

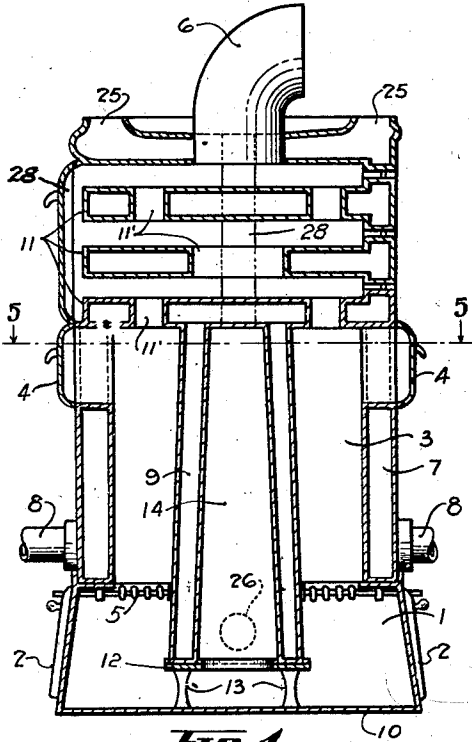
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W. A. JONES

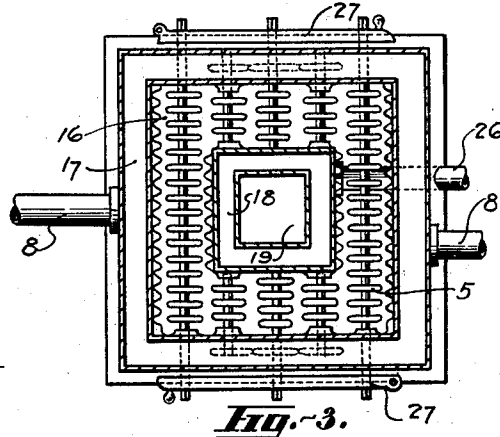
2,415,182

HEATING APPLIANCE

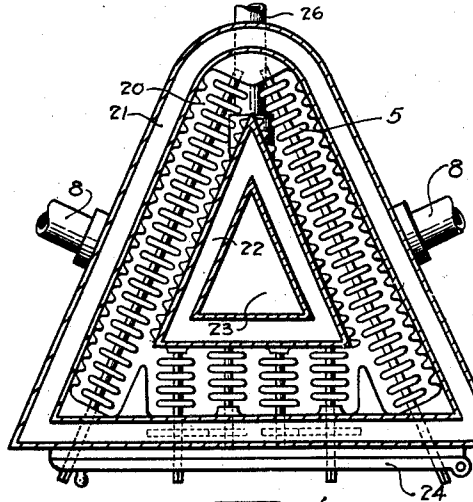
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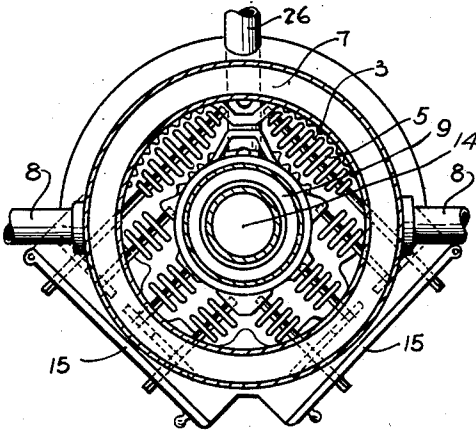
**Fig. 1.**



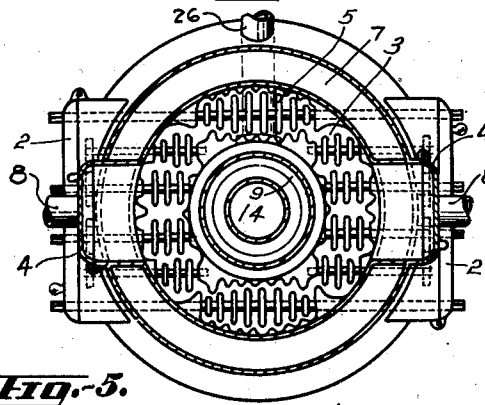
**Fig. 3.**



**Fig. 4.**



**Fig. 2.**



**Fig. 5.**

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## UNITED STATES PATENT OFFICE

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## HEATING APPLIANCE

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10 Claims. (Cl. 122-218)

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This invention relates to heating appliances such as stoves and furnaces, and is a continuation in part of my co-pending application, Serial No. 308,212, filed December 8, 1939, which has matured into Patent Number 2,314,987.

