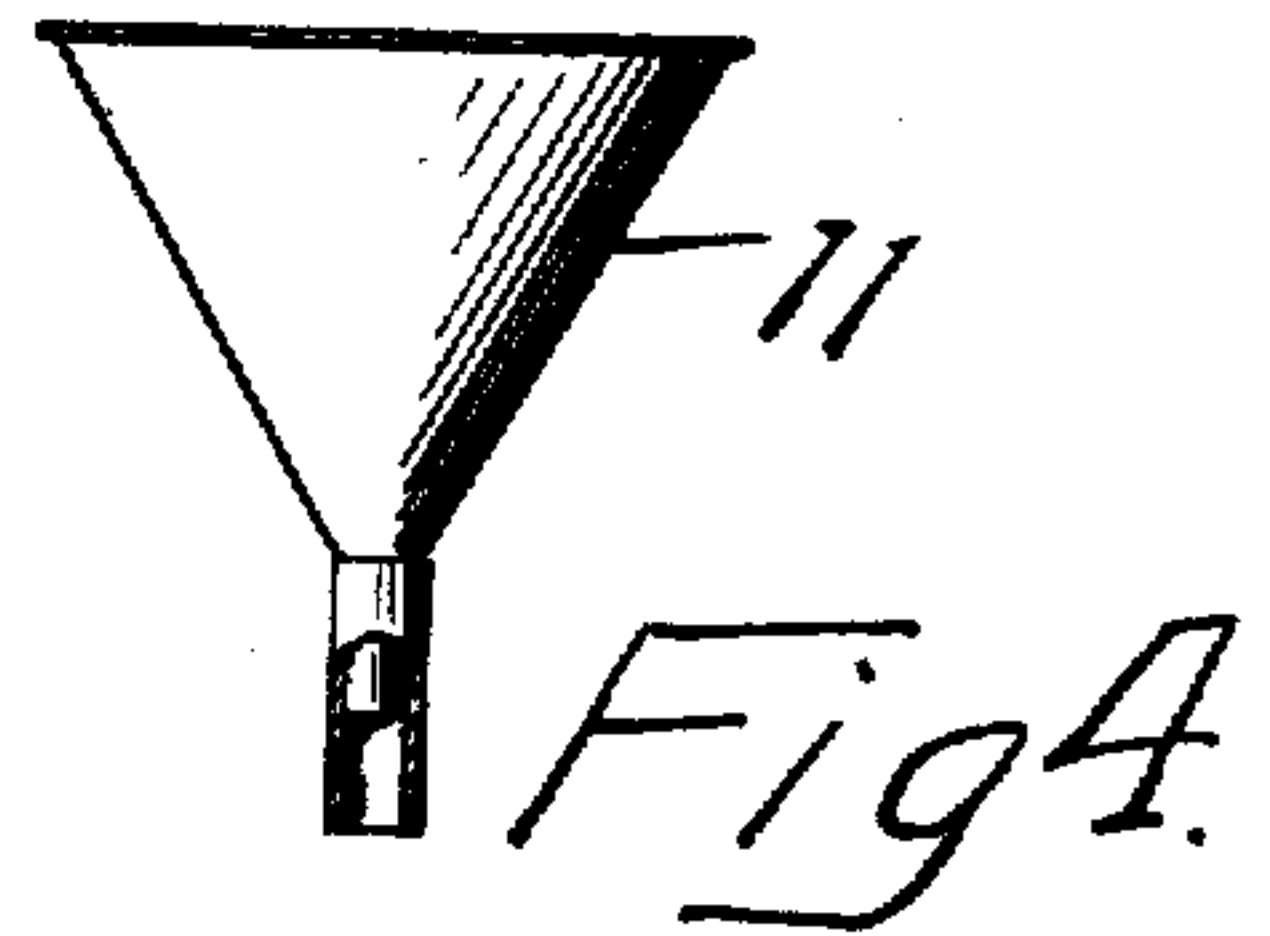
