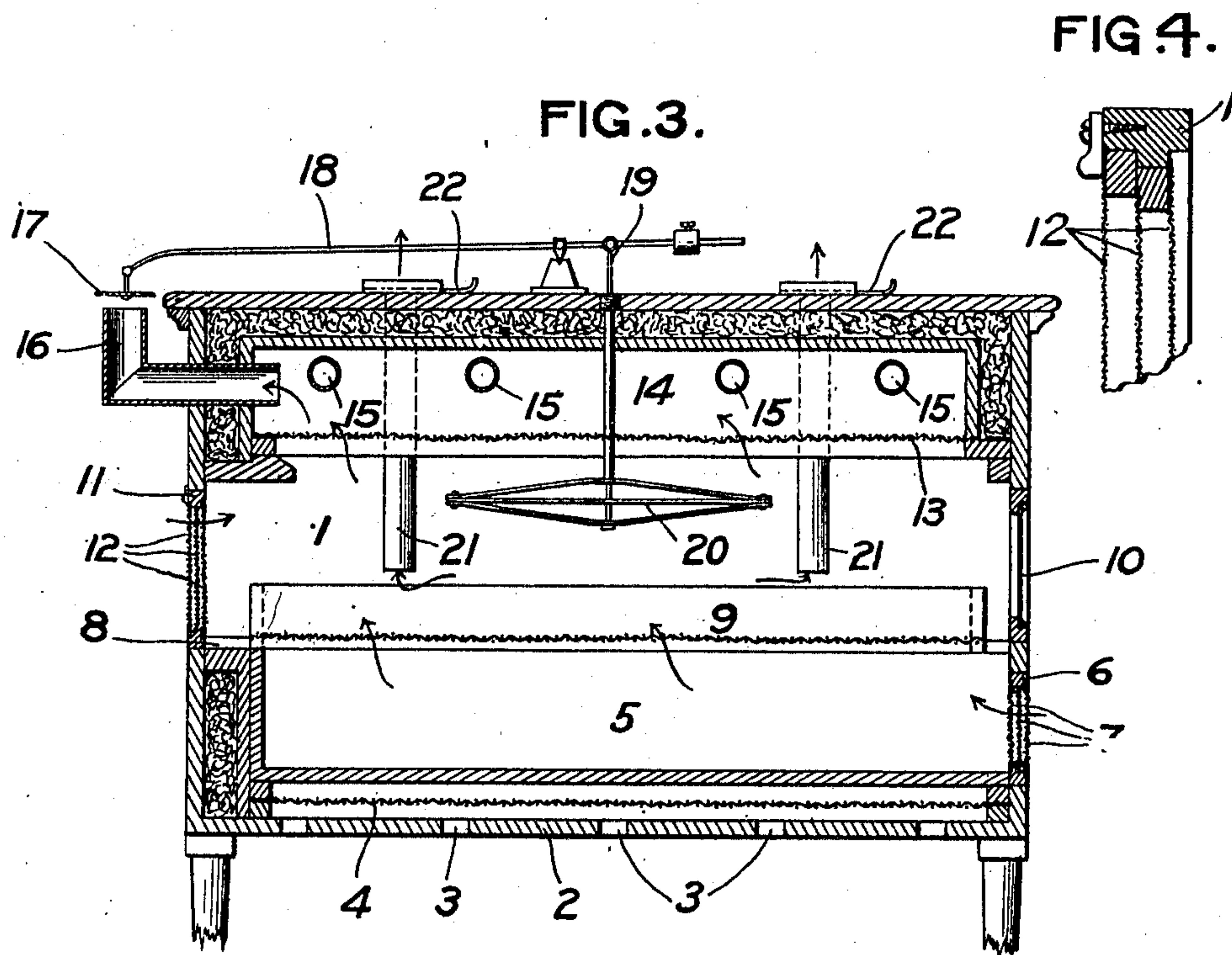
