

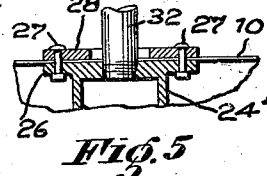
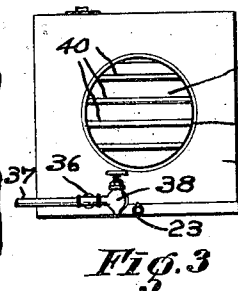
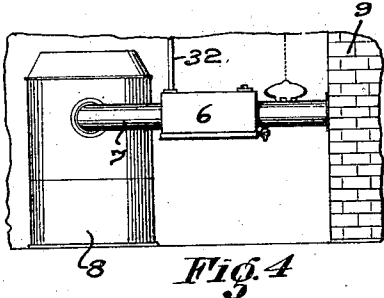
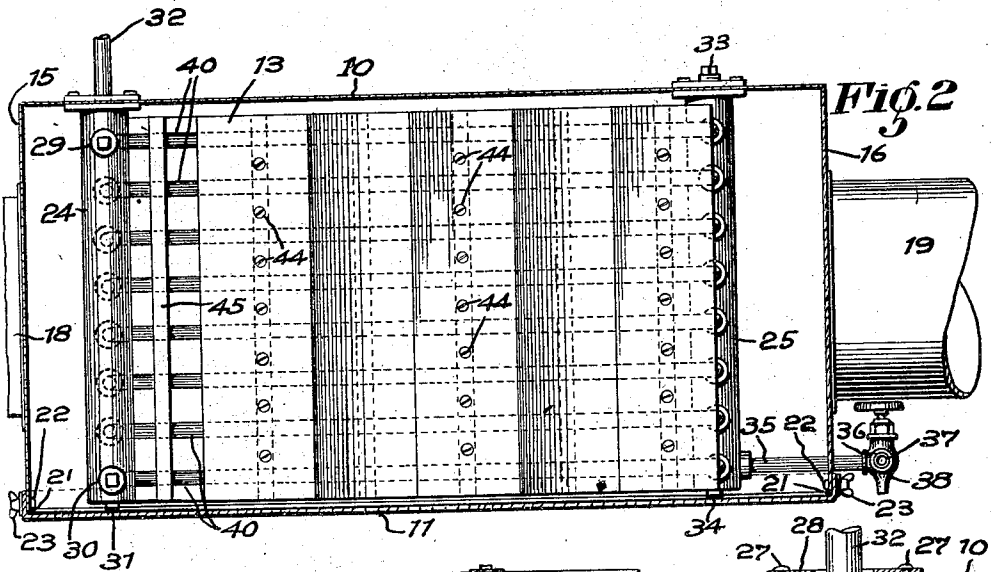
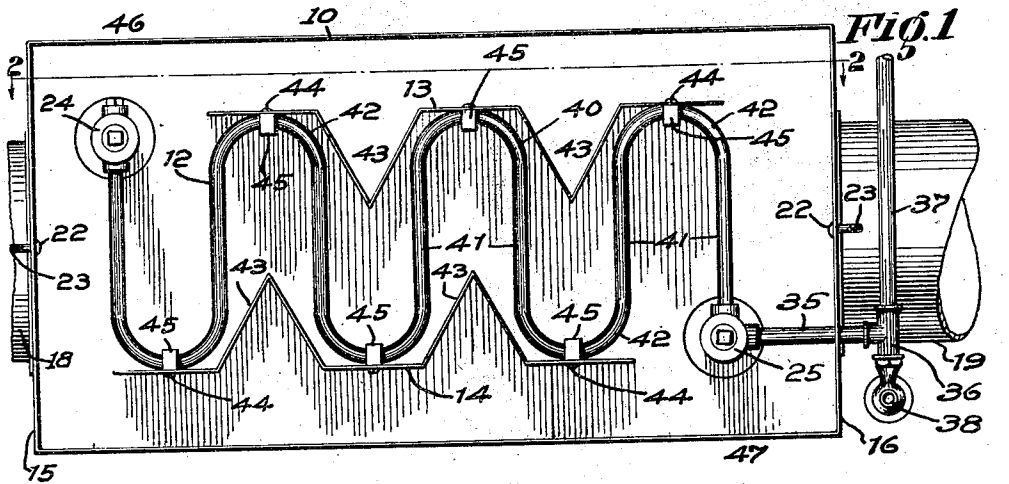
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WATER HEATER

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WATER HEATER.

Application filed March 12, 1927. Serial No. 174,931.

This invention relates to water heaters and more particularly to a water heater for application to the smoke pipe or stack of household heating apparatus for the purpose of utilizing the hot flue gases as a medium for heating the water.