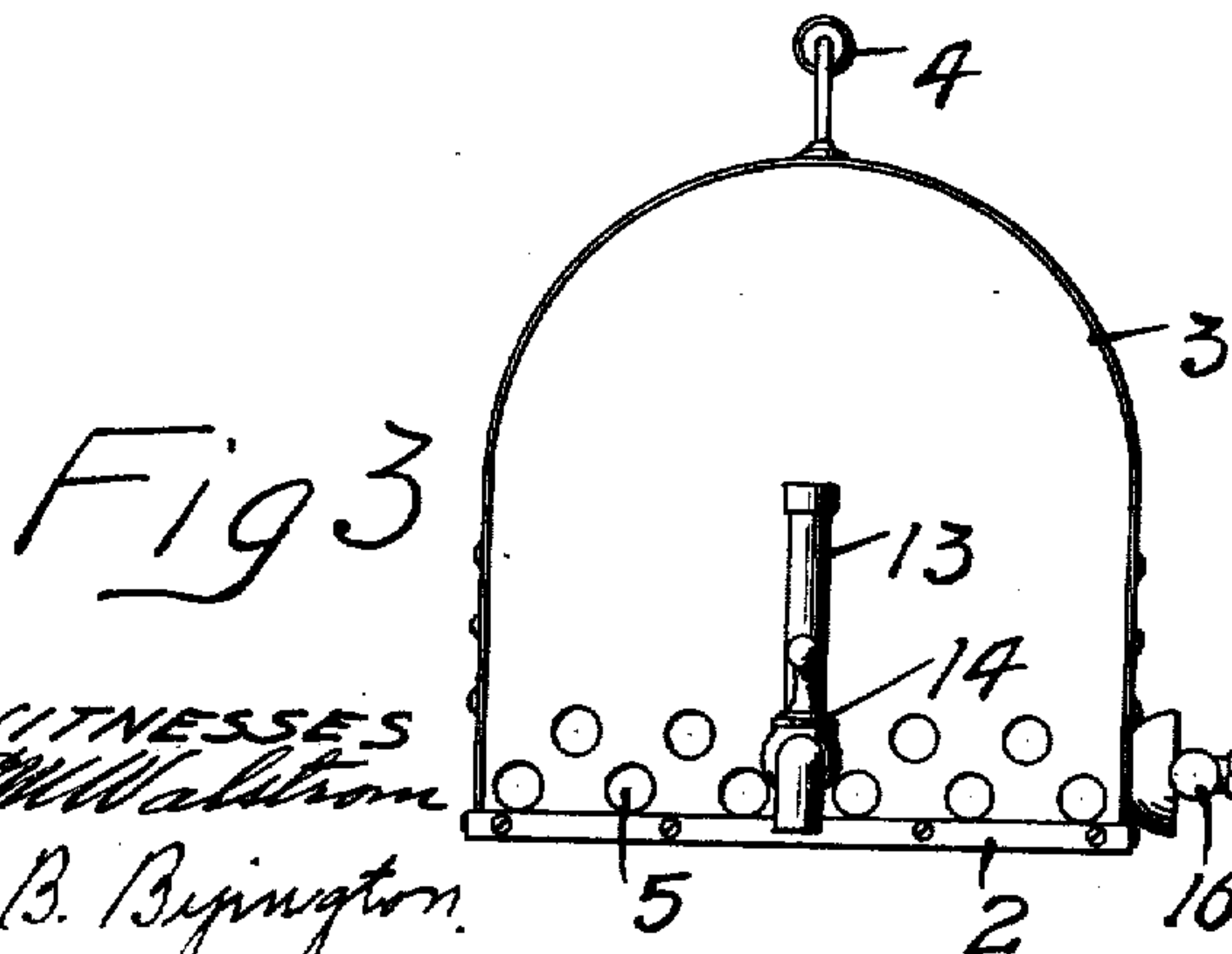
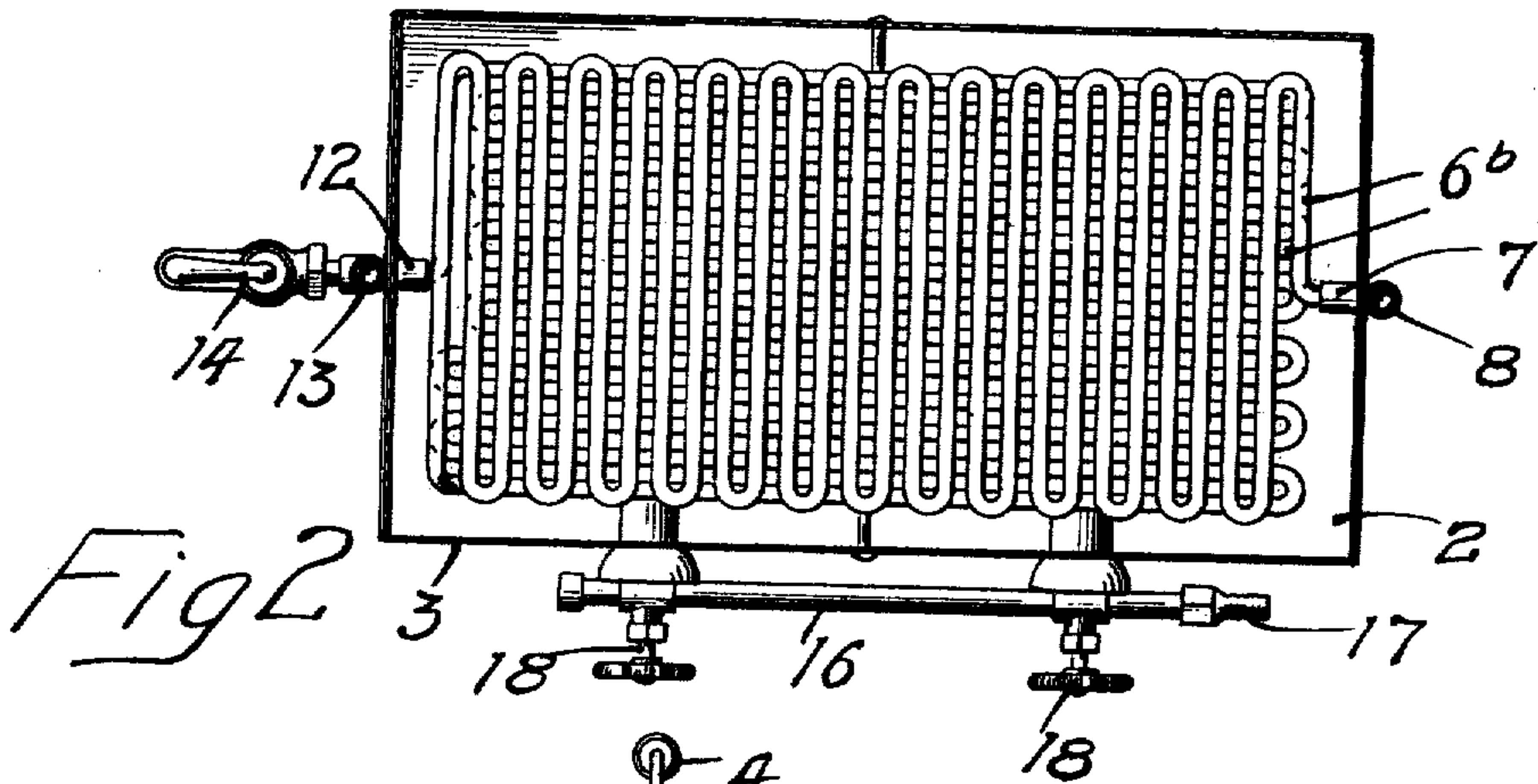
