(No Model.) 2 Sheets—Sheet 1.

F. FREY.

INCUBATOR.

No. 536,617. Patented Apr. 2, 1895.

Fig. 1.

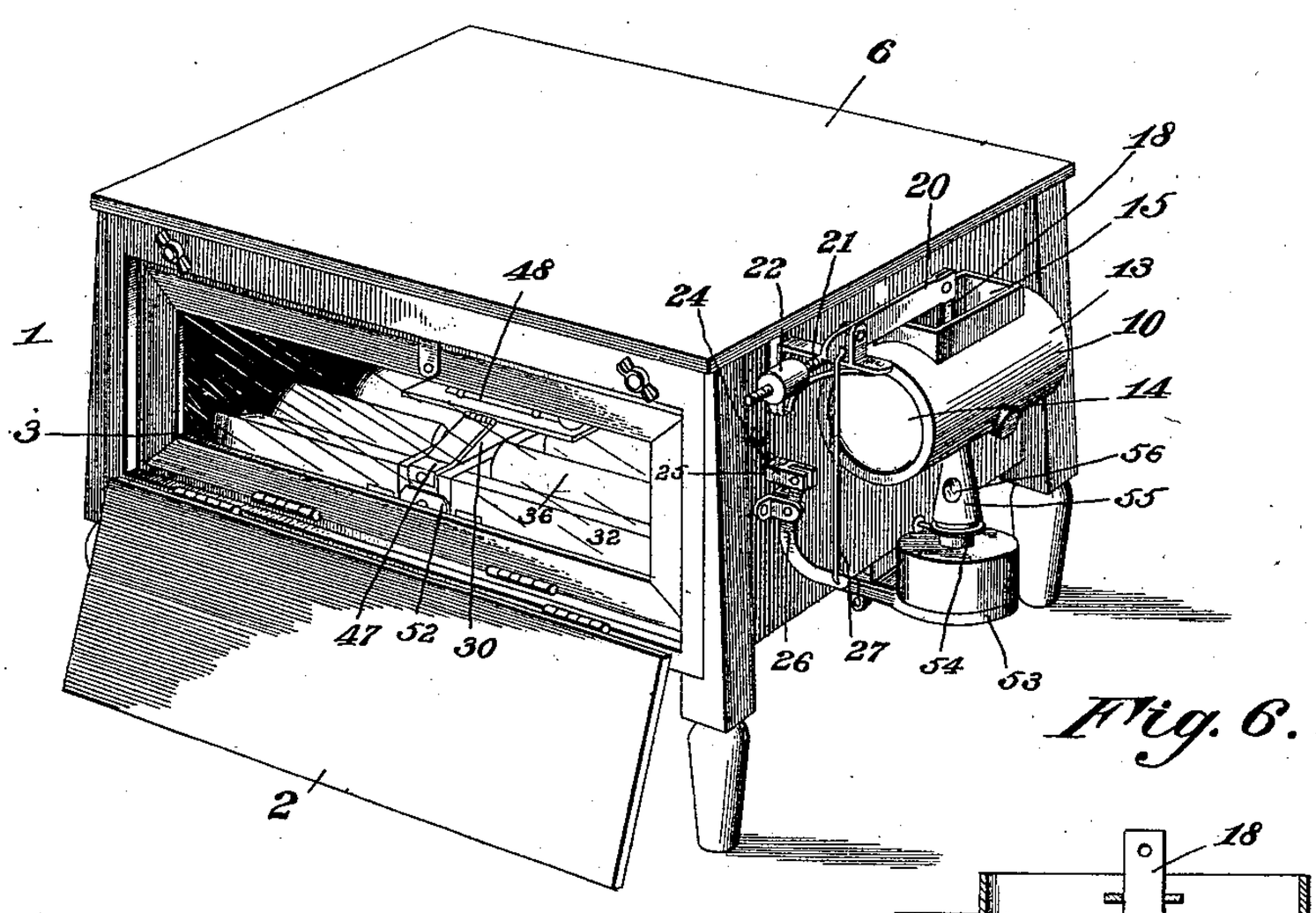


Fig. 6.

