

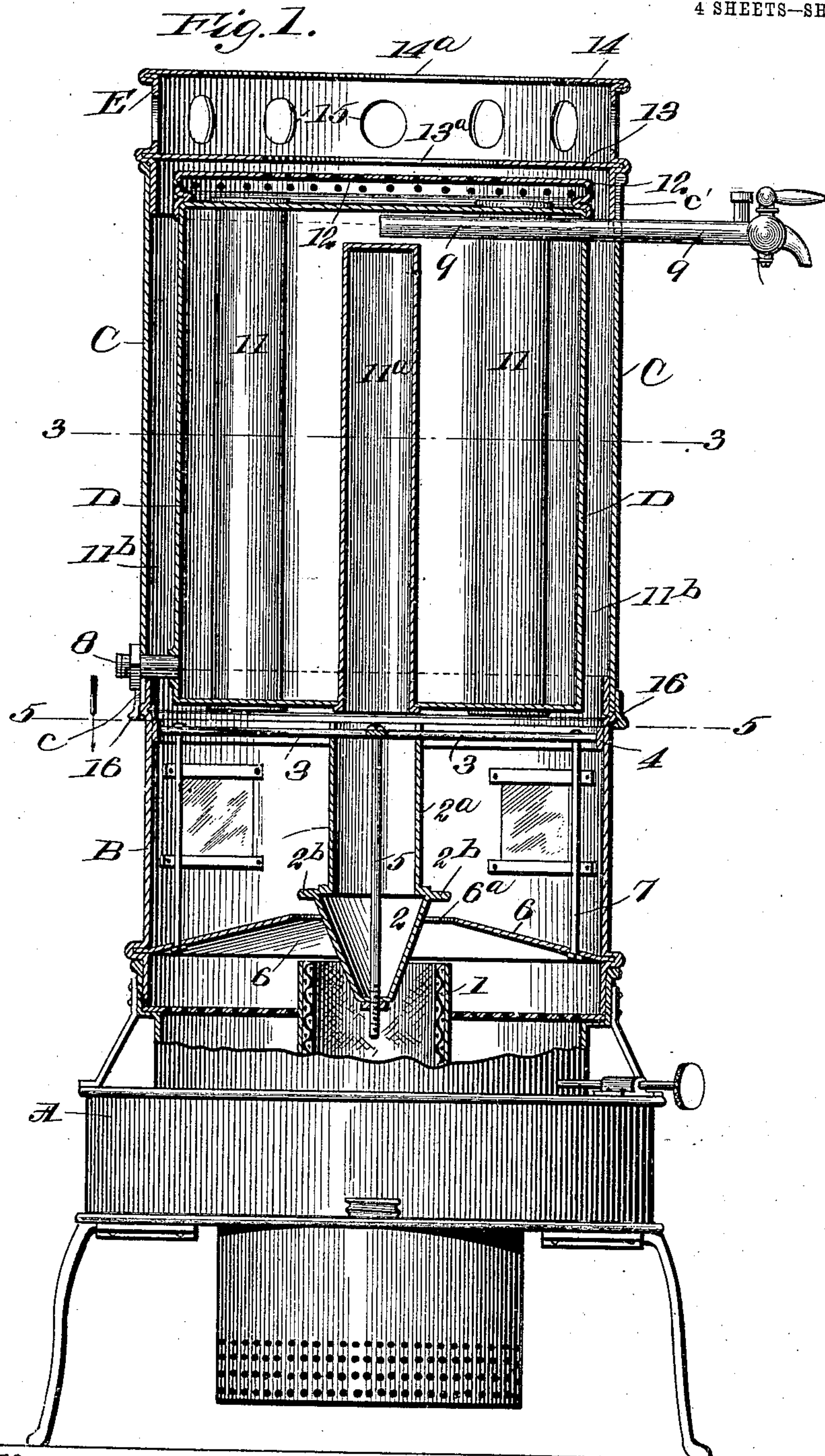
No. 843,526.

PATENTED FEB. 5, 1907.

J. A. FREY.
WATER HEATER.

APPLICATION FILED MAY 29, 1906.

4 SHEETS—SHEET 1.



WITNESSES
E. M. Callaghan
Amos W. Hart

INVENTOR
JOHN A. FREY
BY *Munn & Co.*
ATTORNEYS

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4 SHEETS—SHEET 2.

