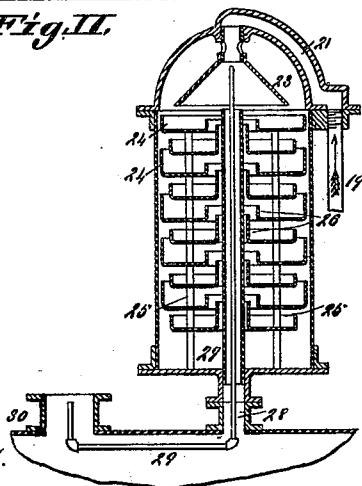


Fig. II



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attys

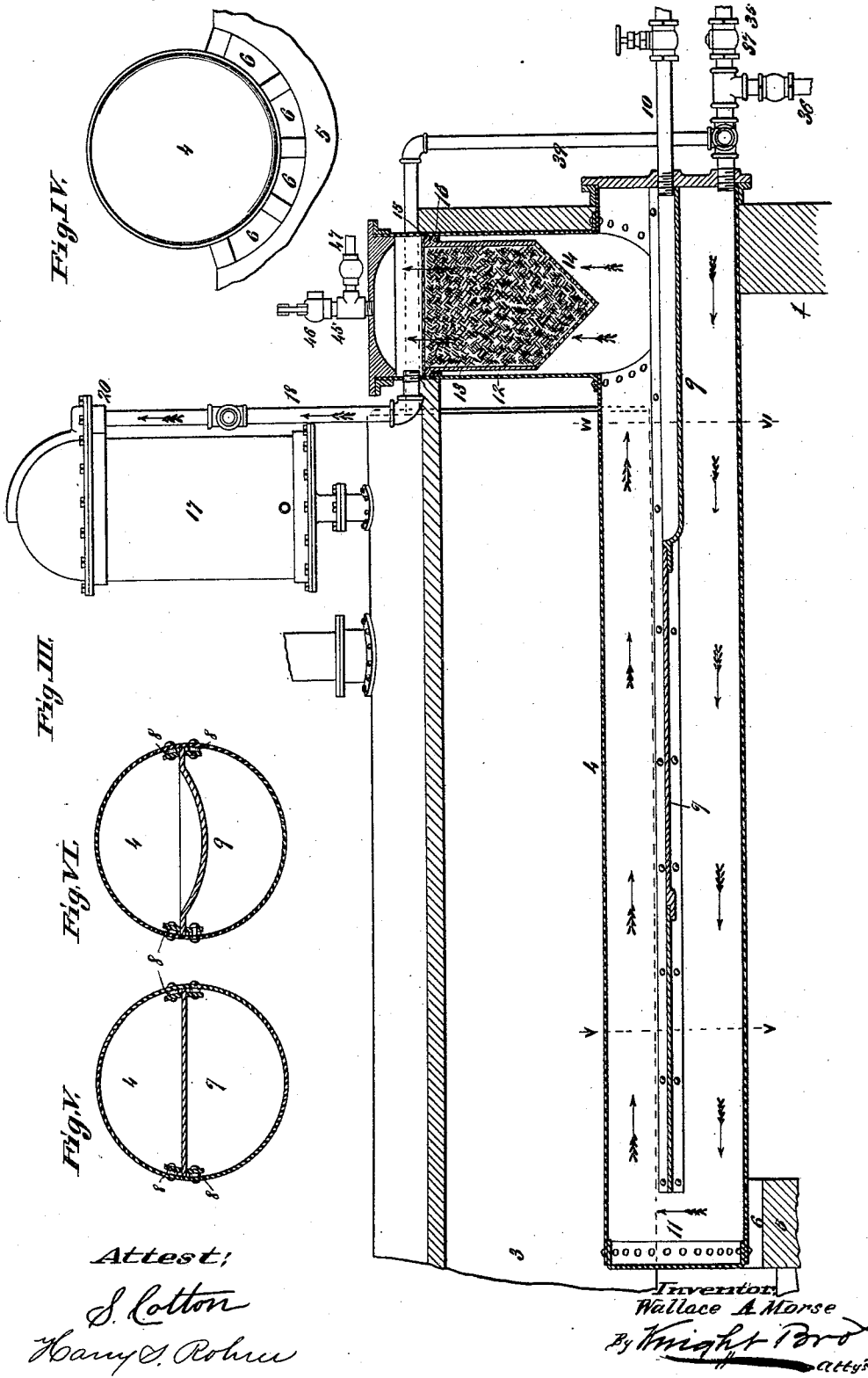
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FEED WATER HEATER.

