

No. 778,527.

PATENTED DEC. 27, 1904.

D. W. BENNETT.
WATER HEATER.

APPLICATION FILED MAY 2, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

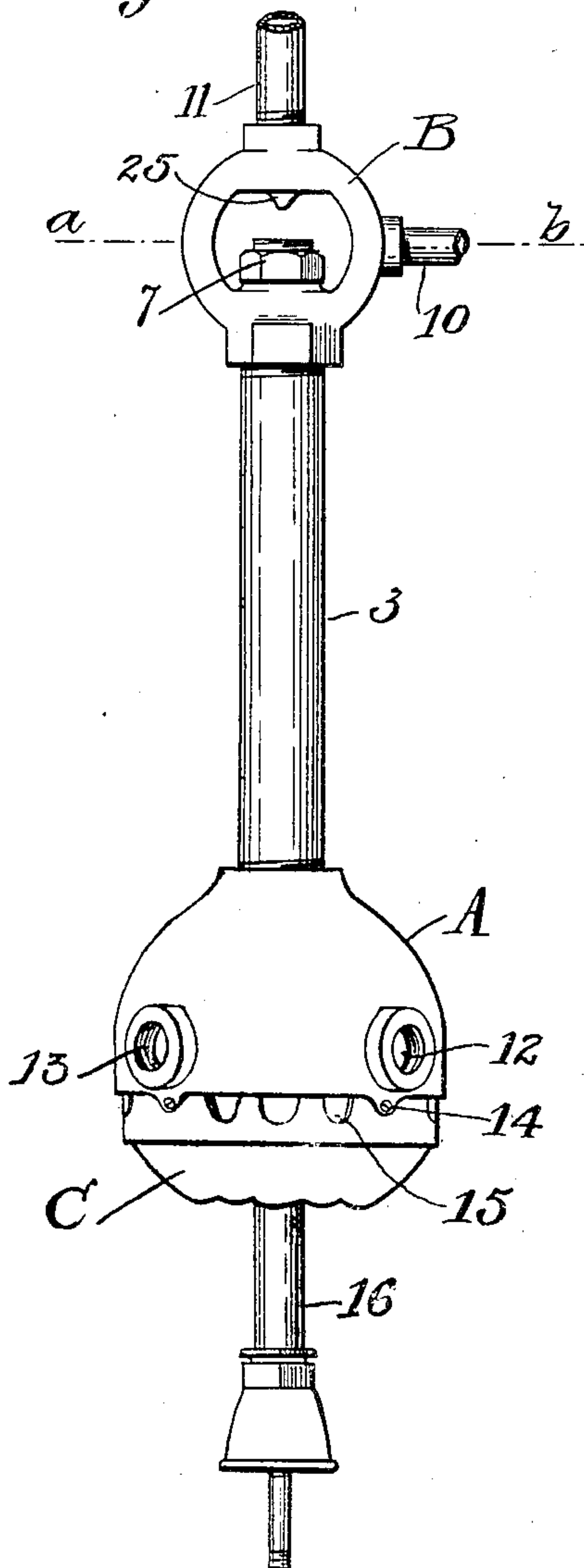
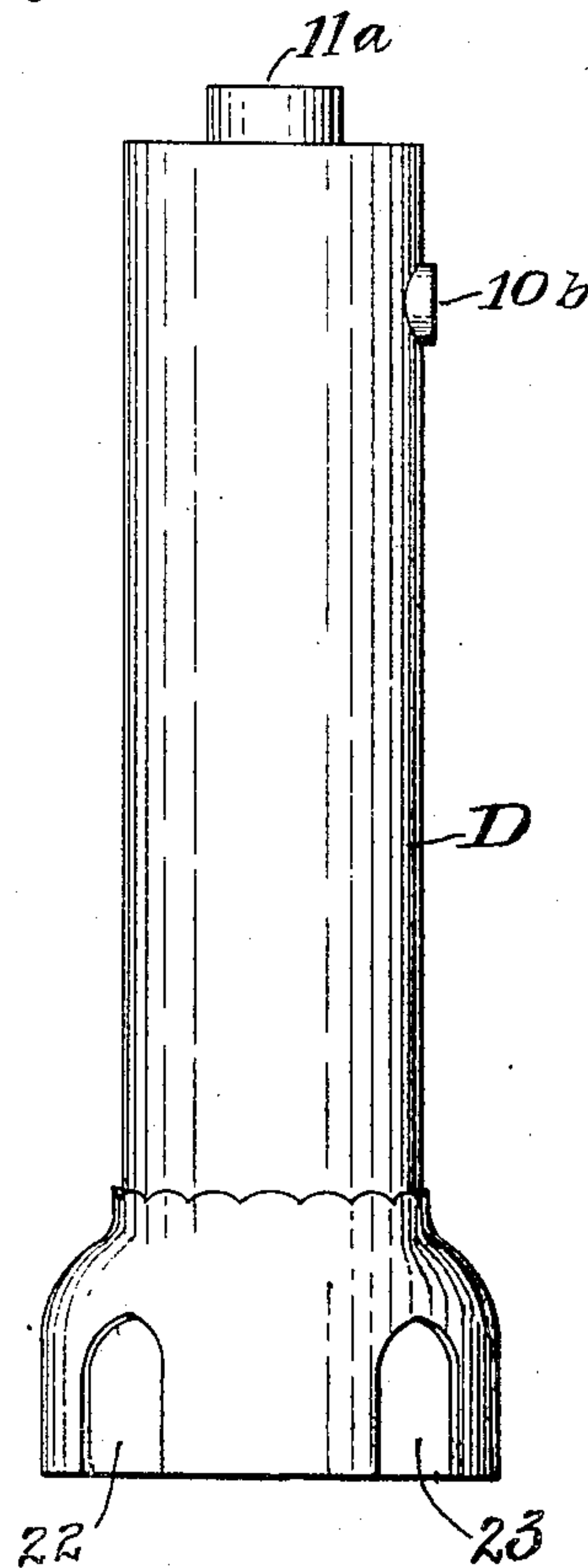