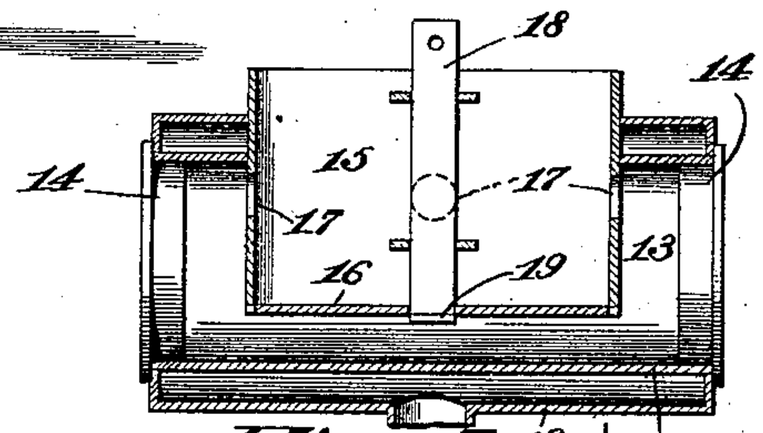
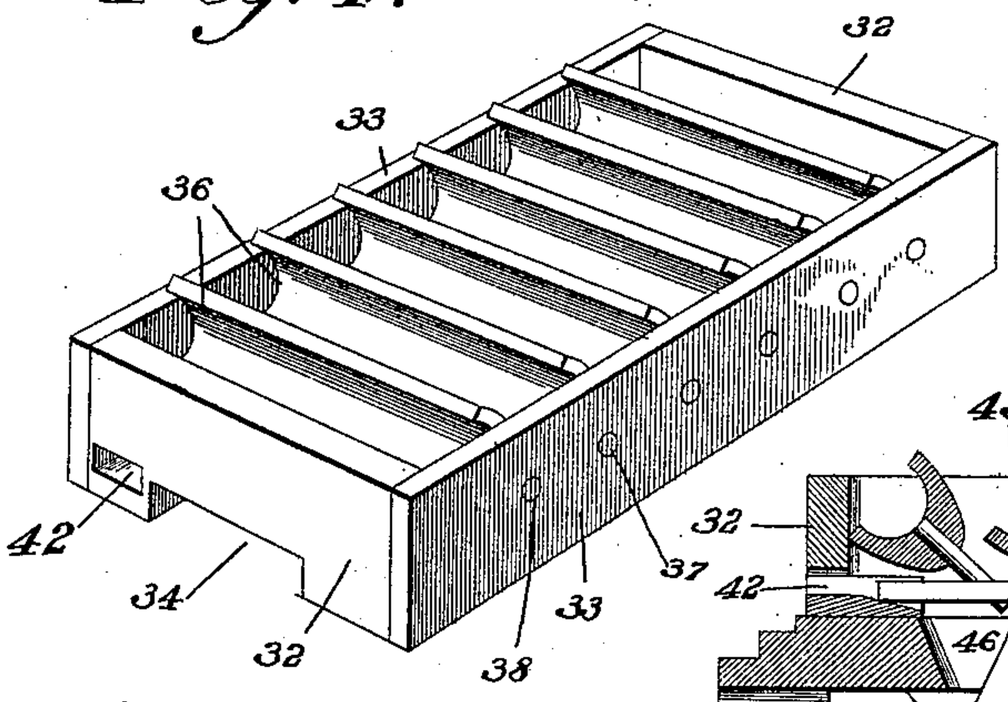
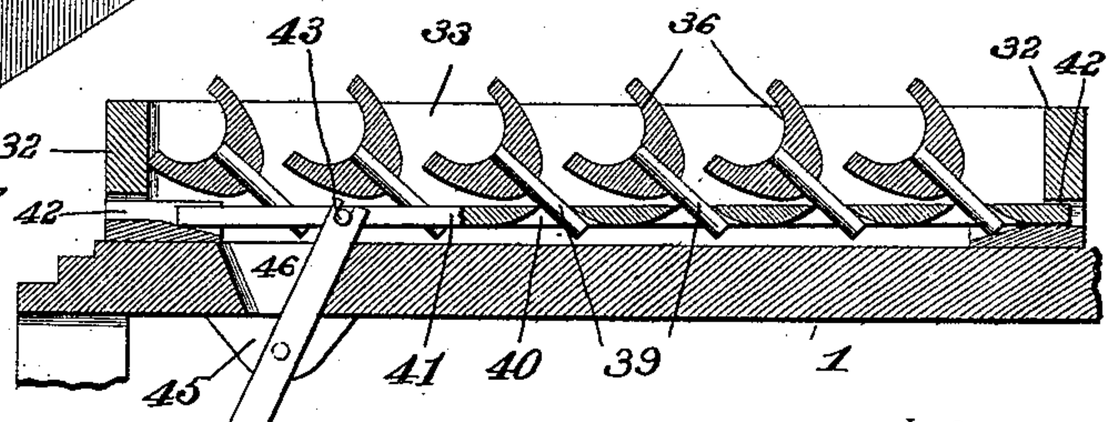