Fig. 2.

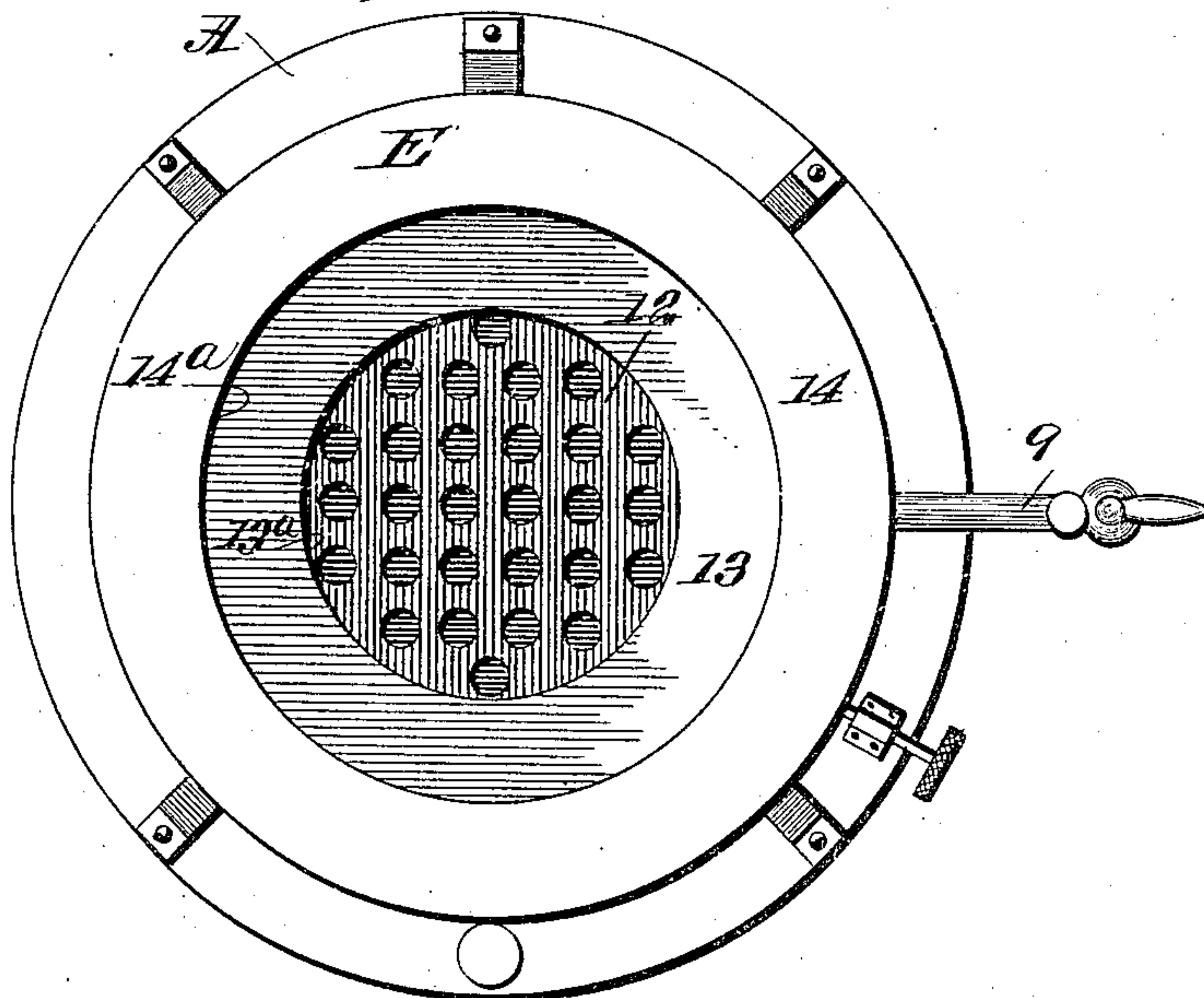
