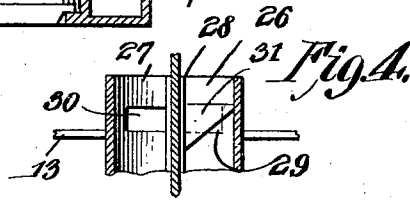
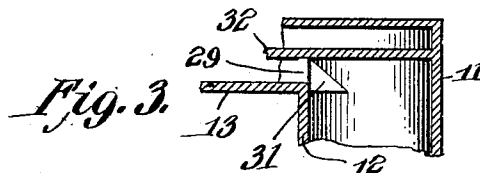
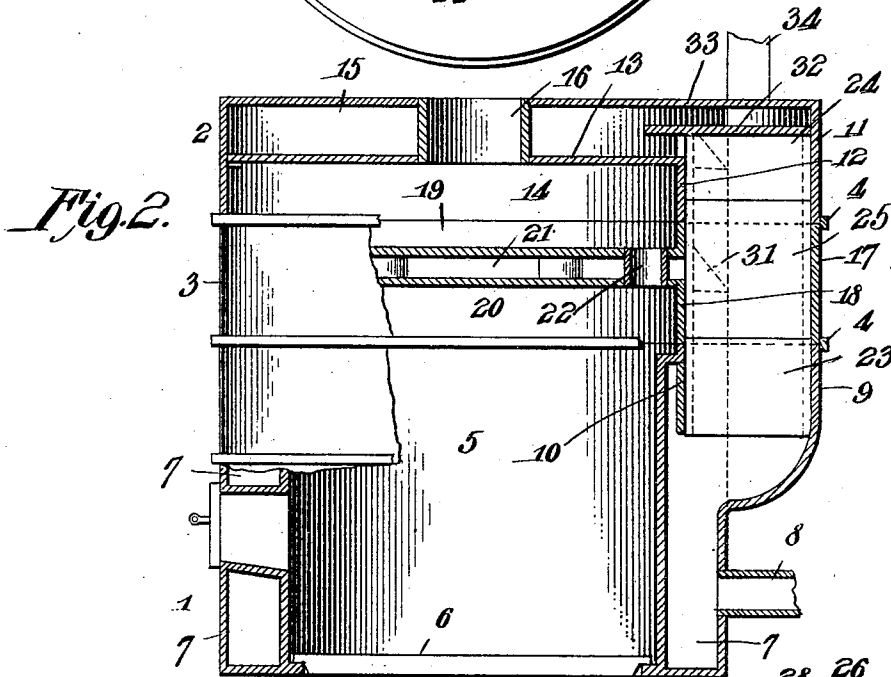
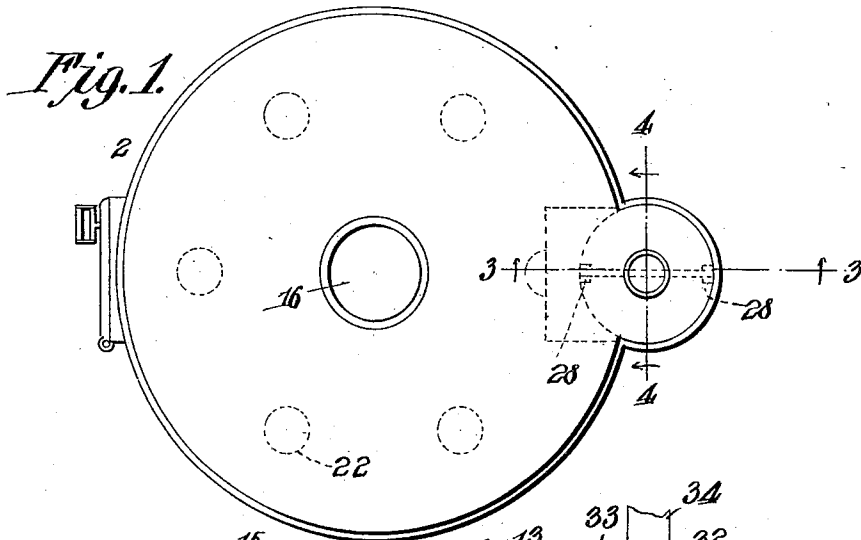


T. A. STELLER.
WATER HEATER.
APPLICATION FILED JULY 24, 1909.

960,123.

Patented May 31, 1910.



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THEODORE A. STELLER, OF HOUGHTON, MICHIGAN.

WATER-HEATER.

960,123.

Specification of Letters Patent.

Patented May 31, 1910.

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To all whom it may concern:

Be it known that I, THEODORE A. STELLER, a citizen of the United States, residing at Houghton, in the county of Houghton and State of Michigan, have invented new and useful Improvements in Water-Heaters, of which the following is a specification.

This invention relates to water heaters designed for the production and circulation of hot water in hot water heating systems and for other similar purposes.

The object of the invention is to provide a heater whereby an effective heating and circulation of the water may be obtained, and one which may be expanded or contracted in size as occasion may require.

The invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a top plan view of a water heater embodying my invention. Fig. 2 is a sectional elevation of the same. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a section on line 4—4 of Fig. 1.

The water heater comprises a bottom section 1, a top section 2 and one or more intermediate sections 3. It is designed in practice to make the intermediate sections interchangeable, so that any number may be introduced between the bottom and top sections to vary the size and water containing capacity in the heater as occasion may require. These sections may be united in a water tight manner in any preferred way. In the present instance I have shown them connected by coupling bands 4, which may be in practice of a suitable construction to hermetically close the joints inclosed by them.

