

D. WHITEFORD.
WATER HEATER.
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1,060,148.

Patented Apr. 29, 1913.

Fig. 1.

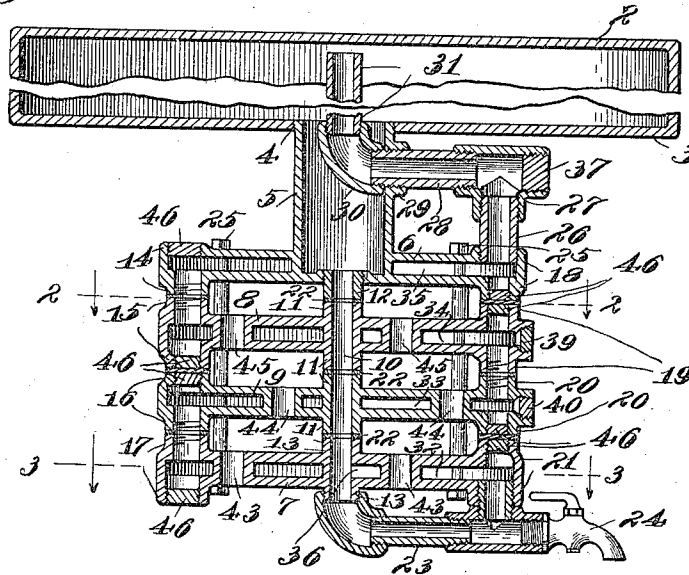


Fig. 2.

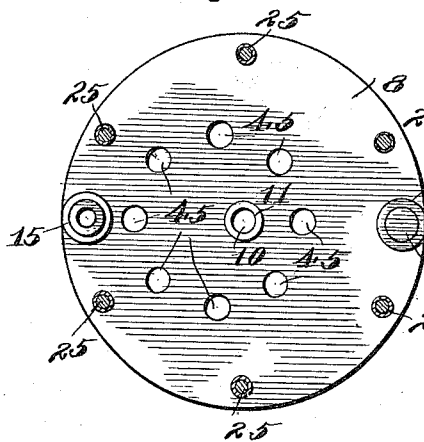
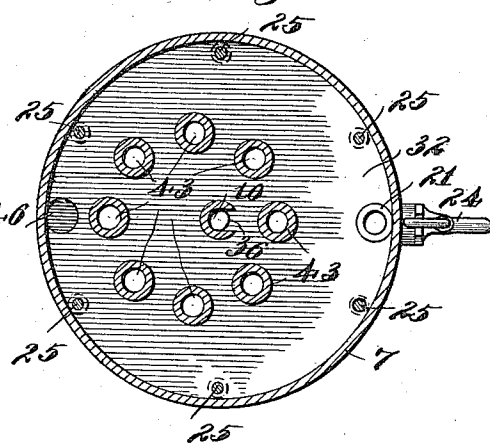


Fig. 3.



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WATER-HEATER.

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To all whom it may concern:

Be it known that I, DAVID WHITEFORD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Water-Heaters, of which the following is a specification.

My invention relates to water heating devices and has particular reference to heating attachments for kitchen boilers and the like.

The object of the invention is, to provide an improved heating device, the heating capacity of which shall be variable to different sizes of boilers, or flexible, so as to provide increased or diminished heating surfaces to be exposed to the hot gases of combustion. To this end I have provided a series of heating disks or compartments, comprising first an upper and a lower disk or compartment, which I term the primary battery of heaters, and one or more interchangeable intermediate disks or compartments, which I term the secondary battery of heaters. Said upper and lower disks together form a complete water heating device sufficient for a boiler of small size, or to utilize a small burner flame.

Where boilers of larger size are to be equipped, one or more additional disks or compartments to the required number are added and provision is made for making these modifications in a manner available to those who are not skilled in the art. These secondary members or heaters, or heating compartments, are identical and interchangeable.

The foregoing construction and arrangement contemplates a continuous circulation of the water in thin sheets throughout the said series of heating spaces or compartments. This circulation is facilitated by admitting the cold water to the lowest disk or compartment first, circulating it through said disk, thence through the next higher disk, and so on until the last disk is reached—which last disk is caused to discharge into the tank or boiler, the heated water obviously tending to move upward, and thus creating the desired circulation.