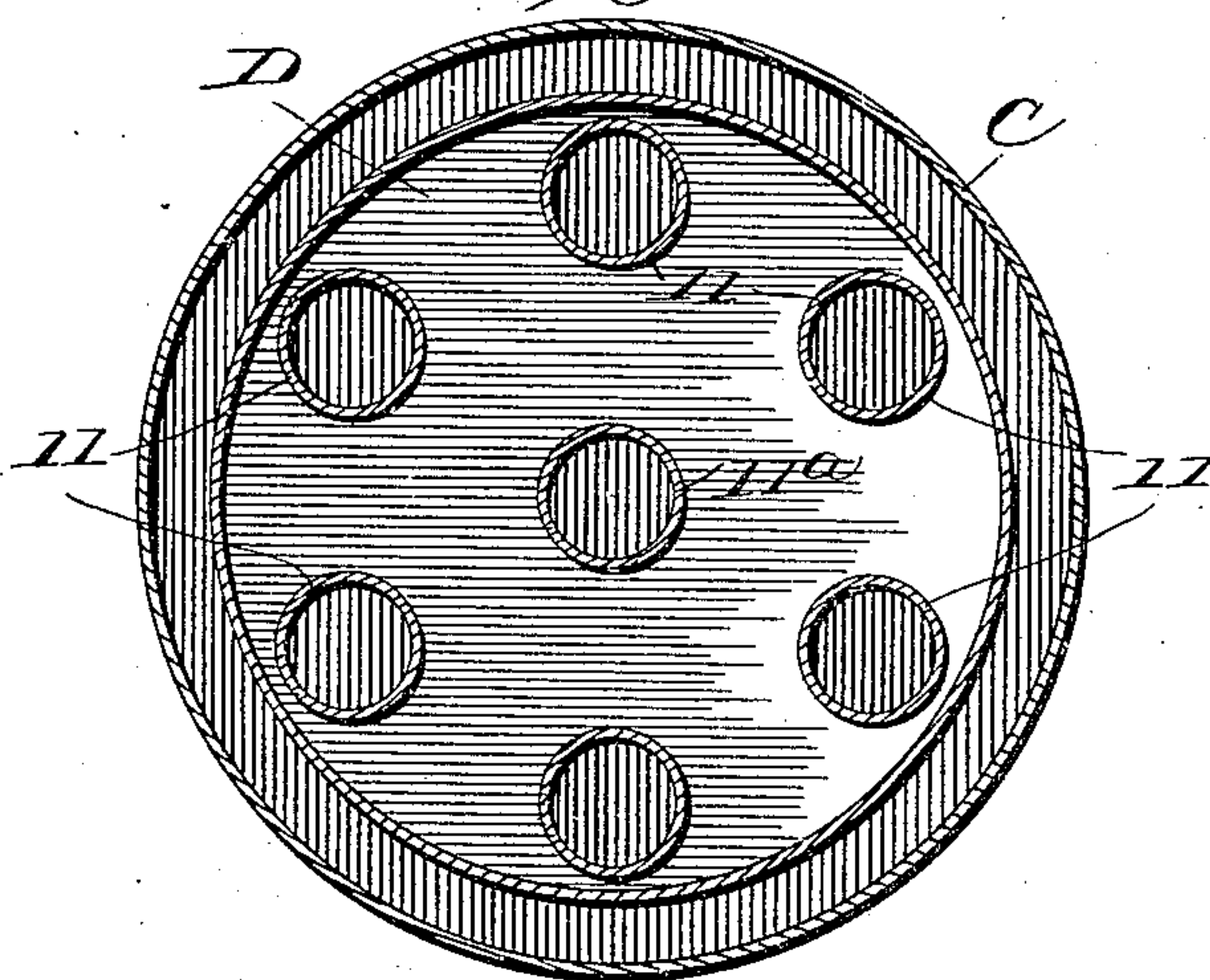