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

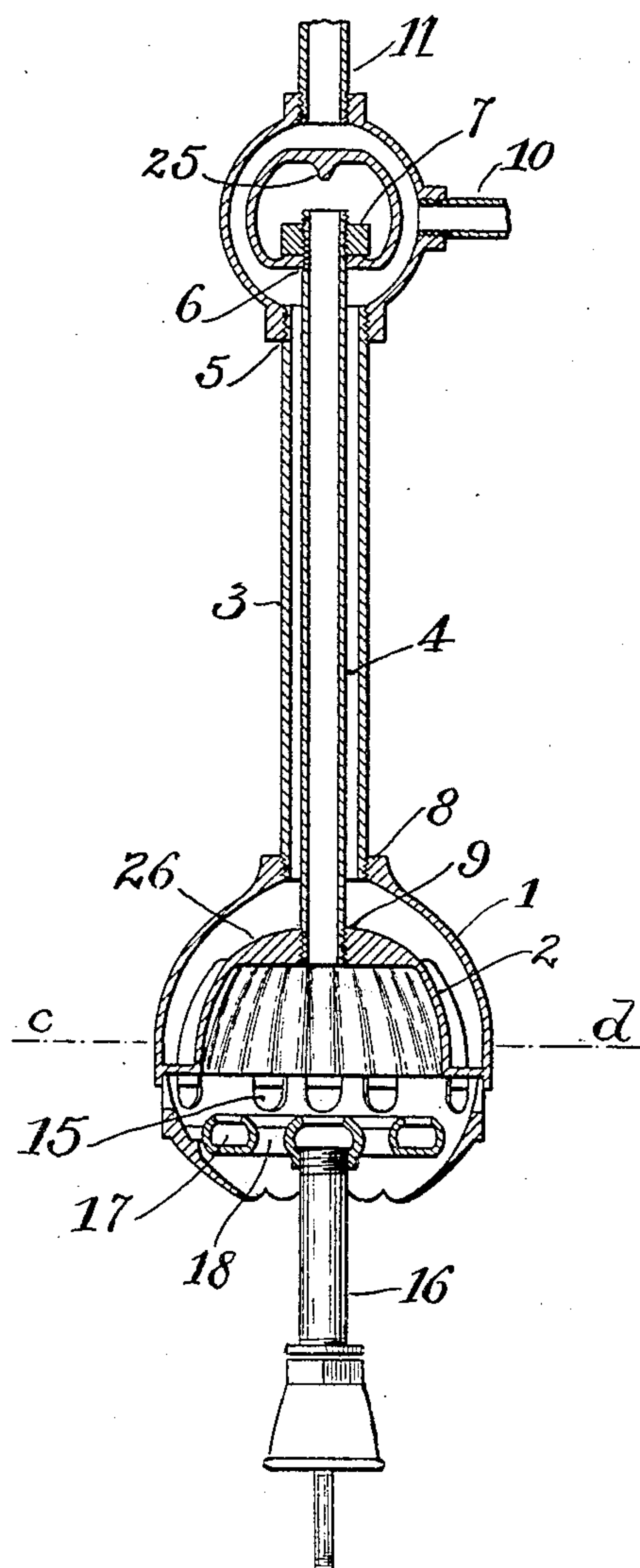


