

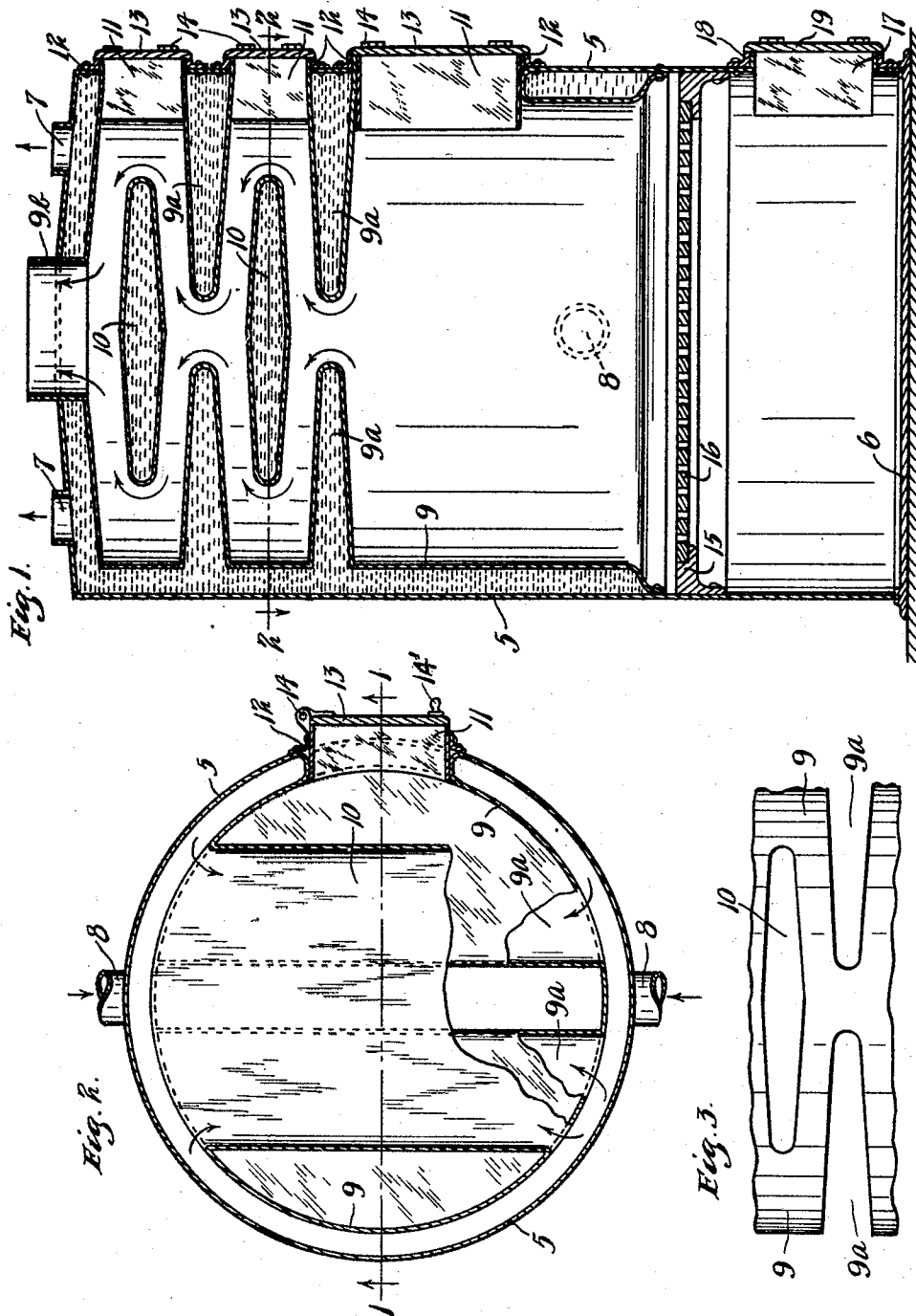
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WATER HEATER

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UNITED STATES PATENT OFFICE

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WATER HEATER

Substitute for application Serial No. 84,960, filed January 30, 1926. This application filed December 22, 1930. Serial No. 504,184.

This invention relates to a hot water heater or boiler, and while the invention is applicable to any type of such a heater or boiler, it particularly is designed for use in a domestic furnace or hot water heater.

It is an object of this invention to provide a simple and efficient construction of water heater or boiler in which the water containing parts are effectively disposed in contact with the heating gases.

It is a further object of the invention to provide a simple and efficient construction of water heater or boiler having the water containing parts effectively disposed in contact with the heating gases which is particularly designed to be easily and inexpensively made, largely from sheet metal.

It is still another object of the invention to provide a water heater or boiler comprising an outer casing, an inner casing spaced therefrom at the sides and top, said inner casing having conduits of comparatively great width extending therethrough, from side to side and also having chambers extending therethrough from opposite sides transversely of said conduits, said chambers having their inner ends spaced at the central portion of the boiler, said casings thus forming a water space therebetween and said conduits and chambers also forming a water space communicating with the first mentioned water space, a passage for the flue gases being thus created whereby said gases pass centrally upward between the inner ends of said chambers and into direct contact with the undersides of said conduits.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like characters refer to the same parts throughout the different views, and in which,

Fig. 1 is a central vertical section taken through the furnace substantially on the line 1—1 of Fig. 2, as indicated by the arrows;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1, as indicated by the arrows; and

Fig. 3 is a partial view in side elevation of the boiler, as seen from the bottom of Fig. 2.