Fig. 3.



WITNESSES
E. M. Callaghan,
Amos W. Hart

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Fig. 4.

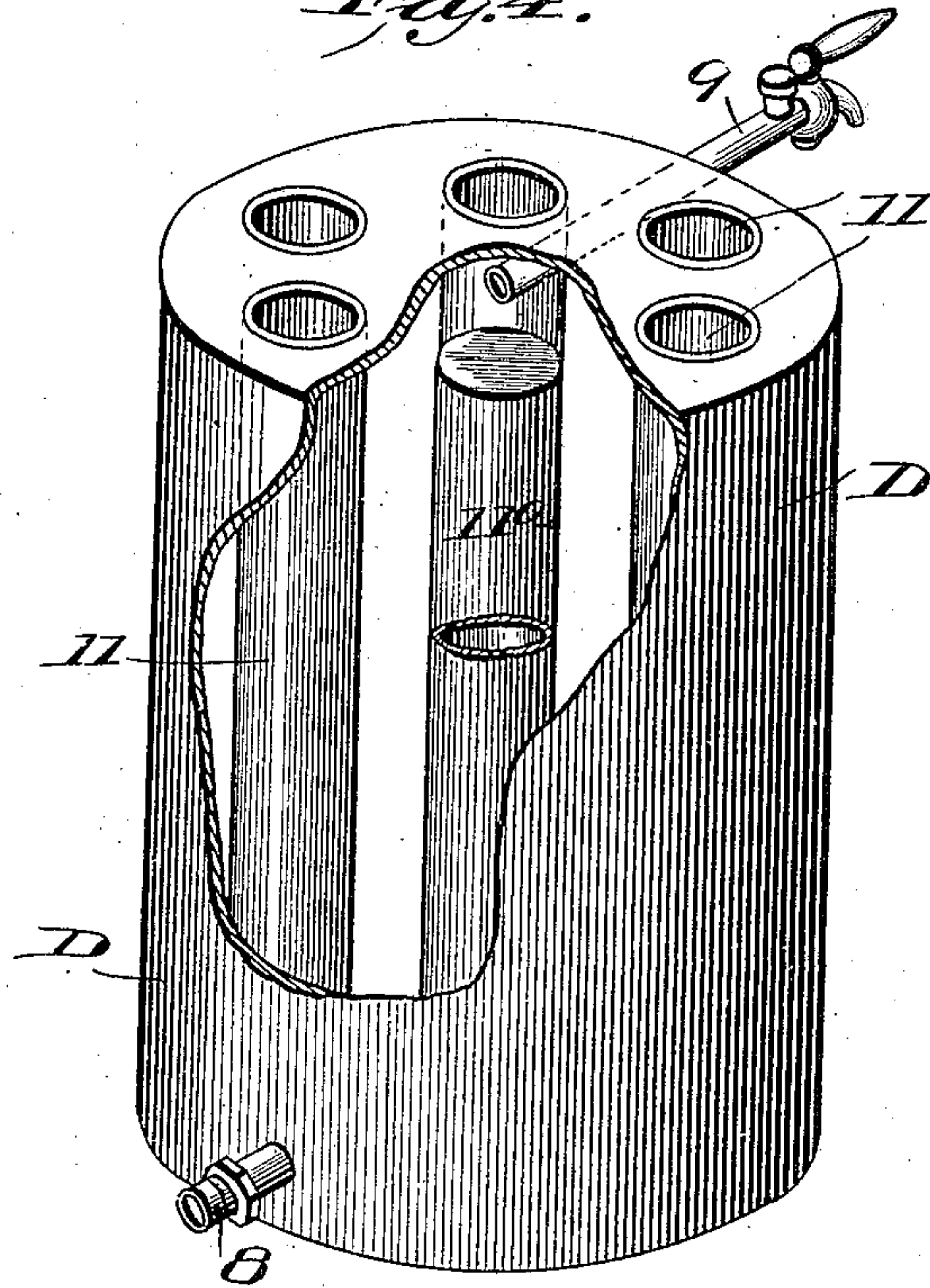
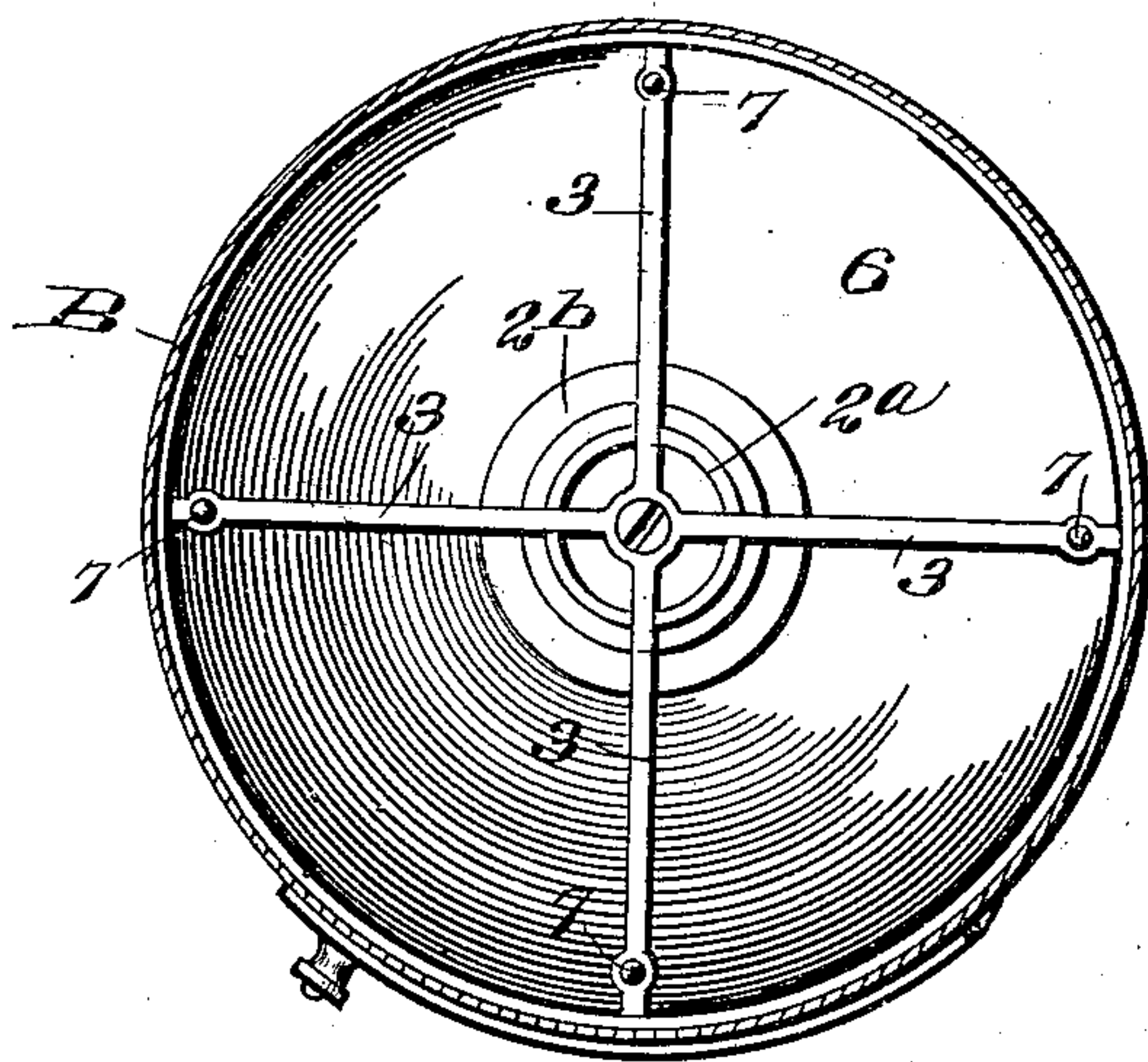