Fig. 4.

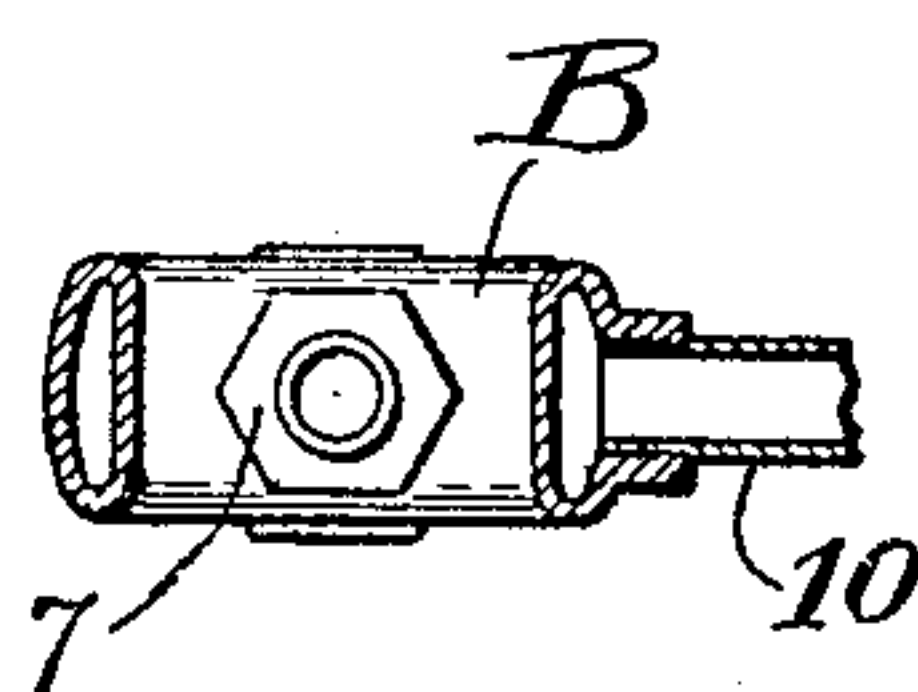
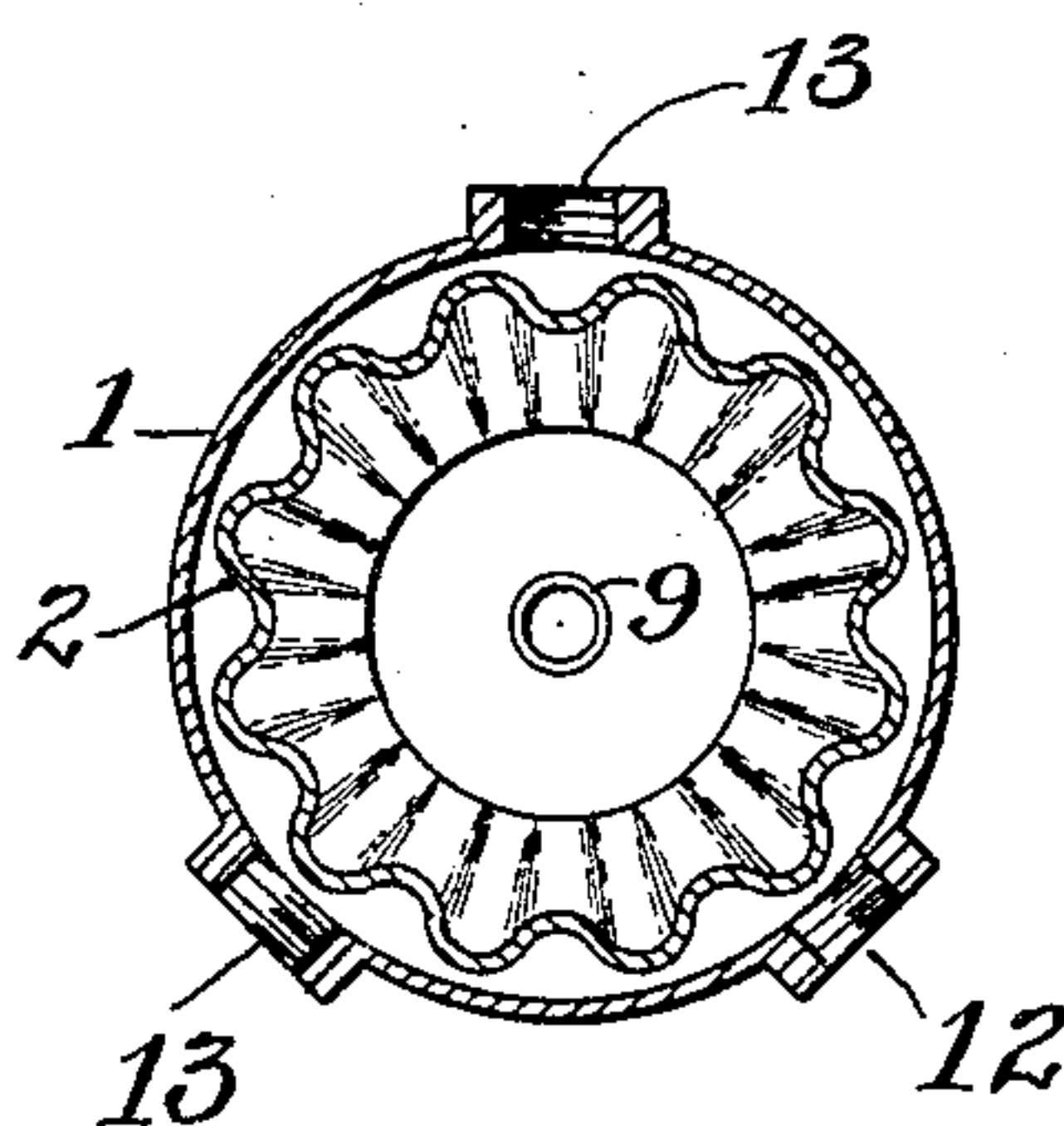


