

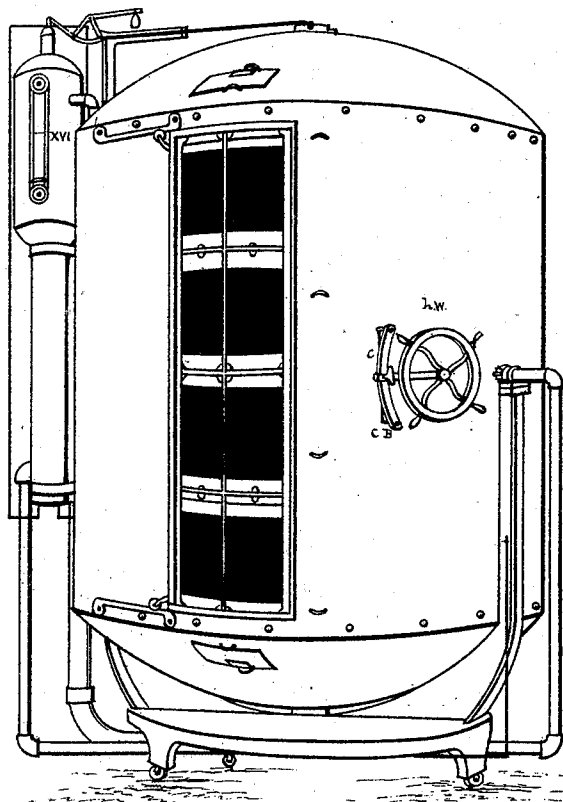
HENRY J. HAIGHT.

Improvement in Incubators.

No. 122,249.

Fig. 1.

Patented Dec. 26, 1871.



Witnesses.

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John Carlin

Inventor.

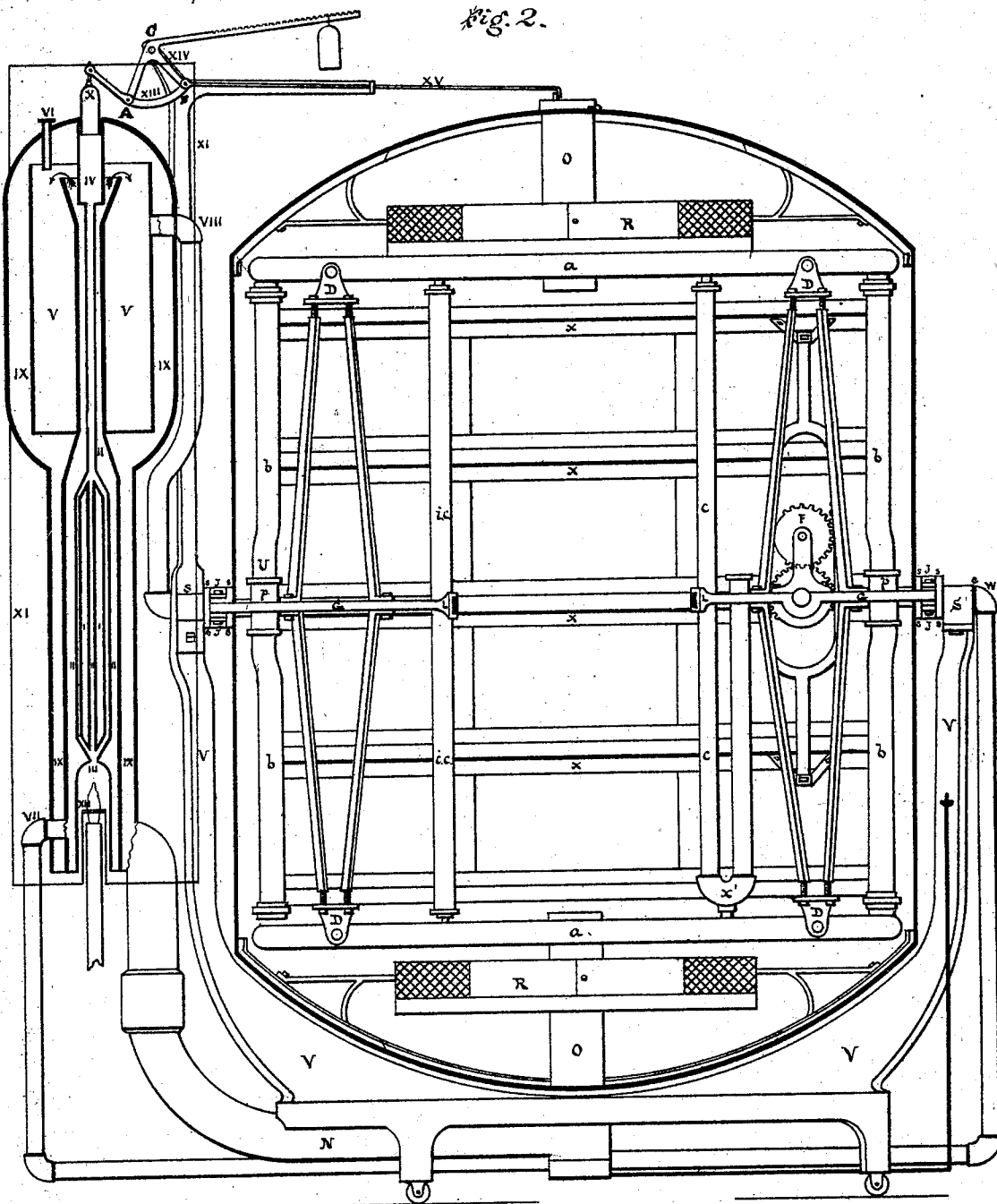
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Fig. 3.