Fig. 5.

Fig. 4.





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(No Model.) 2 Sheets—Sheet 2.

F. FREY.

INCUBATOR.

No. 536,617. Patented Apr. 2, 1895.

Fig. 2.

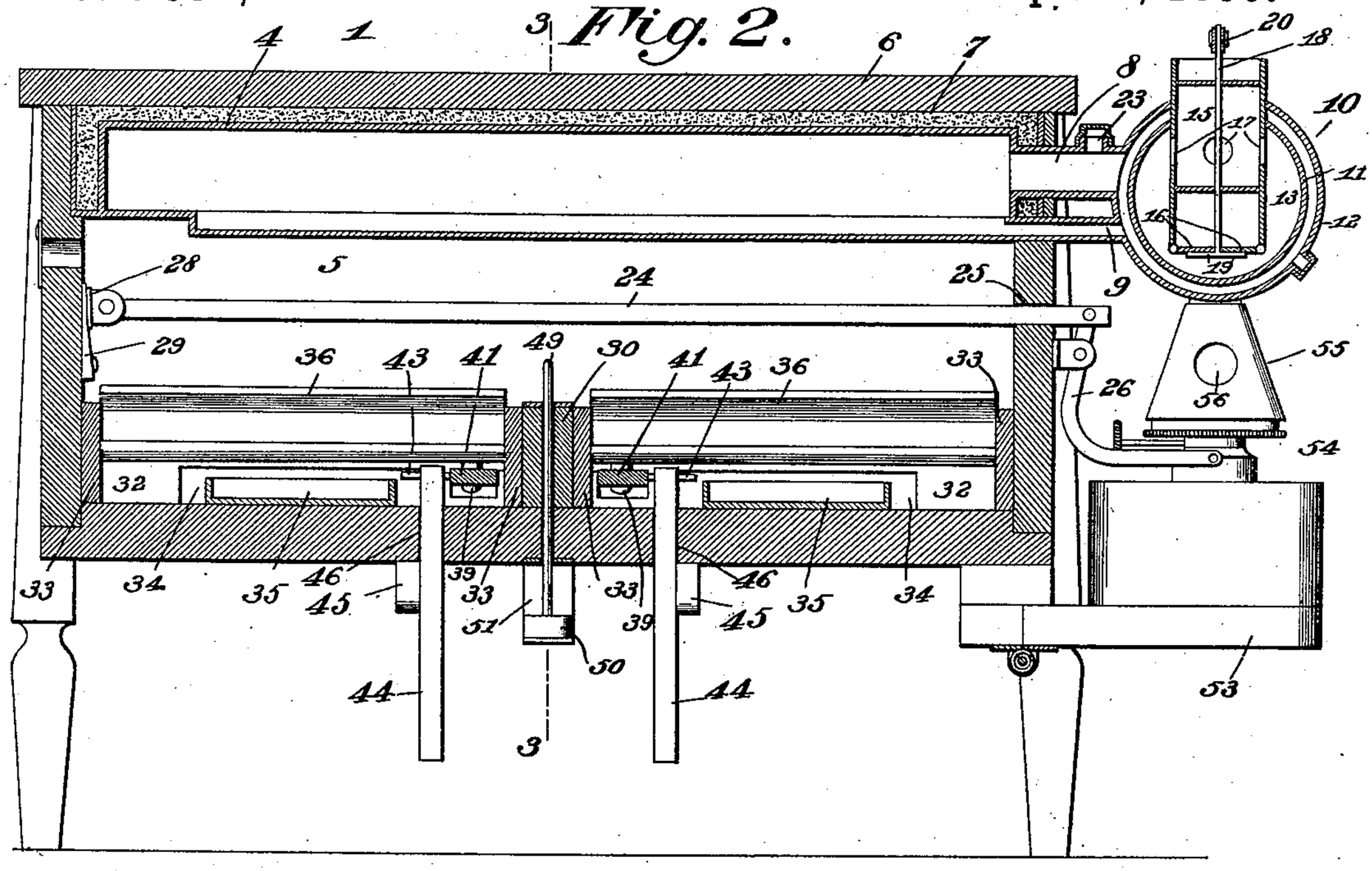
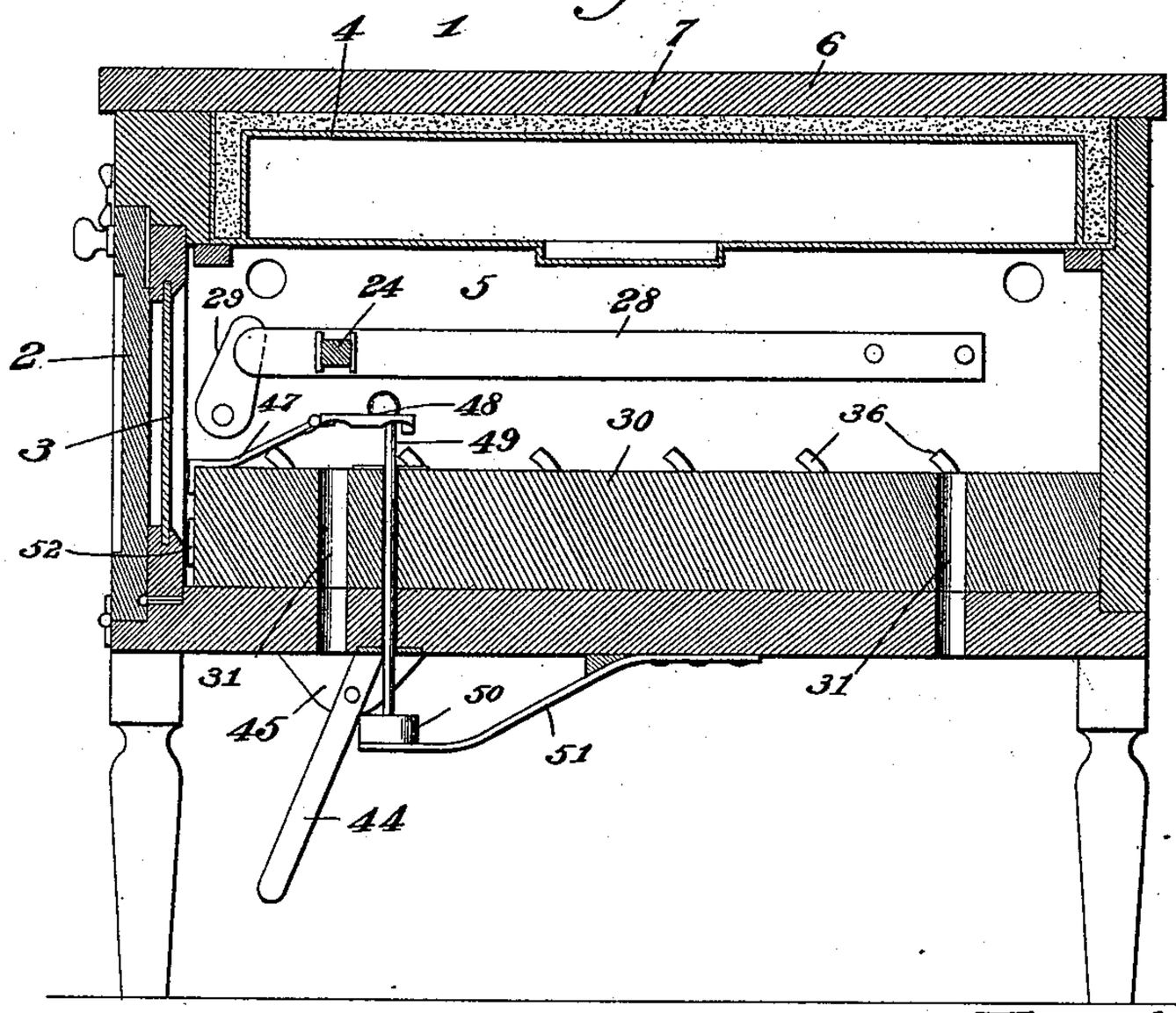