Fig. 5.



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WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 778,527, dated December 27, 1904.

Application filed May 2, 1903. Serial No. 155,255.

To all whom it may concern:

Be it known that I, DWIGHT W. BENNETT, a citizen of the United States, and a resident of the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Water-Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to that class of water-heaters usually employing a gas-flame as the source of heat and commonly used in connection with a boiler or reservoir for holding the heated water supplied by the water-heater.

The objects sought to be attained by my invented device are several in number, including the production and maintenance of a constant circulation of water through the heater, the provision of means to tap therefrom accumulated dirt or sediment, the provision of a maximum of heating-surface for the gas-flame, and generally a construction which will raise the temperature of the water more quickly than has heretofore been accomplished with such devices, which will do so at a minimum of applied heat, and the structure as a whole constituting a light, cheap, durable, and thoroughly effective device.

In the accompanying drawings, illustrating my invention, Figure 1 is a front elevation thereof with the hood or cover removed; Fig. 2, an elevation of the cover. Fig. 3 is a vertical sectional view of the device without the cover, as in Fig. 1. Fig. 4 is a lateral section on the line *a b* of Fig. 1, and Fig. 5 is a lateral section on the line *c d* of Fig. 3.

The heater-body consists, broadly stated, of a basal water-chamber the interior wall of which forms a fire-chamber, an upper water-chamber, and a tubular communication between the two, with inlet and discharge openings. The basal water-chamber is a double-walled body A, composed of the walls 1 and 2, forming a closed water-chamber between its walls, and as a concrete body it has an open base and a hollow interior formed by the inner wall 2. In its best form I prefer that this inner wall forming the fire-chamber shall be substantially hemispherical and ar-

anged inverted in the combination—that is to say, with its open base facing downward—and that the form of the outer wall 1 shall conform substantially thereto. The central tops of these two walls are provided with threaded openings 8 and 9, respectively, of different diameters, that of the outer wall being the greater in order that two tubes 3 and 4, arranged sleeve-like, one within the other, will form an annular chamber between them and which will communicate with the water-chamber of the basal body A when said tubes are screwed into the appropriate threaded openings 8 and 9 thereof.

The upper water-chamber is a double-walled body B, (see Figs. 1 and 3,) preferably in the form of a hollow ring or yoke, the inner and outer walls of which have each an opening 5 and 6, respectively, of different diameters, the larger of which, 5, is threaded to receive the upper screw-threaded end of the outside connecting water-tube 3, and the inner opening 6 is adapted to receive the upper threaded end of the inner tube 4 and to be secured therein by a nut 7. I am able to so secure the inner tube when the upper body B is in the form of a hollow ring or yoke, as better indicated in Fig. 1, and this special form of construction is of value for three reasons. It enables the parts to be easily assembled and easily disconnected for cleaning or repair. It enables the inner tube 4 to operate as a draft-flue, as it thereby opens into the atmosphere, and, finally, it enables the use of a teat or projection 25 to be employed, which not only absorbs the heat, the metal being thickened thereat, but it deflects the heat discharged through the open top end of the tube 4, used as a flue-tube, separating the heat current and deflecting it against the wall of the yoke-like water-chamber B, resulting in great economy of gas, with speedy and increased absorption of heat by the moving current of water through said chambered yoke.

The structural character of the yoke B, as described, is further shown in the plan view thereof, Fig. 4, which, as before stated, is a lateral section through the line *a b* of Fig. 1.

Otherwise than as now to be stated the wa-

ter-chambers A and B and the tubular connection between them constitute necessarily a water-tight body, save that the upper chamber B is provided with an opening and a connecting-pipe 10 and another opening and connecting-pipe 11, the former for the purpose of discharging hot water to a sink or wash-basin, and the latter for discharging hot water to the usual boiler or hot-water reservoir.

The lower chambered body A has two or more openings in its outer wall 1, near the basal rim thereof. (See Fig. 1.) One of these openings—say 12—is the inlet for a cold-water supply, and the other—say 13—is to be supplied with a spigot or tube and cock to serve as a discharge-port for blowing out the heater and relieving it of contained mud or sediment, which collects at that point in this as well as in all other water-heaters.

A most important feature of the invention is the corrugated interior of the inner wall 2 of the basal chambered body A, as this interior wall constitutes the fire-chamber. Said wall is formed with a series of corrugations extending from the basal rim to or near the top of the fire-chamber and has the effect of very nearly doubling its heat-radiating surface as compared with a smooth or regular surface-chamber.

An annular water-chamber is formed between the pipe-walls 3 and 4 by this sleeve-like arrangement of them, and besides operating to form such an annular water-chamber connecting the water-chambers of the body A and yoke B the tube 4 will serve the additional function of a draft-flue and increase the efficiency of the apparatus, as it not only forms a heating-surface itself, but supplies a direct communication from the top of the interior wall or fire-chamber of the body A to the open center of the hollow ring or yoke B, hence operating to convey a powerful current of heat to the latter, as before stated.

Any ordinary Bunsen gas-burner may be used to supply the flame—for example, such as indicated at 16, Figs. 1 and 3, in which it is seen supplied with gas-burner openings 17 and air-openings 18, the burner being supported in appropriate relation to the fire-chamber of the base A by means of an inverted hood C, Fig. 1, screwed at 14 to a teat on the base A, the hood preferably having air-openings 15.

For protecting the parts, as well as presenting an external ornamental appearance, a hood or cover D of suitable form, Fig. 2, made of sheet-iron or other suitable material, is placed over the device, the openings 11^a and 10^b therein corresponding to the projecting nozzles 11 and 10 on the yoke-body B and the openings 22 and 23 corresponding to the ports 12 and 13 in the basal body A of the heater.