Fig. 5.



WITNESSES

E. M. Callaghan,
Amos W. Hart

INVENTOR

JOHN A. FREY

BY *Munn & Co.*

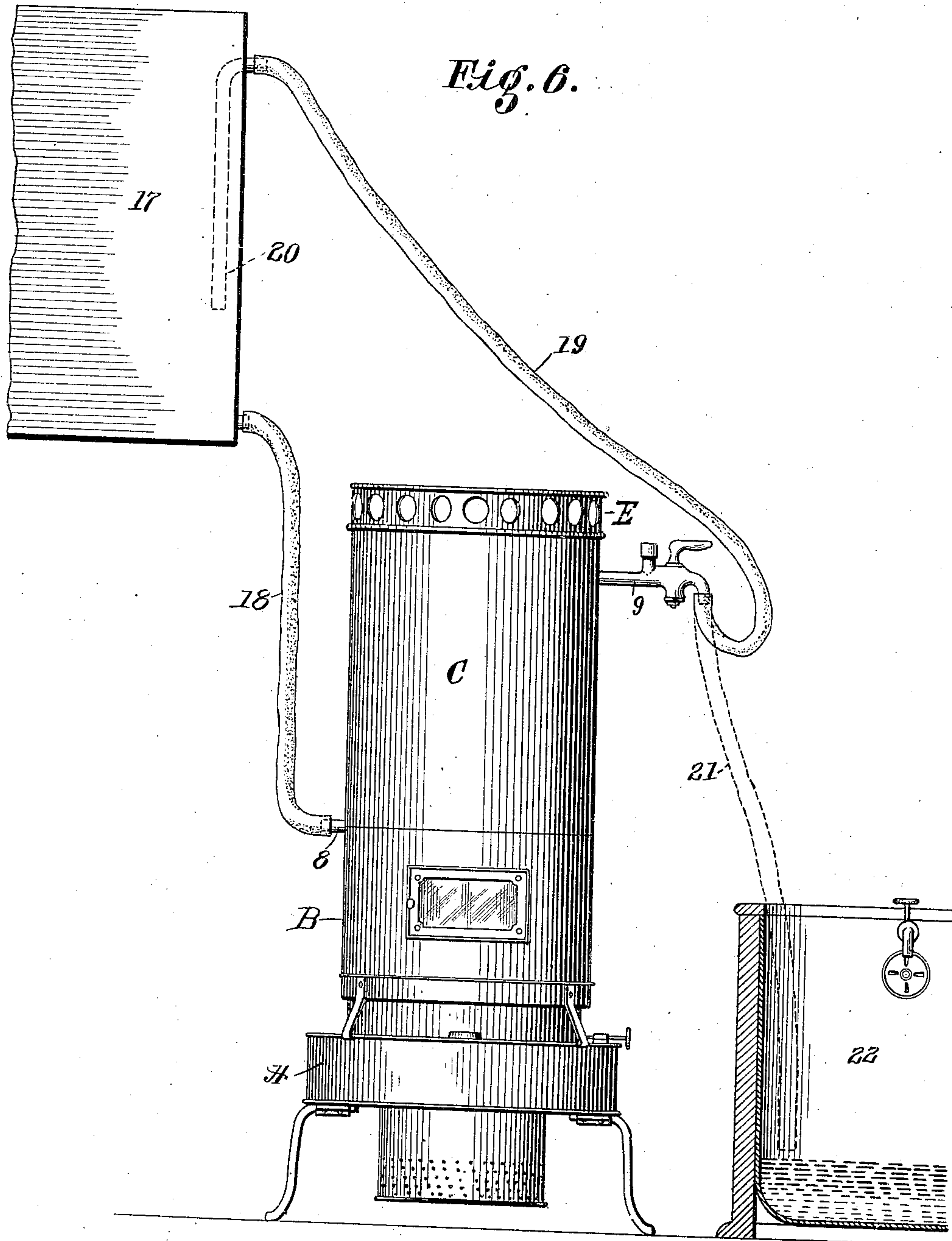
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4 SHEETS—SHEET 4.



WITNESSES

Samuel E. Wade,
Amos W. Hart

INVENTOR
JOHN A. FREY.
BY *Munn & Co.*

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN A. FREY, OF WASHINGTON, DISTRICT OF COLUMBIA.

WATER-HEATER.

No. 843,526.

Specification of Letters Patent

Patented Feb. 5, 1907.

Application filed May 29, 1906. Serial No. 319,393.

To all whom it may concern:

Be it known that I, JOHN A. FREY, a citizen of the United States, and a resident of Washington, in the District of Columbia, have invented an Improvement in Water-Heaters, of which the following is a specification.

My invention is an improvement in portable water-heaters, which are adapted to be connected with a source of water-supply and provided with an eduction-pipe by which water which has circulated through the apparatus and become heated may be drawn off for various uses. The heating of the water is effected very rapidly, and hence economically, by a kerosene or other burner. I have devised improvements in the heater proper or the interior part, through which the water circulates, and also in various connected parts, comprising the casing, the flame-deflector, and supports therefor, as hereinafter set forth.

The details of construction will be described with reference to the accompanying drawings, in which—

Figure 1 is a central vertical section of my improved heater. Fig. 2 is a plan view of the same. Fig. 3 is a transverse section on the line 3-3 of Fig. 1. Fig. 4 is a perspective view, a part being broken away, of the heater proper. Fig. 5 is a transverse section on the line 5-5 of Fig. 1. Fig. 6 is a view illustrating a practical application or use of my invention.