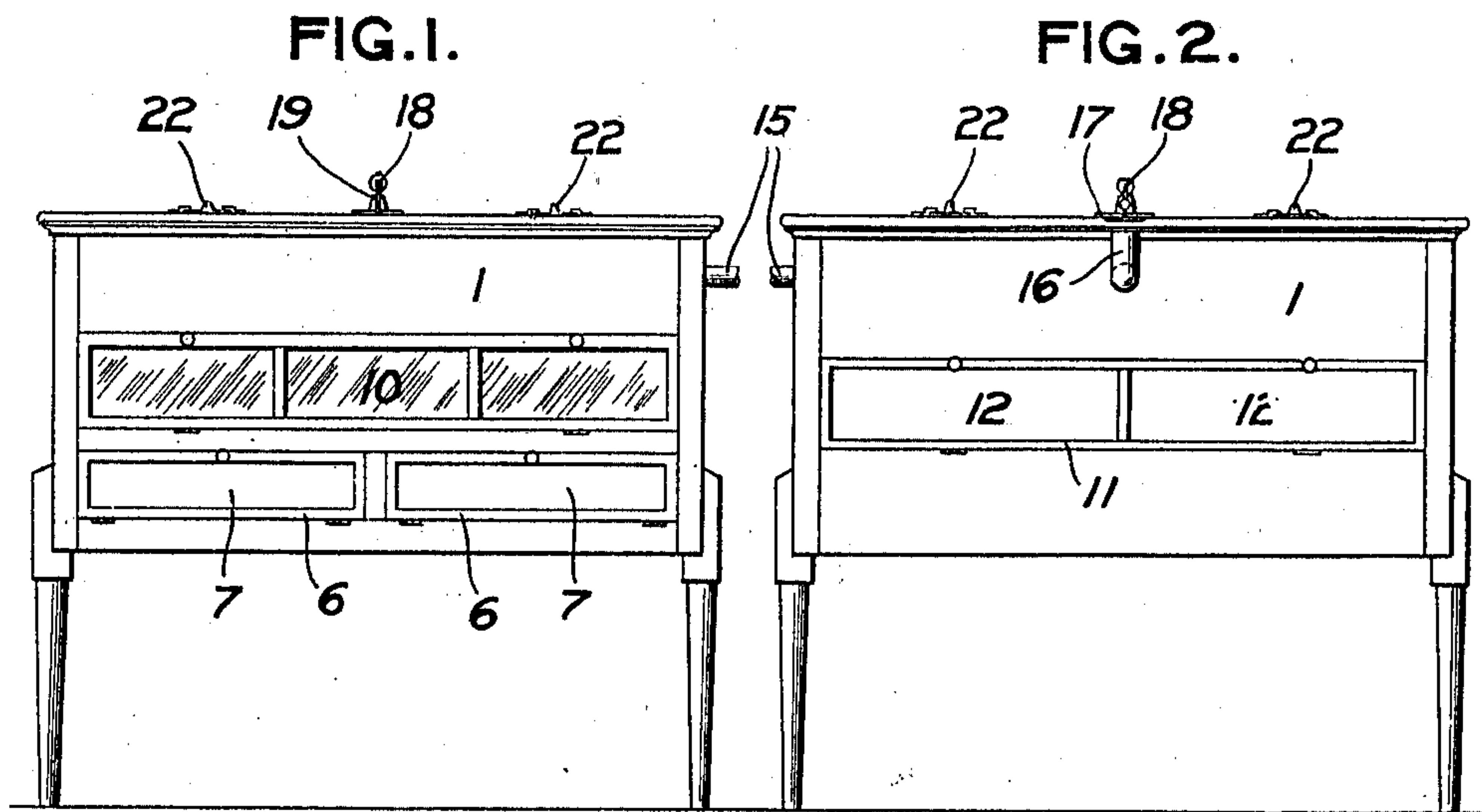


