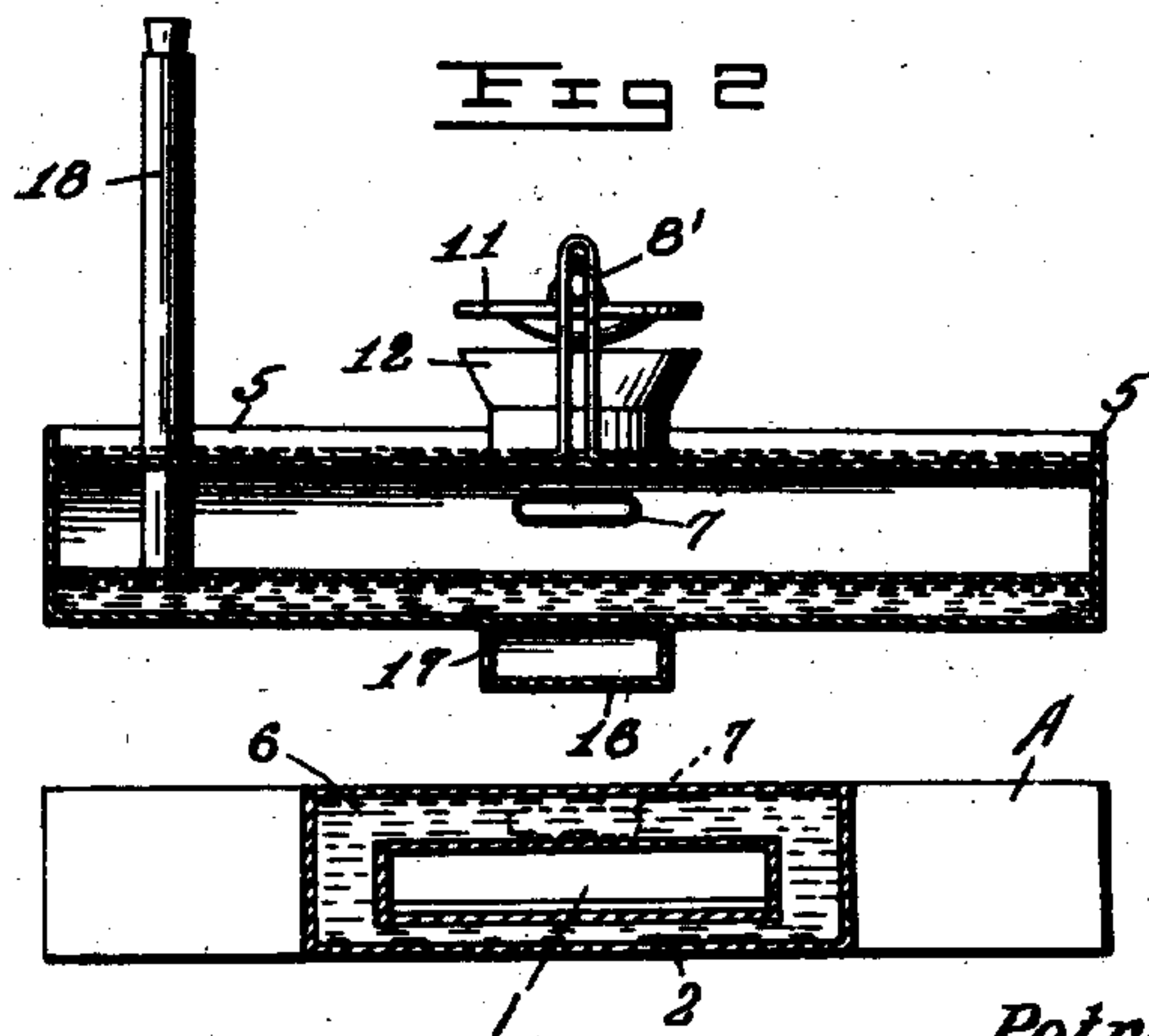
