

No. 685,550.

Patented Oct. 29, 1901.

G. R. & M. O. ADAMS.
INCUBATOR.

(Application filed June 27, 1901.)

(No Model.)

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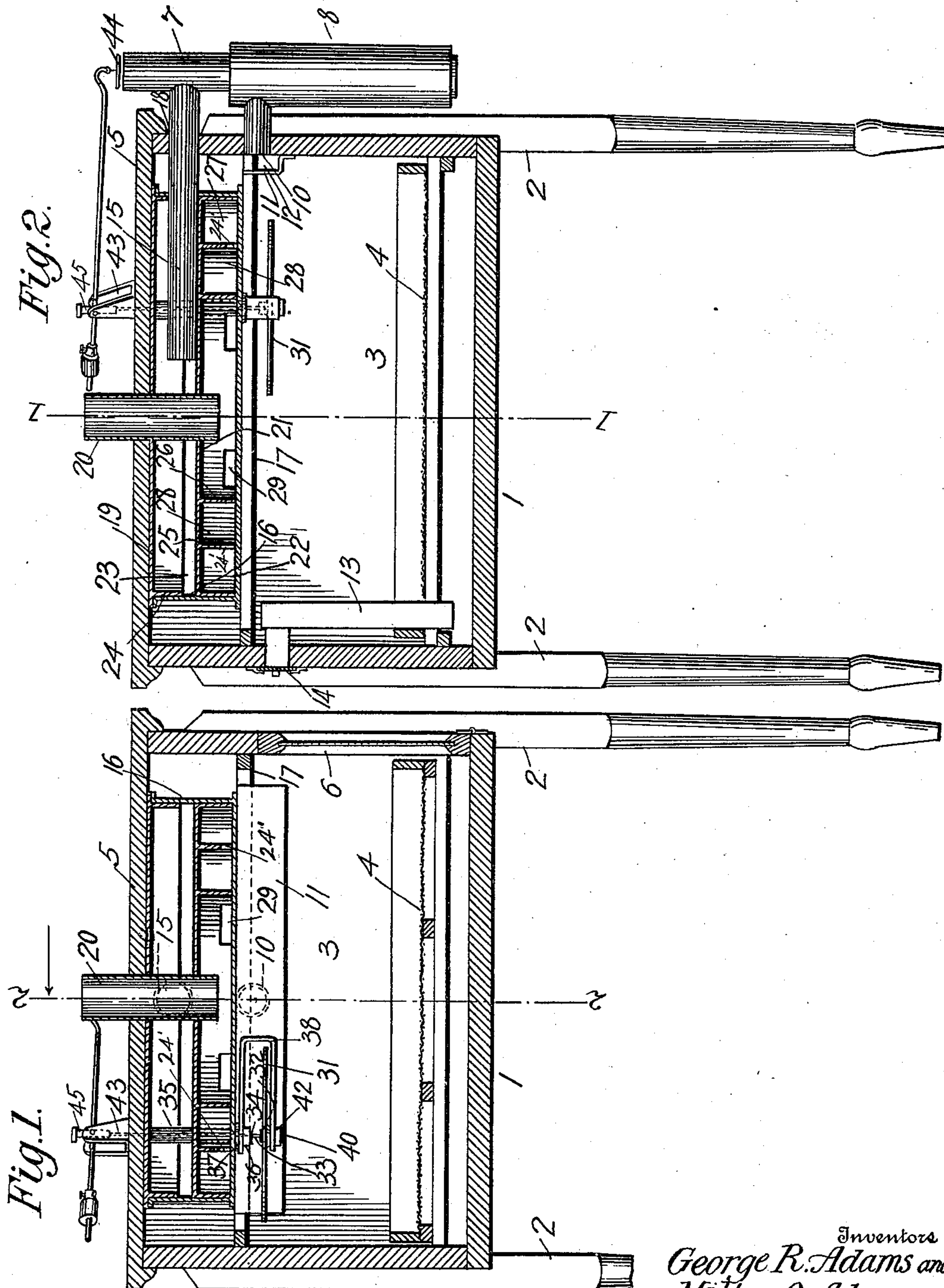


Fig. 1.

Fig. 2.

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Fig. 3.

