C. F. BRAUN.

FEED WATER HEATER.

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1,241,190.

Patented Sept. 25, 1917.

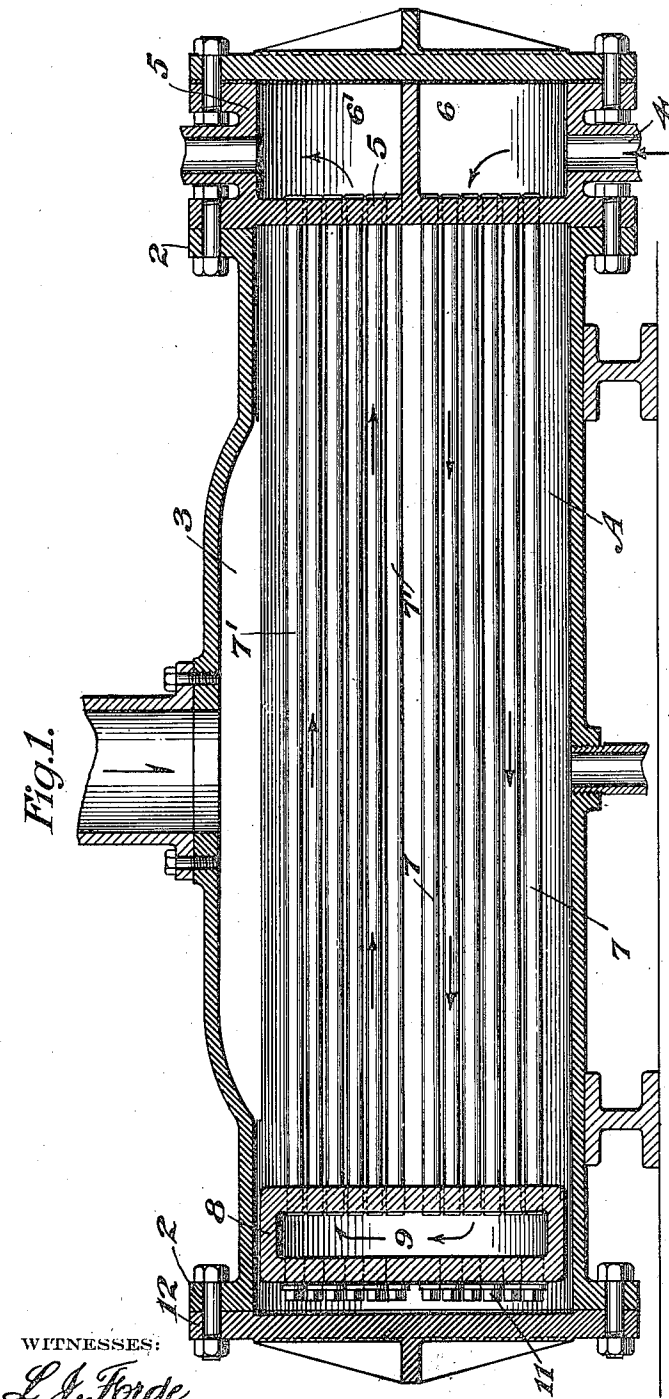


Fig. 1.

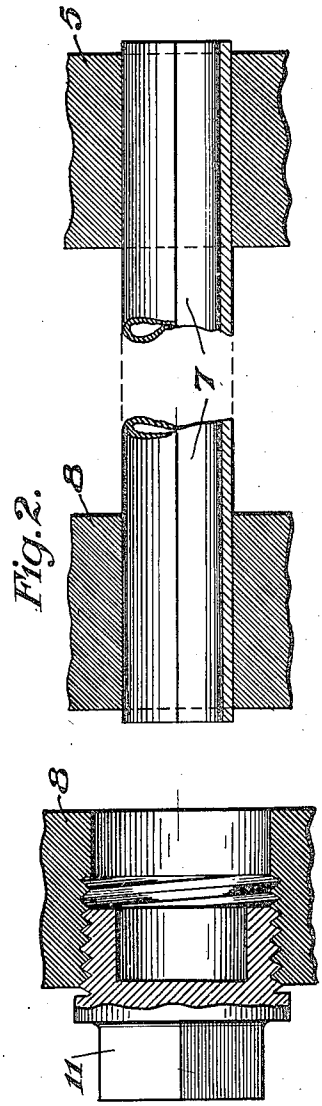


Fig. 2.

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FEED-WATER HEATER.

1,241,190. Specification of Letters Patent. Patented Sept. 25, 1917.

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To all whom it may concern:

Be it known that I, CARL F. BRAUN, a citizen of the United States, residing at the city and county of San Francisco and State of California, have invented new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

This invention relates to water heaters, and pertains especially to a feed water, fuel oil or general tubular heater for service in vertical or horizontal types.