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANK FREY, OF QUINCY, ILLINOIS, ASSIGNOR OF THREE-FOURTHS TO JOHN C. DUSSAIR, JOHN E. HAVIRD, AND HENRY B. DINES, OF SAME PLACE.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 536,617, dated April 2, 1895.

Application filed October 11, 1894. Serial No. 525,627. (No model.)

To all whom it may concern:

Be it known that I, FRANK FREY, a citizen of the United States, residing at Quincy, in the county of Adams and State of Illinois, have invented a new and useful Incubator, of which the following is a specification.

My invention relates to incubators, and it has for its object to provide means for regulating the temperature; to provide means for admitting fresh air without chilling the eggs; to provide means for adjusting the thermostat to actuate the valves at different degrees of heat, as required; to provide improved means for causing a circulation of hot water through the tank; and to provide improved means for turning the eggs.

Further objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings: Figure 1 is a perspective view of an incubator embodying my invention. Fig. 2 is a longitudinal section of the same. Fig. 3 is a transverse section, on the line 3—3 of Fig. 2. Fig. 4 is a detail view in perspective, of one of the egg-trays. Fig. 5 is a detail section of the same and the contiguous portion of the casing, to show the means for reversing the seats. Fig. 6 is a detail longitudinal section of the boiler and heat receptacle.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a casing, provided with a solid door 2 to exclude the light, and an inner, auxiliary, transparent door, 3, which remains permanently closed and through which the contents of the casing may be viewed when the solid outer door is open.

In the top of the casing is arranged a flat tank 4, the lower side of which forms the top of the main or incubating chamber 5, and the upper side of which is spaced from the top 6 of the casing. This space, 7, between the upper side of the tank and the top of the casing is extended around the sides of the tank, and in said space is arranged sand, or other heat insulating material.

Communicating with the tank, at one end, are the upper and lower conductors 8 and 9, which connect with a cylindrical boiler 10, formed between the inner and outer walls 11 and 12 of the cylindrical heat receptacle 13. This heat receptacle is arranged with its axis in a horizontal plane, and the open ends thereof are fitted with removable caps 14, to provide for the removal of soot from the interior of the box or receptacle. The receptacle is provided with a central flue 15, having its open bottom provided with opposite valve-sections 16, preferably hinged to the side-walls of the flue, and the sides of the flue, near the upper side of the receptacle are provided with openings 17 whereby communication is established between the receptable and the flue when the valve is closed. The upper end of the flue is open to allow the escape of products of combustion. Connected to said valve-sections is a stem 18, the connection being made by means of lateral projections 19 on the lower end of the stem which extend under the inner or adjacent edges of the sections, and to the upper end of the stem is attached the lever 20 having a weighted short arm 21. The weight 22 is threaded upon the extremity of the said short arm, to provide for adjustment.

