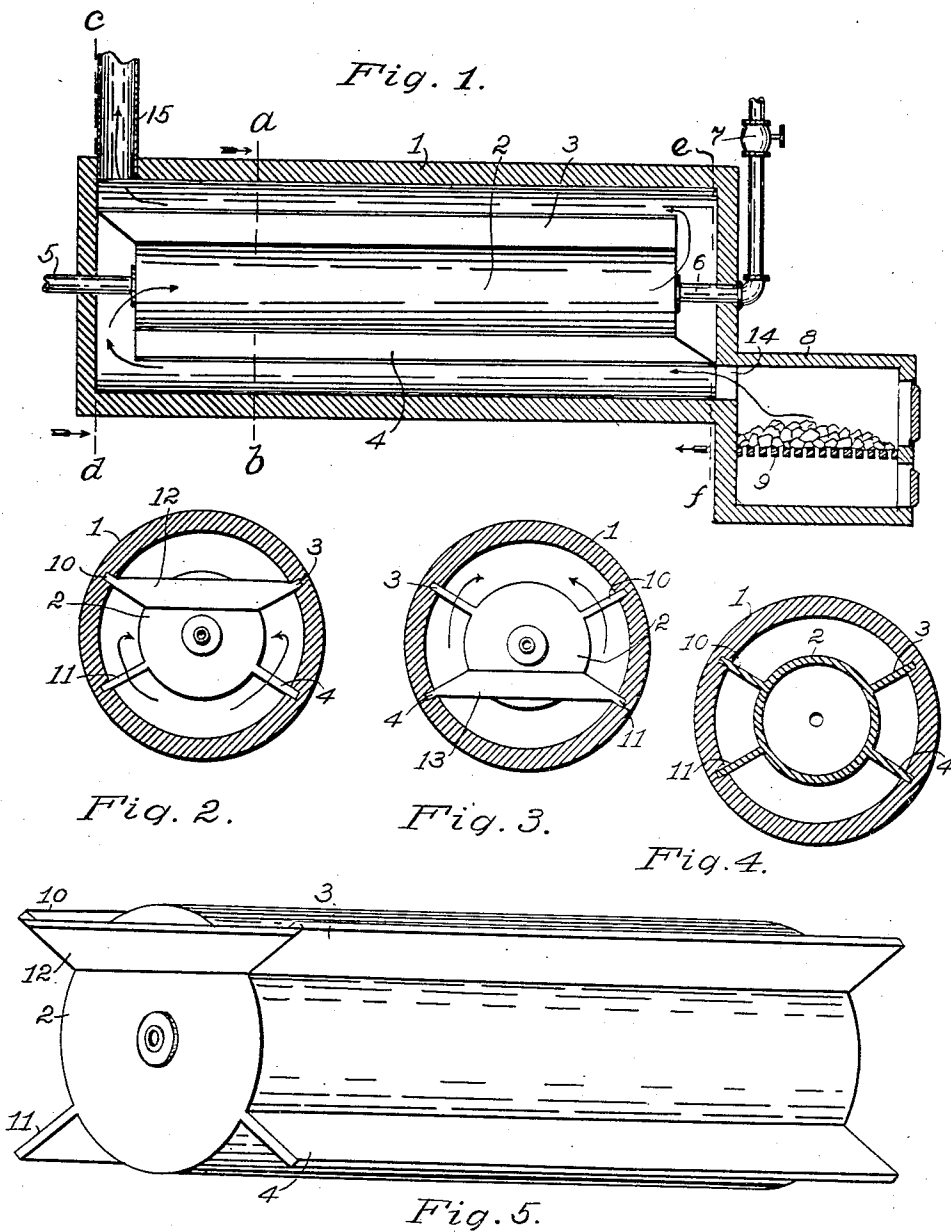


P. T. KNISS.
HOT WATER FURNACE.
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HOT-WATER FURNACE.

1,050,144.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PETER T. KNISS, a citizen of the United States of America, and a resident of Waterloo, Blackhawk county, Iowa, have invented certain new and useful Improvements in Hot-Water Furnaces, of which the following is a specification.

My invention relates to improvements in hot water furnaces, and the object of my improvement is to furnish in a device of this character a simple and inexpensive combination of parts, and in which the currents of heated air or gaseous products of combustion are so carried and deflected in direction about the water container, that a maximum amount of the heat is utilized by conduction to the water in the container.

This object I have accomplished by the means which are hereinafter described and claimed, and which are illustrated in the accompanying drawings, in which:

Figure 1 is a vertical longitudinal medial section of the outer casing of my device, the water-container being shown in elevation therein, and parts being broken away, a vertical longitudinal section of a fire-box in communication with said casing being also shown. Fig. 2 is a vertical transverse section of the casing and container of said device, taken on the line *c—d* of Fig. 1, while Fig. 3 is a like section taken through said parts on the line *e—f* of said figure, and Fig. 4 is a like section taken through said parts on the line *a—b* of said Fig. 1, all of them viewed in the directions indicated by the arrows. Fig. 5 is an enlarged perspective view of the water-container alone with its outwardly directed webs or flanges.