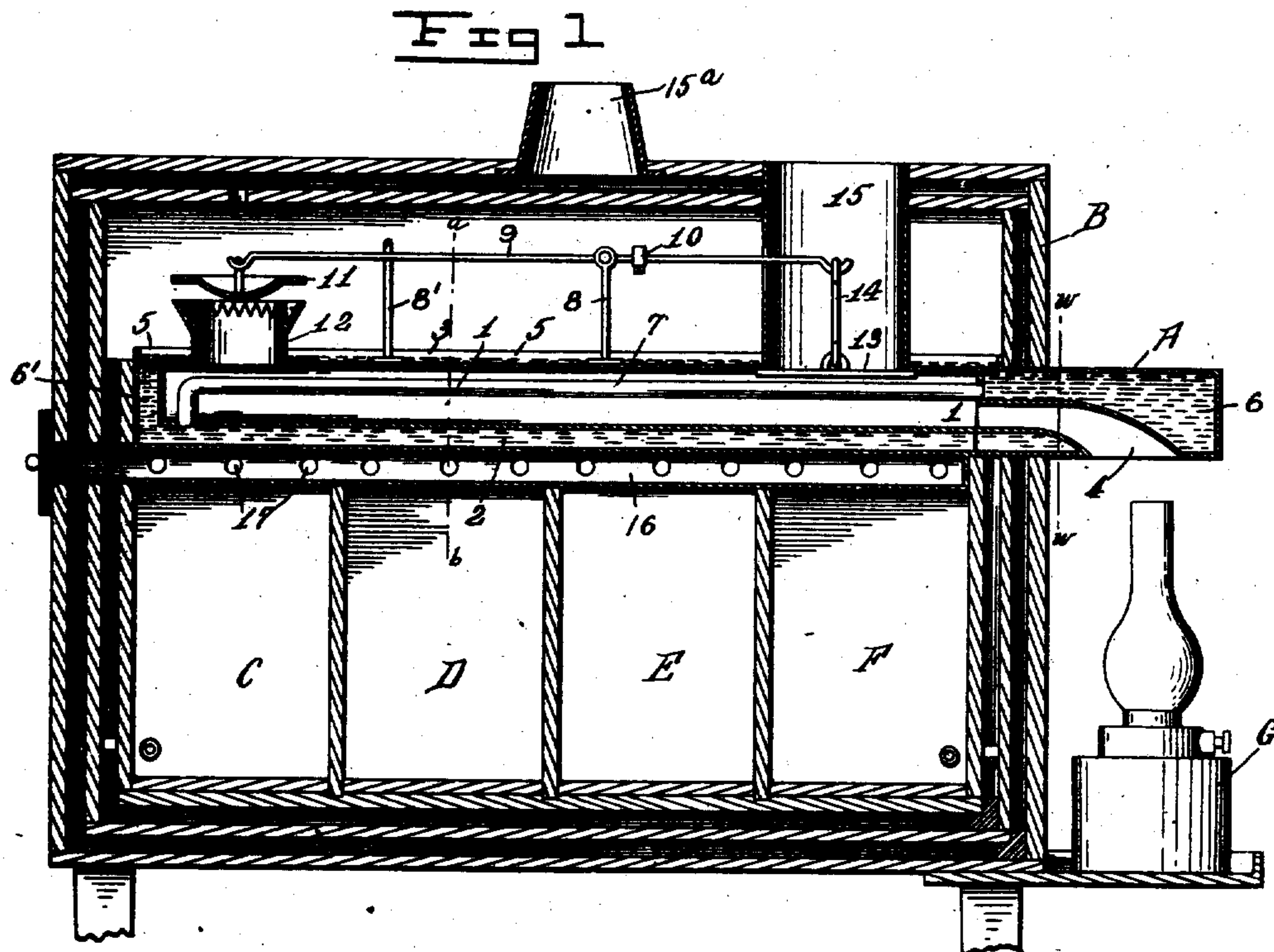