The invention has particular reference to hot water heating appliances.

In the usual type of such appliances, a water jacket surrounding the fire box is provided. It has been proposed to augment this jacket by providing a centrally disposed water container extending upwardly through the fire box. The column of water in such container is usually circular in cross section and, where its diameter is large, efficient heating thereof is difficult to attain. On the other hand, if its diameter is reduced to an extent permitting efficient heating thereof, the value of the auxiliary container is relatively small.

It is an object of the present invention to provide a heating appliance having a fluid heating chamber substantially concentrically disposed within a fire box whereby the latter surrounds the chamber, such chamber being long and narrow and having oppositely disposed portions to provide most efficient heating of the fluid contained therein.

Other objects and advantages of the invention will become apparent from the following description, with particular reference to the accompanying drawing, in which

Figure 1 is a vertical sectional view of an appliance constructed in accordance with the invention;

Figures 2, 3 and 4 are horizontal sectional views of three modified forms of the invention; and

Figure 5 is a section on line 5-5 of Figure 1.

Referring to Figure 1, the generally cylindrical furnace shown therein comprises a base 10, an ash pit 1 with ash removal doors 2, a fire chamber 3 with fuel feeding doors 4, grates 5 disposed between the fire chamber and ash pit, and a flue pipe 6. The usual outer water jacket 7, surrounding the fire chamber, is provided, and cold water inlet pipes 8 communicate with the lower portion of this jacket. Hot water outlets 25 are provided at the top of the furnace.

In accordance with the invention, an inner water container 9, annular in cross section, is mounted in a vertical axial position with respect to the furnace, whereby it extends upwardly through a portion of the ash pit 1, and through grates 5 and fire chamber 3. The upper portion of container 9 communicates with the lower one of the usual plurality of intercommunicating

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horizontally disposed water containing sections 11, which are located above the fire chamber and which have flue openings 11' therein for the passage of gas. Intercommunication between the sections 11 is provided in the usual manner by means of a duct 28 at one side of the furnace. The cold water inlet pipe 26 communicates with the inner container 9 below the fuel burning zone as shown. A ring 12, mounted on legs 13, which rest on the base 10 of the furnace, supports the annular water container 9. An air space 14, open at the bottom, is thus provided within portions of the container, and hot air may circulate within such space.

In this form of the invention, two oppositely disposed fuel feeding openings with doors 4 and two oppositely disposed ash removal openings with doors 2 are provided.

In Figure 2, two ash removing doors 15 are shown as positioned in angular relation to each other at one side of the furnace. Such an arrangement may be of greater practical convenience than that where the doors are positioned opposite each other, as shown in Figure 1. The fuel feeding doors may also be angularly disposed with respect to each other.

Referring to Figure 3, a generally rectangular furnace is illustrated having a fire chamber 16, outer water jacket 17, inner water container 18, and central air space 19. In this case, the fire chamber and each water container are formed by spaced inner and outer rectangularly extending walls. Oppositely disposed ash pit doors 27 are provided.

Referring to Figure 4, a generally triangular furnace is illustrated having a fire chamber 20, outer water jacket 21, inner water container 22, and inner air space 23. Such a three-sided furnace has several practical advantages. It will be observed that, by requiring but a single fuel feeding opening in one side thereof, the interior of the fire box to its remotest part is readily accessible from such one opening. A single ash pit door 24 may be provided.

In all forms of the invention, it will be observed that the inner water container is in longitudinal section long but quite narrow so that, while the container contains a considerable amount of water, the thickness of the water column therein is of such small extent that it may be wholly heated in a very short time. Furthermore, the provision of an inner air space within the walls of the container, such air space being in communication with the lower portion of the furnace, is at times additionally advantageous in achiev-

ing a rapid heating of the water in the container.

Extension of the lower portion of the container below the fuel burning zone, with the water feed pipe communicating therewith, serves to provide at times a water preheating zone in such lower portion, heat from the fire box being frequently present in marked degree in the lower part of the furnace.

While dimensions of the furnace described may be varied within substantially wide limits, it is believed that, for ordinary domestic use, a fire chamber from 20 to 24 inches in overall width and from 5 to 6 inches in actual width between the outer jacket and the inner water container will suffice and will provide greater heating efficiency than a corresponding cylindrical fire chamber of 20 to 24 inches in diameter. The thickness of the water space of the inner water chamber would not normally exceed two inches and its length should be many times its width. In the examples illustrated, such length is approximately, or at least, twelve times the thickness and, in most instances, will be at least ten times the thickness.