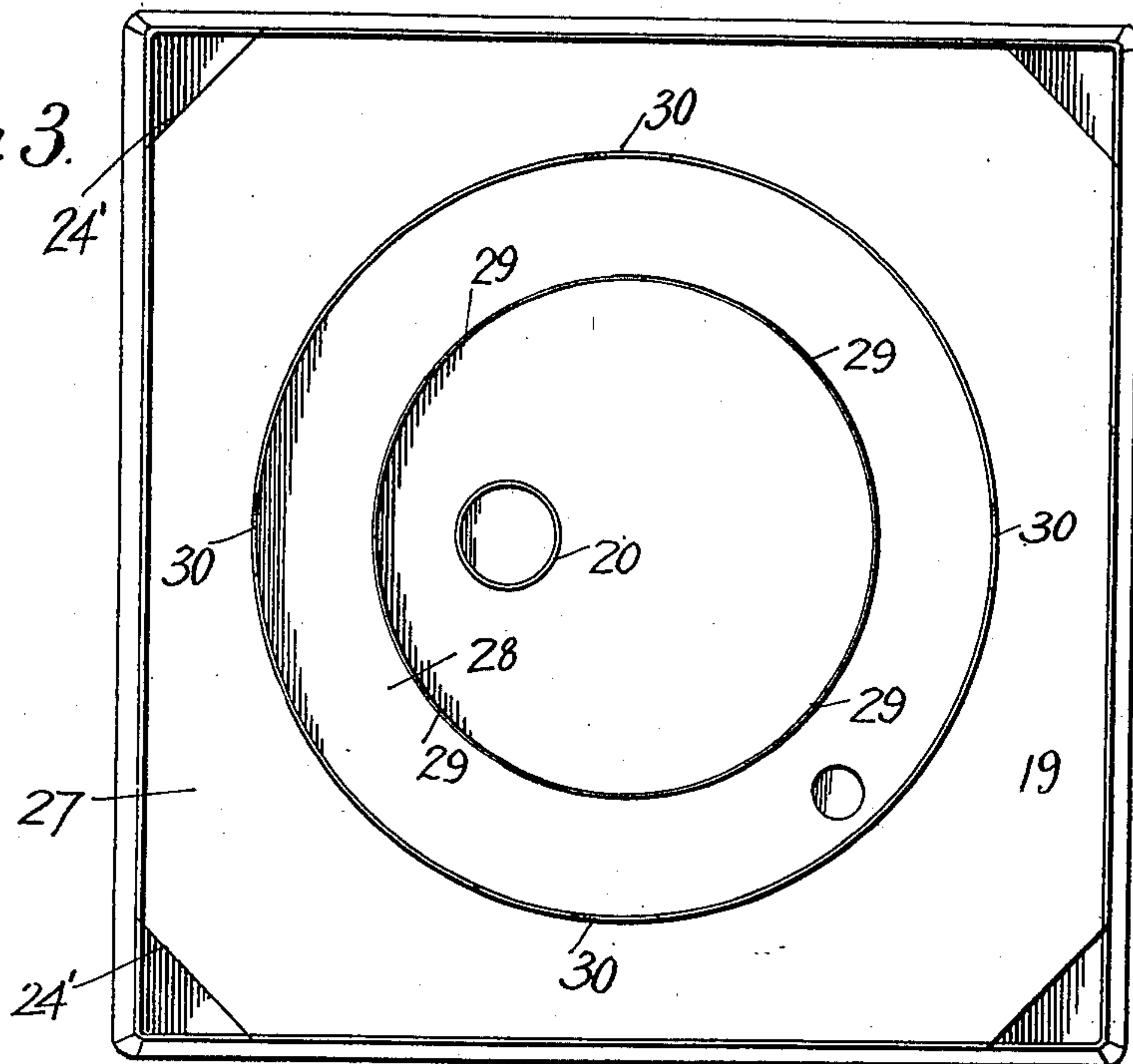