P. J. McCABE.  
HEATING TANK FOR INCUBATORS.  
APPLICATION FILED JAN. 6, 1909.

973,681.

Patented Oct. 25, 1910.

2 SHEETS—SHEET 1.



Inventor  
Patrick J. McCabe

Witnesses  
H. C. Robinson  
H. H. Brown

By

C. D. Giddens  
Attorney

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Fig 3

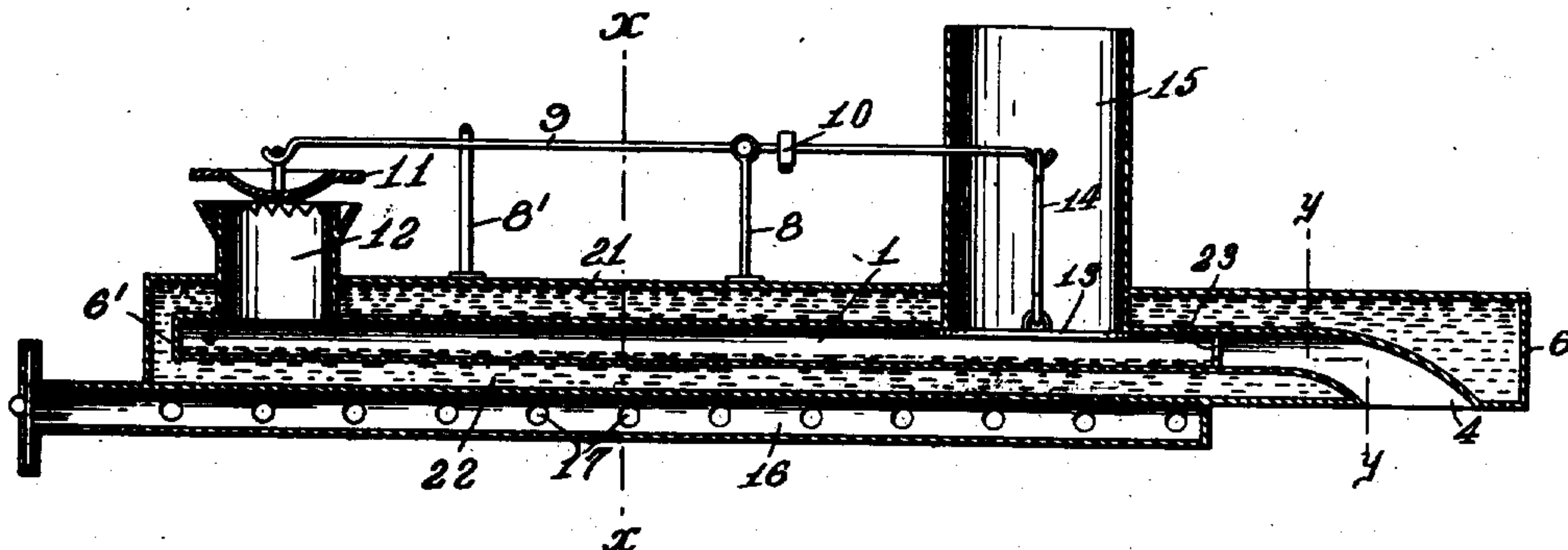


Fig 4

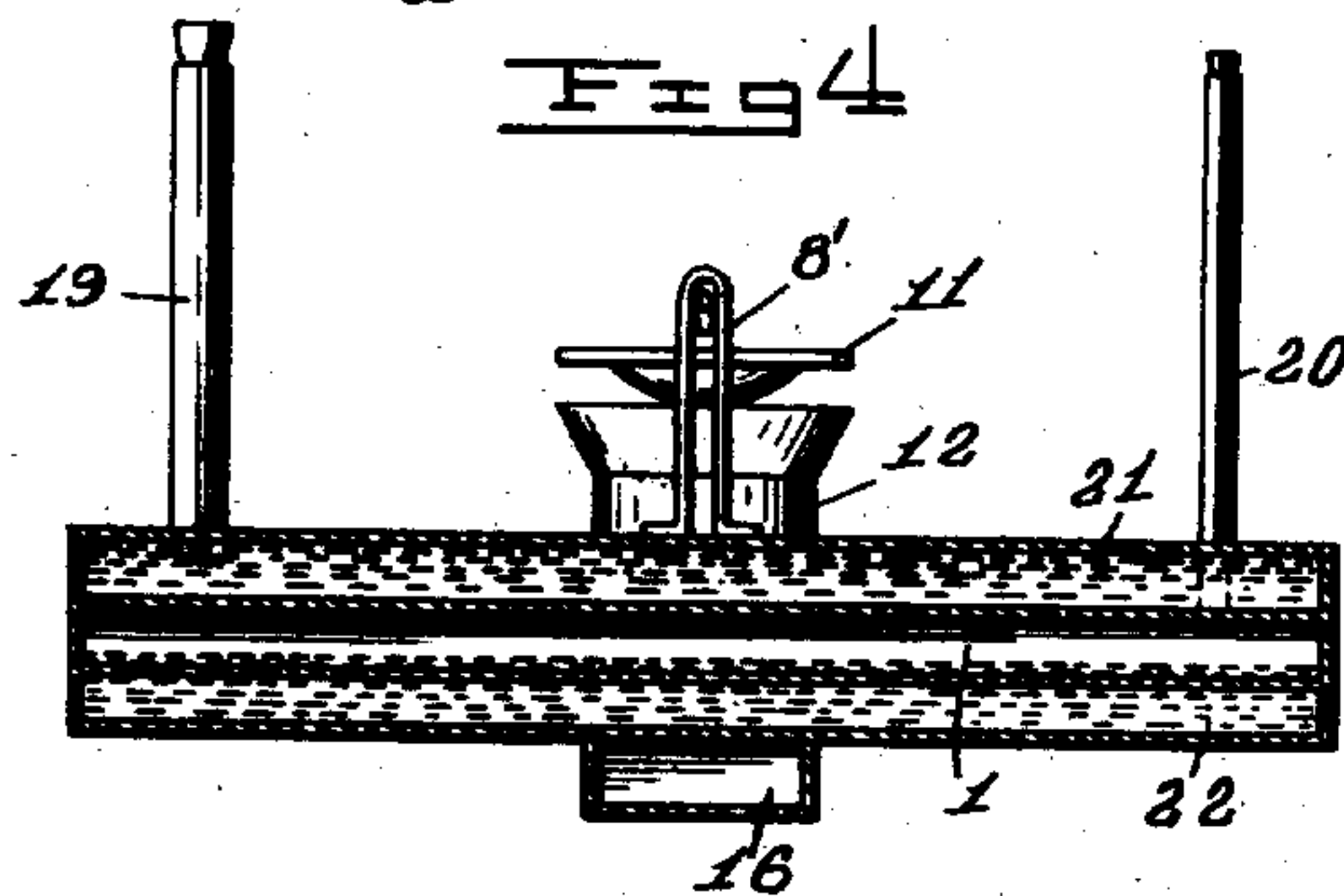
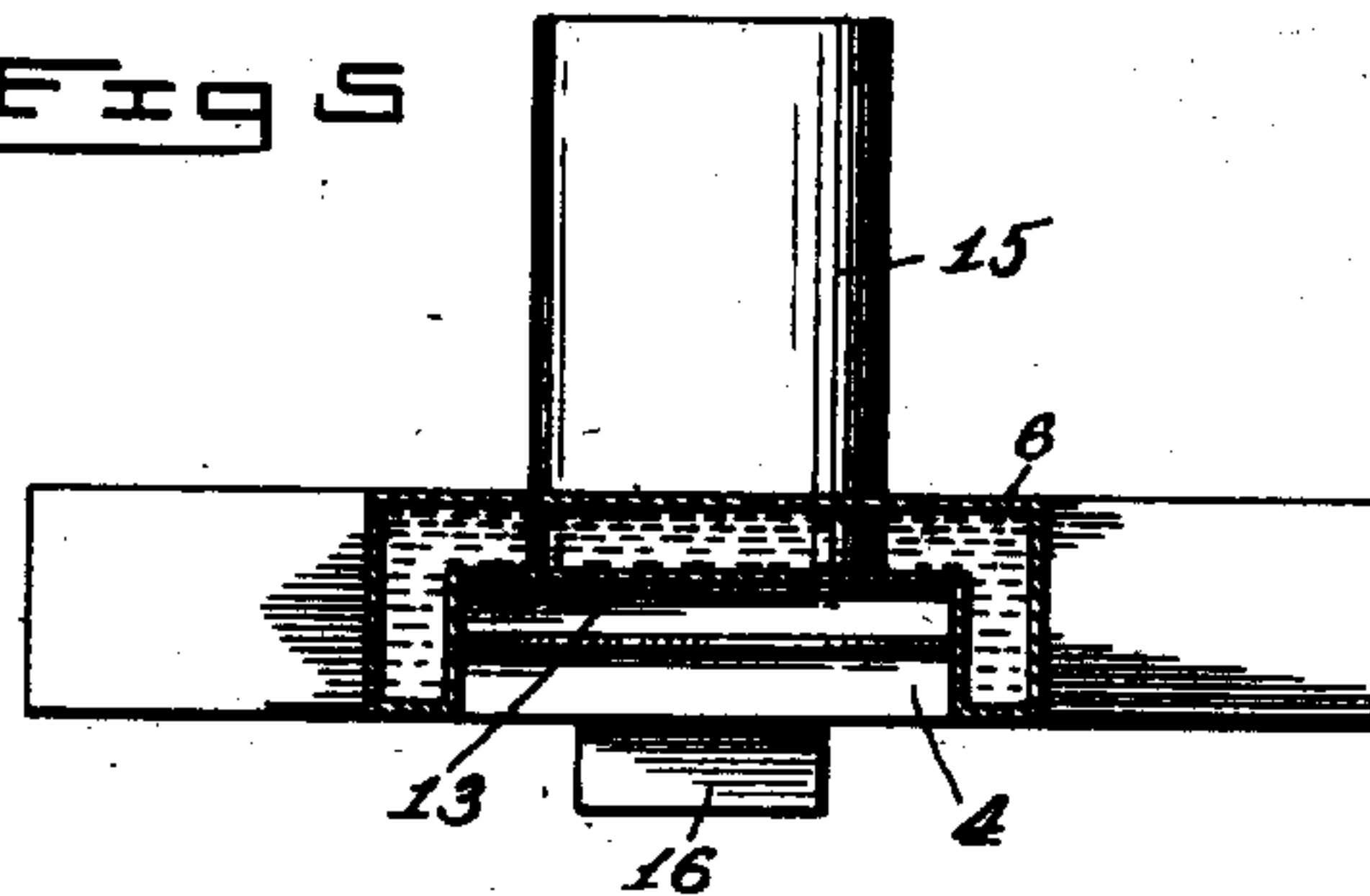


