

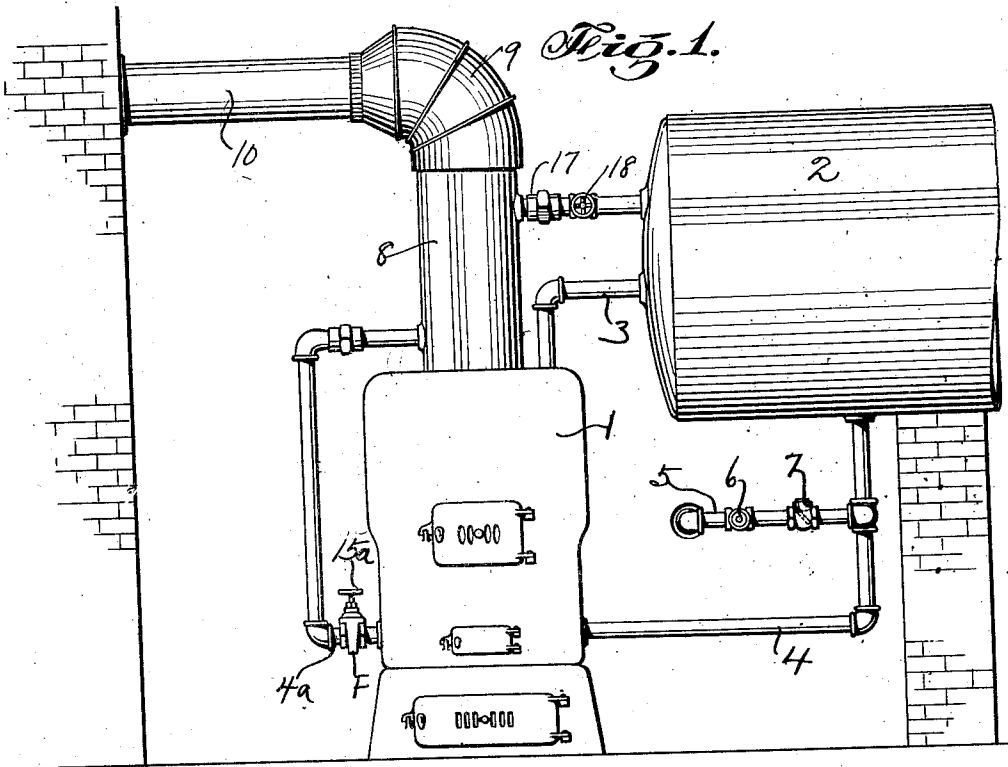
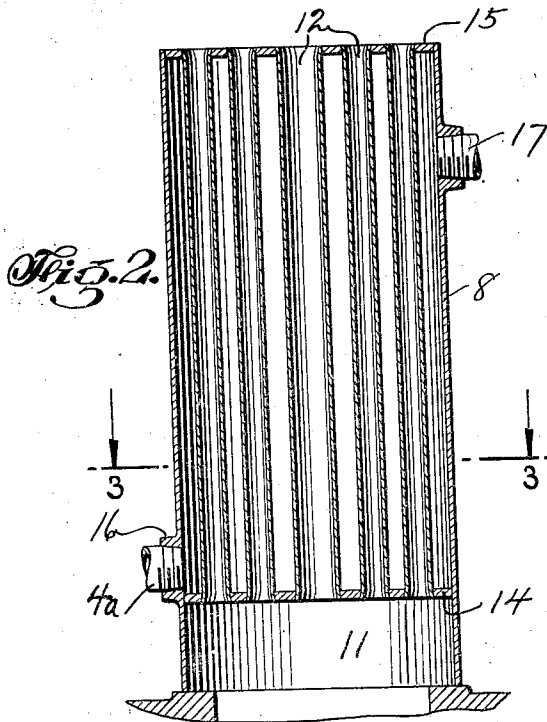
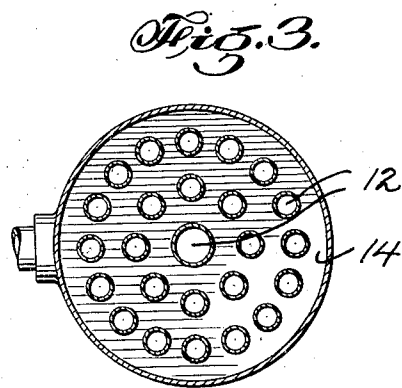
May 26, 1931.

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1,807,481

HOT WATER HEATING SYSTEM

Filed March 26, 1930



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HOT WATER HEATING SYSTEM

Application filed March 26, 1930. Serial No. 438,929.

My invention relates to a new and improved hot water heating system.

One of the objects of my invention is to produce a system which shall be particularly useful for domestic hot water heating systems, either for apartment houses or for smaller houses.

Another object of my invention is to provide a system which shall economize the heat produced from the ordinary stove or other type of heater which is used in domestic installations.

Another object of my invention is to provide a system which shall make it possible to economically utilize the waste gases arising from a coal heater or gas or other type of heater which is now utilized for such purpose.

It has heretofore been well known to provide a coal stove or gas or other heater in which the combustion chamber was surrounded by an annular water pot, which heated water, the heated water being caused to circulate through a tank which formed part of the system. Devices of this type are very wasteful, because the heat which rises from the fire-pot or other combustion chamber, is not utilized. In particular, the heat of the waste gases is not utilized. According to my improved system, a heater which can be constructed in any well known manner, has its efficiency and output materially increased, by an attachment or economizer, which makes it possible to utilize a large part of the heat which is now wasted up the chimney.

