L. C. BYCE.

INCUBATOR.

APPLICATION FILED SEPT. 30, 1913.

1,110,532. Patented Sept. 15, 1914.

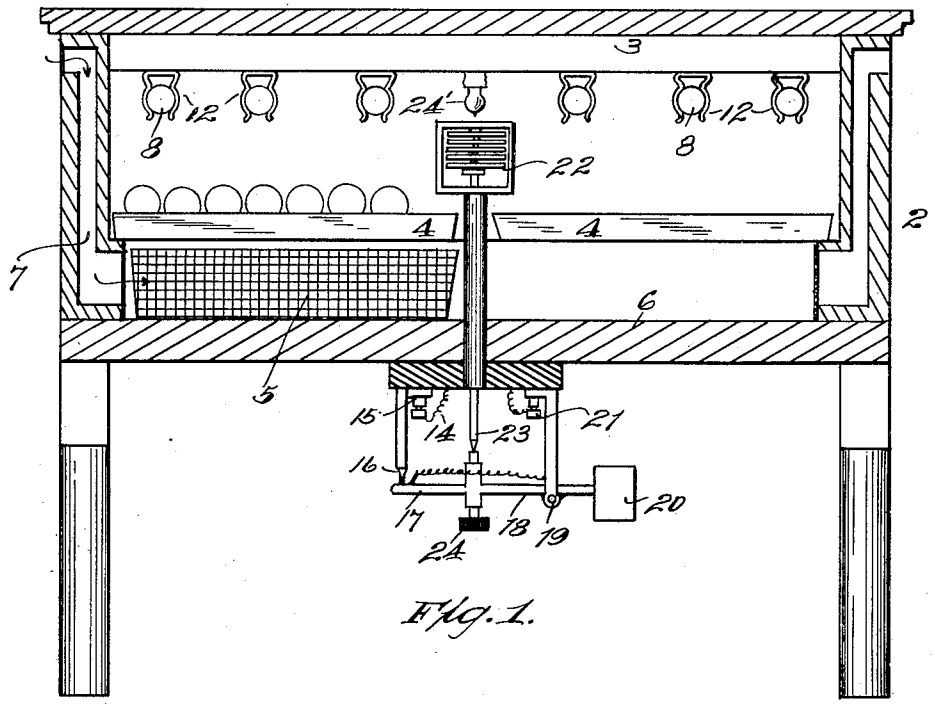


Fig. 1.

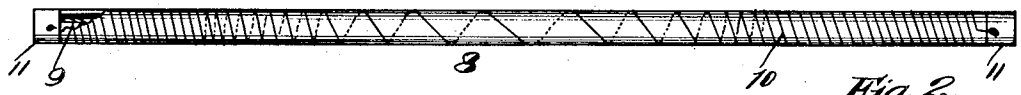
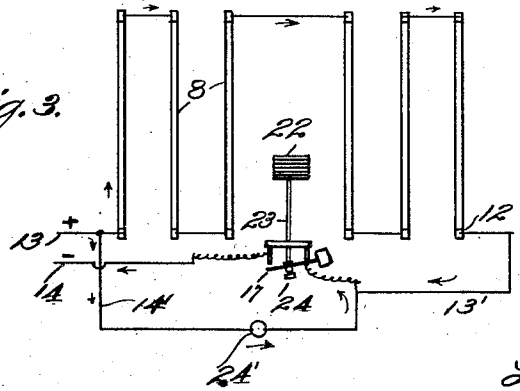


Fig. 2.

Fig. 3.



WITNESSES:

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INCUBATOR.

1,110,532. Specification of Letters Patent. Patented Sept. 15, 1914.

Application filed September 30, 1913. Serial No. 792,602.

To all whom it may concern:

Be it known that I, LYMAN C. BYCE, a citizen of the United States, residing at Petaluma, in the county of Sonoma and State of California, have invented new and useful Improvements in Incubators, of which the following is a specification.

This invention relates to incubators.

The object of the present invention is to provide an efficient, simple, practicable, reliable and automatically regulating incubator.

Another object of the present invention is to provide an incubator involving a plurality of resistance or heating elements, each comprising a helical winding of a resistance electrical conductor, preferably having its windings so pitched that the greater portion of the heat generated will be adjacent to the ends of the unit, and the windings formed at an increased pitch will be further separated at their central portion.

