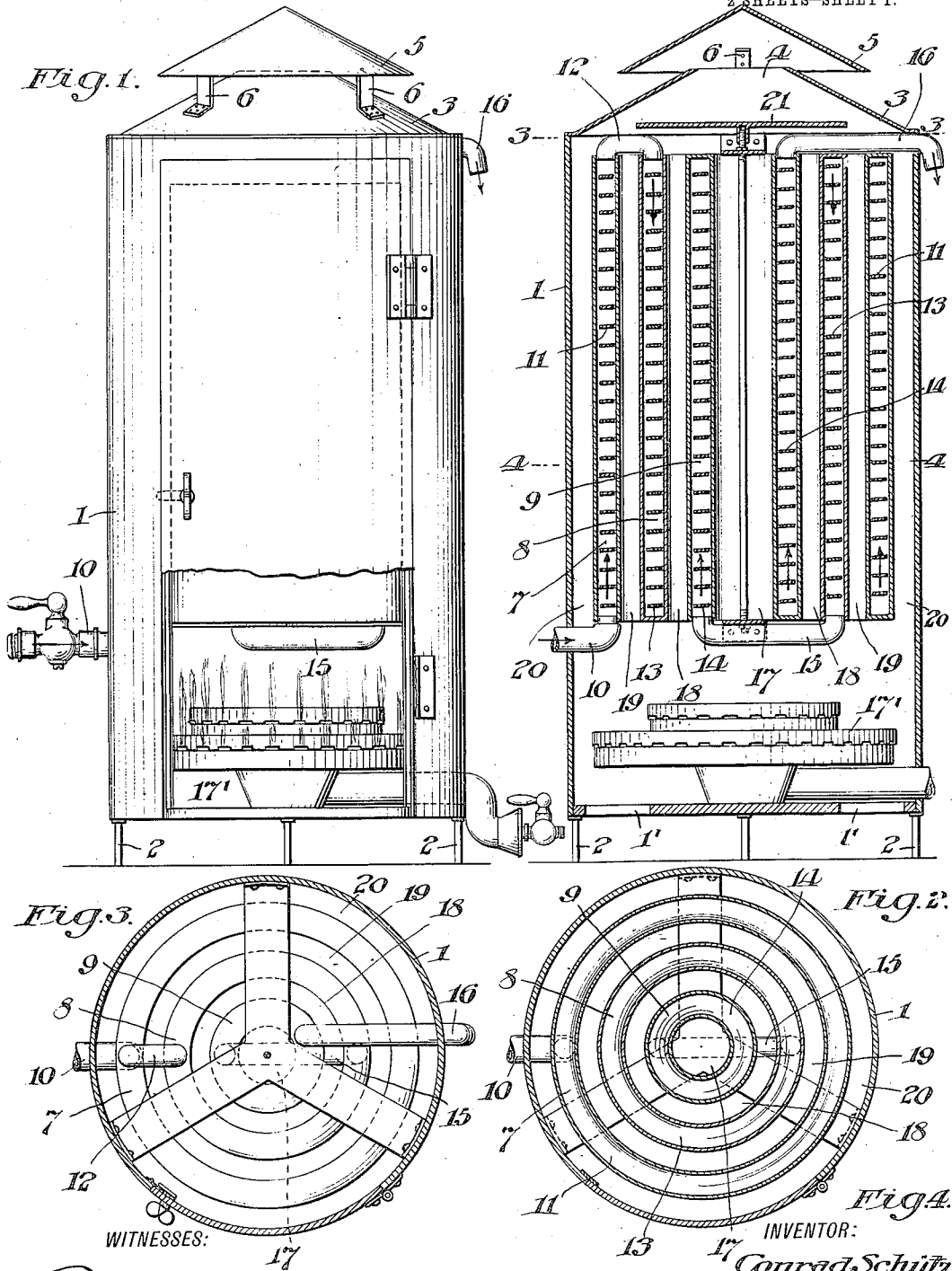


C. SCHÜTZ.
PORTABLE WATER HEATER.
APPLICATION FILED SEPT. 16, 1914.

1,128,534.

Patented Feb. 16, 1915.

