

March 12, 1946

N. A. ARVINS ET AL

2,396,235

PREHEATER

Filed Oct. 8, 1942

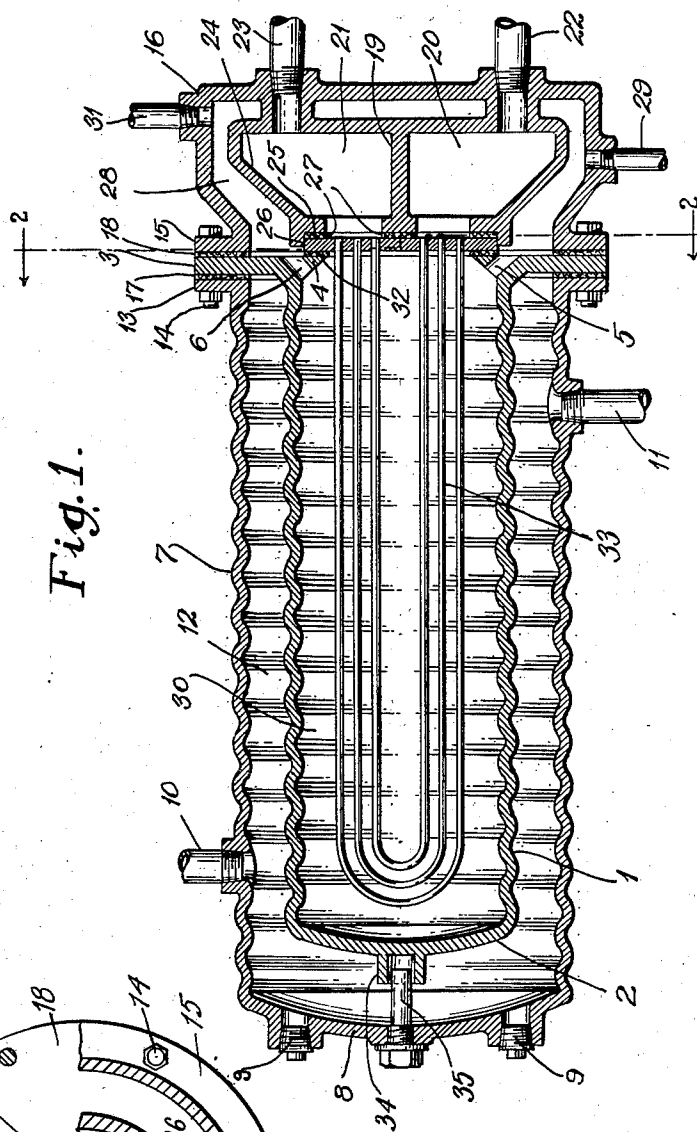


Fig. 1.

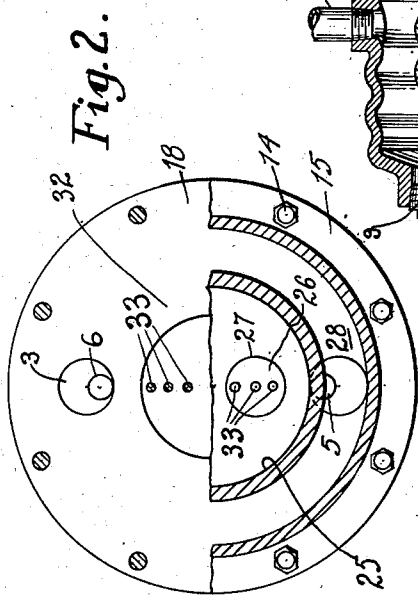


Fig. 2.

INVENTORS
NATHAN A. ARVINS
ABRAHAM A. ARVINTZ
BY *Donald C. Thompson*
ATTORNEY

UNITED STATES PATENT OFFICE

2,396,235

PREHEATER

Nathan A. Arvins and Abraham A. Arvintz,
Brooklyn, N. Y., assignors to Blazel Corporation,
a corporation of New York

Application October 8, 1942; Serial No. 461,347

3 Claims. (Cl. 257—239)

This invention relates to preheaters adapted for use in preheating fuel oil for supply to oil burners of various kinds and classes. More particularly, the invention relates to an apparatus of this class wherein the oil circulating coils are arranged within a water chamber, heated by an outer jacket through which steam or boiler water is circulated, so as to prevent contamination of the boiler water in the event of a leak occurring in the oil circulating tubes. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters, the drawing being a longitudinal sectional view through a preheater made according to our invention.

Fig. 1 is a sectional view through a preheater made according to our invention; and Fig. 2 is a cross-section on the broken line 2—2 of Fig. 1.

In the accompanying drawing, 1 represents an inner casing, the walls of which are preferably corrugated. This casing is closed at one end, as seen at 2, and the other end of the casing has an outwardly projecting annular flange 3, and an inwardly projecting flange portion 4, the latter having inlet and outlet passages 5 and 6.

Arranged outwardly of the casing 1, and in spaced relation thereto, is a jacket 7 which is also corrugated to correspond and match with the corrugations of the casing 1. The jacket is closed at one end, as seen at 8, except for clean out passages controlled by plugs 9. The jacket has apertured bosses for receiving inlet and outlet circulating pipes 10 and 11, whereby steam, boiler water, or the like may be circulated through the chamber 12, formed between the casing 1 and the jacket 7. The other end of the jacket 7, also has an inwardly projecting annular flange 13, adapted to be secured to the flange 3 by bolts 14.