Referring to the drawings, a water heater or boiler is shown comprising an outer casing 5 which will be supported and suitably connected to a base plate 6. The casing 5 has a plurality of pipes or conduits 7 extending therethrough at its upper end for a purpose to be later described, and also has a plurality of pipes or conduits 8 extending therethrough in its lower portion for a purpose to be later described. An inner casing 9 is provided which is spaced from the casing 5 at its sides and top. While the casings 5 and 9 may be of various shapes, in the embodiment of the invention illustrated, they are shown as of cylindrical shape. The casing 9 is flanged outward at its lower end and suitably connected to the inner side of casing 5 in any suitable manner, as by the rivets shown. The casing 9 has a plurality of comparatively wide and flat conduits 10 extending therethrough from side to side and disposed substantially centrally transversely of casing 9. It will be noted that the conduits 10 have their greatest vertical dimension at their central portions tapering in vertical dimension toward each side from said central portion. The conduits 10 have open ends communicating with the space between casings 5 and 9. The casing 9 also has inwardly extending chambers 9a extending therethrough from opposite sides thereof, said chambers extending transversely of the conduits 10 and having their inner ends spaced at the central portion of casing 9. As shown in Figs. 2 and 3, the chambers 9a extend inwardly from the sides which are spaced ninety degrees from the sides of casing 9 from which the conduits 10 extend. Casing 9 has a central conduit 9b leading from its upper end through a suitable opening in the top of casing 5, a water-tight joint, of course, being made between casing 5 and conduit 9b. The casings 5 and 9, at one side thereof, have substantially rectangular casings 11 passing therethrough to the inner side of casing 9, said casing projecting somewhat outwardly of casing 5 and preferably being connected thereto by angle frames 12. Said casings are closed at their outer ends by doors 13 suit-

ably hinged about pintles 14 disposed in hinges carried by said doors and casings. The doors 13, preferably also are equipped with handles 14. The casing 5 has a ring or casting 15 of angular shape in cross section, secured below the lower end of casing 9, which ring is suitably rabbeted to receive and support the grate 16, which preferably will be made of spaced bars. Below the member 15, the casing 5 is also provided with another inwardly extending rectangular casing 17 surrounded by the angular frame 18, which casing is also provided at its outer end with a hinged door 19.

In operation, it will be understood that the grate 16 comprises a burner for solid fuel, such as wood or coal. The conduits 8 will form water inlets for the water chambers of the furnace and will be connected to some suitable and regulated source of water supply. The conduits 7 will form the water or steam outlet means and will be suitably connected to radiators, or other heating members. Water being supplied to the furnace and the necessary fuel supplied, the flames and hot products or gases of combustion will pass upwardly between chambers 9a and around conduits 10 in the path indicated by the arrows in Fig. 1, said gases passing out of pipe 9b which will be suitably connected to a chimney. As shown in Fig. 1 and indicated by the arrows in Fig. 2, the water will circulate in the conduits 10 and chambers 9a. It will be seen that as the hot gases pass upwardly they must pass around the chambers 9a and in passing upwardly centrally therebetween will be brought into effective contact with the lower surfaces of the conduits 10 and with the lower surfaces of succeeding chambers 9a. A very effective heating effect is thus produced. The lower door 13 constitutes a fuel door and the upper doors 13 constitute cleanout doors giving access to the interior of casing 9 so that the surface of chambers 9a and conduits 10 may be cleaned. The lower door 19 constitutes an ash door and the space beneath grate 16 constitutes the ash pit. It will, of course, be apparent that oil or any other fuel may also be used in the furnace. The walls of casings 5 and 9 and of conduits 10 and chambers 9a can conveniently be made of sheet metal. The structure of the furnace is thus quite simple and the furnace may be easily and inexpensively made.

It will, of course, be understood, that various changes may be made in the form, details, proportions and arrangements of the parts without departing from the scope of applicant's invention, which, generally stated, consists in the device capable of carrying out the objects above set forth, in the novel parts and combinations of parts disclosed and defined in the appended claims.

Cross reference is hereby made to my previous application for United States patent on this same invention, filed January 30, 1926, Serial Number 84,960, and entitled "Water heater," formally allowed February 23, 1929, forfeited for failure to pay the final government fee thereon and not renewed.

What is claimed is:—

1. A water heater having in combination, an outer casing, an inner casing spaced therefrom, whereby a water chamber is formed between said casings, spaced comparatively wide flat conduits of less width than said inner casing extending horizontally and centrally therethrough and communicating at their ends with said water chamber, pairs of opposed spaced flat conduits extending inwardly from the sides of said inner casing having closed inner ends terminating short of the center of said inner casing providing a space between said closed inner ends, said last mentioned conduits communicating with said water chamber at their outer ends and disposed respectively between said first mentioned conduits so that said first mentioned and said pairs of last mentioned conduits extend in said inner casing at alternately different levels upwardly, said first mentioned conduits being so disposed as to bridge the space between said pairs of opposed conduits throughout their extent, a fuel burner adjacent the bottom of said inner casing, and an outlet conduit at the top of said casing communicating with said inner casing whereby a circuitous passage is formed for the products of combustion between the ends of said last mentioned conduits and around the sides of said first mentioned conduits.

2. The structure set forth in claim 1, said last mentioned conduits having straight inner ends and having the central portions of their outer ends spaced 90° from the central portions of said first mentioned conduits.

3. The structure set forth in claim 1, said last mentioned conduits having their open outer ends extending almost 180° around said inner casing, whereby a narrow substantially rectangular space is formed between their inner closed ends.

In testimony whereof I affix my signature.
CECIL G. CARLSON.