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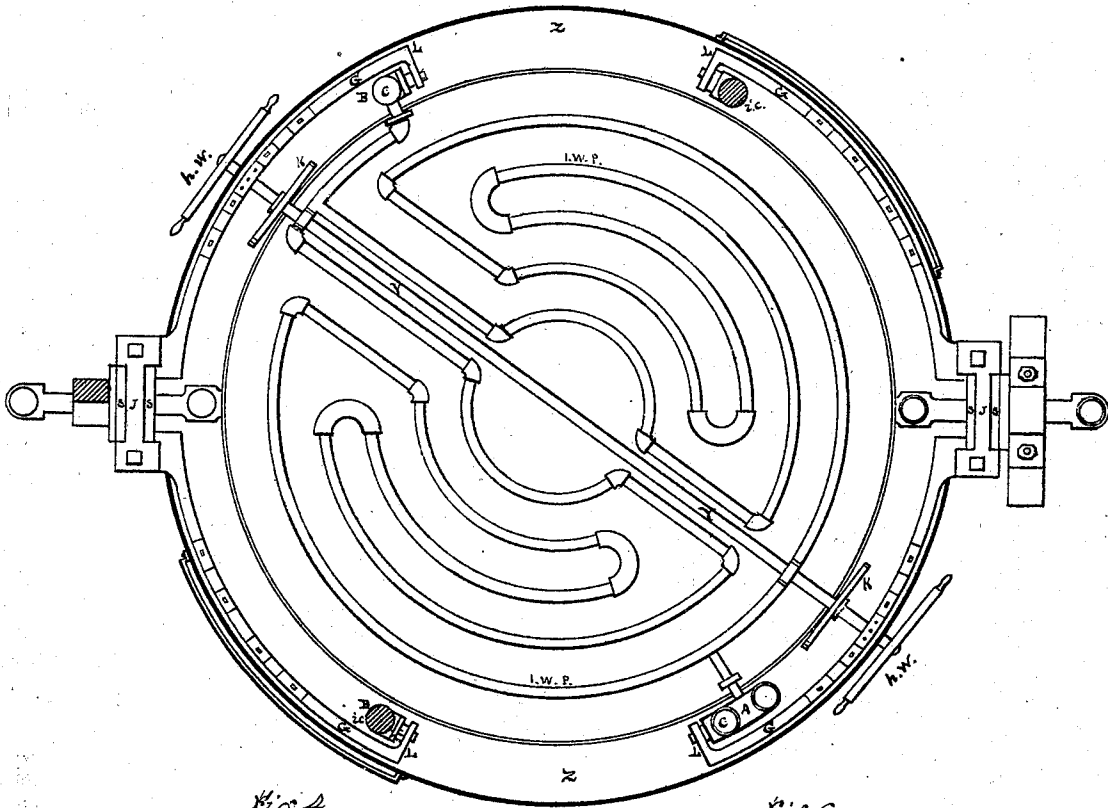


Fig. 4.