The operation of the device is as follows: Water being supplied to the heater at an opening 12 in the basal body A and the burner

being lighted, the large fire-surface of the wall 2 of the fire-chamber will quickly raise the temperature of it and the contained water and cause and maintain a constant circulation of the water upward from the basal water-chamber A to and through the long annular chamber formed by the sleeve-like arrangement of the connecting-tubes 3 and 4 and to and through the hollow yoke B and thence downward through the same passages to the lower water-chamber A, a continuing supply of fresh water causing a discharge of hot water through the main discharge 11 and when required through the side opening 10, which may lead to a sink or basin. This speedy rise of temperature will be accelerated by the radiation of heat through the wall of the inner pipe 4, used as an open-topped flue-tube, and also by the discharge therefrom of a current of high temperature against the wall of the upper water-chamber B. Dirt or sediment collecting in the basal water-chamber A is blown out or discharged through the opening or openings 13 on turning a suitable blow-off cock, with which such opening is to be supplied. It will also be observed that the flame first strikes the wall of the fire-chamber at some little distance above the edge of the basal rim, practically above the inlet and discharge openings 12 and 13, hence avoiding a baking and hardening of the deposited sediment which is so common with most water-heaters of this class.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination forming a water-heater, of a hemispherical double-walled water-tight chamber, supported in inverted position, means to supply and discharge water to and from the hollow interior thereof, means to supply a flame to the surface of the inner wall, a flue-tube passing through said water-tight chamber and secured in an opening in the inner wall forming the fire-chamber, a water-tube communicating with the outer wall and arranged sleeve-like around the flue-tube in such manner as to form an annular space between them, and an upper double-walled hollow ring-like water-chamber provided with openings of different diameters in its two walls, with which said flue and water tubes respectively communicate, with means to discharge water from said upper water-chamber.

2. The combination, forming a water-heater of the class described, comprising a basal double-walled body substantially of hemispherical form, inverted, the inner wall of which forms an open-based fire-chamber, and is corrugated, an upper double-walled hollow body, a tubular connection between the outer walls of said bodies, a flue-tube fitted sleeve-like within the same and connected at each end to the inner walls of said upper and lower bodies and forming an annular communicating water-

passage surrounding the flue connection between the same; means for supplying a flame to said fire-chamber and means to support the same in appropriate relation thereto; water inlet and discharge openings in said basal body, and one or more hot-water discharge-openings in the upper water-chamber; said elements being combined substantially as and for the purposes set forth.

3. The combination, forming a water-heater, consisting of a basal double-walled chamber, the interior wall of which is substantially hemispherical, and is corrugated in radial lines extending from its diametric center toward the rim edge, screw-threaded coinciding openings of different diameters in its two walls, a flue-tube leading from the inner and smaller opening, a water-tube leading from the outer and larger opening and arranged sleeve-like around the flue-tube, and an upper double-walled hollow ring-like body provided with basal openings of different diameters with which said flue and water tubes respectively communicate, means to supply and discharge water to and from said lower chamber, means to supply a flame to the interior of the inner wall thereof, and means to discharge water from said upper chamber.

4. The combination, forming a water-heater

of the class described, consisting of a substantially hemispherical hollow body, inverted, forming a fire-chamber, and which is double-walled to form a water-chamber wholly surrounding the said fire-wall, openings of different diameters in its two walls, a flue-tube leading from the inner and smaller opening, a water-tube leading from the outer and larger opening, and arranged sleeve-like around the flue-tube, an upper double-walled hollow ring-like body forming interiorly a flue-passage to the atmosphere and with which said flue-tube directly communicates, and exteriorly thereto an upper water-chamber with which said water-tube directly communicates, means to supply and discharge water to and from said lower water-chamber, means to discharge water from said upper chamber, means to supply a flame to the fire-chamber, a perforated hood to support the burner, and an external cover supported on the exterior of the lower water-chamber.

In testimony whereof I have hereunto affixed my signature this 16th day of April, A. D. 1903.

DWIGHT W. BENNETT.

Witnesses:

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