A. C. GORDON.

WATER HEATING SYSTEM

APPLICATION FILED APR. 7, 1917.

1,266,455.

Patented May 14, 1918.

2 SHEETS—SHEET 1.

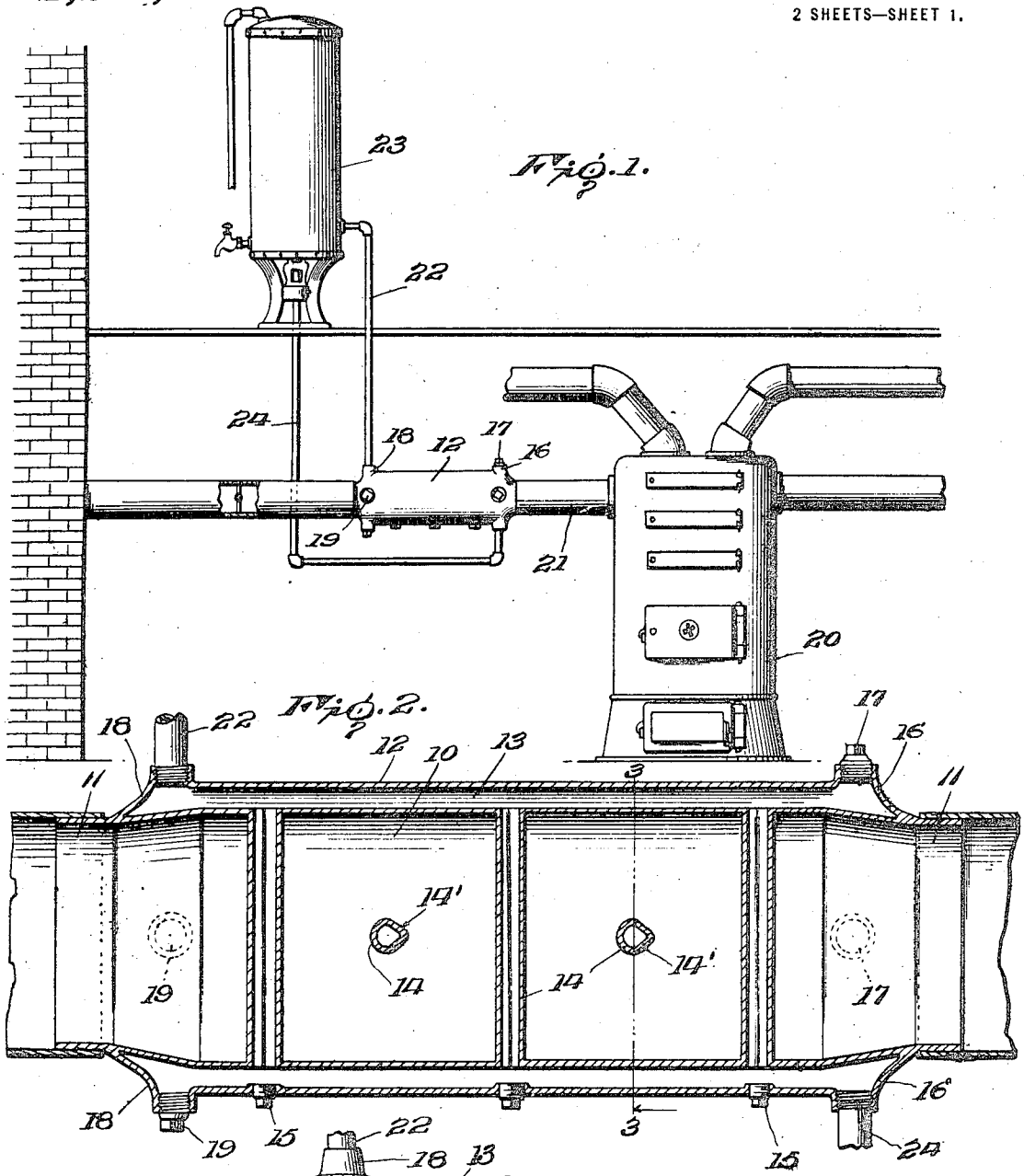


Fig. 1.

Fig. 2.

