

965,100.

Patented July 19, 1910.

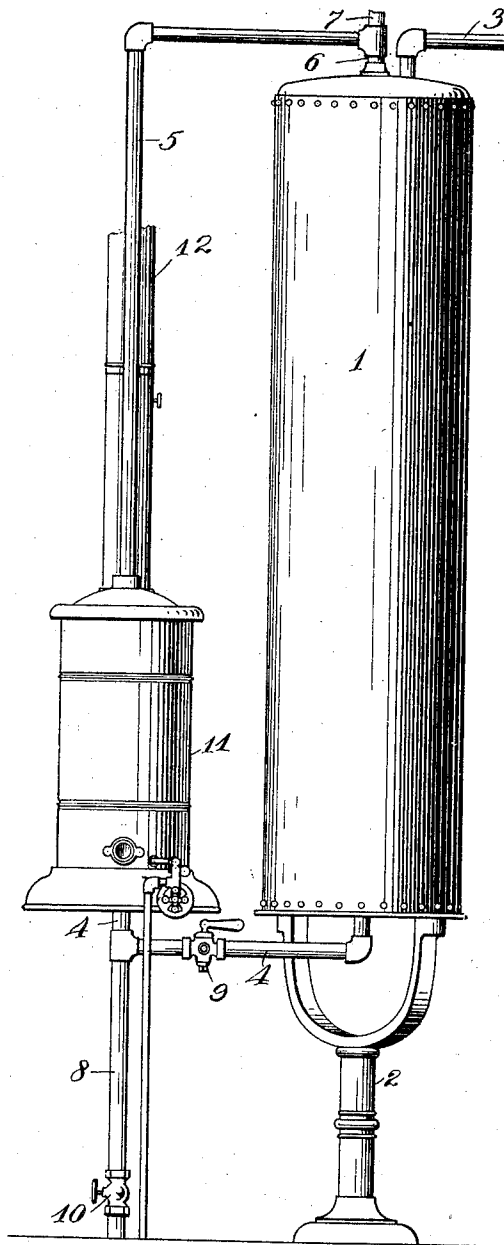


FIG. 1

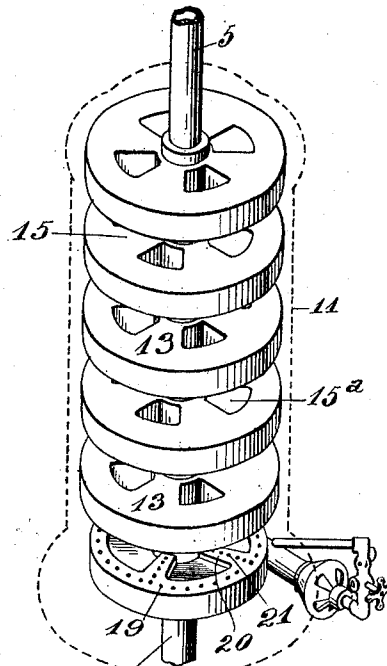


FIG. 2

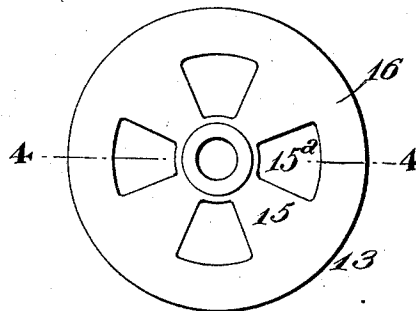


FIG. 3

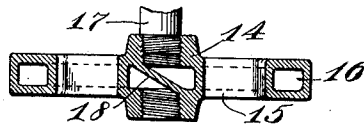


FIG. 4

WITNESSES:

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W. L. Mc Garrell.

INVENTOR,

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BY Bates, Fouts & Hull,  
ATTYS.

# UNITED STATES PATENT OFFICE.

OTTO FOX, OF CLEVELAND, OHIO, ASSIGNOR TO NATURAL GAS REGULATOR COMPANY,  
OF CLEVELAND, OHIO, A COPARTNERSHIP.

## WATER-HEATER.

965,100.

Specification of Letters Patent.

Patented July 19, 1910.

Application filed June 17, 1908. Serial No. 438,918.

### *To all whom it may concern:*

Be it known that I, Otto Fox, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Water-Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to water heaters which are employed for the purpose of heating water very rapidly by means of gaseous fuel and has for its objects to provide a heater of this type which is particularly efficient in operation, which will utilize to a great extent the heat units applied thereto and which is at the same time simple and economical of construction.