Fig. 6.

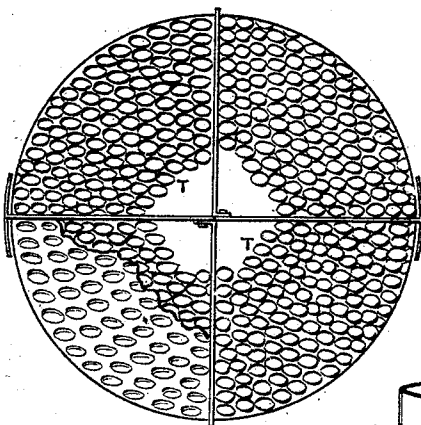
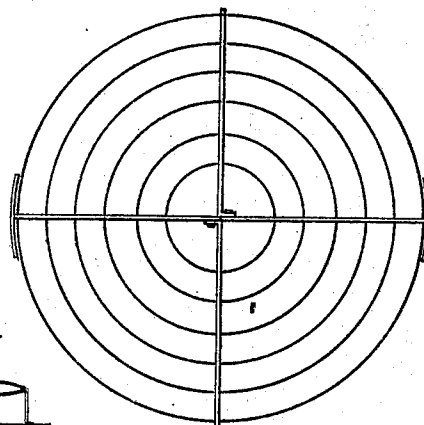


Fig. 5.



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Fig. 7.

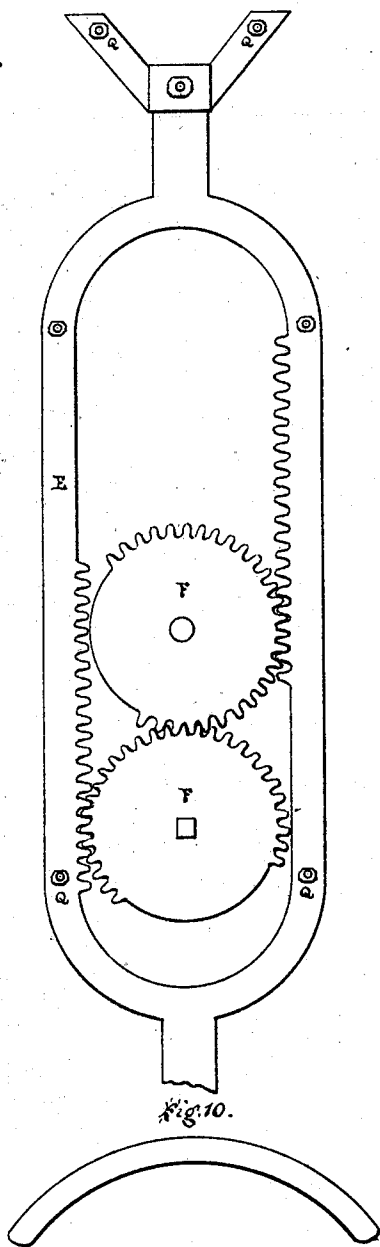


Fig. 10.

Fig. 8.

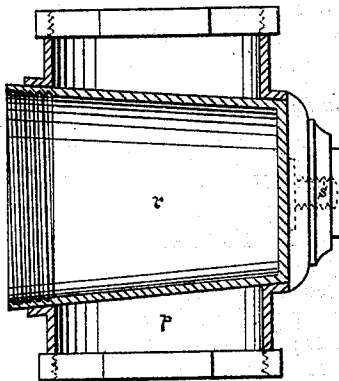


Fig. 9.

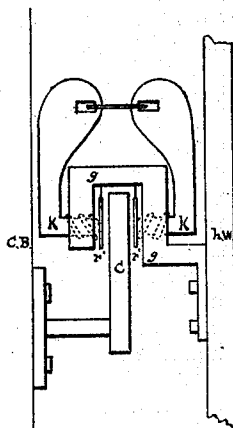
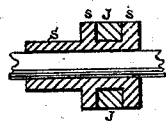


Fig. 11.



