Oct. 28, 1947. L. A. BEATTY 2,429,663

WATER HEATER

Filed June 12, 1945

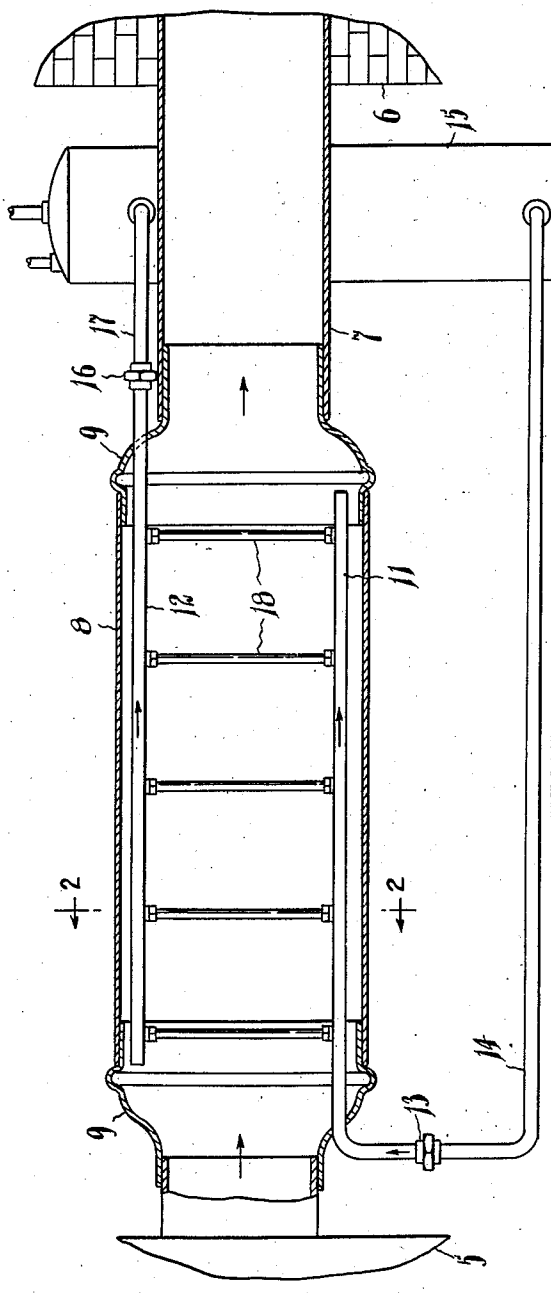


Fig. 1.

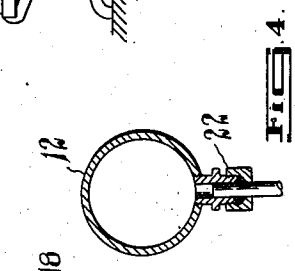


Fig. 4.

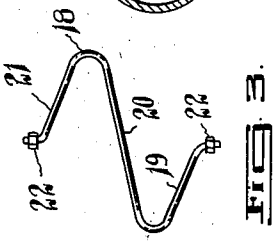


Fig. 3.

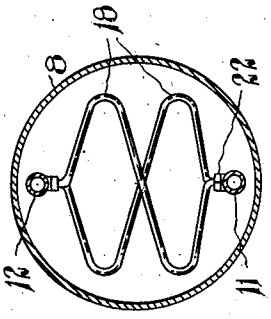


Fig. 2.

Inventor
L. A. Beatty
By Frederick E. Bromley
Atty.

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WATER HEATER

Louis Albert Beatty, Toronto, Ontario, Canada

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1 Claim. (Cl. 257—240)

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The invention relates to improvements in water heaters of the class in which waste products of combustion while conducted through a furnace smoke pipe are utilized as the heating medium.

The paramount object of the invention is to provide a highly efficient and serviceable heater of this character, and one which by reason of the particular construction and arrangement of its parts will assure of rapid heating of water and the furnishing of a constant supply of the same during normal operation of a furnace.