The bolts 14, also pass through flanges 15 of an oil and water distributing casing or header 16, and suitable packing gaskets 17 and 18 are arranged between the flanges 3 and 13, and 3 and 15 respectively.

The casing 16 is divided by a partition 19 into oil inlet and outlet chambers 20 and 21, with which inlet and outlet pipes 22 and 23 respectively communicate. The casing 16 has an inwardly tapered or conical wall 24 terminated at its inner end in a recessed seat 25, upon which a tube sheet or plate 26 is adapted to be sup-

ported and retained. Suitable packing 27 is employed between the plate 26, and the seat 25. The packing 27 also extends to the inner surface of the partition 19.

Formed outwardly of the wall 24 is a water chamber 28 to which an inlet pipe 29 communicates for supply of city or other water to the chamber 30 of the casing 1, through the port 5. An outlet pipe 31 also communicates with the chamber 28, as shown.

The gasket 18 also extends between the plate 26, and the flange 4 of the casing 1, as seen at 32. The plate 26 supports a plurality of oil circulating tubes 33, which are adapted to circulate oil from the chamber or compartment 20 to the chamber or compartment 21.

In referring to the apparatus as an oil preheater, it will be understood that this illustration is given basically to demonstrate one adaptation of the invention, and the apparatus may be used as a preheater or heat exchanger of any type and kind in conjunction with various types and kinds of fluids or gases.

From the foregoing description it will appear that the apparatus is composed of four primary parts or units, the inner casing comprising one part, the jacket 7 another part, the casing 16 the third part, and the tube plate 26 including the tubes 33 which are a unit part of this plate, the fourth part. These parts are of simple construction and may be readily coupled and uncoupled, it being understood that the parts 7 and 1, as well as the tube unit 26—33 are all detachable from the casing 16 without disturbing any of the fittings or fixtures coupled with the casing 16. It will thus appear that the apparatus may be cleaned and repaired in a simple and practical manner, as and when required. The chamber 12 may be cleaned out by removal of one or both of the plugs 9, and in some instances, the passages controlled by said plugs may be utilized for circulating purposes, depending upon the nature of the installation.

On the closed end wall 2 of the casing 1, is an elongated tubular socket 34 and coupled with the closed end wall 8 of the housing or jacket 7 is a pin or stud 35, which fits the socket 34 to form a support and guide for the closed end tube of the casing 1. In this connection it will be understood that the corrugations formed in the wall structure of the casing and jacket will care for expansion and contraction to which these tubular structures may be subjected in the use of the apparatus, and any differential in this expansion and contraction as between the casing

and jacket will be compensated for by the sliding support which is provided at 34—35.

It will also be apparent that by providing the corrugated wall structure the greatest possible area may be provided in the walls of the casing as well as the walls of the jacket or housing, while minimizing the overall length of these parts. In any event a greater efficiency can be accomplished in heat transfer within a minimum space, of course, where larger units are necessary to care for the volume of material or substance handled, suitable capacities will be provided.

By employing the chamber 28, it will appear that a jacket or housing is provided around the intake chamber 20 and exhaust chambers 21. This construction produces greater efficiency by reason of the fact that the heated water or other heat transferring medium is exposed to the greatest degree to the fluid introduced or circulated through the coils and which passes through the said intake and exhaust chambers.

It will also appear that the apparatus as disclosed may be used simply as a heat exchanger by employing the casing, with the coils arranged therein, in other words, the outer jacket may be eliminated. In such installations, the heating medium may be circulated directly to the chamber of the casing.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A preheater of the class described, comprising an elongated casing, a housing encircling the casing and spaced therefrom to form a circulating chamber between said casing and housing, a distributor casing at one end of said first named casing and housing, both of said casings and said housing being flanged, and fastening devices passed through said flanges in coupling the casings and said housing together, a tube plate supported between the first and second named casings inwardly of said flanges and having coils extending into the first named casing, said distributor casing having inlet and outlet chambers communicating with said coils for circulating a medium to be heated through the coils, means

comprising a chamber in the second named casing enveloping the major portion of said inlet and outlet chambers for introducing a heat conducting medium into the first named casing around said coils, and means whereby a heating medium may be circulated through said circulating chamber.

2. In a preheater of the class described, the combination with inner and outer casings forming an inner tube chamber jacketed by a circulating chamber, of a header coupled with one end of said casings, said header having intake and exhaust passages through which a medium to be heated is adapted to be circulated, the header having a chamber jacketing said intake and exhaust passages, an inwardly projecting flange on said inner casing, means between the header and the flange of said inner casing for supporting circulating coils in said inner casing and in communication with said intake and exhaust passages of said header, and said flange having passages placing said header chamber in communication with the chamber of said inner casing.

3. A heat exchanger, comprising an elongated casing, a tube sheet having circulating coils arranged within the interior of the casing, a header closing the open end of said casing, means on said casing and header supporting said tube sheet between said casing and header, said header having intake and exhaust passages communicating with said coils, said header and the intake and exhaust passages thereof having spaced substantially parallel outer and side walls with a chamber therebetween, means bridging said chamber uniting the outer side walls of the header, said bridging means having intake and exhaust passages forming communications for a medium to be circulated through the passages and said coils, the first named means of said casing including passages placing said chamber of the header in communication with the interior of said casing, and said header having an intake and an exhaust communicating with the chamber thereof.

NATHAN A. ARVINS.
ABRAHAM A. ARVINTZ.