A further improvement contemplated by my invention is, to provide, a heating attachment which shall receive the cold water from the boiler and send said water back heated through a single pipe opening in the boiler, thereby facilitating the at-

tachment, or providing a simple means of equipping an existing boiler with my improved device.

The flexibility of the arrangement further contemplates adaptation to various other situations, such as connecting the heating disks with the water back of an ordinary stove equipped with such a water back; and also for modifying arrangement as to the method of returning the heated water into the boiler in certain cases.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of a heating device embodying my invention, same being attached to a boiler—the latter broken away between its top and bottom. Fig. 2 is a section taken substantially on line 2—2 of Fig. 1. Fig. 3 is a section taken substantially on line 3—3 of Fig. 1.

Referring in detail to the several views, 2 represents the top and 3 the bottom of an ordinary kitchen water boiler, in the bottom of which is an opening 4, into which is inserted a pipe 5, which forms a part of my improvement.

The heater proper consists of a series of hollow disks, an upper one 6 and a lower one 7 constituting the primary disks or battery, while intermediate disks 8 and 9 constitute the secondary disks or battery. From the pipe 5 the cold water from the boiler is let into the lowermost disk 7 through a conduit 10, which is formed by a series of oppositely disposed hollow hubs 11 on the intermediate disks, and hub 12 on the upper disk, and a pair of hubs 13 on the lowest disk 7. A similar arrangement of upwardly and downwardly identically projecting pairs of hubs 14, 15, 16 and 17 on one side of the central series of hubs, and hubs 18, 19, 20 and 21 on the opposite side of said central series of hubs, which is provided to form communicating passages from one disk to another. Water-tight joints are formed between the adjoining ends of these hubs, by means of fiber washers 22. The lower end of the conduit 10 also leads into a drain pipe 23, connected with the lowest hub 13 and provided with a drain cock 24. All of the disks are then clamped together and the fiber joints made water-tight by means of a series of rods 25, having heads at one end and nuts threaded on their opposite ends. These rods, as

shown, pass through the entire series of disks, their heads and nuts engaging, respectively, the top and bottom disks.

As stated in the foregoing, the cold water is first taken into the lowest disk as soon as it circulates upwardly through this series and is discharged through the disk 6 through a nipple 26 having its lower end threaded into the upper nipple 18 of the disk 6. The upper end of the nipple 26 is threaded into a "T" 27 connected with a short pipe 28 having threaded engagement with a hub 29 on the pipe 5. The pipe 28 projects into the interior of the pipe 5 and is connected through a quarter bend fitting 30 with lower end of the hot water discharge pipe 31 which extends within the boiler to a point near its top 2.

Each of the disks has an interior space in which the water is successively heated, the lower disk 7 having a water space 32, the next disk 9 having a water space 33, the next disk 8 having a water space 34, and the top disk 6 having a water space 35. The water is caused to flow in at one side of each disk, and out through the hubs at its opposite side, this flow beginning at a lateral opening 36 in the lower end of the passage 10, which opening directs the initial flow to the right on (Fig. 1), whence it flows back through the passage formed by the upper hub 17 and lower hub 16; thence to the right in the water space 33; thence upward through the passage formed by the upper hub 20 and lower hub 19 into the passage 34; thence through the upper hub 15 and lower hub 14 into the water space 35; thence into the pipes 26, "T" fitting 27, pipe 28, quarter bend 30, and pipe 31, into the upper end of the space within the boiler. From the boiler the water is drawn off in any suitable manner.

Occasionally the boilers are provided with inlets for the hot water, and to provide for such a contingency I have equipped the "T" 27 with a plug 37 in its right-hand branch (Fig. 1), which plug may be removed and a pipe 38 (indicated by dotted lines) substituted.

I have made another provision or augmentation by providing the intermediate disks 8 and 9 with normally plugged lateral outlets closed by plugs 39 and 40 respectively. In Fig. 1, as shown by dotted lines, a pipe 41 connected with the opening closed by the plug 39, this pipe 41 leading to a stove water back, not shown. The purpose of this provision is to make use of the water heating arrangement of an ordinary stove thus equipped, during such season or seasons as such stoves are usually employed, namely, during the cold weather, for the sake of the economy of letting the cook stove serve as a room heater in addition to its usual capacity.