A further object is to produce a heat exchanger which is adapted for facile installation in the smoke pipe of a furnace or like heating plant of the domestic type.

Distinctive features of the invention are that it is inexpensive to manufacture and that it is admirably suited for heating water of a hot-water tank.

The invention consists in the novel construction and arrangement of parts of the heater as described in detail in the ensuing description and exemplified in the accompanying drawing.

In the drawing,

Fig. 1 is a view of the water heater installed in a smoke pipe and connected to a hot water tank the casing being in section.

Fig. 2 is a cross section of the water heater taken on line 2—2 of Fig. 1.

Fig. 3 is a detail of one of the heating coils, and

Fig. 4 is a sectional detail showing a manner of connecting the ends of the coils to manifolds.

Like numerals of reference indicate corresponding parts in each of the figures throughout the drawing of the invention.

The smoke pipe of a furnace usually has a substantially horizontal stretch which reaches from the furnace, indicated at 5, to the chimney flue, denoted at 6, on more or less of an upward slope. The water heater of my invention is suited to be installed in this stretch of the smoke pipe, denoted at 7. It comprises a tubular case 8 of a slightly larger girth than the smoke pipe and having a reduction head 9 at each end for fitting thereon. The case is of approved construction and serves to contain the heat exchanger and forms therewith a unitary device.

The heat exchanger comprises a lower pipe 11 and an upper pipe 12 parallelly arranged and substantially horizontally disposed with a slight upward slope in the direction of the travel of the products of combustion.

The lower pipe constitutes an induction manifold, and the upper pipe constitutes an eduction

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manifold. The induction manifold leads outwardly from the casing at the end thereof nearest the furnace for connection as at 13 to a piping, as at 14, extending from a source of cold water, which in the present disclosure is the hot water tank 15 common to dwellings. The other end of the induction manifold is closed.

The eduction manifold also leads outwardly of the casing but at the end thereof remote from the furnace, and has a fitting, as at 16, by which it is connected to the piping 17 for delivery of heated water to the tank. The other end of this manifold is closed.

Said manifolds are connected at suitably spaced intervals substantially throughout their length by means of coils 18 which individually heat water circulated therethrough. Each coil is a member bent in a single vertical plane transversely of the manifolds as best shown in Fig. 3, and is desirably fashioned of a length of copper or other suitable metal tubing first bent, as at 19, to extend upwardly and outwardly from the lower manifold and then bent, as at 20, inwardly and upwardly to extend to the opposite side thereof, and finally bent, as at 21, inwardly and upwardly to the upper manifold. This forms a sinuous coil having several return bends in a single plane. The zigzag coil is connected in approved manner to the manifolds, as by standard fittings 22.

The alternate coils of the series are oppositely arranged, as shown in Fig. 2, so that their corresponding crooks project from opposite sides of the manifolds. This reduces retardation of the flow of the fire gases and enhances the exchange of heat. Any number of coils may be employed according to requirements.

It will be manifest that the invention provides a highly efficient and serviceable water heater which utilizes products of combustion that are ordinarily wasted.

What I claim is:

A water heater of the character described comprising a tubular casing for substantially horizontal disposition in the smoke pipe of a furnace, a pair of spaced pipes lengthwise disposed in said casing one above the other, the lower pipe constituting an induction manifold and the upper pipe constituting an eduction manifold, and a lengthwise series of substantially vertical coils disposed between said manifolds at right angles to a plane passing therethrough, each coil consisting of a tube connected to the lower manifold and bent to one side of said plane to slope upwardly and return bent to slope upwardly to the opposite side of said plane and return bent to

slope upwardly to said eduction tube and being connected thereto, adjacent tubes being reversely arranged so that corresponding bent portions thereof slope in opposite directions.

LOUIS ALBERT BEATTY.

REFERENCES CITED

The following references are of record in the file of this patent:

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