The bottom section 1 is provided with a fire pot or combustion chamber 5, at the base of which is a grate 6 to support the bed of fuel. Said section is inclosed by a water jacket 7 coextensive in depth therewith, and with which communicates at any suitable point a water inlet 8, which may be connected with the return pipe of the heating system or with any other source of supply of water to be heated. At the rear of said section 1 the water jacket is provided with an offset 9 of preferably circular form, a circular contour being imparted thereto by

the arrangement therein of a segmental guide or partition 10.

The top section 2 comprises a cylindrical body having an offset portion 11 corresponding in form to the offset portion 9 of the bottom section, and which is given a circular formation by an annular vertical partition or guide 12. Said top section is also provided with a horizontal partition 13 forming a lower compartment 14 and a top compartment 15, through which compartment 15 extends a flue 16 communicating at its lower end with the compartment 14 and extending through the top plate of said section for connection with a smoke flue or pipe through which the products of combustion are finally exhausted from the heater.

The intermediate section 13 conforms in diameter to the sections 1 and 2 and has a similar offset portion 17 having a vertical annular partition or guide 18. The body portion of this section is divided by a pair of parallel horizontal partition walls into upper and lower compartments 19 and 20 and an intervening chamber 21, the said compartments 19 and 20 being in communication through short flues 22 extending through the chamber 21.

The products of combustion from the fuel heat the walls of the base section and thence pass upward into the compartment 20 and through the flues 22 into the compartment 19, thence into the compartment 14 of the top section and finally out through the flue 16, heating on their passage the walls of the chambers 15 and 21, as will be readily understood.

The offset portions 9, 11 and 17 and partitions 10, 12 and 18 of the respective sections are arranged in alinement to provide a vertical passage at the rear of the heater which communicates at its lower end with the water jacket 7 of the base section 1. This passage is subdivided by vertical partition plates 23, 24 and 25 within said offset portions of the base, top and intermediate sections to provide vertical channels 26 and 27, constituting respectively a down flow channel for the cool water and an up flow channel for the hot water. Said partition plates 24 are arranged in alinement with each other and in abutting contact at their meeting edges to close communication between the channels except at their lower

ends. If desired these partition plates may be arranged to slidably engage guideways 28 formed by spaced strips on the offsets and segmental guide walls of the respective sections.

The channel 26 is in communication with the chambers 15 and 21 through ports 29, for the discharge of cool water from said chambers into said channel, while the channel 27 is also in communication with said chambers 15 and 21 through ports 30 for the inlet of hot water from said channel into said chambers. The respective sets of ports 29 and 30 are arranged in alinement with each other, or in the same horizontal plane, the ports 30 being completely open, while the ports 29 are partially covered by deflectors 31 projecting into the channel 26 so as to guide the water discharging through said ports downwardly into said channel. The chambers 15 and 21 serve as storage chambers for water which is heated by the out flowing products of combustion as will be readily understood. The tops of the channels 26 and 27 are covered by a horizontal shield 32 which projects beyond the upper ports 29 and 30 into the chamber 15 and is arranged below the top of the section 2 to provide an outlet passage 33 for the hot water, which passage communicates with a hot water feed or discharge pipe 34, which is closed by the shield against direct communication with either channel. This hot water discharge pipe may be connected with the circulating pipes of the hot water heating system or with any suitable receptacle to be supplied with hot water from the heater.

In the operation of the heater, the jacket and chambers 15 and 21 are kept supplied with a sufficient quantity of water, which becomes highly heated by radiation from the walls of the fire pot and by the heat absorbed from the discharging products of combustion. The water in the jacket 7 is heated to a somewhat higher degree than the water in the chambers 15 and 21, and remains as a constant body to enable a circulation to be established through said chambers 15 and 21 and the channels 26 and 27, sufficient water then passing upward from the jacket to take the place of that discharging from the chamber 15 in the operation of the heater. The cool water contained in the chambers 15 and 21 exhausts through the ports 27 into the channel 26 and passes downwardly into the top of the water jacket, while the hot water in the chamber 15 exhausts through the passage 33 into the pipe 34. The hot water contained in the chamber 21 exhausts therefrom through the port

29 therein and is commingled with the water passing upward through the channel 26 through the jacket and discharges through the port 29 at the top of said channel into the chamber 15 where it is heated to a higher degree and then discharges through the passage 33. Hence it will be seen that there will be a constant circulation of the cool water between the chambers, channels and jacket, a discharge of hot water from the chamber 15, and a circulation of hot water from the jacket and chamber 21 to the chamber 15, as well as from the jacket to the chamber 21. Hence the water will not only be preliminarily heated to a certain degree, but raised to a higher temperature before it discharges from the chamber 15, the construction and arrangement of parts enabling all of the available heat of the fire and the discharging products of combustion to be used.

By constructing the heater of sections in the manner described, the number of intermediate sections employed may be varied, so that the water containing capacity of the heater may be regulated as circumstances may require.

I claim:—

A water heater comprising a base section having a combustion chamber and a water jacket, a top section horizontally partitioned to provide superposed hot water and smoke chambers, each having an outlet, the smoke outlet extending through the water chamber, and an intermediate section having partitions forming smoke and water chambers, the latter provided with smoke flues extending therethrough, said sections having their smoke chambers in communication through said flues, and portions upon said sections forming a vertical passage communicating with the water jacket and through pairs of cold and hot water ports with the respective water chambers, vertical partitions upon the sections separating said ports and dividing said passage to provide hot and cold water channels, a horizontal shield arranged below the water outlet of the top section and closing the upper ends of the channels, said shield having an extension projecting inwardly beyond the ports connecting said channels with the upper water chamber, and outwardly projecting deflectors arranged in the cold water channel and overhanging and partially inclosing said cold water ports.

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

THEODORE A. STELLER.

Witnesses:

ST. CLAIR WILLSON,
CASPAR BRAND.