Other objects of my invention will be set forth in the following description and drawings which illustrate a preferred embodiment thereof, it being understood that the above general statement of the objects of my invention is intended merely to generally explain the same and not to limit it in any manner.

Fig. 1 is a diagrammatic elevation illustrating the complete system.

Fig. 2 is a sectional view of the economizer.

Fig. 3 is a sectional view on the line 3—3 of Fig. 2.

The device includes a heater which may be

a coal or gas stove or any other type of heater. This heater is provided with the ordinary annular water-jacket which surrounds the combustion space. This water-jacket is not shown, as in itself it is old and well known. This annular water-jacket is connected to the hot water tank 2 by means of a pipe 3 and the bottom of this annular water-jacket is connected to the tank by means of a pipe 4. Cold water can be fed into the tank from a suitable source of supply, by means of a pipe 5 which is provided with a hand-valve 6, and with a check-valve 7. If the device is used in the ordinary way, the water in the tank circulates through the heater 1, by means of the pipes 4 and 3. The pipe 8 which is connected to the top of the heater 1, serves as an outlet to the flue or chimney, the connection being completed through an elbow-member 9, and a pipe 10. The pipe 8 is provided with a chamber 11 into which the hot gases can freely enter. The hot gases pass through a series of pipes 12, whose ends fit gas-tight in perforated plates 14 and 15 which are made of any suitable metal.

As shown in Fig. 3, the central pipe 12 is made of larger diameter than the other pipes, so as to permit the free flow of the hot gases which arise from the heater. This is an important feature of the invention because if the economizer prevents the heater or boiler from having its natural draft, there is a back draft of the hot gases of combustion, which makes the device impractical. I do not wish to be limited to the specific construction shown for permitting a free flow of the hot gases of combustion, because the diameter of the economizer could be made less than the diameter of the pipe 8, in order to permit some of the hot gases to flow around the economizer, in order to produce a full draft. A great many thin-walled pipes are provided and these pipes are made of suitable metal which can readily conduct heat. I prefer to use galvanized steel, or brass, or copper, and to have the walls of these pipes not exceed one-eighth inches in thickness. The pipe 4 may be directly connected to the pipe 4a, or the pipe 4a may be connected to the water-jacket around the combustion space of the

heater so that both forms of connection are to be considered as equivalent for the purposes of the invention. The pipe 4a is provided with a hand-valve 15a, so as to control
 5 the flow of the water from the pipe 4, or from the water-jacket, into the pipe 4a. The pipe 4a is connected to the lower part of the economizer at the connection 16, so that the water circulates around the pipes 12, and
 10 the water also moves upwardly in the economizer to the pipe 17, which is provided with the hand-valve 18. If desired, the valve 15a may be used to regulate an ordinary faucet F.

Experience has shown that since the water
 15 moves upwardly in the economizer and also passes around a great many thin-walled tubes which are heated by the waste gases, that a great economy is produced.

The pipe 5 is merely used for initially filling
 20 the tank 2 and for replacing water which is withdrawn from the tank 2. The pipes 12 may have one and one-quarter inches internal diameter, and I prefer to have at least twenty-four pipes in an ordinary size. The
 25 height of the economizer is from thirty to forty inches. The economizer may be connected to a steam boiler, to utilize the heat of the waste gases.

The annular body of water which is heated
 30 in the heater 1, forms in effect a vertical column of water, the top of which is below the top of the water level in the tank 2. The tank 2 is always kept full of water, because
 35 as hot water is withdrawn therefrom, fresh water always enters from the city mains or the like, through the pipe 5.

The water in the economizer in effect forms a second column of water, which is also vertical, and which is above the column of hot
 40 water which has been previously mentioned. The column of hot water in the economizer is connected to the tank 2, at a point which is above the top of the first column of water. Likewise, the height of the column of cold
 45 water which is provided by the water in the tank 2, and the water in the pipe 4 exceeds the combined heights of the first column of hot water, and the second column
 50 of hot water. Hence, the effect of the heater and of the economizer is to produce a column of water whose height is equal to the combined heights of the heater and of the economizer, so that the flow of water which is produced
 55 through the tank 2, is of maximum velocity. This is an important advantage of my invention.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions can be made without
 60 departing from its spirit.

I claim:

A water heating system comprising a reservoir tank, an inlet pipe connected to
 65 said tank, said inlet pipe being also connected to a source of fresh cold water so that

said reservoir tank is maintained full, a heater having a first water column which is substantially vertical, said reservoir tank being connected to said first water column by separated pipes at substantially the top
 70 and bottom of said first water column, an economizer located above said heater, said economizer having a plurality of substantially vertical pipes through which the waste hot gases from the combustion space of said
 75 heater can pass, said economizer being dimensioned to permit a rapid upward flow of said hot gases through the same so that the draft of the heater remains effective, said economizer having a second water column
 80 which is substantially vertical, the top of said second water column being connected to said reservoir tank, the bottom of said second water column being connected to said
 85 first water column at a point substantially below the top of said first named column.

In testimony whereof I affix my signature.

ALBERT E. KLEIN.