

No. 704,560.

Patented July 15, 1902.

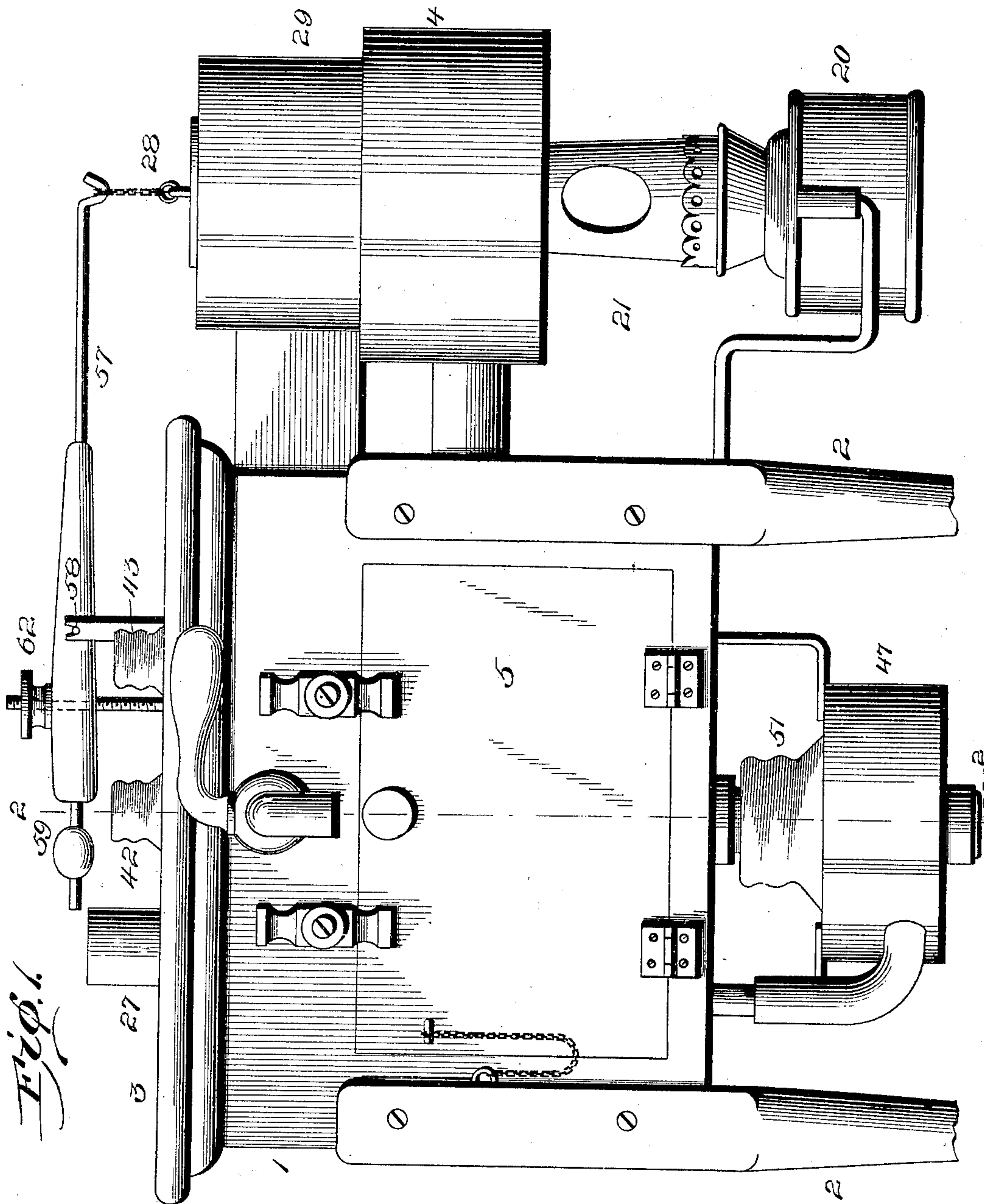
A. J. MOORE.

INCUBATOR.

(Application filed Dec. 9, 1901.)

(No Model.)