A capped inlet opening 23 is formed in the upper side of the upper conductor 8, to provide for filling the tank with water, and it will be seen that in operation the water which is heated in the annular cylinder passes upward, through the upper conductor, and after partially cooling returns through the lower conductor to the cylinder.

Arranged longitudinally in the incubating chamber is a thermostat-bar 24, attached at one end to one end of the casing and extending at the other end through an opening 25 in the opposite end wall. The outer end of said bar is pivotally attached to the short arm of a bell-crank lever 26, and the longer arm of said lever is connected by means of the rod 27 with the short arm of the weighted lever 20. The longitudinal expansion of the thermostat-bar will be communicated through said levers and connections and will result in opening the valve which controls the flue, the amount of opening being more or less according to the extent of expansion of the bar.

The means for fastening the fixed end of the bar to the contiguous wall of the casing may be varied as desired, but in the construction illustrated it consists of a plate-spring 28, one end of which is secured permanently to the end wall. Contiguous to the free end of this spring is arranged a pivotal wedge-block 29, adapted to be adjusted under the free end of the spring to hold the latter more or less removed from the plane of the surface of the said end wall. The object of this construction is to adjust the thermostat-bar longitudinally, whereby more or less expansion thereof will cause the opening of the valve, according to the degree of heat required in the incubating chamber.

Arranged in the chamber, parallel with and between the end walls thereof, is a partition-bar 30, in which is formed a series of air-inlet openings or passages 31 communicating with corresponding openings in the floor of the chamber, whereby fresh air may be admitted and suitably warmed before coming in contact with the eggs, which are arranged in trays upon opposite sides of the partition bar.

The trays consist of a rectangular frame having end-bars 32 and side-bars 33, the end-bars being provided at their lower edges with recesses 34 to receive the moistening pans 35 which are arranged longitudinally under the trays. Within this frame is arranged a series of seats or rests 36, concavo-convex in section, and resembling troughs, which are disposed transversely and are provided with terminal trunnions 37 mounted in bearings 38 in the side-bars of the frame. Depending from the seats or rests are studs 39, which fit in openings 40 in the slide-bar 41, said slide-bar being mounted in guides 42 at the ends of the frame and having a lateral pin 43 for engagement with the upper notched end of the shifting-lever 44. This shifting-lever is fulcrumed on a bracket 45 depending from the floor of the casing and projects at its upper end through a slot 46 in said floor.

Hinged to a bracket 47 attached to the front end of the partition-bar, is a thermometer 48, which rests on the upper end of a supporting-pin 49, fitted in a guide in the floor of the casing, and this pin is fitted at its lower end with a head or enlargement 50 which rests upon the free end of a spring-bracket 51, attached to the under side of the floor. By pressing the supporting-pin upward the thermometer may be tipped or inclined forward to enable the attendant to read it without opening the transparent door. The trays are held in place by means of a button 52 pivoted to the front end of the partition-bar.

Hinged to the casing at one end is a spring-supported shelf 53, upon which is adapted to rest the lamp or heat-generating device 54, and the burner of said device is held by said shelf in the lower end of the downwardly flared or enlarged funnel or chimney 55, which is permanently attached to the lower side of the heat-receptacle and is provided in its side with a transparent panel 56 whereby the extent of the flame may be noted.

From the above description it will be seen that when it is necessary to turn the eggs the lower ends of the shifting levers are moved to the opposite position to that occupied, thereby throwing each seat or rest into the opposite position. The seats or rests are arranged at such intervals that the eggs cannot fall between them, and therefore each seat serves as a guard for the seats upon opposite sides thereof.

The advantage in pivoting the temperature-measuring device to normally occupy an approximately horizontal position resides in the fact that this arrangement provides for a more compact construction of the apparatus, and at the same time allows the trays and other parts to be removed and replaced, without affecting the facility with which the said measuring device can be read when desired.