It will be apparent that the invention may be applied to other forms of structure than those illustrated, both in interior and exterior outline. In other words, the shape of the inner water container may be varied within relatively wide limits. For instance, the walls of such container may be of oval or elongated rectangular shape. Furthermore, while the ash pit or portion below the fuel burning zone has been shown as following in shape that of the fire box, it is apparent that it may be of any other convenient practical shape.

Moreover, various structural and mechanical details may be altered without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A water heating furnace comprising a fire box, an ash pit arranged below the fire box, a water heating chamber substantially concentrically arranged within the fire box, said chamber having a portion extending into the ash pit and formed by inner and outer walls providing therebetween water passage portions oppositely spaced with respect to each other and having an air space therebetween, said chamber having a length at least about five times greater than the distance between said inner and outer walls, grates extending around said outer wall at the base of the fire box, and a water feed pipe communicating with said chamber at a point below the grates.

2. In a water heating furnace having a fire box constituting a primary fuel receiving chamber, means forming a water chamber extending upwardly through the primary fuel receiving chamber whereby the latter lies laterally opposite the water chamber, said water chamber having spaced opposed portions, the space between said portions being free from passage of water, a water jacket extending around the fire box, at least one horizontally disposed water container positioned above the fire box, communicating passages between said chamber, jacket and container, and means for supplying water to be passed through said chamber, jacket and container and heated.

3. A water heating furnace comprising means forming inner and outer spaced water heating chambers, said chambers being substantially concentrically arranged with respect to each

other and having communicating passages therebetween, a fire box constituting a primary fuel receiving chamber substantially entirely contained in the space between said water chambers, means for supplying water to be passed through said water heating chambers and heated, said inner water heating chamber having portions oppositely spaced with respect to each other, the space between said portions being free from passage of water.

4. A water heating furnace comprising a base, a water container mounted in spaced relation to the base, said container having spaced opposed portions enclosing an air space therebetween, said space being closed at the top and open at the bottom, a fire box extending around said container and having its lower portion located above the bottom of said container, and a water jacket extending around the outer surface of the fire box and having communication with said container.

5. A water heating furnace comprising means forming a fire chamber constituting a primary fuel receiving chamber, substantially rectangularly extending inner and outer walls enclosing therebetween a water heating chamber extending upwardly through the primary fuel receiving chamber and substantially axially thereof whereby the primary fuel receiving chamber lies laterally opposite the water heating chamber, means for supplying water to be passed through said water heating chamber and heated, said water heating chamber surrounding a space free from passage of water.

6. A water heating furnace comprising means forming a fire chamber constituting a primary fuel receiving chamber, substantially triangularly extending inner and outer walls enclosing therebetween a water heating chamber extending upwardly through the primary fuel receiving chamber and substantially axially thereof whereby the primary fuel receiving chamber lies laterally opposite the water heating chamber, means for supplying water to be passed through said water heating chamber and heated, said water heating chamber surrounding a space free from passage of water.

7. A water heating furnace comprising means forming a fire chamber constituting a primary fuel receiving chamber, means forming a water heating chamber extending upwardly through said primary fuel receiving chamber and substantially axially thereof whereby the primary fuel receiving chamber lies laterally opposite the water heating chamber, means for supplying water to be passed through said water heating chamber and heated, said water heating chamber comprising portions oppositely spaced with respect to each other, the space between said portions being free from passage of water.

8. A water heating furnace comprising a fire box constituting a primary fuel receiving chamber, means forming a water heating chamber extending upwardly through the primary fuel receiving chamber and substantially axially thereof whereby the primary fuel receiving chamber lies laterally opposite the water heating chamber, said water heating chamber comprising water containing portions oppositely spaced with respect to each other and having an air space therebetween.

9. A water heating furnace comprising a substantially annular water container surrounding an air space, a substantially annular fire box constituting a primary fuel receiving chamber

surrounding said water container whereby the primary fuel receiving chamber lies laterally opposite the water container, and a second substantially annular water container surrounding said fire box and having communication with said first water container.

10. A water heating furnace comprising means forming a fire chamber constituting a primary fuel receiving chamber, means forming an annular water heating chamber surrounding a space free from passage of water and extending upwardly through the primary fuel receiving chamber and substantially axially thereof whereby the primary fuel receiving chamber lies laterally opposite the water heating chamber, and means for supplying water to be passed through said water heating chamber and heated.

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