Referring in the first instance to Fig. 1, A indicates a base which includes an oil-reservoir and a burner 1; B, a subbase supported thereon; C, a casing which incloses the heater proper, D, and is seated upon the subbase B, and E is a foraminous top that is in turn supported on the casing C. The burner 1 may be constructed in the usual or a preferred manner. Within the cylindrical shell of the subbase B an inverted conical flame-deflector 2 is supported centrally by means of a spider or skeleton frame 3. (See Fig. 5.) In this instance the spider is shown provided with four radiating arms; but three will suffice. These are joined with a ring 4, which is secured to the inner side and upper portion of the subbase-casing. The upper portion 2^a of the deflector is cylindrical, and the edge is provided with notches or open slots which receive the arms of the spider 3, as shown in Figs. 1 and 5. A screw-bolt 5 depends from the center of the spider 3 and passes through the truncated lower end of the deflecting-

cone 2, where a nut is applied for securing the parts rigidly together. The cone has a horizontal flange 2^b at its base, by which the flame and heated gases of combustion are further deflected laterally into the chamber of the casing of subbase B. The lower portion of the deflecting-cone 2 hangs within the annular burner 1, as shown, and a conical hood, which also serves as a concentrator of the flame and heated air, is provided with an opening 6^a, surrounding the upper portion of the conical deflector. The opening 6^a is of such size that the flame and heated air have free passage upward and outward laterally, as will be readily understood. A fierce combustion is produced at this point, and the heated air passes on into the flues 11 11^a and also into the annular space 11^b, surrounding the heater proper. The hood 6 is suspended from the spider 3 by screw-rods 7, to whose lower ends nuts are applied. Thus the entire concentrating and deflecting attachment is suspended from the spider E, so that it may be readily constructed or put together before being introduced into the casing of the subbase.

The heater proper (see Figs. 1-4) is composed of a cylinder having an inlet-pipe 8 adjacent to its lower end and an outlet-pipe or cock 9 at its upper end. It is traversed endwise by flues 11, which extend through the heads of the cylinder and are upset or riveted in such manner as to form a water-tight joint, as usual in the construction of tubular steam-boilers. A central pipe 11^a extends upward from the bottom of the cylinder, and its closed upper end terminates a short distance below the top of the cylinder. The outlet-pipe 9 extends horizontally inward to a point directly over the pipe 11^a or, in other words, to the space formed in the top central portion of the heater D. This construction and arrangement of parts constitute a distinguishing and important feature of my invention, since by it I am enabled to take water from the heater at a point where the circulation is freest and the heat greatest, and as practical experience has demonstrated a considerable economy is thereby effected.

A cap 12 is seated loosely on the top of the cylinder D and provided with numerous top and lateral holes for escape of heated air. The foraminous top E, fixed upon the casing C of the heater proper, is provided with a partition 13, having a large central opening

13^a, through which the heated air escaping from the openings of the cap 12 pass upward, and the top portion 14 is also provided with an opening 14^a, while side openings 15 are further provided for escape of heated air, as shown. Platters, plates, tea-kettles, or other food receptacles or heaters may be placed upon the top 14 and will thus be kept warm, the heated air in such case passing out laterally through the holes 15.

It will be seen by inspection of Fig. 1 that the flame and heated air which are deflected laterally into the chamber of the subbase B will enter the several pipes 11 11^a and also the annular space 11^b, formed between the heater proper, D, and the surrounding casing C, so that the heat has direct action upon a great area of surface. A high degree of heat is radiated from the central flue 11^a in the central portion of the body of the water in the heater, and thus a greater calorific effect is produced than would be practicable if the said flue passed directly through the cylinder.

It is practicable to dispense with the subbase B and to seat the casing C and contained heater E directly upon a stove or other form of heater. For this purpose I provide the casing C with a cast-iron base rim or flange 16, which will in such case rest directly upon the stove or other heater, thus protecting the thinner sheet-metal casing C.

It is apparent that the cap 12, placed upon the heater proper, D, serves to confine the heated air to a certain degree, so that the water circulating through the heater is more quickly heated than would be otherwise practicable, and at the same time the said cap permits a sufficiently free escape of the heated air.