4 Sheets—Sheet 1.



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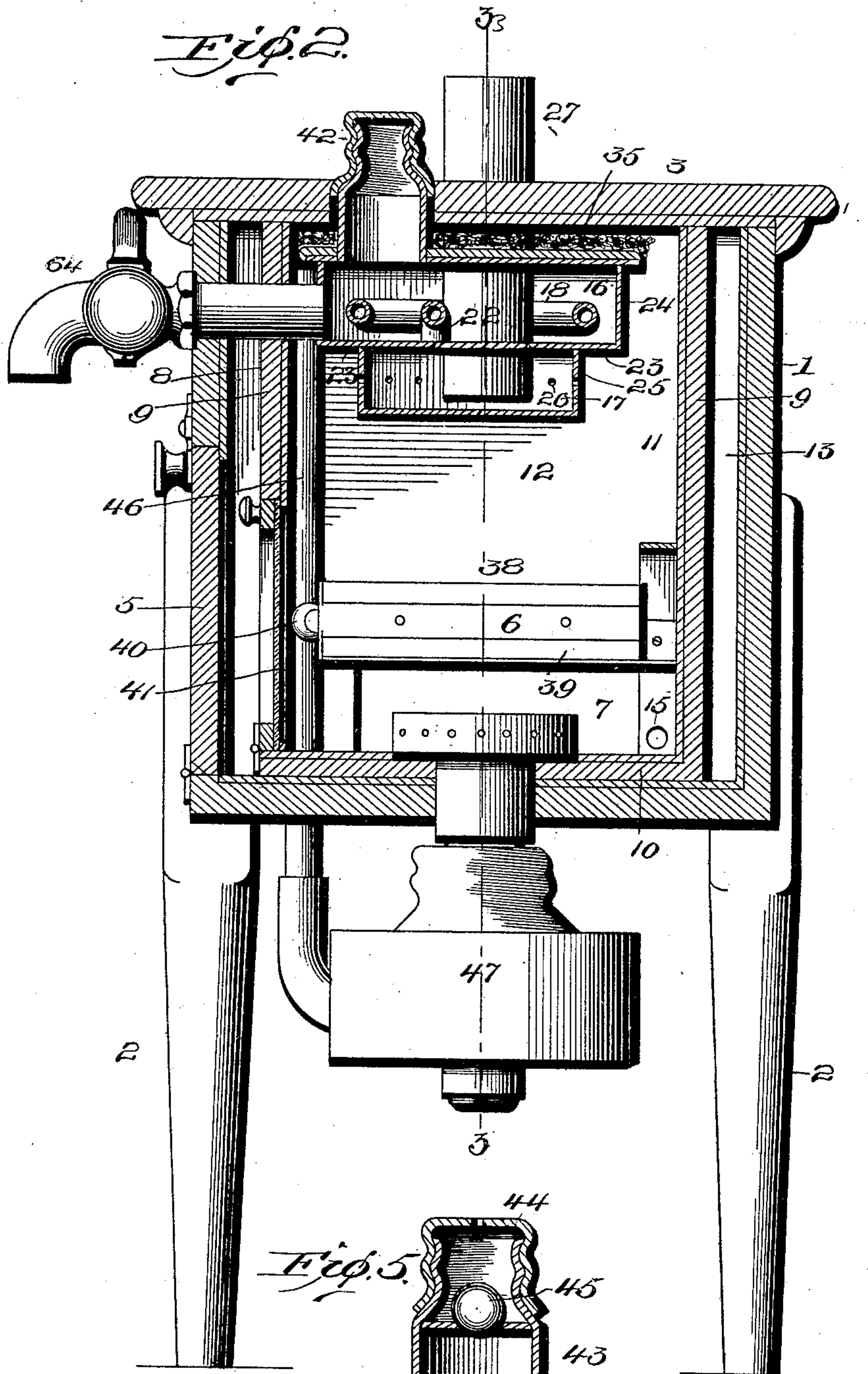
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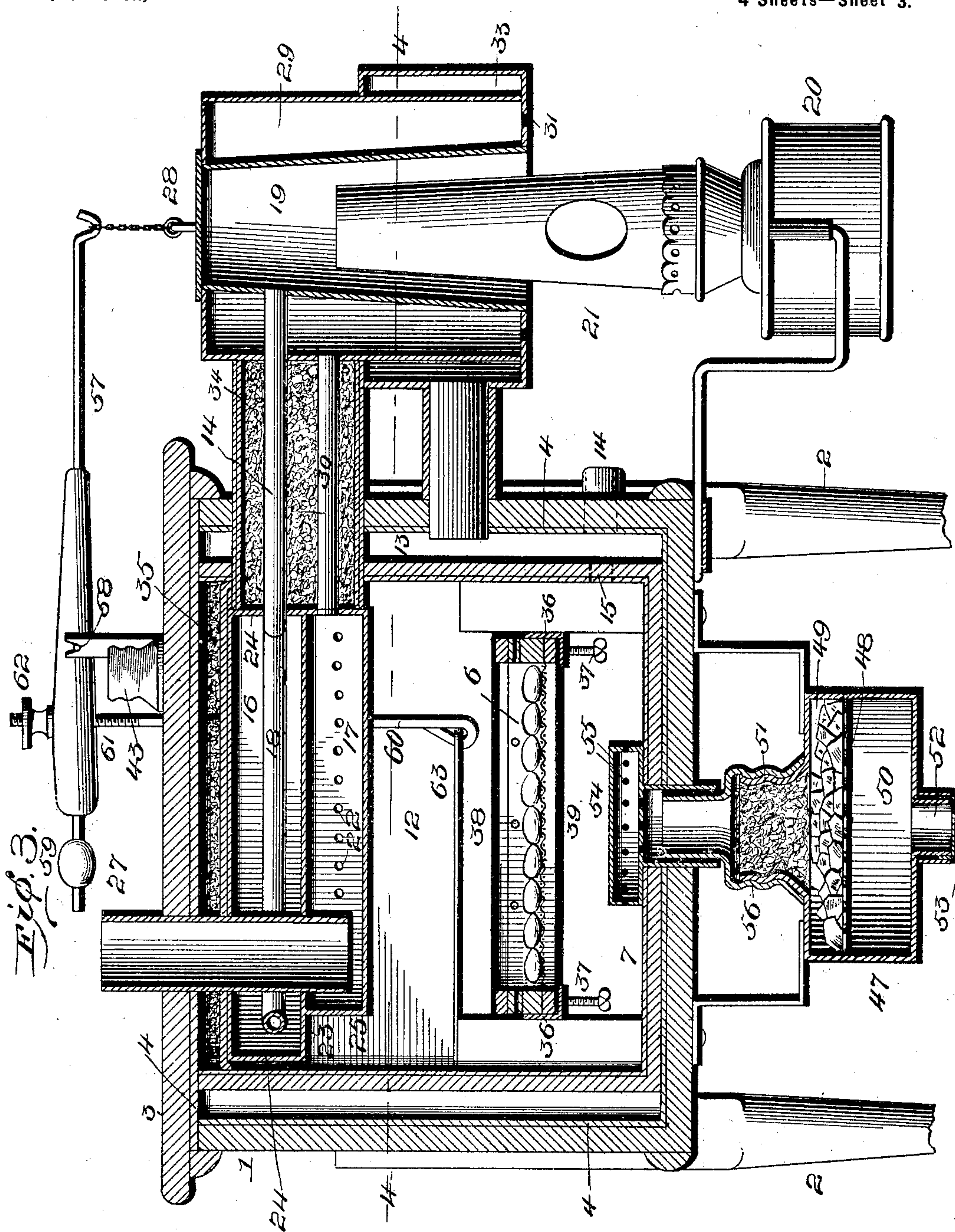
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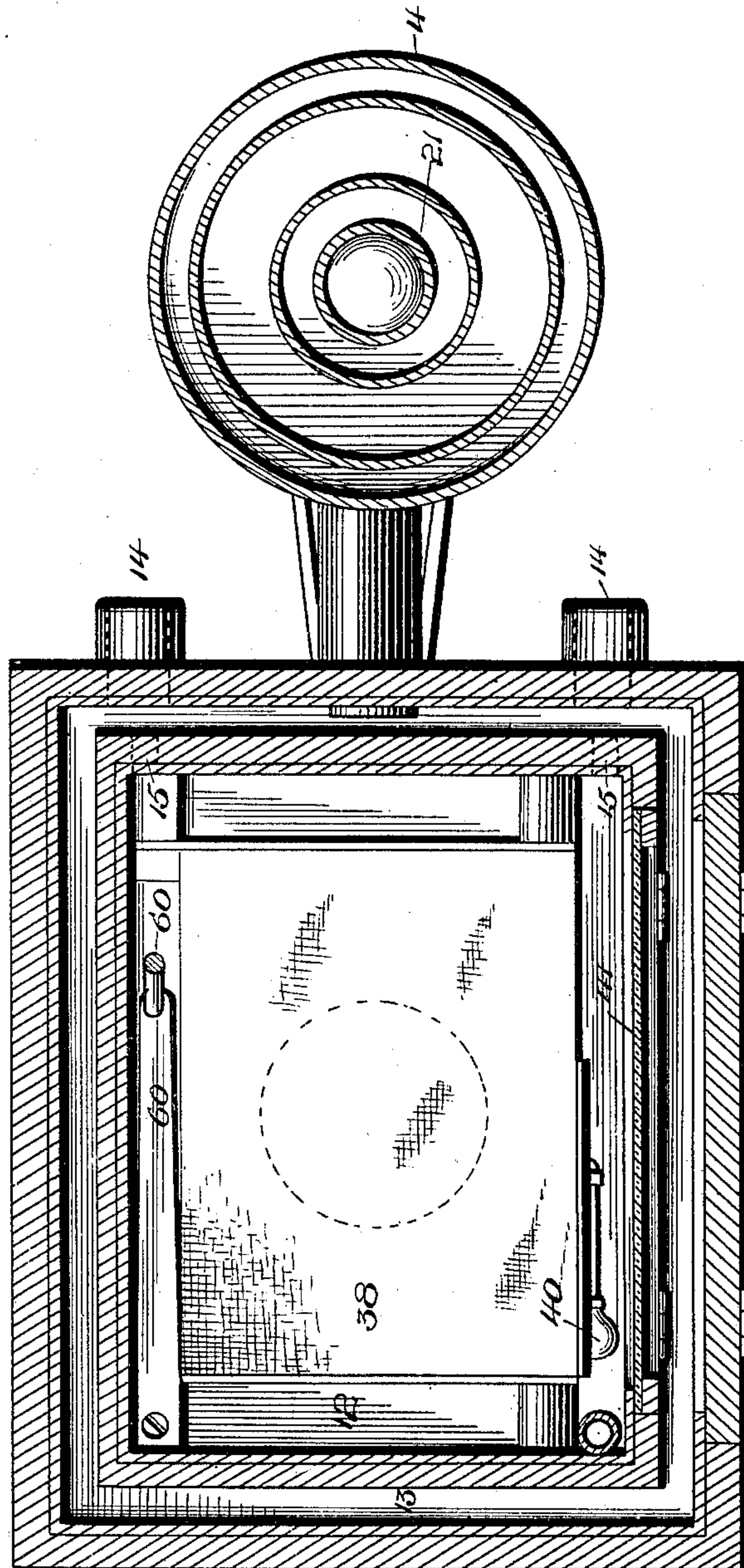
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4 Sheets—Sheet 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ANDREW J. MOORE, OF LEBANON, PENNSYLVANIA.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 704,560, dated July 15, 1902.