The object of the invention is to provide a simple practical tubular heater which will have the advantage of permitting both the inside and outside of the tubes to be readily exposed for cleaning. Practically any type of heating surface will eventually become coated with impurities in the water resulting in the accumulation of scale in the case of a tubular heater both on the inside and outside of the tubes; these accumulations seriously retarding heating transmission and reducing the efficiency of the heater. It is therefore essential that some means be furnished by which the heating surface may be arranged for easy cleaning. This at once eliminates from consideration any bent or coiled tubes. It also eliminates from consideration all straight tube heaters which are constructed so as to render it difficult or impossible to expose the ends of the tubes for inserting a cleaning tool. It is further desirable and necessary to provide in the heater a practical method to take care of expansion and contraction of the tubes. These and various other desiderata are taken care of in the present invention.

Having reference to the drawings—

Figure 1 is a vertical longitudinal section through the heater.

Fig. 2 is an enlarged detail view showing manner of securing the tubes.

A represents a shell, here shown as adapted to a heater of the horizontal type and having end annular flanges 2 and a steam dome 3. 4 is a water channel casting and tube head 5, which is adapted to be bolted or otherwise removably secured to one of the end flanges 2 on the shell A. Head 5 is made hollow, with its inner divided chambers 6 6′ in communication with a series of tubes 7—7′, which latter have one end fixedly secured in the inner wall 5′ of the head; the opposite end of the tubes being secured in a floating head 8, an outer removable wall 5″ is bolted to the head which may be removed to clean out the chambers 6 and 6′ or for other purposes. Floating head 8 is adapted to have a free sliding movement in the shell A, the interior diameter of the shell A being such that the head 8 can be inserted or withdrawn as a unit with tubes 7 through the shell A. Head 8 is made hollow to provide an interior water chamber 9, tubes 7—7′ terminating in one wall of this chamber; and the interior of all of the tubes being in communication through the medium of chamber 9 just as the respective tubes 7—7′ are in communication with each other at the opposite end through the medium of their chambers 6—6′. The end of head 8 is perforated in line with the tubes and these perforations are normally closed by removable brass plugs 11. These plugs and perforations are for the purpose of allowing the inside of the tubes to be reached for cleaning purposes by a cleaning tool.

In operation, if it is desired to clean the outside of the tubes, head 5 is unbolted from the shell and floating head 8 pulled out, whereupon the exterior of all the tubes are exposed. At the same time by removing the screw plugs 11 the interior of the tubes may be cleaned.

If it were desired to clean only the inside of the tubes, it would be possible simply to remove the cap 12 on the end of the shell adjacent to the floating head 8 and then unscrew the plugs 11 without the need of taking the entire nest of tubes out of the shell.

This construction is especially suitable for high pressure service or for use where exhaust steam contains oil or other impurities.

The cleaning of the tubes at any time may be accomplished as above described, in a very short space of time and without breaking any pipe connections. The expansion of the tubes at both ends eliminates the possibility of leaks. The floating water head accommodates the differences in expansion.

In case of repair or renewal the same can be quickly and economically effected.

Having thus described my invention what I claim and desire to secure by Letters Patent is—

1. A water heater including a horizontally disposed shell having its ends provided with outwardly extending flanges, said shell having its top portion formed with a longitudinally extending outwardly bulging steam dome, a feed head having an end wall and a fixed partition, means to removably bolt said

end wall to one of the shell flanges, a floating head, a plurality of nests of tubes connected to the end wall of the feed head and to the inner wall of the floating head, a plate removably bolted to the feed head and abutting the outer end of the fixed partition thereof, the outer wall of the floating head having openings in register with the tubes, screw plugs removably secured in said openings, and a plate removably bolted to the other flange of the shell.

2. A water heater including a shell, a two-compartment feed head secured to one end of the shell, a floating head in the shell, a plurality of nests of tubes connected to the respective compartments of the feed head and to the floating head, said floating head having a series of apertures in register with the tubes, screw plugs closing said apertures, a plate secured to the feed head, and a plate secured to the other end of the shell, said securing means for the feed head being removable at will to allow the tubes, floating head and the feed head with the plate of the latter to be removed as a unit from the shell, and said plate of the feed head being removable at will from the latter to allow access to the tubes without removing the feed head from the shell, and said plate of the shell being removable at will to allow access to the screw plugs while the feed head remains in normal position.

3. A feed-water heater including a shell, a feed head detachably secured to one end of the shell and formed with an end wall and a fixed partition, a floating head, a plurality of nests of tubes connected to the end wall of the feed head and to the inner wall of the floating head, a plate removably bolted to the feed head and abutting the outer end of the fixed partition thereof, the outer wall of the floating head having openings in register with the tubes, screw plugs removably secured in said openings, and a plate removably bolted to the other end of the shell.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CARL F. BRAUN.

Witnesses:
JOHN H. HERRING,
W. W. HEALEY.