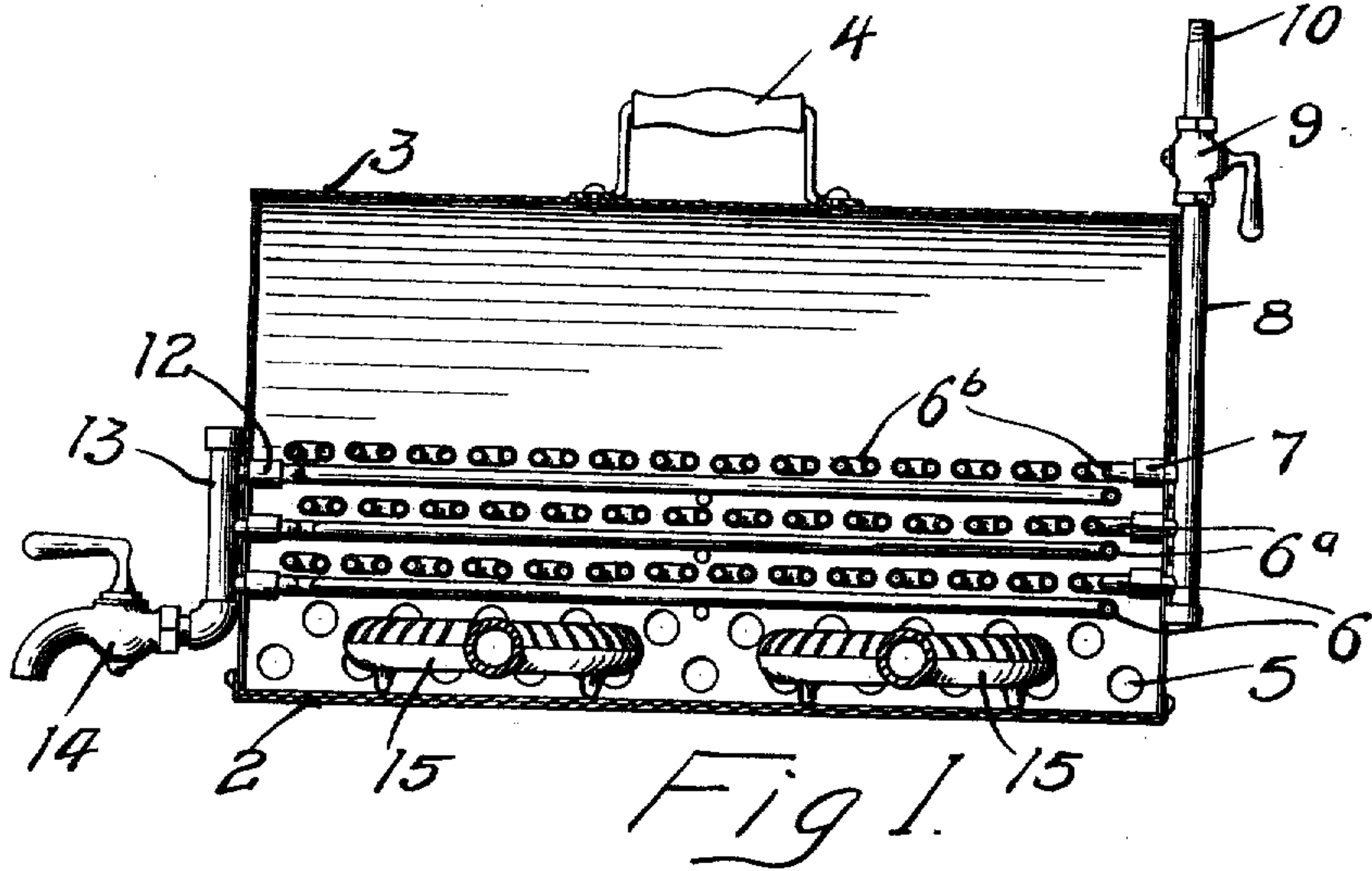