One object of the invention is to provide an efficient and reliable water heater of the type referred to, which is of durable but inexpensive construction, which may be easily applied in the stack or smoke pipe of a heater and which will not interfere with the normal draft.

To the accomplishment of this object and such others as may hereinafter appear, the invention in one aspect comprises a casing adapted to be inserted in place of a section of the smoke pipe of a furnace or the like to provide a continuation of the passage through the smoke pipe, combined with a water conduit extending through the interior and through the wall of said casing for connection with inlet and outlet hot water pipes outside of the casing.

The invention further consists in other features of construction and combinations of parts hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art.

The various features of the invention will be explained with reference to the accompanying drawings, in which:

Figure 1 is a bottom plan view of a water heater constructed in accordance with the present invention, a cover constituting the lower portion of the casing having been removed to reveal the interior construction of the heater;

Fig. 2 is a section on the line 2—2 of Fig. 1, but showing the cover in place;

Fig. 3 is an end elevational view of the heater on a smaller scale;

Fig. 4 is a conventional view illustrating one application of the heater to the smoke pipe of a household heater; and

Fig. 5 is a fragmentary sectional view showing the preferred manner of connecting the water distributing coils, through a header, to the house pipe line.

Referring first to Fig. 4 of the drawings, a water heater 6 is shown as applied to a smoke pipe 7 which connects the combustion chamber of a furnace 8 with a chimney 9,

the heater 6 having been inserted in place of a previously removed section of the smoke pipe.

The water heater shown in Fig. 4 and in detail in Figs. 1 and 2 comprises an elongated box-like casing 10 having a bottom cover 11, a system of water-distributing piping 12 within the casing 10, and oppositely disposed flue gas baffle plates 13 and 14 which are supported by the piping 12. As illustrated, the end walls 15 and 16 of the casing are secured in any suitable manner to sections 18 and 19, respectively, of the smoke pipe 7. Each end wall of the heater casing is apertured to provide for communication between the interior of the casing and the sections of the smoke pipe, the aperture in the end wall 16 being indicated at 20 in Fig. 3. The aperture in the end wall 15, although not shown, is similar to the aperture 20. Both the casing 10 and the cover 11 are made of heavy galvanized sheet iron, the casing having a wire-rolled rim 21 and the cover being provided with narrow flanges which fit over this rim. The flanges at the ends of the cover are notched to receive bolts which extend through the end walls of the casing and carry wing nuts 23 for detachably securing the cover in place.

The water distributing piping 12 comprises two headers 24 and 25 which are vertically disposed adjacent to diagonally opposite corners of the casing 10. The headers may conveniently be suspended from the top wall of the casing 10. To this end each header is flanged at its upper end, as best shown at 26 in Fig. 5, and each header flange is secured in place by bolts or rivets 27 which extend through a washer 28 at the outer side of the casing. The headers terminate, at their lower ends, just short of the cover 11 and both the upper and lower ends of the headers are bossed and tapped for connections with inlet or outlet pipes of the house hot water pipe line. The sides of the headers may also be bossed and tapped at points adjacent to their upper and lower extremities to receive inlet or outlet pipes extending at right angles to the headers. The header 24 is illustrated as so bossed and tapped for this purpose at 29 and 30, both of these openings being closed

by suitable plugs when not used. As shown for purposes of explanation a plug 31 closes a tapped opening in the extreme lower end of the header 24 while a vertical hot water outlet pipe 32 is screwed into the tapped opening in the flanged upper end of the header 24. The tapped openings at the top and bottom of the header 25 are closed by plugs 33 and 34 but a tapped opening at the side of the header 25 near its lower end has screwed therein a horizontal cold water inlet pipe 35. The inlet pipe 35 extends outwardly through the adjacent end wall of the casing and may be provided with a T 36 for connection with a supply or service pipe 37 and with a safety discharge valve 38.

The headers 24 and 25 are connected by a series of horizontal distributing pipes or coils 40 each of which is bent back and forth to produce, in its simplest form, the serpentine shape shown in Fig. 1. It will be observed that each distributing pipe 40 is composed of a plurality of parallel cross runs 41 and curved connecting portions 42 and that the cross runs are centralized widthwise of the casing 10 and are made sufficiently short to provide for comparatively wide unobstructed passages at opposite sides of the distributing pipes through which the flue gases are free to pass uninterruptedly should the pipe coil become clogged.