Witnesses.

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UNITED STATES PATENT OFFICE.

HENRY J. HAIGHT, OF NEW YORK, N. Y.

IMPROVEMENT IN INCUBATORS.

Specification forming part of Letters Patent No. 122,249, dated December 26, 1871.

SPECIFICATION.

To all whom it may concern:

Be it known that I, HENRY J. HAIGHT, of New York city, in the county of New York, in the State of New York, have invented a new and Improved Machine for Hatching the Eggs of Poultry, which I call the Rotary Incubator; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

The nature of my invention consists in providing the incubator with movable egg-layers, which are to be drawn, by means of mutilated racks and mutilated pinions, to the immovable egg-layers, both of which will press gently the eggs laid in the lowermost layer, and keep them steady in place during the revolution of the machine, and with two semicircular pipes, four perpendicular full tubes with two half tubes, through which the heated water will pass from the water-heating apparatus to the horizontal water-chambers, which are affixed to the backs of the immovable egg-layers, thus giving necessary warmth to the interior. It is a labor-saving machine.

The incubator is a cylindrical body, from one to two arm-lengths in diameter, and of any height, and arched at both the ends, and with two hollow axes so constructed as to admit the ingress and egress of water in pipes through them. (See *ie*, Fig. 2.) Its frame-work consists of the above-mentioned semicircular pipes *a a*, Fig. 2, whose vacant halves are substituted by circular iron bands and perpendicular tubes *b b c c*, Fig. 2, which, being of copper or brass, are so constructed as to serve as a frame-work and distributors of heated water. Those semicircular pipes are laid one upon the front side of one of the ends of the body, and the other upon the rear side of the other end, and are mainly connected with the pipes *b b*, Fig. 2, leading to the heating apparatus. Each of the pipes *b b*, Fig. 2, has two sections fastened to a hollow plug, *p*, Figs. 2 and 8, which revolves with the body round its immovable coupling *r*, Fig. 8, attached to a pipe running through the hollow axis. This coupling is kept in position within the plug by a screw, *s*, Fig. 8, and has but one aperture, fixed in an upper direction, *u*, Fig. 2, or in a downward direction, *w*, Fig. 2. The two full tubes *c c*, Figs. 2 and 3, have half tubes coupled with them by means of bends *x*, Fig. 2, screwed, one of them to the outlet of the

upper semicircular pipe A, Fig. 2, and the other to that of the lower semicircular pipe B, Fig. 2. All their ends or feet are capped, and those of the full tubes rest in a kind of sockets on the opposite bands. The full and half tubes contain small outlets, perforated in them at places required by the horizontal water-chambers, to which they are to be annexed. Besides these full tubes two galvanized iron bars or columns, *i c*, Figs. 2 and 3, are fastened to both the semicircular pipes and bands. Round the perpendicular tubes and columns, exactly in the middle of the body, are horizontally united four strong arms of galvanized iron, G, Figs. 2 and 3, to the hollow axes—two arms to each axis—where they are well screwed to the revolving journals J, Figs. 2, 3, and 11, which (each having two semicircular pieces screwed to the arm) turn round the stationary axes *s s*, Figs. 2, 3, and 11, held up by the support V, Fig. 2. Their other extremities are secured to the tubes and columns L *c*, L *i c*, Figs. 2 and 3, between which the glazed doors are so arranged as to slide on the left hand on casters outside the body. Upon these arms are placed two bars of galvanized iron on one side and two others on the other side, and their other ends are fastened to the semicircular pipes and bands D, Fig. 2, and between the two bars a mutilated rack, with its mutilated wheels E F, Figs. 2 and 7, is fastened to the movable egg-layers X, Fig. 2, the spindle-wheel resting on the arm and its conjoint wheel in an upright bar screwed to the arm or jointed to the spindle-pillow. There are only two racks in the machine, whose spindle-wheels are annexed to the spindle nearly close to its extremities K K, Fig. 3. The frame-work is then covered with a sheet of galvanized iron, leaving two apertures for the doors Z Z, Fig. 3, two for the axes, two for the spindle, and two in the centers of the top and foot of the body for the large tin vapor-flues O, Fig. 2, which are constructed expressly to receive the vapor from the vapor-conduit N, Fig. 2, coming from the heating apparatus, and to distribute the moistened air into the interior. The last-mentioned apertures—each containing two or more small holes made in the body-cover—are furnished with revolving valves with holes corresponding in number and size with those in the body. The valves are overtopped with slightly-curved ridges running in a transverse line with the axes. The springs which connect the valves with the body-cover force the former to return to their