S. M. DICK.
 PORTABLE WATER HEATER.
 APPLICATION FILED SEPT. 23, 1907.

914,393.

Patented Mar. 9, 1909.



WITNESSES
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J. B. Bejington.

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UNITED STATES PATENT OFFICE.

SAMUEL M. DICK, OF MINNEAPOLIS, MINNESOTA.

PORTABLE WATER-HEATER.

No. 914,393.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed September 23, 1907. Serial No. 394,108.

To all whom it may concern:

Be it known that I, SAMUEL M. DICK, a citizen of the United States, and residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Portable Water-Heaters, of which the following is a specification.

My invention relates to a class of heaters in which water can be easily and quickly raised to a high temperature.

The object of the invention is to provide a heater capable of attachment to the faucet of a water supply system, and also adapted for use in rural communities where no system of water supply is usually found.

A further object is to provide a heater that is portable and of simple construction and one which will heat water to the boiling point, if desired, while it is flowing from the receiving to the discharge end of the heater.

The invention consists generally in various constructions and combinations, as hereinafter described and pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a longitudinal section of a water heater embodying my invention. Fig. 2 is a plan section. Fig. 3 is an end view. Fig. 4 is a view of the funnel used for filling the heater, when it cannot be attached to a water faucet.

In the drawings, 2 represents a suitable base and 3 a case or cover adapted to fit over said base and conceal the heater, and said cover has a suitable handle 4 for convenience in carrying the device from place to place. The lower walls of the cover are secured by suitable means to the base and are provided with a series of air circulating holes 5.

Above the base I provide the water circulating tubes, and I have shown a series of them arranged in sets, one above another. Three sets are shown, but a greater number may be employed, if preferred. Each set consists of a tube 6 of suitable size and preferably of brass or copper, bent to form horizontal loops, which extend back and forth transversely of the said base from one end to the other thereof. These loops are parallel with one another and are all in substantially the same horizontal plane. At the end of the base the tube is curved downwardly and looped to form a series of horizontal sections extending lengthwise of the base and beneath the cross sections and substantially at

right angles thereto. The longitudinal sections are parallel substantially with one another and are in substantially the same horizontal plane and near the transverse sections. The receiving end of the tube is provided with a coupling 7 connecting it with a vertical supply pipe 8, having a valve 9 and an open end 10 for attachment to a water faucet or to receive the end of the funnel 11, should it be desired to pour water into the heater from a pitcher or pail. The cross sectional area of the supply pipe 8 is equal substantially to the sum of the cross sectional areas of the heating tubes and, consequently, a sufficient volume of water will enter through the supply pipe to keep the tubes filled at all times.