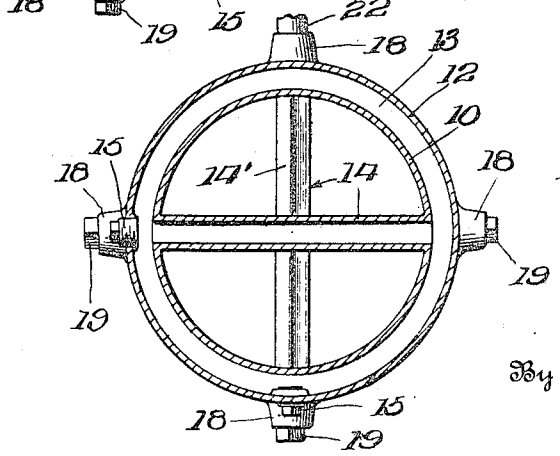


Fig. 3.

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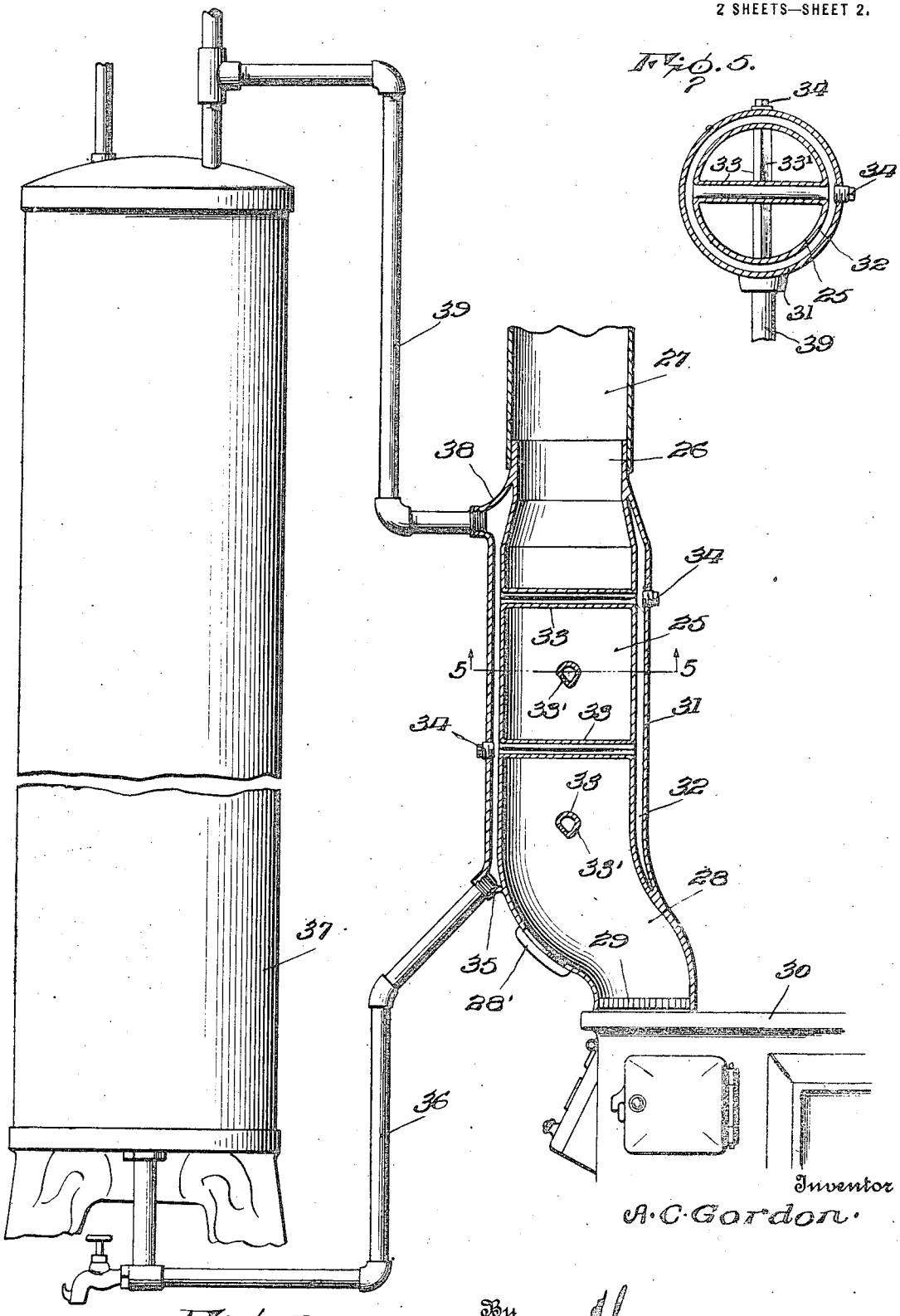


Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

AI C. GORDON, OF GLENS FALLS, NEW YORK.