Application filed December 9, 1901. Serial No. 85,265. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. MOORE, a citizen of the United States, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Incubators; and I do hereby 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.

My invention relates to incubators, and has for its object improvement in construction designed to produce effects approaching nature as nearly as possible in supplying moist heat, fresh air, proper ventilation, and other necessities to effect incubation of the eggs with certainty and with the least attention and labor, as will be fully disclosed in the following specification and claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a front elevation of my improved incubator; Fig. 2, a vertical transverse section on line 2 2, Fig. 1, the condenser being shown in elevation; Fig. 3, a vertical longitudinal section on line 3 3, Fig. 2, the lamp being shown in elevation; Fig. 4, a horizontal section on line 4 4, Fig. 3; and Fig. 5, a vertical section of the escape or relief valve of the water-chamber on an enlarged scale.

Reference being had to the drawings and the designating characters thereon, 1 indicates the outer casing or body of the incubator, preferably supported on legs 2, is provided with a detachable cover 3, and the sides, ends, bottom, and cover are lined with asbestos 4 or other suitable non-conductor of heat, a door 5, which affords access to the egg-tray 6 and to the nursery 7 below the egg-tray; 8, an inner casing, whose sides or walls 9 and bottom 10 are also lined with a suitable non-conductor of heat 11, and the sides or walls extend up to and are engaged by the cover 3, which also forms a cover for the inner casing, the egg or hatching chamber 12 within said casing, and for the air-chamber 13, which surrounds the casing 8 and is supplied with fresh air through ducts 14 and communicates with the chamber 12 through ducts 15. (Shown in Figs. 2, 3, and 4.)