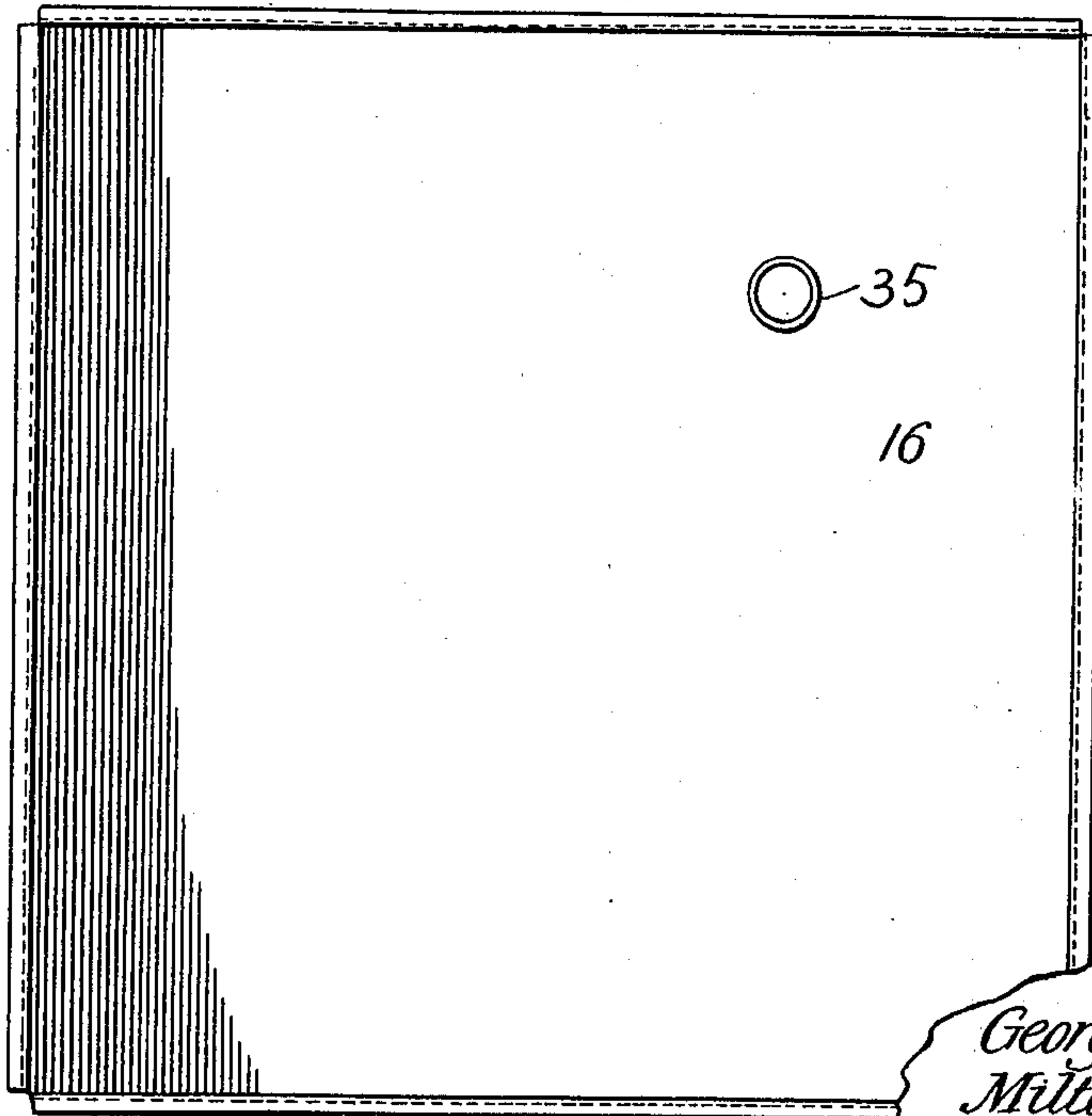