My invention is practicable for heating water for many purposes—as, for instance, in hospital-tents, camp-tents, barber-shops, restaurants, private houses, and hotels. In Fig. 6 I illustrate an arrangement of the heater in connection with a source of supply and a bath-tub. 17 indicates a tank or other source of water-supply, which is placed at a higher level than the heater and connected with the inlet-pipe 8 by means of a flexible tube 18. Another flexible tube 19 connects the outlet-pipe 9 with a pipe 20, leading down into the tank. When heat is applied to the heater D, water will circulate through the same and becoming duly heated will pass upward through the pipes 9, 19, and 20 into the tank whose contents will thus become quickly heated in turn. On the other hand, a flexible tube 21 may be extended to a bath-tub 22 for conveying heated water thereinto. This illustration serves to indicate one of the many practical applications or uses of my invention.

It is to be understood that rigid pipes may be substituted for flexible pipes wherever conditions may favor or permit it.

It will be understood that the top E may be detached from the casing C of the heater. The heater may also be entirely detached from the surrounding casing C and the latter left supported upon the subbase B, in which case it serves merely as a conductor for heated air. To provide for such detachment, the casing C is provided with a slot *c* in its lower end to receive the outlet-pipe 8 and with a corresponding slot *c'* in its upper end to similarly receive the outlet-pipe 9. The space between the sides of the heater and the casing is sufficient to allow the heater with the inlet-pipe 8 to be drawn out through the casing C, the outlet-pipe 9 in such case leaving the slot *c'*, as will be readily understood.

What I claim is—

1. In a water-heater of the class indicated, the combination, with a burner, of a water-heater and a subbase interposed between it and the burner and including a concentrator or hood having a central opening and arranged above the burner, an inverted conical deflector projecting downward through such opening and into proximity to the burner, and means arranged within the subbase-casing for supporting the hood and deflector, substantially as described.

2. The combination, with a burner and a water-heater, of an interposed subbase comprising a surrounding casing, a skeleton frame secured in its upper portion horizontally, a conical inverted flame-deflector and a rod suspending it from the center of the skeleton frame in the required proximity to the burner, substantially as described.

3. The combination, with a burner and a water-heater, of an interposed subbase having a skeleton frame secured in its upper portion, and a hood or conical concentrator provided with a central opening and arranged in the lower portion of the subbase, and rods pendent from the skeleton frame and serving to support said hood, substantially as described.

4. The combination, with a water-heater comprising a cylindrical casing and a series of vertical open-end flues which traverse the same, and a burner located below the heater, of an interposed subbase comprising a surrounding casing, a transverse flame-concentrator consisting of a metal plate provided with a central opening, and a conical flame-deflector suspended in said opening, the means for the suspension extending to and being connected with the subbase substantially as described.

5. The combination, with a water-heater and a burner, of an interposed subbase comprising a casing, a skeleton frame arranged and secured in the upper portion thereof, and a suspended and detachable conical deflector, the upper extension of the same abutting said skeleton frame, and a screw-rod pendent from the latter and extending through the

deflector and having a nut applied to its lower end whereby the deflector may be readily attached and detached, substantially as described.

5 6. The combination, with a burner and a water-heater, of an interposed subbase comprising a casing upon which the heater is arranged, of an inverted conical deflector having a lateral flange, a conical hood or concentrator having a large central opening through
10 which the conical deflector projects, the flange of the latter being a short distance above the hood whereby free passage is left, and means for suspending the deflector and
15 hood within the casing, substantially as described.

7. A water-heater comprising a cylinder with flues traversing the same, a casing surrounding the water-heater but spaced there-

from and having a base-flange projecting below the water-heater whereby it is adapted to serve as a means for support of the two parts upon a stove or other heater, substantially as described. 20

8. A water-heater proper comprising a cylinder having a series of open-end flues traversing it from end to end and a central flue whose upper end is closed and terminates below the top of the cylinder thus leaving a free space for circulation of water, and the
30 water-outlet pipe 9 extending horizontally into such space and through the side of the cylinder, it being provided exteriorly with a stop-cock, as shown and described.

JOHN A. FREY.

Witnesses:

SOLON C. KEMON,
AMOS W. HART.