Within the chamber 12 and supported by

the walls thereof is a water-chamber 16 and a hot-air chamber 17, the former provided with a pipe 18, communicating with the combustion-chamber 19, which receives the heated gases from the lamp 20, delivered through its chimney 21. The pipe 18 traverses the ends and sides of the chamber 16, heats the water therein, and discharges its hot gases into the hot-air chamber 17 through its downward bend or elbow 22, as shown in Figs. 2 and 3. The hot-air chamber is of less area than the hot-water chamber, leaving a heating-surface 23 on its bottom above and around the hot-air chamber, from which and the sides 24 of the hot-water chamber heat is radiated to heat the chamber 12, and the vertical walls 25 of the hot-air chamber are provided with perforations 26 through which the hot air from the chamber 17 passes into the hatching-chamber 12, and the foul air from the hatching-chamber passes through the same perforations to the hot-air chamber 17 on the same principle that air from the outside enters and air from the inside of a room passes out through a key-hole, and the foul air near the bottom of chamber 17 escapes through the stack or pipe 27, which extends nearly to the bottom of the chamber 17, and through which pipe 27 the lamp 20 finds draft when the damper 28 is closed and its natural draft is cut off. This is due to the lower end of the pipe 27 being above the bottom of the hot-air chamber and that the pure hot air fills the chamber 17 above the perforations 22, as shown in Figs. 2 and 3. Hot air is supplied to the chamber 17 from the chamber 29 by a pipe 30, and cold fresh air is supplied to the chamber 29 through perforations 31 in the bottom thereof, as shown in Fig. 3, and the air-chamber 13 communicates with the dead-air chamber 33 around the chamber 29, and the pipes leading to the hot-water chamber and to the hot-air chamber are provided with a packing 34 of mineral wool, asbestos, or other non-conductor of heat, and the outer walls of the chambers 29 and 33 are also provided with a covering of like material, (not shown,) and above the hot-water chamber is a like packing 35.

The egg-tray 6 is supported upon suitable brackets 36, which are provided with screws 37 for the purpose of raising the rear end of

the tray to turn the eggs. This is accomplished by removing the front row of eggs, then raising the rear end of the tray until the eggs roll to fill the space made by removing the first row, which will make a turn of the eggs, and then placing the eggs taken out of the front end of the tray into the space made at the rear end of the tray by the eggs rolling toward the front. To approach nature as close as we may, the tray 6 is provided with a covering 38 above and a supplemental bottom 39 of woolen fabric, such as flannel, through which the heat passes or filters slowly and is evenly distributed to the eggs during the period of incubation, and they also form a friendly covering to the chicks as they emerge from the eggs. The upper covering 38 is loosely secured in position on the tray, so that the newly-hatched chickens can readily raise it and go down into the nursery 7, below the tray. The tray is so situated that ample space is provided, in front and at both sides, for the chicks to get out of the tray and down into the nursery, as shown in Fig. 4. The egg-tray will form subject-matter of a separate application for a patent. On the front of the tray or in any preferred position a thermometer 40 is placed to indicate the temperature of the egg-chamber 12 and so that it can be seen and read through the glass door 41 in the inner casing, as shown in Figs. 2 and 4.

The water-chamber 16 is provided with a nozzle 42, through which it is filled, and with an escape-nozzle 43, having a perforated cap or cover 44 and a check-valve 45 for allowing the excess steam generated to escape, and steam from this chamber is conducted through a pipe 46 to a condenser 47, preferably having a perforated diaphragm 48 separating the condenser into two chambers 49 and 50, the former of which is filled with pieces of stone and earth which serve as a condensing medium, and above the chamber 50 is a chamber 51, filled with cotton or wool 56 to arrest any water passing with the air admitted through the duct 52 in the bottom of chamber 50 and which is provided with a suitable cover 53, preferably of loosely-woven fabric, to prevent vermin or insects entering. Above the condenser and within the hatching-chamber, or, rather, in the nursery, is a distributor 54 for the moistened air coming from the condenser and is discharged through the perforations 55.

The damper 28 for the combustion-chamber of stack 19 is connected to a lever 57, fulcrumed at 58 and provided with a counterweight 59 to balance the damper, and to the lever 57 is connected a rod 60, adjustable in the lever by means of a screw-thread 61 on the rod and a nut 62 to balance the lever and make it very sensitive, and the opposite end of the rod 60 is attached to a thermostat 63 in the hatching-chamber, and the damper is automatically raised and lowered by the well-known action of the thermostat to regulate the temperature in the hatching-chamber.

Water may be drawn from the chamber 16 through faucet 64 at any time it may be desired to empty said chamber.