Fig. 4.



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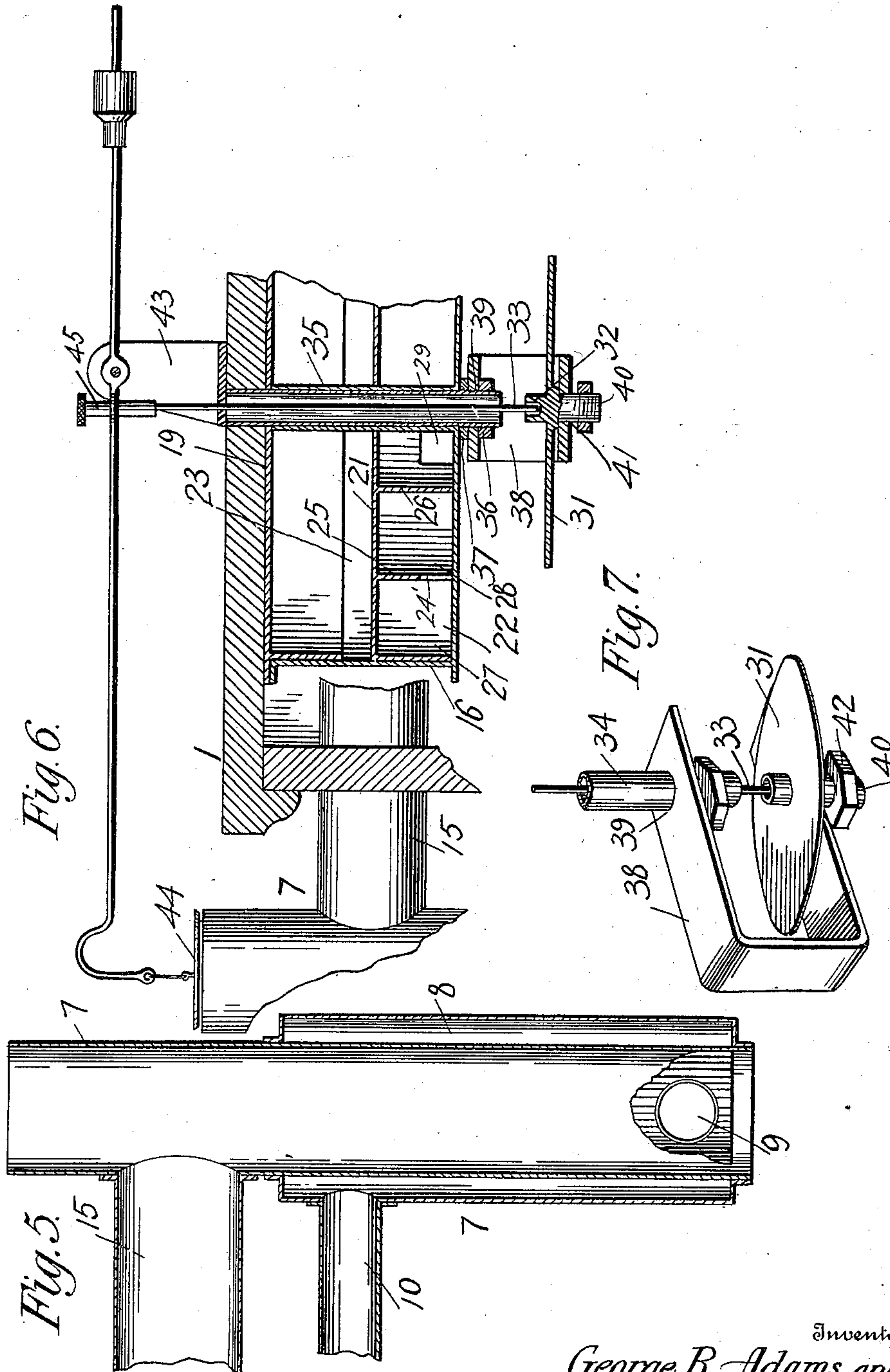
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UNITED STATES PATENT OFFICE.

GEORGE R. ADAMS AND MILTON O. ADAMS, OF HIAWATHA, KANSAS.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 685,550, dated October 29, 1901.

Application filed June 27, 1901. Serial No. 66,293. (No model.)

To all whom it may concern:

Be it known that we, GEORGE R. ADAMS and MILTON O. ADAMS, citizens of the United States, residing at Hiawatha, in the county of Brown and State of Kansas, have invented certain new and useful Improvements in Incubators; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in incubators, and has for its object to provide improved means for heating and ventilating the egg-chamber, so as to secure the circulation of heat and moisture in an effective manner and to maintain within the egg-chamber an even and determined temperature.

With this and other objects in view the invention consists of certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the appended claim.

In the accompanying drawings, Figure 1 is a vertical front to rear section of the incubator, taken on line 1-1 of Fig. 2. Fig. 2 is a vertical transverse section of the same, taken on the line 2-2 of Fig. 1. Fig. 3 is a bottom plan view of the top or cover and partition of the tank. Fig. 4 is a top plan view of the tank-body. Fig. 5 is a detail sectional view of the air and heat conducting flues. Fig. 6 is a sectional view through the tank and top of the incubator, showing the construction of the thermostat; and Fig. 7 is a detail view of the thermostat.