Similar numerals denote corresponding parts throughout the several views.

My improved hot water furnace is designed to conserve the utmost simplicity, strength and longevity consistent with the operation of its proper functions and the preservation of means for utilizing the maximum amount of heat contained in the gaseous products of combustion. With this end in view I supply an outer casing 1, which is preferably though not essentially of a hollow cylindrical form with closed ends, and supplied with an inlet-port or opening 14 at the lower part of its forward end, and with an opening and flue 15 at the rear upper part of its cylindrical periphery. Said casing also has central openings through each head to receive the inlet- and

outlet-pipes 6 and 5 respectively of the container-drum 2, the latter being supported within said casing and spaced apart therefrom all around. The fire-box 8, having a grate 9 therein, is in communication with the inlet-opening 14 of said casing, but of course, any other description of heating-means might be employed in lieu thereof to create a current of heated air or gases through said casing as might be desired. The outer casing 1 is preferably constructed of suitable materials which do not conduct heat readily, such as brick, firebrick or other materials, or partly of one and partly of another material or materials. The water-containing drum 2 is preferably though not essentially of cylindrical shape, hollow, with closed ends, the heads being centrally orificed to admit the said inlet- and outlet-pipes 6 and 5 respectively, both pipes extending through the casing-heads, while a stop-cock 7 may be placed in the pipe 6 to regulate the flow therethrough into the drum 2. The water-container or drum 2 has four radial longitudinal outwardly-projecting webs or flanges 3, 4, 10 and 11, whose extreme longitudinal edges are seated in corresponding slots in the inner wall of the casing 1 to support the drum therein equally spaced apart therefrom all around. It will also be observed that said flanges are so located upon the drum, that the interspaces between the flanges 3 and 4, and 10 and 11, are each of one half the dimensions of the interspaces between each pair of flanges 3 and 10, and 4 and 11 respectively, whereby while the interspaces between the flanges 3 and 10, and 4 and 11, are equal, and the interspaces between the flanges 3 and 4 and 10 and 11 are also equal, the side interspaces are each of one half the size of the upper and lower interspaces in transverse area. The space between the drum 2 and the casing 1 is thus subdivided into a plurality of channels, and to convert these channels into a single means of continuous communication between the opening 14 and the flue 15, I have adopted the following means. The flanges above described are preferably integral with the body of the drum 2, that is, cast in one piece therewith, as are also the transverse webs or flanges 12 and 13 which are carried respectively across the upper part of the rear head and the lower part of the forward head of said drum 2 and inclined somewhat so as to respectively

unite the rear ends of the flanges 3 and 10, and the forward ends of the flanges 4 and 11, said transverse flanges having their outer edges carried into receiving slots on the inner walls of the heads of the casing 1 so as to not only aid in supporting the drum but also in acting as baffling-plates to divert the draft of the heated gases generated in the fire-box 8 to pass in succession through the interspaces of the said longitudinal flanges as follows. As indicated by arrows in Fig. 1, the draft from the lower interspace is diverted by the rear transverse flange 12 into the side interspaces, and from the latter is again diverted by the other flange 13 into the upper interspace to pass back and forth over the drum to the flue 15. It will be seen that in this manner the draft is carried over the drum in a long circuit, which permits the heat to be conducted to a maximum extent to the water in the drum. The drum and its flanges may be cast in one integral piece, and requires little or no machining, which makes it strong and inexpensive, while being thick-walled and enduring.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In a heating-chamber having a draft inlet and a draft outlet, a hollow body suspended therein and having a communication with the exterior of the chamber, partitions between said body and the inner wall of said chamber separating the interspace into flues lying side by side along and surrounding the body, and baffling means arranged between the ends of said body and the chamber wall adapted to cause a draft to pass in succession through certain of said flues to move lengthwise of the body first to the rear, then to the front and lastly to the rear again to the chamber outlet.

2. In a heating chamber having both

draft inlets and outlets located at opposite ends, one at the lower part of the front end and the other at the upper part of the rear end, a hollow receptacle suspended in said chamber and spaced apart therefrom all around, partitions separating the interspace into four longitudinal flues arranged side by side about said body and secured and sealed to the wall of the chamber along their longitudinal edges, the upper and lower interspaces being equal, and each of the side interspaces one half the dimensions of either of the upper or lower interspaces, and baffling-means arranged between the ends of said body and the chamber wall adapted to cause the draft to pass from the lower wide interspace equally into the two side interspaces, and from the side interspaces into the upper wide interspace, and then to the chamber outlet at its top.

3. A water boiler, consisting of a single-piece hollow closed receptacle having an inlet-port, said body having integral longitudinal ribs of which two are connected at adjacent ends by a transverse integral rib, and the other two are connected at the other oppositely located adjacent ends by another transverse integral rib, and said body being adapted to be supported in an outer chamber with the outer edges of all of said ribs embedded partly in the walls of the chamber, to provide a continuous succession of flues about the body adapted to cause a draft to pass thereover longitudinally back, forward and back to the draft exit of the chamber.

Signed at Waterloo, Iowa, this 29th day of May 1912.

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Witnesses:

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