In the practical operation of the incubator a regular degree of heat is automatically maintained, the eggs are turned every other day, and the air is kept moist and pure, and as a result every fertile egg put in the tray is hatched.

Having thus fully described my invention, what I claim is—

1. An incubator having a hot-water chamber in the upper part of the hatching-chamber, means for heating the same, a condenser provided with means for supplying fresh air thereto and communicating with the lower part of the hatching-chamber and with the hot-water chamber.

2. An incubator provided with a lamp, and a combustion-chamber, a hot-air chamber in the hatching-chamber, means for supplying hot air to said hot-air chamber, a connection between the combustion-chamber and said hot-air chamber, and an exit-pipe in said hot-air chamber affording draft to the lamp and an exit for foul air from the hatching-chamber.

3. An incubator having a hot-water chamber, and a hot-air chamber in the upper part of the hatching-chamber, means for heating both of said chambers, an exit for foul air communicating with the hot-air chamber, and a condenser connected to the hot-water chamber and discharging into the hatching-chamber.

4. An incubator provided with a lamp, and a combustion-chamber, a hot-air chamber in the hatching-chamber and having perforations in its walls, means for supplying hot air to said hot-air chamber, a connection between the combustion-chamber and said hot-air chamber, and an exit-pipe in the hot-air chamber affording draft to the lamp and an exit for foul air from the hatching-chamber, and means for supplying fresh air to the hatching-chamber.

5. An incubator having a hot-water chamber, and a hot-air chamber in the upper part of the hatching-chamber, the hot-air chamber having perforations in its walls, means for heating both of said chambers, a foul-air-exit pipe extending into the hot-air chamber, means for supplying air to the hatching-chamber through the casing of the incubator, and a condenser connected to the water-chamber and discharging moistened air into the hatching-chamber.

6. An incubator having a heater provided with a combustion-chamber, a hot-water chamber, and a hot-air chamber in the upper end of the hatching-chamber, a pipe communicating with the combustion-chamber and the hot-air chamber and extending through the hot-water chamber, an air-heating chamber surrounding said combustion-chamber, an air-chamber between the casings of the incubator, a pipe communicating therewith and with said hot-air chamber, means for dis-

charging foul air through said hot-air chamber, means for supplying fresh air, and a condenser connected to the hot-water chamber and to the hatching-chamber.

5 7. An incubator having a heater provided with a combustion-chamber, a fresh-air-heating chamber, and a dead-air chamber concentric therewith; a hot-water chamber, and a hot air chamber in the hatching-chamber, an
10 air-chamber between the casings of the incubator communicating respectively with the air-heating chamber and the dead-air chamber of the heater, an exit for foul air through the hot-air chamber in the hatching-chamber,
15 and a condenser connected to the hot-water chamber and discharging into the hatching-chamber.

8. An incubator provided with a hot-water chamber, means for heating the water therein; a condenser having a fresh-air supply and communicating with the hatching-chamber
20 below the egg-tray, and a connection between said hot-water chamber and said condenser.

9. An incubator provided with a hot-water
25 chamber, means for heating the water therein, and a condenser connected with the hot-water chamber for supplying fresh and moistened air to the hatching-chamber.

10. An incubator provided with a hot-water
30 chamber, means for heating the water therein, a condenser having an upper and a lower chamber, a perforated partition separating said chambers, a condensing medium in one of said chambers, an air-supply and an

air-distributor, and means for connecting the
hot-water chamber and the condenser. 35

11. An incubator having a hot-water chamber in the hatching-chamber, means for heating the water, a condenser provided with means for supplying fresh air thereto, and a
40 liquid-arrester above the condensing-chamber, and means for connecting said hot-water chamber and condenser.

12. An incubator having a hot-water chamber, and a hot-air chamber in the upper part
45 of the hatching-chamber, a heater connected to said hot-water chamber and hot-air chamber, a condenser connected to the hot-water chamber and provided with means for supplying fresh air to the hatching-chamber
50 through the condenser, an egg-tray between the heating-chambers and the condenser, and a foul-air exit for the hatching-chamber communicating with said hot-air chamber.

13. An incubator provided with a hot-water
55 chamber, a condenser having a fresh-air supply and connected to the hot-water chamber for supplying moist air to the hatching-chamber, an egg-tray provided with means for distributing heat over the upper surface
60 of the eggs and moist air over the lower surface thereof.

In testimony whereof I affix my signature in presence of two witnesses.

ANDREW J. MOORE.

Witnesses:

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