G. M. CURTIS,
INCUBATOR.
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970,311.

Patented Sept. 13, 1910.



WITNESSES:

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UNITED STATES PATENT OFFICE.

GRANT M. CURTIS, OF BUFFALO, NEW YORK, ASSIGNOR TO CYPHERS INCUBATOR COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

INCUBATOR.

970,311.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed March 2, 1908. Serial No. 418,872.

To all whom it may concern:

Be it known that I, GRANT M. CURTIS, a citizen of the United States, and resident of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Incubators, of which the following is a specification.

This invention relates to incubators.

The object of the invention is to provide an incubator having novel and improved means for regulating the flow of air across and through the egg tray so as to control simultaneously, but independently, the temperature and the ventilation of the eggs.

To this end the invention consists in the incubator hereinafter described as it is defined in the succeeding claims.

In the drawings:—Figure 1 is a front elevation of an incubator embodying this invention; Fig. 2 is a rear elevation of the same; Fig. 3 is a vertical transverse section through the incubator and Fig. 4 is a detail sectional view showing the construction of the removable diaphragms in the incubator doors.

The incubator illustrated in the drawings has a casing 1, as usual, and the bottom 2 is provided with perforations 3, permitting the movement of air through them. Above these perforations is the usual porous diaphragm 4 of suitable fabric. Above the diaphragm is the chick space containing the chick drawer 5, and at the front of this chick space is a door 6, consisting of a frame carrying in its center a series (three in this case) of sheets of porous material 7, such as felt or cloth, two of which sheets are mounted on independently removable frames, as shown in Fig. 4, so that the porous door may have either one, two or three of these sheets or diaphragms, as occasion may require.

Above the chick drawer and running on suitable supporting means, such as a pair of cleats 8 (of which only one is shown) is the egg tray 9. In front of the egg tray is a glazed door 10. At the back of the egg tray and opening into the hatching space is another porous door 11 having a series (three in this case) of diaphragms or sheets 12 of felt or other suitable porous material for retarding the movement of air. At least two of these sheets 12 are independently removable from the door 11 in the same manner as the sheets 7, so that either one, two or three sheets may be employed to check air

movement, as the condition of the weather may require. Above the hatching space is a diaphragm 13 of felt or other suitable porous material, and above this diaphragm is the heating chamber 14, in which are suitable heating means 15, such as hot water pipes. The heating chamber 14 is connected with the outer air by a discharge tube 16, controlled by a damper 17 actuated by a pivoted lever 18, which by a rod 19 is connected with a thermostat 20 in the egg chamber, so that as the temperature of the egg chamber rises or falls, the connection of the heating space 14 with the outer air is opened or closed. The hatching chamber is heated by radiation from the diaphragm 13. Further tubes or air conduits 21 are provided extending from the egg chamber adjacent to the egg tray upward through the top of the incubator, and their upper ends are controlled by movable dampers 22, so that a still greater change of air in the egg chamber can be produced.

It will be seen that, without removing the eggs from the incubator, the egg chamber may be thoroughly ventilated, either rapidly, by opening the doors 10 and 11 and allowing free play of air through the hatching chamber, or else slowly and continuously, by graduating the air movement inward through the porous door 6 and outward through the porous door 11, in the continuous operation of the machine. This air movement may be graduated in the present form of the invention by employing the number of sheets 7 or 12 that conditions may indicate.

Owing to the arrangement of the door 7 entirely beneath the egg tray, and the door 12 above the egg tray, the amount of air flowing upward through the egg tray and between and around the eggs may be controlled independently of the control of the total amount of air passing into the egg space and upward through the diaphragm 13 and the ventilating tubes 21. This control is secured by varying the relative porosity of the two doors 7 and 12 by means of the removable sheets of fabric. Thus, for example, by using all of the sheets in the door 7, and only one or two in the door 12, a small amount of air may be caused to pass through the door 7 and upward through the egg tray, while a comparatively large volume of air passes through the door 12 di-

rectly into the egg space and upward therefrom. On the other hand, by using all of the sheets in the door 12, and only a part of those in the door 7, a greater quantity of air
 5 may be caused to pass upward through the egg tray, while the total amount of air passing through the incubator and out through the ventilating tubes 21 and 16 may remain the same. It will be noted that there is no
 10 air discharge downward from the heating chamber 14 through the diaphragm 13, but that the heating of the hatching chamber is accomplished by radiation from the surface of the diaphragm 13.

15 The periodical cooling of the eggs may occur by opening the doors 10 and 11 at the front and back of the incubator, thus permitting free movement of air over the eggs. When the hatch is occurring the dampers
 20 22 are opened and a free ventilation of the eggs and newly hatched chicks is effected.

What I claim is:—

1. In an incubator having a hatching
 25 hatching chamber, and a heating chamber above the chamber for heating the latter by radiation; a porous door in one wall of the incubator communicating with the hatching

chamber; and a porous door in the opposite wall of the incubator entirely below the level of the hatching chamber. 30

2. In an incubator having a hatching chamber, and a heating chamber above the hatching chamber for heating the latter by radiation; a porous door of variable thickness in one wall of the incubator communicating with the hatching chamber; and a
 35 porous door of variable thickness in the opposite wall of the incubator entirely below the level of the hatching chamber.

3. In an incubator having a hatching
 40 chamber and a space beneath the hatching chamber; means for heating the hatching chamber; a porous door in the rear wall of the hatching chamber, having one or more
 45 separately removable sheets of porous material; and a porous door in the front wall of said space entirely beneath the hatching chamber, having one or more separately removable sheets of porous material.

GRANT M. CURTIS.

Witnesses:

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 M. C. ISLER.