original positions, from which they are drawn by the self-regulator's rod X V, Fig. 2, clutching the ridges. The body-cover is furnished externally with handles for facilitating the turning of the incubator with hands. R R, Fig. 2, represent the temporary artificial mothers, where newly-hatched chicks, directly brought from the hatching-chambers, are allowed to rest for at least twenty hours. They are made of fine wire, with a bottom covered with cloth, and are suspended so considerably above the center as not to be disturbed in their position during the revolution of the incubator. The interior is partitioned into two or more egg-receptacles, each being of a width sufficient to admit the human arm to move freely around within between movable egg-layers fastened to the racks, and immovable egg-layers fixed to the perpendicular tubes, by means of their outlets, holding the hollow joints of their horizontal water-chambers.

The egg-layer is made of a network of galvanized wire twisted in the shape of a large egg, T, Fig. 4, and is kept firm in position by a cross of iron and also by short pieces of wire, Fig. 5, fastened to it and to the base of wire-work, Fig. 6. It is covered with cloth, braced underneath to the base so as to make egg-hollows in the network. All the egg-hollows are made laterally parallel with the hollow axes that the eggs may be latitudinally turned to their other sides by the rotation of the incubator. (See Fig. 4.) The horizontal water-chambers—each chamber having two semicircular sections well-sustained underneath by a cross of galvanized iron, which is attached to the perpendicular tubes and columns—are made of copper tubes bent in the shape shown in the drawing, I W P, Fig. 3. They receive the hot water from A c, Fig. 3, through the joints connected with them, and discharge it into B c (Fig. 3) tube. The drawing, Fig. 3, shows one of the chambers where the spindle Y, Fig. 3, occupying the middle of the incubator, passes between its sections. The water-chambers are attached to the bases of the immovable egg-layers. The movable egg-layers have no water-chambers coupled with them. The movable egg-layers are to be raised or lowered by the mutilated pinions or wheels operating on the mutilated racks (to which they are bolted) Q, Fig. 7. The hand-wheel *h w*, Figs. 1 and 3, connecting with the spindle, is supplied with a detent, Fig. 9, made of an iron bar, or crook-shaped in the manner shown in the drawing *g g*, Fig. 9, and screwed to one of the spokes of the hand-wheel *h w*, Fig. 9, and a curved bar, Fig. 10, and also C, Figs. 1 and 9, attached to the body C B, Figs. 9 and 1. Two right-angled keys, *k k*, Fig. 9, running through the crook, are furnished with broad, flat handles on the upper ends and with screws on the lower ends, which are so arranged by manual pressure at the same time as to come toward each other or retreat from each other. By their forward movement they come in contact with the sides of the curved bar, thus locking the hand-wheel and consequently the movable egg-layers. The little rough-surfaced pieces of iron *r. r.*, Fig. 9, are suspended solely to protect the sides of the curved bar from

being bored by the keys. At the hours of rotation the detent is unlocked, and after the movable egg-layers are brought to the immovable egg-layers it is relocked and the incubator is turned, by which movement all the eggs leave their layers and rest on their turned sides in the opposite layers; the detent is then unlocked, and after the movable layers are drawn back is locked again. Thus the operation of the detent is repeated in every rotation.