A further object of the present invention is to provide an electrical heating incubator involving a series of connected resistance heat generating units, the circuit wires of which are controlled by an automatically operable thermomechanical device sensitive to minute variations of temperature in the incubator. In making these heating elements especial attention has been given to the winding or rather to the distribution of the wire thereon, for the reason that it is always much easier to heat the center of the egg chamber of an incubator than the corners or sides thereof, hence I have separated the coils of the wire on the center portions of the elements and wound them closer at the ends to overcome the tendency of overheating the incubator at its central portion and increasing the heat adjacent to the side walls. This is an especial feature in heat distribution in electrical incubators and one by which the proper spacing of the elements above the eggs gives perfect distribution of heat, which is a most essential element to the best results in hatching.

The invention further consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which:—Figure 1 is a vertical longitudinal section through the incubator. Fig. 2 is a detail view of one of the resistance units. Fig. 3 is a diagrammatic view of the wiring.

In the drawings 2 represents the housing of an incubator, in which there is a top portion 3, spaced a suitable distance below which are egg trays 4, and below which are nursery baskets 5, the incubator chamber being closed by a bottom 6. The egg chamber may be ventilated by any suitable means, and to that end the walls of the housing of the incubator are provided with ventilating conduits 7 for conveying air from the outside to and from the lower portion of the incubating chamber.

It is one of the objects of the present invention to provide a reliable automatically regulating incubator, the heating of which is accomplished by a plurality of resistance units 8, consisting of a core or rod 9 upon which is spirally or otherwise mounted an electric conductor 10 preferably of high resistance, the ends of the units being provided with bushings 11 adaptable for electrical contact with clips 12, secured to the top 3 of the incubator on its lower surface.

I have found that by winding the resistance coil 10 in close pitch adjacent to the ends of the core 9 and increasing the pitch of the intermediate portion of the core, the heat is more efficiently conserved and distributed by reason of the closer coils of the conductor 10 heating that portion of the chamber adjacent to the walls, which are usually the coldest area of an incubator, and the increasing of the pitch of the coil 10 at the central portion thus decreases the heat produced in the center of the chamber.

There may be as many of the heating units 8 mounted in the incubator as desired, and they are preferably so spaced that the best results in the uniform heating of the incubating chamber may be obtained. To that end I have shown some of the units as arranged close to the end walls with the central space or pitch of the transversely extending units increasing.

The clips 12 holding the heating units are connected in a suitable manner, as indicated in the diagrammatic view, Fig. 3, so that a main or lead wire 13 will connect with one of the clips. Another main or lead wire 14 is provided to complete the circuit; this being connected to a binding post 15 of an automatic switch consisting of a contact point 16 with which is engageable the swinging end 17 of a switch lever 18 pivoted at 19 and carrying a counter-balance 20, the function of which is to normally swing the switch end

17 toward the contact 16. The switch arm 18 is in electrical connection with a binding post 21, from which a lead 13′ extends and is connected with one of the clips 12 at one end of the housing, the circuit through the clips and their superposed heating units 8 being completed when the switch 17 is closed against the contact point 16.

For the purpose of very accurately, positively and automatically controlling the temperature and heating of the incubating chamber, there is mounted in the same a thermostat 22, which is adapted to expand downwardly at one end against a push-rod 23, which normally rests upon the upper end of an adjusting screw 24 carried in the switch arm 18, the counter-balance 20 on the switch arm normally lifting the latter and its superposed rod 23 upwardly so that a contact will be closed and the end of the switch arm 17 will contact the post 16.

When the automatic controlling device has been regulated it will maintain the temperature at a predetermined degree; if this is exceeded the thermostat 22 will expand and force the rod 23 downwardly to depress the lever 17 from engagement with the contact point 16, thus interrupting the electrical circuit energizing the heating units. Upon the gradual reduction of the temperature in the incubating chamber as the heating units cool, the counter-balance 20 will automatically close the switch 17 against the contact point 16 to again complete the electrical circuit.

There may be and preferably is provided in the incubator a signal lamp 24 which is connected in series with the leads 13 and 14 by a shunt wire 14′, connected to one side of the switch post 21, so that as the switch intermittently opens and closes the electric bulb will be likewise energized or deënergized, while the incubator is in operation.

From the foregoing it will be seen that I have provided an extremely simple practical and efficient automatically operating electrically heated incubator, and by the peculiar construction and arrangement of the heating units the most advantageous distribution of heat in the incubating chamber is obtained.

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

In an electrical incubator, a chamber having a similar combined air inlet and outlet at each end thereof and located in a common plane adjacent to the plane of the top of the incubator, a series of spaced independent cores disposed beneath the under face of the top, said cores extending transversely of the length of the incubator and entirely across the width thereof and having electric conductors wound thereabout, the coils of the conductor being widely separated at the centers of the cores and being closely related at the ends of the core whereby to provide maximum heat at the bounding walls of the chamber.

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

LYMAN C. BYCE.

Witnesses:
C. KECK,
K. H. ZIMMERMAN.