WATER-HEATING SYSTEM.

1,266,455. Specification of Letters Patent. Patented May 14, 1918.

Application filed April 7, 1917. Serial No. 160,506.

To all whom it may concern:

Be it known that AI C. GORDON, a citizen of the United States, residing at Glens Falls, in the county of Warren and State of New York, have invented certain new and useful Improvements in Water-Heating Systems, of which the following is a specification.

This invention relates to an improved water heating system especially adapted for domestic purposes and has as its primary object to provide a heater designed to utilize the waste heat from a furnace or range for heating water for the household.

The invention has as a further object to provide a heater which may be interposed in the smoke flue of the furnace or range and which will be formed with crossed circulating pipes spaced such distance apart that the soot cannot collect between the said pipes.

And the invention has as a still further object to provide a heater having a number of inlets and outlets at its respective extremities so that pipes may be led from any one of the said inlets or outlets to a tank and the device thus readily installed without regard to the particular disposition of the device in a flue.

Other and incidental objects will appear as the description proceeds and in the drawings wherein I have illustrated the preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a diagrammatic view showing my improved heater interposed in the flue of a conventional type of domestic furnace, with pipes leading from the heater and connected to an ordinary tank,

Fig. 2 is a longitudinal sectional view more particularly showing the construction of the heater and illustrating the inlets and outlets therefor,

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2 and more particularly illustrating the arrangement of the transverse circulating pipes of the device,

Fig. 4 is a sectional view showing a slightly modified form of heater particularly designed for use in connection with a domestic range, a portion of such range being conventionally illustrated with the heater connected with an ordinary tank, and

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 4.

In carrying out the invention, my improved heater is formed with a hollow cylindrical body or casing 10 provided at its extremities with reduced extensions 11 for receiving a flue pipe. Surrounding the body 10 is a jacket 12 connected with the said body, adjacent the extensions 11 thereof, and providing a heating chamber 13 between the jacket and the said body. Extending diametrically through the body 10 is a series of circulating pipes 14 arranged with successive pipes disposed at substantially right angles to each other and communicating with the heating chamber 13. Any suitable number of the pipes 14 may be employed but, in this connection, it is to be observed that the said pipes are spaced relatively wide apart so that soot cannot collect between the said pipes. Corresponding sides of the said pipes are, as particularly shown in Fig. 3, substantially V-shaped to present oppositely inclined deflecting walls 14′ sloping toward the sides of the casing. Formed through the jacket 12 opposite one end of each of the pipes 14 are suitable openings which are closed preferably by screw threaded plugs 15. The openings of successive adjacent pipes are arranged at opposite ends of the said pipes and by removing the plugs 15, the pipes may be easily cleaned.

Formed through the jacket, at one extremity of the heater, are a plurality of inlet ports 16. The ports 16 are preferably arranged at quadrantly spaced points about the jacket and are normally closed by screw threaded plugs 17. Formed through the jacket 12, at the opposite extremity of the heater, are a plurality of outlet ports 18. These ports, as in the instance of the ports 16, are arranged at quadrantly spaced points about the jacket and are normally closed by screw threaded plugs 19.

In Fig. 1 of the drawings, I have shown the manner in which my improved heater is employed in connection with a furnace. In this figure, a conventional type of domestic furnace 20 is illustrated as provided with a smoke flue 21. My improved heater is interposed in the said flue with the inclined walls 14′ of the pipes 14 presented toward the furnace and is supported in position by the adjacent sections of the flue,