Referring now more particularly to the drawings, the numeral 1 designates the body or casing of the incubator, supported upon legs 2 and provided with an egg-chamber 3, containing a tray 4 for the reception of the eggs. This casing is closed at the top by a removable cover 5 and is provided at the front with a hinged door 6, provided in the usual manner with transparent panels, through which the interior of the egg-chamber may be viewed. Located upon one side of the casing are the air or heat conducting pipes or flues for conducting heated air to the egg-chamber and the products of combustion from a lamp or other heater to the tank to supply the

proper amount of heat for incubation, the said flues being constructed and arranged as follows: A heat-conducting flue or tube 7 is provided to receive the hot air, products of combustion, and gases from the lamp or other heater used and is open at top and bottom and surrounded by an air-conducting flue or tube 8, the spaces between the two tubes at the upper and lower ends of the tube 8 being closed, as shown. The tube 8 is, however, provided adjacent to its lower end with an air-inlet 9 and adjacent to its upper end with an eduction pipe or tube 10, which extends through the side wall of the casing and discharges the heated air from the tube 8 into the egg-chamber 3. It will of course be understood that the air passing through the tube 8 is heated by radiation from the tube 7 and brought to the proper temperature for admission into the chamber 3 to heat the interior thereof. In order to effect a thorough distribution and circulation of the hot air coming through the eduction-tube 10 into the egg-chamber 3, we preferably provide upon the interior of the side wall of the chamber through which said tube enters a longitudinal deflecting and distributing plate 11, which is constructed and arranged in such a manner as to form, with the said wall, a chamber or passage 12, through which the hot air coming from the air-flue is caused to pass in opposite directions toward the front and rear of the egg-chamber, and to thereby be supplied equally to opposite ends of the chamber, so as to create a more thorough and equable circulation of the same within and around the chamber. The hot air and moisture contained within the egg-chamber after circulating around said chamber are discharged through an outlet flue or passage 13, located vertically upon the opposite side of the egg-chamber from the air and gas conducting flues and opening at its lower end into the egg-chamber and at its outer end to the atmosphere, a valve 14 being provided to control the said upper end of the flue or passage, so that the escape of the hot air and moisture may be regulated as desired.

The hot-air flue or tube 7 is connected near its upper end with a lateral pipe 15, by which when the open end of said flue is closed the products of combustion therefrom are con-

ducted into the tank. This pipe 15 extends through the wall of the chamber 3 above the pipe 10.

The body 16 of the tank is supported in the upper portion of the egg-chamber 3 by cleats 17, extending around the side walls of said chamber, and is provided in one of its side walls with an opening 18 for entrance of the pipe 15. The top or cover 19 of the tank is not secured to the cover 5 of the incubating-chamber, and extending through said covers is a vent-pipe 20, through which the heat after having been utilized to heat the tank exhausts to the atmosphere. The lower end of this pipe extends through and is connected to a horizontal partition 21, which divides the body of the tank into lower and upper compartments 22 and 23, serving to receive the heated products of combustion entering through the pipe 15. The partition 21 is provided with a downwardly-extending flange or rim 24, which closes the inlet of air into the lower compartment 22 except at the corners, where said partition and rim are cut away to form inlets 24' for the passage of heated products of combustion from the chamber 23 to the chamber 22. Projecting downwardly from the under side of the partition 21 are annular partitions 25 and 26, arranged concentric with each other and forming outer and inner annular chambers or passages 27 and 28, through which the products of combustion are caused to pass before escaping through the vent-pipe 20. These annular partitions are provided at intervals with apertures 29 and 30, forming inlets, through which the products of combustion circulate into said chamber from the outer compartment 22. The two sets of inlets 29 and 30 are disposed on lines between each other, so that the products of combustion entering the lower compartment 22 will first be caused to pass around the outer side of the partition 25, thence into the chamber 27 through the inlets 29, thence around said chamber and through the inlets 30 into the chamber 28, and thence through the pipe 20 to the atmosphere. By this construction it will be seen that an effective circulation of the heated products of combustion through the tank is secured and that all the available heat therefrom is taken up before the said products pass outward through the pipe 20, so that the tank is always maintained in a heated condition. By thus subdividing the tank into a series of chambers or compartments a large area of conducting-surface is afforded for taking up the heat and radiating it, so as to provide for its effective distribution within the egg-chamber.