The terminal of the tube 6 has a coupling connection 12 with a vertical pipe 13 having a regulating valve 14 at its lower end. The valve 14 is arranged so that it is partially open at all times, and it will be impossible for any one to shut off entirely the flow of water therethrough and cause the water in the heating tubes to become heated to a dangerous degree. The tube sections of the second series above the lower one are similar in form and arrangement, and I will designate them by the same reference numerals, with the addition of the exponent "a". The sections are arranged, however, with respect to the lower ones, so that the transverse coils or loops will be staggered with respect to the corresponding loops of the first series, or will be arranged so that one side of each loop will be above the space between the sides of the lower loops and causing the flame passing up between the lower loops to be directed against the surfaces of the loops above. The longitudinal loops of the second series will be arranged in a similar manner alternating in position with the corresponding loops of the first series or located above the spaces between the longitudinal loops of the first series, causing the flames to be directed against their surfaces, thereby hastening the heating of the water in the coils. The loops or coils of the third series, which I will designate by the same reference numerals, with the addition of the exponent "b", correspond to those described and will be arranged in staggered relation with respect to the loops of the second series. The flames therefore passing up through the series of loops will be compelled to follow a crooked or tortuous path, and consequently, a very large per-

centage of the heat units will be utilized while the flames are passing through the coils. The use of a number of coils increases the heating surface, permits a larger volume of water to be exposed to the heat at one time, and not only shortens the period required for the heating of the water, but insures the presence of a sufficient volume to make the device practicable as a hot water supply for washing or bathing purposes.

The water flowing through the thin tubes is heated almost instantly and the length and number of the tubes allows the heating of a sufficient quantity of water to supply ordinary needs. At any time the volume of water may be increased by providing additional loops or coils. To heat the coils, I provide gas burners 15, mounted on the base in any suitable manner and having a gas supply pipe 16 with a tip 17 at one end to which a gas tube may be connected and attached to the burner of a bracket or chandelier. Suitable valves 18 allow the convenient regulation of the gas supply, according to the temperature of the water desired.

I claim as my invention:

1. A water heater comprising a base, a series of tubes bent to form horizontal loops or sections arranged in sets one above another on said base, each set comprising a series of longitudinal loops and a series of transverse loops, the longitudinal loops forming continuations of the transverse loops and each set of loops being independent of the other sets, a supply pipe having independent connections with the receiving ends of the said transverse loops, the cross sectional area of said supply pipe being equal substantially to the sum of the corresponding areas of said tubes, and a discharge pipe having independent connections with the delivery ends of said longitudinal loops, and said discharge pipe having a regulating valve.

2. A water heater comprising a suitable base and burners therefor, a series of pipes bent to form horizontal loops or sections above said burners, said loops being arranged in sets or groups and each set consisting of a series of transverse loops, and a series of longitudinal loops forming a continuation of said transverse loops and at right angles substantially thereto, the sets of loops being arranged one above another, and the loops of one set being staggered with respect to the corresponding loops of the contiguous set, whereby a tortuous passage will be formed upwardly through said loops, a supply pipe having independent connections with the receiving ends of said transverse loops, and a discharge pipe provided with a suitable valve and having independent connections with the discharge ends of said longitudinal loops, substantially as described.

3. A portable water heater comprising a suitable base and burners therefor and coils arranged in sets above said burners, each set consisting of a series of transverse loops, and a series of longitudinal loops forming a continuation of said transverse loops, a vertical supply pipe connected with the receiving ends of said transverse loops and provided with an open upper end and a valve therefor, a discharge pipe connected with the discharge ends of said longitudinal loops and having a regulating valve, a removable cover inclosing said loops and burners, and having means for securing it to said base, and said cover having a suitable handle for convenience in transporting the heater.

In witness whereof, I have hereunto set my hand this 13th day of September 1907.

SAMUEL M. DICK.

Witnesses:

J. B. BYINGTON,
I. M. PYATT.