It will be understood, furthermore, that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, I claim—

1. In an incubator, the combination of a casing, an insulated tank arranged therein, a sectionally annular boiler in communication by upper and lower conductors with the tank, the space inclosed by said boiler forming a heat receptacle, a valved flue arranged in said receptacle and having openings communicating therewith, and caps fitting in the ends of the heat-receptacle and removable therefrom, substantially as specified.

2. In an incubator, the combination with a casing, and a tank arranged therein, of a horizontal cylindrical heat-receptacle having inner and outer concentric walls to form a boiler which is in communication with said tank, a heat inlet conductor communicating with the receptacle at its bottom, a flue arranged in the receptacle in alignment with said conductor and provided with side openings, a valve arranged in the flue, and means for operating the valve, substantially as specified.

3. In an incubator, the combination with a casing, a tank, an annular boiler in communication with the tank and a heat-generating device, of an upwardly closing valve arranged to control the passage of heat through the heat receptacle of the boiler, a thermostat-bar arranged in the casing and extending at one end beyond the same, a lever pivoted at an intermediate point, and having the extremity of one arm connected to said valve, a weight adjustably mounted upon the other arm of said lever, a bell-crank lever having one arm connected to the exposed end of the

thermostat-bar and the other end connected to the weighted arm of the intermediately pivoted lever, substantially as specified.

4. In an incubator, the combination with a casing containing egg-supporting devices, heat-generating apparatus, draft appliances, in connection with the heat-generating apparatus, including a valve, a thermostat-bar arranged in the casing and projecting at one end beyond the wall thereof, connections between the exposed end of said bar and the valve, a plate supporting the inner end of the bar and attached to a fixed object, and means for adjusting said plate to vary the position of the bar, substantially as specified.

5. In an incubator, the combination with a casing containing egg-supporting devices, heat-generating apparatus, draft appliances including a valve, of a thermostat-bar, arranged in the casing, connections between the bar and said valve, and means for adjusting the bar longitudinally, substantially as specified.

6. In an incubator, the combination with a casing containing egg-supporting devices, heat-generating apparatus, draft appliances including a valve, of a thermostat-bar, arranged in the casing, connections between the bar and said valve, and means for adjusting the bar longitudinally, consisting of a spring-plate attached at one end to the bar and at the other end to the wall of the casing, and a wedge-block adapted to be engaged with said plate to extend the bar, substantially as specified.

7. In an incubator, the combination with a casing and means for heating the interior thereof, of egg-trays having pivotal seats or rests, and means for shifting the same, substantially as specified.

8. In an incubator, the combination with a casing, and heating devices therefor, of egg-trays having frames, trough-like seats or rests pivoted in the frames, and means for shifting the rests or seats, substantially as specified.

9. In an incubator, the combination with a casing and means for heating the interior thereof, of egg-trays having frames, concaved seats or rests pivoted for rocking in the frames, and means for shifting or rocking the seats or rests substantially as specified.

10. In an incubator, the combination with a casing and heating devices therefor, of egg-trays having frames, seats or rests pivoted in the frames, slide-bars, studs on the seats or rests engaging openings in the slide-bars, and means for sliding said bars, substantially as specified.

11. In an incubator, the combination with a casing and means for heating the same, of egg seats or rests pivotally mounted for rocking, slide-bars operatively connected to series of said seats or rests, and levers in engagement with the slide-bars and having exposed portions whereby the seats or rests may be adjusted from the outside of the casing, substantially as specified.

12. In an incubator, the combination of a casing, means for heating the interior thereof, a partition bar provided with inlet openings registering with similar openings in the floor of the casing, egg-trays having frames arranged upon opposite sides of said partition-bar, pivotal seats or rests for the eggs, and means for shifting said rests, and a temperature measuring device arranged in the casing above the said bar and in proximity to said inlet openings, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRANK FREY.

Witnesses:
MARION E. MCMASTER,
HETTIE L. SIMPSON.