2 SHEETS-SHEET 1.



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BY
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ATTORNEY

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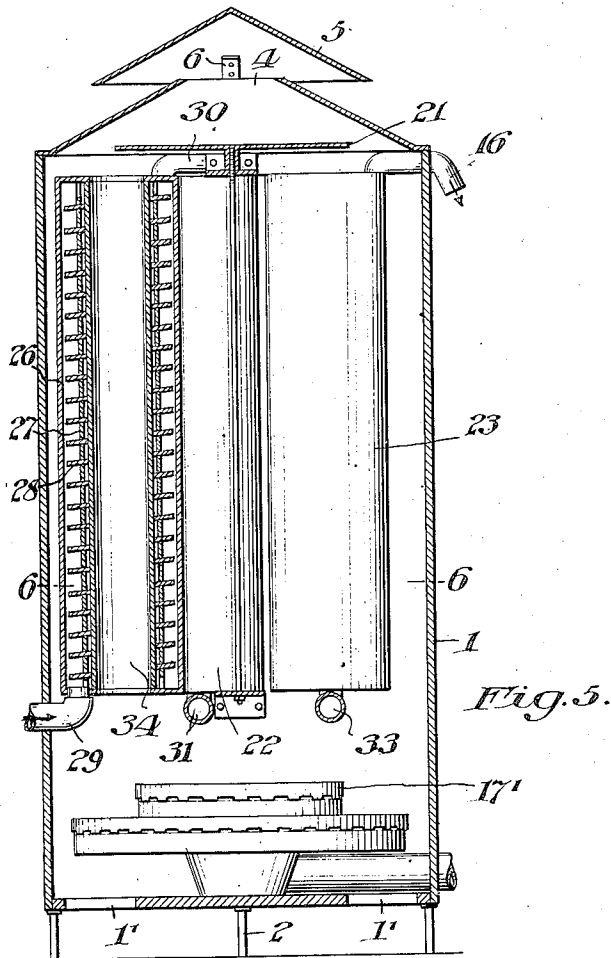


Fig. 5.

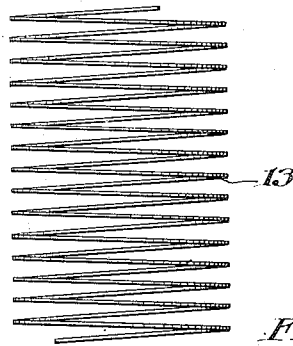


Fig. 7.

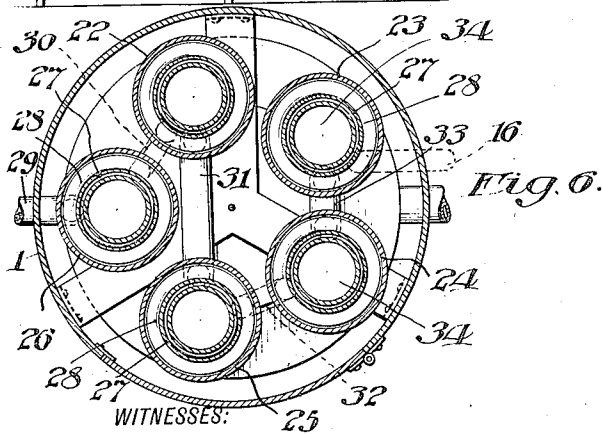


Fig. 6.

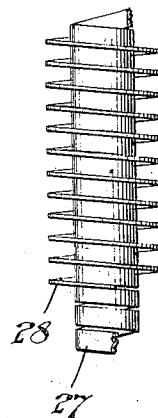


Fig. 8.

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UNITED STATES PATENT OFFICE.

CONRAD SCHÜTZ, OF PHILADELPHIA, PENNSYLVANIA.

PORTABLE WATER-HEATER.

1,128,534.

Specification of Letters Patent.

Patented Feb. 16, 1915.

Application filed September 16, 1914. Serial No. 861,988.

To all whom it may concern:

Be it known that I, CONRAD SCHÜTZ, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Portable Water-Heaters, of which the following is a specification.