My invention also contemplates the combination of a particular form of water heating element with a type of burner which will co-act therewith to produce a maximum efficiency in operation.

A further object of the invention is to provide a heater of the type referred to which is so combined with a boiler or receptacle for hot water as to permit the flow of water through the heater to be reversed when the burner is not in operation, whereby any sediment that may accumulate within the heater elements may be quickly and conveniently removed.

I accomplish the above objects by the construction illustrated in the drawings hereto annexed, wherein—

Figure 1 represents a side elevation of my heater connected up to a fixed or stand boiler; Fig. 2 represents a perspective view of the heater proper and the burner for the same, the inclosing casing being represented in dotted lines; Fig. 3 represents a top plan view of one of the heater elements; and Fig. 4 represents a sectional view taken on the line 4—4 of Fig. 3.

Describing the parts by reference characters, 1 denotes the boiler, which may be supported on a suitable stand 2.

3 denotes an inlet pipe through which cold water is supplied to the boiler, 4 the pipe leading from the boiler to the heater proper through which water is supplied from the boiler to the heater, 5 the hot water outlet pipe leading from the heater. The last mentioned pipe is provided with a connection 6 adapted to discharge into the boiler.

7 denotes a pipe leading from pipe 6 to the faucet or other point of use, and 8 denotes a pipe which communicates with the inlet pipe to the heater. Pipes 4 and 8 are provided with valves 9 and 10 respectively.

The heater proper comprises a casing 11 which surrounds the heating elements and the burner and which is provided at the rear portion thereof with a flue 12 through which the products of combustion may be discharged.

13 denotes one of the heating elements. Each element 13 comprises a wheel casting consisting of a central hub 14 connected by radial hollow spokes 15 with a hollow rim 16. Each hub is internally threaded for the reception of the correspondingly threaded ends of the inlet and outlet connections. The lowermost heating element will have threaded therein the cold water inlet pipe 4, while short pipe sections or nipples 17 connect the adjacent heater elements. Each heater element is provided with a partition 18 which extends diagonally across the enlarged central portion of the hub, whereby the water supply to the bottom of each element will be caused to circulate outwardly through the hollow spokes on the inlet side of the partition into the hollow rim, thence into the hub through the remaining hollow spokes above or on the outlet side of said partition. By this construction, the water supplied to each heating element is spread out and caused to travel throughout the whole extent of each element in its passage to the next element in the series, the uppermost element being connected with and discharging into pipe 5.

As will appear more particularly by reference to Figs. 2 and 3, the open spaces 15<sup>a</sup> between the spokes 15 are of substantially the same shape and lateral area as the spokes themselves and the elements are so arranged that the radial spokes of one disk are in vertical alinement with the spaces of the disk thereabove, whereby the products of combustion discharged from the burner will be baffled or intercepted successively by the radial spokes of each heating element in the series, thus rendering the heater extremely efficient in operation. This efficiency is increased by the particular type of burner which is employed with the heater. This burner, as will appear from Fig. 2, is provided with a circular series of burner

apertures 19 which are located below the hollow rim of the heating element next thereabove, the burner orifices being preferably located about midway between the inner and the outer periphery of said rim. The burner is preferably a casting and is provided on its upper surface with ribs 20 located beneath the radial arms 15 of the heater element thereabove and provided with burner orifices 21 arranged to discharge against the central portions of the radial spokes of said heating element.

By the construction and arrangement of heater elements and burner above described, great efficiency is secured and the water is very quickly heated with a minimum consumption of fuel.

By closing the valve 9 and opening the valve 10, the water supplied to the stand boiler 1 through the pipe 3 may be caused to circulate through pipe 5, through the heater elements 13 and out through pipe 8, effectually removing, by this reverse flow, any sediment that may have accumulated within the heater.

Having described my invention, I claim:

1. A water heating element comprising a central hub and a hollow rim, and hollow

spokes connecting the hub and rim, said hub being provided with an inclined partition extending across the same and placing some of said hollow spokes in communication with the portion of the hub on one side of said partition and the remaining spokes in communication with that part of the hub on the other side of said partition, the hub and the rim being in substantially the same plane.

2. A water heater comprising a vertical series of connected elements, each element comprising a central hub, a hollow rim surrounding said hub, hollow spokes connecting the rim and hub, and an inclined partition extending across said hub and dividing the same into a lower inlet portion and an upper outlet portion, the inlet portion communicating with some of said spokes and the outlet portion with the remainder of said spokes, the rim and the hub being in substantially the same horizontal plane.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

OTTO FOX.

Witnesses:

W. L. McGARRELL,  
A. J. HUDSON.