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Patented Sept. 29, 1891.



UNITED STATES PATENT OFFICE.

WALLACE A. MORSE, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO
JOHN O'BRIEN, OF SAME PLACE.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 460,483, dated September 29, 1891.

Application filed December 16, 1890. Serial No. 374,916. (No model.)

To all whom it may concern:

Be it known that I, WALLACE A. MORSE, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Feed-Water Heaters and Economizers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to certain improvements in feed-water heaters and economizers for steam-boilers; and my invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a rear elevation illustrative of my invention. Fig. II is a vertical section taken on line II II, Fig. I. Fig. III is a similar view taken on line III III, Fig. I. Figs. IV and V are vertical transverse sections taken, respectively, on lines IV IV and V V, Fig. III. Fig. IV is a front end view of the drum, showing part of the bridge-wall.

Referring to the drawings, 1 represents the furnace, and 2 3 the boilers.

I will first describe the economizer, which consists of a drum 4, the forward end of which rests on the bridge-wall 5, which has openings 6 directly beneath the boiler to permit a portion of the heat and products of combustion to pass beneath the drum. These openings 6 are shown clearly in Figs. III and IV. The rear end of the drum extends out through the back wall of the furnace, as shown in Fig. III. The drum is divided horizontally by a diaphragm or partition 7, which is made in sections, as shown in Fig. III, having overlapping ends or joints, and held between flanges or strips 8, riveted to the drum, (see Figs. IV and V,) so that it may be readily removed through the back end of the drum for cleaning purposes, and at the same time the overlapping joints make the diaphragm as nearly water-tight as is necessary in practice. The back section 9 of the diaphragm (see Figs. III and VI) is made in concave form for the purpose of more readily collecting and facilitating the throwing out or away of the mud through a pipe 10. There is a space 11 between the inner end of the drum and the diaphragm 7 to permit the water to pass from

the lower part of the drum to the upper part, as shown by the arrows in Fig. III.

12 represents a dome placed over and communicating with the rear end of the drum, and within which a filter-box 13 is located, the box being over the section 9 of the diaphragm of the drum, so that this section of the diaphragm will collect the sediment and mud, which will be the greatest at the point where the filter is located. The filter-box has a perforated bottom 14, preferably of cone shape, so as to increase the amount of its surface and facilitate the passing of the water. The box is suspended within the dome by means of an outturned flange 15, resting on a ring 16, secured to the dome, so that the box can be easily removed when desired, and which also makes a water-tight joint and compels the water as it comes from the drum to pass through the filter on its way to the live-steam chambers 17, the upper part of the dome being connected to the chambers 17 by means of a pipe 18, having branches 19, the upper end of the branches terminating at the flanges 20 of the chamber 17 and communicating with ports 21, (see Figs. I and II,) arranged in the removable tops 22 of the chambers through which the water passes, and it will be seen that with this arrangement the covers can be removed or lifted from the chambers for the purpose of cleansing the parts, and this will not be interfered with by the pipe connection. The ports 21 discharge the water into the chambers at the top of the covers 22, and the water falls over a spray-cone 23 (see Fig. II) into pans 24. There are a number of the pans 24 supported on rods 25, and the water flows over the inner edge of one pan, over the outer edge of the next, and so on down to the bottom of the series of pans, each pan having a neck 26, and the neck of each alternate pan being higher than its outer edge, so that the water will be caused to flow over the outer edge of each alternate pan and over the neck of the other pan, as will be readily understood. The pans surround a central steam pipe or tube 27, with a space between their hollow necks and the pipe for the circulation of steam, the pipe communicating with the water, as shown at 28, Fig. II.