Fig 5



Inventor  
Patrick J. McCabe

Witnesses  
H. G. Robinson

H. H. Rymer

334

C. D. Sedder  
Attorney



# UNITED STATES PATENT OFFICE.

PATRICK J. McCABE, OF MADISON LAKE, MINNESOTA.

## HEATING-TANK FOR INCUBATORS.

973,681.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Original application filed July 3, 1908, Serial No. 441,817. Divided and this application filed January 6, 1909. Serial No. 470,992.

*To all whom it may concern:*

Be it known that I, PATRICK J. McCABE, a citizen of the United States, residing at Madison Lake, in the county of Blue Earth and State of Minnesota, have invented new and useful Improvements in Heating-Tanks for Incubators, of which the following is a specification.

This invention relates to heating tanks, more particularly to that kind used for heating incubators as disclosed in my co-pending application for patent, Serial Number 441,817, filed July 3, 1908.

The purpose of the present invention is to provide a heating tank of such structure that it is adapted to fit entirely within the incubator, and having an intermediate chamber or passage-way through the length thereof, and through which the heat passes, thereby obtaining more effective and uniform heating of the water within the tank, thus keeping the hatching chambers at a more uniform and effective temperature.

A further purpose of the invention is to provide the heating-tank with means whereby the heated air is, in circulating, passed over an exposed film of water, for the purposes and with the results hereinafter set forth.

A further purpose of this invention is to provide an automatic heat regulator which, without the use of a thermostat, or other artificial device, but by means of the air pressure only, will regulate the temperature within the incubator.

With these as the essentials, my invention embodies other advantages that will appear in the course of the following detailed description, and set forth in the claims.

In the accompanying drawings illustrating the invention: Figure 1 is a horizontal sectional view of my improved tank shown applied to an incubator; Fig. 2 is a transverse sectional view of the tank shown in Fig. 1, taken on the line *a-b*; and Fig. 2<sup>a</sup> is a similar view taken on the line *w-w* of Fig. 1. Fig. 3 is a horizontal sectional view of the modified form of tank. Fig. 4 is a transverse view of the tank shown in Fig. 3 taken on the line *x-x*; and Fig. 5 is an end elevation of the tank partly shown in section along the line *y-y* of Fig. 3.

Referring more in detail to the several views wherein like characters of reference designate corresponding parts in the dif-

ferent figures shown, the tank A comprises a rectangular metallic vessel adapted to be placed substantially wholly within an incubator B. Throughout the length of the tank A there is a passage-way 1 communicating at one end with the heating means and at the other end with the interior of the incubator. The former of said communications, designated 4, has a downwardly flaring opening whereby the heated air from the lamp G may be gathered and directed into the heating passage-way 1. Said passage-way divides the water tank A into a plurality of communicating chambers 2, 6 and 6'. The water-chamber 2 is within the lower portion of the tank and extends substantially throughout the surface of the lower wall thereof. The water-chamber 6 is that portion of the tank immediately over the flared opening 4, and projects beyond the outer wall of the incubator B. The chamber 6 is narrower than the chamber 2 but wider than the passage-way 1 at its flared end 4, thus forming spaces on each side of said passage-way which connect said chambers 2 and 6 and enable the water in the tank to circulate freely therethrough. The water-chambers 2 and 6' communicate with the water-chamber 6 by means of a pipe or inclosed water passage 7, which passage extends throughout the length of the heating chamber 1, for the purpose of giving a greater surface to the action of the heat within said chamber 1.

That portion of the tank A within the walls of the incubator B is provided with an upstanding ledge 5 that extends entirely around the side edges of the inclosed upper wall. The purpose of this provision is to provide a chamber 3 adapted to receive a thin film of water, the function of which will be presently described.

The inclosed water-chambers of the tank A are filled by means of the pipe 18 that communicates with the lower chamber 2 and is of sufficient height to extend outside of the incubator, whereby the tank may be filled without in any way interfering with the workings of the incubator. The open water-chamber is adapted to be filled before the cover is put on the incubator, but there may be provided some such means for filling the same in the manner described for the inclosed tank.

For automatically regulating the heat



within the tank I have devised a means whereby this is readily accomplished. The means comprising a balancing bar or rod 9, fulcrumed upon an upstanding support 8 that is secured to the top of the tank. The rod 9 carries at one end a plate 11 adapted to overhang an outlet 12 that delivers the heat into the incubator from the chamber 1, and at its opposite end the rod 9 supports a valve 13 by means of a link 14, said valve seating against the underside of the opening 15. The proper regulation of the plate 11 and valve 13 is effected by a movable weight 10 upon the rod 9. The valve supporting rod 9 is steadied in its operation by means of upstanding guide-wires 8'. In normal position the plate 11 and the valve 13 are adapted to be substantially as that shown in Fig. 1, wherein the plate 11 closely overhangs the opening 12 and the inlet 15 is closed.