My invention is designed to provide a portable water heater of simple construction and high efficiency. Its characteristic features are fully disclosed in the following description and the accompanying drawings in illustration thereof:

In the drawings, Figure 1 is a broken elevation of a heater embodying my improvements; Fig. 2 is a vertical sectional view taken through the center of the construction shown in Fig. 1; Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2; Fig. 5 is a vertical sectional view taken through the center of a modified construction; Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5; Fig. 7 is a detached elevation of a circulating coil, and Fig. 8 is an elevation of a section of a modified circulating coil.

The apparatus, as illustrated in Figs. 1 to 4 inclusive, comprises a vertical cylindrical shell or case 1, supported on feet 2, and having the conical top 3 with an opening 4 covered by the conical hood 5 carried on the dome by the supports 6.

Concentric cylindrical chambers 7, 8, and 9, suitably formed of sheet metal, are supported within the case 1. Water is introduced to the bottom of the chamber 7 by a pipe 10 which passes through the case 1, the water rising through a spiral circuit in the chamber between the coils of the helix 11 disposed therein. A short pipe 12 connects the top of the chamber 7 with the top of the chamber 8, containing a helix 13, the water in the chamber 7 discharging through the conduit 12 into the top of the chamber 8, whence it flows downwardly through a helical course provided by the coils of the helix 13. A pipe 15 connects the bottom of the chamber 8 with the bottom of the inner chamber 9, which contains the helical web 14, water delivered from the chamber 8 through the conduit 15 to the chamber 9 being carried upwardly therein through a helical course by the action of the coils of the helix 14. From the top of the circular

chamber 9, the water is discharged by the pipe 16 which passes through the top of the shell 1.

A gas burner 17 is supported upon the bottom of the shell 1 beneath the concentric cylindrical flues 17, 18, 19, and 20, which surround the respective chambers 7, 8, and 9. A spreader plate 21 is supported above these flues and serves to distribute the hot gases resulting from the burner flame and its combination with air passing through the ports 1' in the bottom of the shell 1.

As illustrated in Figs. 5 and 6, the shell 1 may contain a set of cylindrical chambers 22, 23, 24, 25, and 26 arranged around the center of the shell and each containing a helix 28 comprising flat coils having their webs extending transversely to the length of the chamber and a helix 27 comprising cylindrical coils having their webs extending longitudinally of the chamber and interposed between the webs of the coils of the helix 28, which are spread thereby. The webs of the coils of the helixes 28 form inclined tortuous passages for the water through the chambers and are held against the collapsing tendency of the pressure of the water by the webs of the coils 27. A pipe 29 passes through the shell 1 to a connection with the bottom of the chamber 26, which has its top connected with the top of the chamber 22 by the pipe 30. The bottom of the chamber 22 is connected by a pipe 31 with the bottom of the chamber 25, which has its top connected with the top of the chamber 24 by a pipe 32. The bottom of the chamber 24 is connected with the bottom of the chamber 23 by a pipe 33, and the top of the chamber 23 is connected with a discharge pipe 16 which passes through the shell. In this form of construction, the burner 17 is placed beneath the center around which the water chambers are arranged, the heated products of combustion are spread, within the shell 1, by the baffle 21 so that they make contact with the inner and outer walls of the water chambers, flowing through the flues 34 within the inner walls of these chambers.

It will be understood that, if desired, coils similar to the coils 27 may be interposed between the webs of the coils of the helixes 11, 13 and 14 to prevent the collapse thereof.

Having described my invention, I claim:
1. A water heater comprising a shell, one or more water circulating chambers within

said shell, inclined webs disposed in said chamber or chambers for effecting the circulation of water therein, spreaders disposed between said webs, and a burner for heating
5 water in said chamber or chambers.

2. A water heater comprising a shell, one or more water circulating chambers within said shell, inclined webs disposed in said chamber or chambers for effecting the circulation of water therein, inclined webs disposed between said webs first named and extending transversely thereto, and a burner for heating water in said chamber or chambers.
10 bers.

15 3. A water heater comprising a shell, one

or more water circulating chambers within said shell, coils disposed within and having their webs extending transversely to the length of the respective chambers, coils disposed within and having their webs extending longitudinally of the respective chambers, said coils forming passages through the respective chambers, and a burner for heating water in said chambers.

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

CONRAD SCHÜTZ.

Witnesses:

JOHN J. DONNELLY,
JOS. G. DENNY, Jr.