In order that the gases and products of combustion passing between the pipe coils 40 shall act to heat the water most effectively throughout all portions of the several coils, the baffle plates 13 and 14 are provided. As shown, these baffle plates are vertically disposed at opposite sides of the bank or series of coils 40. Each baffle plate is provided, for the illustrated length of coil, with two V-shaped portions 43 which project inwardly into the spaces between the cross runs of the coils to deflect the hot flue gases and bring them in effective heating contact with all portions of the serpentine distributing pipes 40. Each baffle plate is fastened by screws 44 to three vertical supporting bars 45. The bars 45 are evenly notched along their outer faces to receive the pipes 40 of each coil and thus serve not only to support the baffle plates but also to hold the pipes 40 in even spaced-apart relation. The baffle plates 13 and 14, in addition to deflecting the gases which pass between them, as above described, serve also to provide passages between the plates and the adjacent side walls of the casing 10 for the uninterrupted flow of gases between the two smoke pipe sections. This construction insures that even if the draft through the casing 10 should become choked as, for example, by accumulations of soot or foreign matter upon the water distributing pipes or within the passage between the baffle plates, the gases will

nevertheless be free to flow through the passages along the outer sides of the baffle plates. This construction insures a permanent draft for the products of combustion.

The two baffle plates 13 and 14 are relatively offset lengthwise of the casing 10, or shortened at opposite ends, so that a comparatively wide space is provided between the baffle plate 13 and the left hand end of the casing (viewing Fig. 1) and a correspondingly wide space is provided between the baffle plate 14 and the right hand end of the casing. The baffle plates are constructed and arranged in this manner so that, if desired, connections with the smoke pipe may be made through the sides instead of the ends of the casing (at the localities designated 46 and 47 in Fig. 1) while still insuring that the flue gases will pass between the baffle plates and be deflected thereby into contact with all of the coils 40.

The above described water heater may advantageously be employed for heating water for the ordinary household uses and inasmuch as the ordinarily waste flue gases are utilized as the medium for heating the water considerable expense is saved. This water heater might also be used in the return pipe to the boiler of a hot water householding system to preheat the water before it is returned into the boiler so that the recirculated water will require less heating in the boiler to raise it to a desired temperature.

Although the water heater has been referred to herein as adapted for application to the smoke pipe of a furnace, it will be understood that it may be applied to the smoke pipe leading from the combustion chamber of a steam, hot water, oil or gas heater as well as from the combustion chamber of a hot air heater.

While the details of construction of the illustrated water heater have been described with considerable particularity, the invention is not limited to these precise details or any of them except as they may be set forth in the following claims.

The nature and scope of the invention having been indicated and its preferred embodiment having been specifically described, what is claimed as new, is:—

1. A stack water heater comprising a casing adapted to be interposed between sections of the smoke pipe of a heater, having inlet and outlet openings for connection with said sections, spaced baffle plates within the casing arranged to provide a tortuous passage between them for the flue gases, said plates being also spaced inwardly from the walls of the casing and constructed and arranged to provide an uninterrupted passage adjacent said tortuous passage from one of said pipe sections to the other, and a water distributing coil arranged within said tor-

tuous passage and having inlet and outlet terminals accessible from the exterior of the casing.

2. A stack water heater for application to the smoke pipe of a heater comprising a unitary system of water distributing piping, a rectangular box-like housing for said piping adapted to connect two sections of the smoke pipe, said housing having an opening at the bottom to permit said water piping to be assembled within the housing as a unit, a removable cover for closing said bottom opening, water inlet and outlet pipes connected with said distributing piping, means for suspending said piping from the top wall of the housing, and baffle plates supported by said piping for directing the path of the flue gases through said housing.

3. A stack water heater comprising an elongated casing adapted to be interposed between sections of the smoke pipe of a heater and having openings at its opposite ends for connection with said pipe sections to permit a continuous flow of flue gases through said casing, vertical headers at opposite ends of the casing having their upper ends secured to the top of the casing, one

header having a cold water inlet and the other header having a hot water outlet, a series of water distributing pipes connecting said headers, and a plurality of baffle plates supported by said distributing pipes and constructed and arranged to provide a tortuous passage shaped to deflect the flue gases alternately toward opposite sides of the casing.

4. A stack water heater comprising a rectangular box-like casing adapted to connect two sections of the smoke pipe of a heater, two headers suspended from diametrically opposite corner portions of the top wall of said casing and adapted for connection with water inlet and outlet pipes respectively, a series of horizontal water distributing pipes arranged one above another connecting said headers, said pipes extending in serpentine courses, the cross runs of said pipes being vertically alined, vertical spacer bars carried by said series of pipes, and baffle plates secured to said spacer bars and having V-shaped deflecting portions projecting into the spaces between the alined cross runs of the distributing pipes.

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