The water-heating apparatus is a cylindrical body, the upper portion of which is broader in diameter than the lower portion, and is covered with a sheet of galvanized iron. The lower portion consists of one water-receptacle of copper, I, Fig. 2, in which are perpendicularly inserted one or more slender copper hot-air flues, II, Fig. 2, which converge at the base in the lamp-chamber III, Fig. 2, and at the head in a somewhat larger copper tube leading to the self-regulator IV, Fig. 2; and in the upper portion the I, Fig. 2, receptacle extends upward, though narrowed in breadth, till it ends in a funnel. Around this small receptacle is constructed another much broader receptacle, V, Fig. 2, with a very slender tube piercing through the top of the apparatus VI, Fig. 2, for the purpose of receiving the fresh supply of water and air. This receptacle is open at the top, and has an outlet connected with the distributing-pipe VIII, Fig. 2. The discharging-pipe VII, Fig. 2, is connected with the inlet of the lower receptacle. The space between the water-receptacle and the body is the vapor-chamber IX, Fig. 2, with an outlet at the foot of the heating apparatus in connection with the vapor-conduit.

The self-regulator X, Fig. 2, is a movable arch-topped cylinder with two or more little perforations round its side, and is placed within the uppermost part of the hot-air tube, whose inward rim prevents the rising self-regulator from overstepping the tube. To the head of the self-regulator are fastened two rods, XI, Fig. 2, connected with the movable cone of the lamp XII, Fig. 2, and a flexible joint attached to the crank XIII, Fig. 2, at the A point of the triangle, (crank.) This crank also holds at the B point of the triangle the self-regulator's rod, and turns at the C point of the triangle on a peg fastened to the ramification of the support XIV, Fig. 2; and to the C point of the crank is affixed an indented beam, on which a weight of any metal is suspended. When the movable cone is drawn down by its jointed rods it intensifies the flame, thus heating the air to such a degree that the air, greatly increased in heat, quantity, and buoyancy, rushes up through the hot-air flues and tube and lifts the self-regulator, which, by means of its rod XV, Fig. 2, pulls the valve open that cold air may rush down through the apertures of the valve into the body till the overcharged heat is reduced, by its escape through the same apertures, to its fixed minimum. With the rising self-regulator the rods XI, Fig. 2, draw the movable cone up from the flame, which soon loses its intensity, and consequently the lifting force of the cooling air on the self-regulator is weakened, and the spring of the valve, recovering its retrograding

power, draws the self-regulator and movable cone down. Thus, by the repeated ascents and descents of the self-regulator and movable cone, the uniformity of the temperature within the body is preserved. By being balanced on the beam—not exactly equal to, but very little lighter than all the combined forces employed by the self-regulator and valve-spring—the weight facilitates the ascent of the self-regulator. A glass meter, XVI, Fig. 1, is placed outside, on the face of the upper portion of the heating apparatus, with a tube communicating inside with the water-receptacle for indicating the rise or fall of the water, and two ordinary thermometers, intended to indicate the state of the temperature of the body, are so constructed to suspend on brackets fixed inside as not to be disturbed by the revolutions of the incubator.

In order to prevent newly-hatched chicks from falling into the open spaces between the movable egg-layers and the body-cover, a wall of fine wire-net is put in closely to the edges of the movable egg-layers, around all, except where the movable egg-layers face the doors, which are somewhat farther than the body-cover; and the open spaces between the movable egg-layers and the doors are covered with pieces of fine wire-net fastened horizontally to these layers. Before the incubator is turned the movable cup, linking the vapor-conduit to the vapor-flue attached to the body, should be drawn from the said flue by the revolving-rod, (placed under the base of the support,) which is secured by means of its small flexible elbows to the movable cup, this rod be-

ing furnished with a long upright handle, which is to be pushed to the side of the support and held fast by a ring attached to the support during the rotation of the incubator.

Claims.

I claim as my invention—

1. The rotary incubator with the movable egg-layers, with their working mutilated racks and wheels, and with the immovable egg-layers with the water-pipes, as described and shown.
2. The combination of the distributing and discharging pipes through the hollow axes and the receiving and discharging tubes through the plugs, as described and shown.
3. The detent, unlocking and locking the spindle of the mutilated wheels, as described and shown.
4. The hollow axes, with the revolving journals and their jointed arms supporting and enabling the rotary incubator to turn, in combination with the distributing and discharging pipes, connected, by means of the plugs, with the receiving and discharging tubes through them, as described and shown.
5. The combination of the water-heating apparatus with the hot-air flues, the water-receptacles, the vapor-chamber, the self-regulator, the movable cone, the self-regulator's rod, and the weight-beam, as described and shown.

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