When the incubator is in operation the heat from the lamp G, passing through the passage-way 1, enters into the interior of the incubator by way of the outlet 12, as stated. Now, if for any reason should the heat become excessive the additional outflow acting against the plate 11 would force the same upward, thus permitting the valve 13 to drop; whereupon cold air from the operating room would enter the passage-way 1 by way of the inlet passage-way 15, and reduce the temperature of the air in the passage-way 1 until the plate 11 and the valve 13 assumed their normal positions. After the products of combustion have passed through the passage-way 1 and heated the water within the inclosed portion of the tank and within the water-passage 7, the heated air enters the air spaces in the casing of the incubator, makes two circulations, and finally escapes through the vent 15\* on top of the incubator into the operating room, in the manner described in my patent for incubators, dated June 29, 1909, No. 926,434. To moisten or condition this heated air before it is diffused in the incubator operating room, I subject the same to the action of the exposed film of water 5. Then this moistened air, passing into the operating room, returns by way of the ventilator 16 into the egg chamber. The purpose of this construction is to keep the air in the room in which the incubator is being operated as fresh as the air out of doors. Each egg has enough natural moisture in itself to hatch well if it does not come in contact with dry air, which is certain to take from the egg some of its natural supply of moisture. Another advantage of this construction is that the bottom of my heating tank is of the same temperature over its entire area, owing to the opposite directions of the returning water and the outgoing air.

To the underside of the tank there is pro-

vided an air conducting pipe 16 that communicates with the atmosphere in the operating room, and which is provided with perforations 17, through which said air is conducted into the several hatching chambers, C, D, E and F.

In the modified form of tank shown in Fig. 3, the construction is substantially that shown in Fig. 1, excepting that instead of having the exposed film of water on the upper wall of the tank I have means for holding the same within the passage-way 1, which means comprises a ledge or plate 23, welded or otherwise secured to the bottom of said passage-way adjacent to the opening 4; and there is a further advantage that instead of having an inclosed passage-way for conducting the water through the length of the chamber 1 I form a separate wall, which divides the tank into an upper and lower water-chamber, designated 21 and 22 respectively. The inclosed water-chambers are adapted to be filled by means of the pipe 19, and the chamber for holding the exposed film of water by the pipe 20, both of said pipes communicating with the outside of the incubator. In this type of structure the heat, in passing through the passage-way 1, is subjected to the exposed water and is thus moistened or conditioned before entering the interior of the incubator chamber.

If desired, the film of exposed water may be carried upon the top of the tank, as illustrated in Fig. 1, without departing from the spirit of my invention.

In both of the structures shown, the operation of thus treating the water is equally effective, but by reason of the simplicity of structure of the tank in the former instance I prefer and have shown that kind. There may, of course, be other types of tanks for effecting this same result, and I therefore do not wish to be understood to limit myself to the precise details disclosed, but rather reserve, instead, the right to make such changes as will better adapt the invention to its purposes, and in doing so limit myself only to the prior art to which this invention pertains.

I claim:

1. A hot water heater comprising a tank provided with a horizontal passageway therethrough having a downwardly turned mouth at one end opening on the under side to receive heated air and an opening on its upper side near each end, said passageway being as wide as the tank for the greater part of its length, but narrower than said tank at the mouth end, and automatic valves controlling said upward openings.

2. A hot water heater comprising a tank provided with a horizontal passageway therethrough having a downwardly turned mouth at one end opening on the under side to receive heated air, said passageway being



as wide as the tank for the greater part of its length, but narrower than said tank at its mouth end to provide water communication between the front end of said tank and  
5 the portion below the heating passageway, and a water circulating tube extending through said heating passageway connecting the front to the rear of said tank.

3. A hot water heater comprising a horizontal tank divided by a horizontal diaphragm into an upper and lower section, the upper section serving as a passage for hot air and opening at the bottom of the tank to receive heated air, the lower portion of said

tank adapted to hold water and having a forward and a rear water section in communication therewith, and a circulating tube extending through the hot air section to connect the front and rear ends of the water tank to cause water to circulate therein. 15 20

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PATRICK J. McCABE.

Witnesses:

F. B. KNOFF,

GEO. T. SWEARINGEN.