29 represents a steam-equalizing pipe extending from above the pipe or tube 27 to the steam-outlet 30 of the boiler, so as to insure a circulation of steam through the chamber. I have described the construction of one of the chambers with its interior arrangement, and the other is similarly arranged. The water is carried from the chambers to the boiler through pipes 31. (Shown clearly in Fig. I.)

32 represents blow-off pipes communicating with the bottom of the steam-chambers 17 and provided, of course, with suitable valves.

33 represents a balance-pipe forming a communication between the two chambers.

35 represents the main water-pipe, through which the drum 4 is supplied and projecting downward from which is a blow-off pipe 36. The pipe 35 has a check-valve 37 located beyond the pipe 36 from the drum 4. Between the pipe 36 and the drum the pipe 35 has a cross-coupling 38, with which pipes 39, leading to the upper parts of the boilers 2 3 below the water-line, connect. The pipes 39 have each a check-valve 40. These valves are set the reverse way from which check-valves are usually applied to boilers, so that water can at all times pass from the boilers to the drum in case the supply to the pipe 35 should be shut off, while the water cannot pass from the drum back into the boilers through the pipes 39. The object of thus having the boilers connected to the drum is to avoid danger of the water at any time being exhausted from the economizer-drum, and thus avoid the possibility of the drum becoming overheated or burned.

45 represents a pipe located over the dome 12 and which is provided with a safety-valve 46 for relieving undue pressure. Communicating with the pipe 45 is a pipe 47, provided with a valve, and which may be used to remove the scum on the surface of the water in the top of the drum.

I claim as my invention—

1. In a feed-water heater and economizer, the combination, with the furnace-walls and the bridge-wall, of a drum resting upon and being supported by the bridge-wall at one end and the other end being projected through and supported by the wall of the furnace, the bridge-wall being provided with the opening 6 under the drum, substantially as set forth.

2. In a feed-water heater and economizer, a drum having a diaphragm or partition, said diaphragm being made in sections and mov-

ably held to the drum by strips secured to the latter, substantially as and for the purpose set forth.

3. In a feed-water heater and economizer, a drum having a diaphragm or partition divided transversely into a number of removable sections, and strips extending longitudinally of the drum and being secured thereto for holding said sections in place, substantially as set forth.

4. In a feed-water heater and economizer, a drum having a diaphragm made in overlapping sections, and a filter, the section of the diaphragm beneath the filter having a concave form, substantially as and for the purpose set forth.

5. In a feed-water heater and economizer, a drum having a diaphragm composed of removable sections, in combination with a filter, the section of the diaphragm beneath the filter being concave and removable independently of said filter, substantially as set forth.

6. In a feed-water heater and economizer, the combination of a drum, a dome, live-steam chambers provided with flanges, pipes forming a communication between said dome and the live-steam chambers, and covers on the live-steam chambers having ports communicating with said pipes, substantially as and for the purpose set forth.

7. In a feed-water heater and economizer, the combination of a drum, a water-supply pipe for the drum, and pipes forming a communication between the boilers and drum and provided with check-valves arranged to permit the passage of water from the boilers to the drum, but preventing the passage of water from the drum to the boilers, substantially as and for the purpose set forth.

8. In a feed-water heater and economizer, the combination of a drum, live-steam chambers, pipes forming a communication between the drum and the live-steam chambers, pans located within the live-steam chambers and upon which the water is deposited from said pipes, and a steam-pipe passing through said pans, with a space between it and the necks of said pans, substantially as and for the purpose set forth.

9. In a feed water heater, the combination of the live-steam chambers, a steam-pipe leading from the boiler to the chambers, and a circulating-pipe 29, substantially as and for the purpose set forth.

WALLACE A. MORSE.

In presence of—

E. S. KNIGHT,
J. M. MAROT.