which are arranged to fit over the extensions 11 of the body 10 of the device. The waste products of combustion and waste heat from the furnace will thus flow through the heater to the chimney. Connected to one of the outlet ports 18 of the device is a pipe 22 leading to the usual hot water tank conventionally illustrated at 23 and leading from the bottom of the said tank is a return pipe 24 connected to one of the inlet ports 16 of the heater. As will now be readily understood, the chamber 13 of the heater will be filled with water which will flow through the pipes 14. These pipes being interposed directly in the path of the heated currents through the flue 21, will quickly become heated to heat the water within the said pipes which will then circulate through the pipes into the chamber 13. Furthermore, the body 10 of the heater will also, of course, become heated to further heat the water within the said heating chamber. In this connection attention is directed to the arrangement of the inclined walls 14′ of the pipes 14. The heated currents flowing through the casing 10 will as will be clear strike the said walls to be deflected laterally thereby toward the wall of the casing. The heated currents will thus be caused to impinge directly against the casing wall to act thereon in a maximum degree for effectually heating the said wall and accordingly heating the water within the chamber 13. The heated water will then rise through the pipe 22 to the tank 23 when cold water from the said tank will return through the pipe 24 to the heater. A constant circulation of the water will thus be had to maintain all of the water within the tank 23 hot and it is to be noted that my improved heater utilizes only the waste heat from the furnace so that the efficiency of the furnace for heating purposes is not in the least reduced. In all instances the internal diameter of the casing 10 will be such that the presence of the heater in a flue will not reduce the cubical capacity of the flue. Owing to the presence of the number of inlet ports 16 at different points around one extremity of the heater and the presence of a similar number of outlet ports 19 around the opposite extremity of the heater, the pipes for the water tank may be respectively connected to whichever of the said ports are most conveniently located so that the device may be readily installed without reference to the position of the heater in the flue.

In Fig. 4 of the drawings, I have illustrated a slight modification of the invention disclosing a heater particularly designed for use in connection with the conventional kitchen range. In this modification, the body of the heater is indicated at 25. The heater body is preferably cylindrical and is hollow, as in the preferred form of the invention, so that the products of combustion may readily pass therethrough. At its upper extremity, the body 25 is provided with a reduced extension 26 for receiving a flue as conventionally illustrated at 27. At its lower extremity, the body is provided with a reduced extension 28 which is offset or curved longitudinally and is formed, at its lower end, to fit over the collar 29 of a conventional type of kitchen range, as indicated at 30. These ranges are, as is well known, usually provided with a number of shelves, adjacent the flue opening of the range and for this reason, the extension 28 of the heater is offset so that the said heater may be readily connected to the range without interfering with the said shelves, the offset in the extension 28 being sufficient to support the heater to extend in the rear of the said shelves. Surrounding the body 25 is a jacket 31 forming a heating chamber 32 and extending diametrically through the said body to communicate with the said chamber are a plurality of circulating pipes 33 similar to the pipes 14 of the preferred form of the invention and provided with inclined deflecting walls 33′ presented toward the range. The jacket 31, at reverse ends of the pipes 33, is provided with cleaning openings for the said pipes and these openings are closed by plugs 34. Leading through the lower extremity of the jacket 31 is an inlet port 35 to which is connected a pipe 36 from the bottom of a suitable tank as conventionally illustrated at 37. Leading through the upper extremity of the jacket is an outlet port 38 to which is connected a pipe 39 from the top of the said tank. The chamber 32 will, therefore, be always filled with water as will also the pipes 33 so that the products of combustion from the range 30 flowing over the said pipes will act to heat the water therein which will then circulate through the pipes to the chamber 32 and thence to the tank 37. As in the preferred form of the invention, the pipes 33 are preferably arranged at substantially right angles to each other and are spaced relatively wide apart so that soot cannot collect between the said pipes. Formed in the rear side of the extension 28 is a suitable opening through which the interior of the heater may be readily cleaned and closing the said opening is a removable cap 28′.

It will therefore be seen that I provide a particularly efficient construction for the purpose set forth and a heater which, while being particularly adapted for domestic purposes may, nevertheless, be employed in various other situations.

Having thus described the invention, what is claimed as new is:

1. A water heater consisting of a tubular body having its ends constructed to fit with-

in the sections of a smoke flue, circulating pipes extending diametrically across said body and in angular relation to each other and spaced apart, the walls of said pipes presented to the products flowing through the body being tapered whereby to deflect said products, a jacket surrounding said body and spaced therefrom and having its ends reduced and secured to the body, said jacket being provided with openings located co-axially with the circulating pipes, plugs normally closing said openings, inlets at one end of said jacket, and outlets at the opposite end thereof.

2. A water heater consisting of a tubular body having its ends constructed to fit within the smoke flue, the lower portion of said body being offset from the axis thereof and said offset portion being provided with a clean out opening in its under side, circulating pipes extending diametrically across said body and in angular relation to each other and spaced apart, the walls of said pipes presented to the products flowing through the body being tapered whereby to deflect said products, a jacket surrounding said body and spaced therefrom and having its ends reduced and secured to the body, said jacket being provided with openings located co-axially with the circulating pipes, plugs normally closing said openings, inlets at one end of said jacket, and outlets at the opposite end thereof.

In testimony whereof I affix my signature.

AI C. GORDON. [L. S.]