The normal heater is represented by dotted

lines as the ordinary gas burner 42. The heat from the latter first strikes the lower surface of disk 7; thence the gases of combustion pass through the series of perforations 43 between the disks 7 and 9. From the latter space the heat ascends through perforations 44 to the space between disks 9 and 8. From the latter space the heat continues its ascent through the perforations 45 into the space between disks 8 and 6, and whatever of surplus heat then remains is impinged against the bottom of the boiler after escaping at the outer edges of the disks 6 and 8.

The hub openings described in the foregoing and not referred to as affording passages for the circulating water, are normally closed by plugs 46.

It will be seen from the foregoing description that the device as a whole may be attached without any further alteration in an existing boiler than that involved in making a single perforation for the pipe 5; that the arrangement is adaptable to the several methods of heating now in vogue; that it is adaptable to the well known form of boilers without any alteration whatever by connecting the pipe 5 in any suitable manner with an already existing opening in the bottom of the boiler, and an already existing opening in the side or the top of the boiler, to which the pipe 38 may lead; and that the heating capacity of the burner may be taken care of, whatever the volume of heat may be, for the purpose of equipping the different sizes of boilers, by increasing or diminishing the number of secondary disks 8 and 9, as each particular situation may demand.

The openings 43, 44 and 45 are staggered with relation to each other, as shown in Fig. 1, to better distribute the hot gases of combustion over the heater surfaces.

I claim as my invention:—

1. In a heating device, the combination with a tank of a plurality of disks having shallow water spaces therewithin, said disks being individual and separable members, means for circulating water in alternately opposite directions through said disks, and means for passing gases of combustion through the lower disk or disks to the upper disk.

2. In a heating device, the combination with a tank, of an upper and a lower primary disk having water spaces therewithin, secondary disks which are separable and interchangeable and adapted to be interposed between said primary disks for the purpose of varying the heating capacity of said heating device, means common to all of said disks for securing them together as a unit, means for circulating water from and back into said boiler in opposite directions through said disks, and means for heating said device.

3. In a heating device, the combination with a tank, of a series of separable disks having water spaces therewithin, hollow hubs on said disks which serve to space said disks apart and to provide water-passages from disk to disk, a single inlet passage from said tank into the lowest of said disks, means for draining said passage and tank, means for circulating water in alternately opposite directions through said disks, means for returning the water to said tank through said single inlet opening, and means for heating said device.

4. In a heating device, the combination with a tank, of a heater comprising built-up and separable sections or disks constructed and arranged so that they may be increased or diminished in number and still leave a complete heater, spacer-hubs on said disks, and subserving as means for circulating water in alternately opposite directions through said sections, means common to all of the disks for securing them together as a whole, and means for heating same.

5. In a heating device, the combination with a tank, of a series of water space disks which may be assembled in variable numbers to form a complete heater, a single pipe connection between said heater and said tank, means for drawing water from said tank through said connection into said heater and for returning the water from the heater through the same connection, means for varying the direction of said return, and means for heating said heater.

6. In a heating device, the combination with a tank, of a series of water space disks which are adapted for assemblage in vari-

able numbers to form a complete water heater, means for admitting water from said tank into said heater, variable means for returning the water from said heater to said tank, and variable means for heating the water passed through said heater.

7. In a heating device, the combination with a tank, of a series of disks having water spaces therein, means for flowing water into and from said disks or spaces through a central opening in the bottom of the tank, and means for passing hot gases of combustion through the disks arranged below the uppermost disk.

8. In a heating device, the combination with a tank, of a series of water spaces, hubs for spacing apart said water spaces and for circulating water from and back into said tank, a single pipe-opening in said tank, through which the water is led into as well as from said spaces, and means for heating the water during such flowage.

9. In a heating device, the combination with a tank, of a battery of heater disks arranged one above another, each said disks being an individual member separable from the other disks, means common to all said disks for supporting them relatively to each other as a unit, means for circulating water through said disks, and means for heating said disks.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

DAVID WHITEFORD.

Witnesses:

M. C. ALLEN,

J. W. BECKSTROM.