The vent-pipe 20 is eccentrically disposed with reference to the chambers 27 and 28, as is the pipe 15, such pipes terminating upon opposite sides of the center of said chamber, so that each inlet-opening 24 is located the same distance from the said vent-tube 20, so that the products of combustion entering the com-

partment 22 at either corner will have to travel the same distance to pass out of pipe 20.

The thermostat controlling the heating of the egg-chamber 3 comprises an expansible and contractible disk or diaphragm 31, having a cup or socket 32 to receive the lower end of a stem 33, projecting upwardly through the tube or pipe 34, extending through the cover 5 and through a tube 35, connected to the body portion 16 of the tank. The lower end of the tube 34 is threaded for the reception of clamping-screws 36 and 37, which connect thereto the upper arm of the lower free end of a horizontally-disposed U-shaped bracket 38, which is formed with an opening 39 for the passage of said tube and the lower end of the stem 33. The diaphragm 31 is located between the two arms of this bracket and is provided on its under side with a threaded stem 40, which projects through an opening 41 in the lower arm of the bracket and has threaded thereon a clamping-nut 42, which in connection with the clamping-nuts 36 and 37 holds the disk or diaphragm in position. Fulcrumed in a bracket 43, secured upon the upper surface of the cover 5, and to which the tube 34 is connected, is a weighted or counterbalanced operating-lever carrying at one end a damper 44, which controls the exhaust of the heated products of combustion from the top of the tube 7 and regulates the supply of such products to the exterior of the tank and the supply of heated air to the egg-chamber. Upon this lever is mounted an adjusting-screw 45, which is provided with a socket or recess to receive the upper end of the stem 33, so that the lever may be adjusted to operate under different degrees of pressure from said stem. When the temperature in the egg-chamber rises above a predetermined height, the diaphragm is expanded and moves the stem 33 upwardly, thereby elevating the outer end of the lever and lifting the damper, so as to open the upper end of the pipe 7 and allow the products of combustion to escape directly to the atmosphere, thus diminishing the amount of heat supplied to the tank and the amount of hot air supplied directly to the egg-chamber, so that the temperature within the latter will quickly fall to the normal point. When the temperature falls below the proper point, the diaphragm contracts and allows the stem 33 to drop, whereby the free end of the lever moves downward and the damper seats upon and closes the upper end of the pipe 7, thus providing for the passage of all the products of combustion to the tank and the supply of heated air to the egg-chamber.

It will be noted that the parts of the thermostat are in no case directly connected with the interior of the walls of the egg-chamber. The object in thus making the thermostat independent of connection or attachment to the walls of the incubating-chamber is to prevent all liability of the position or arrangement of the thermostatic mechanism being changed or affected by warping or spreading of said

walls, so that no matter what the condition of the walls may be in this incubator the thermostat will always remain unchanged as to position, so that its operation will not be interfered with or affected by changes in the shape or formation of the walls.

From the foregoing description, taken in connection with the accompanying drawings, the construction, mode of operation, and advantages of the invention will be readily understood without a further extended description, and it will be seen that the invention provides an incubator in which provision is made for the effective circulation of heat and moisture and the free inlet of pure air, as well as the maintenance within the egg-chamber of a constant and regulated degree of temperature.

While the preferred embodiment of the invention is as herein disclosed, it will of course be understood that changes in the form, proportion, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

In an incubator, the combination with a casing having an egg-chamber, of a tank arranged within the upper portion of said chamber and comprising a body portion, a cover, and a partition interposed between the bottom of the body and the cover and dividing the interior of the body into upper and lower compartments, said partition being formed with inlets connecting said compartments and upon its under side with a series of annular air chambers or passages provided with inlets for the circulation of the products of combustion from one to the other, a vent tube or pipe eccentrically connected with one of said chambers, and a flue or chimney connected with the upper compartment of the tank for conveying the products of combustion there- to, the said vent-tube and flue being arranged on opposite sides of the center of the tank, substantially as set forth.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

GEORGE R. ADAMS.
MILTON O. ADAMS.

Witnesses:

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