

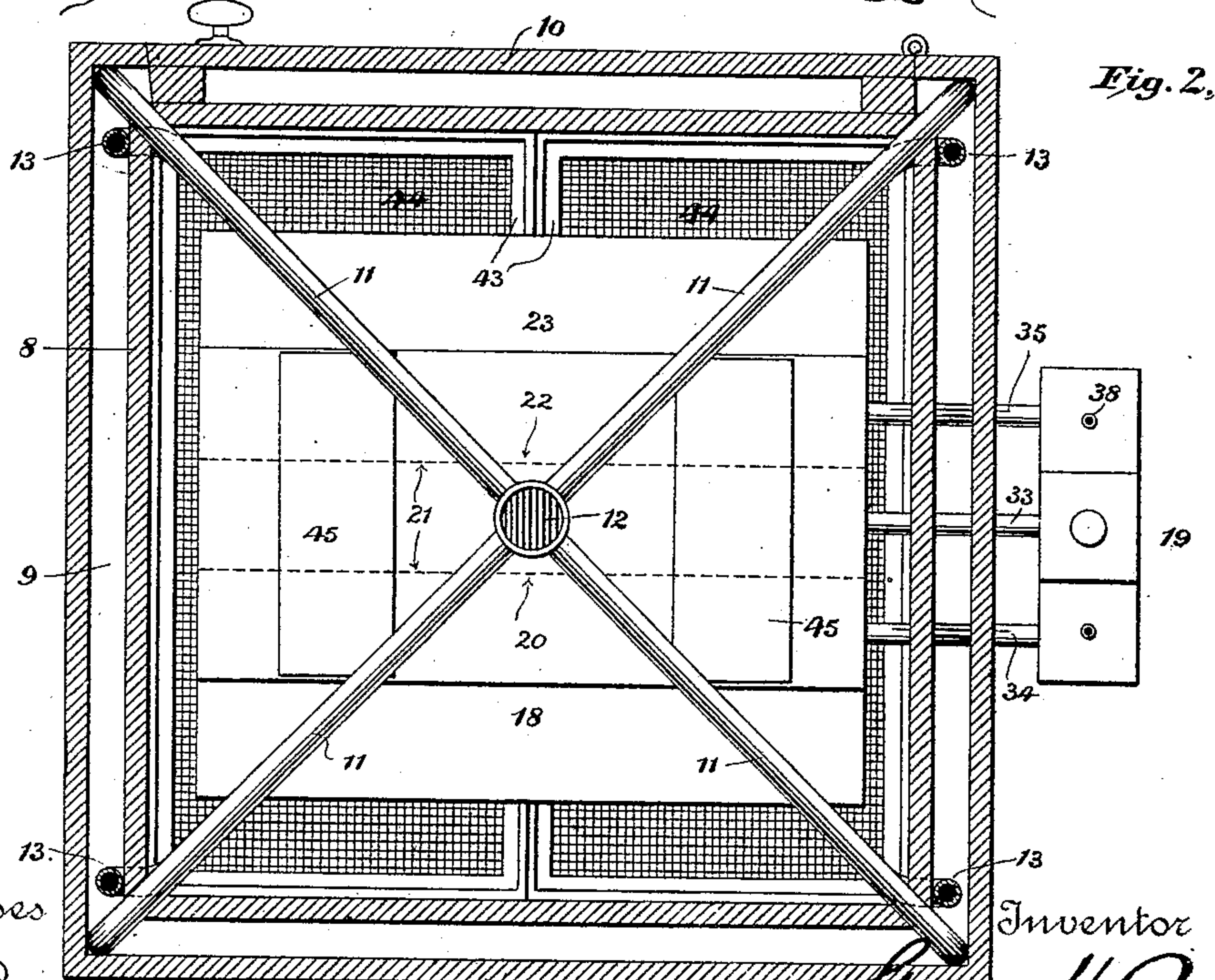
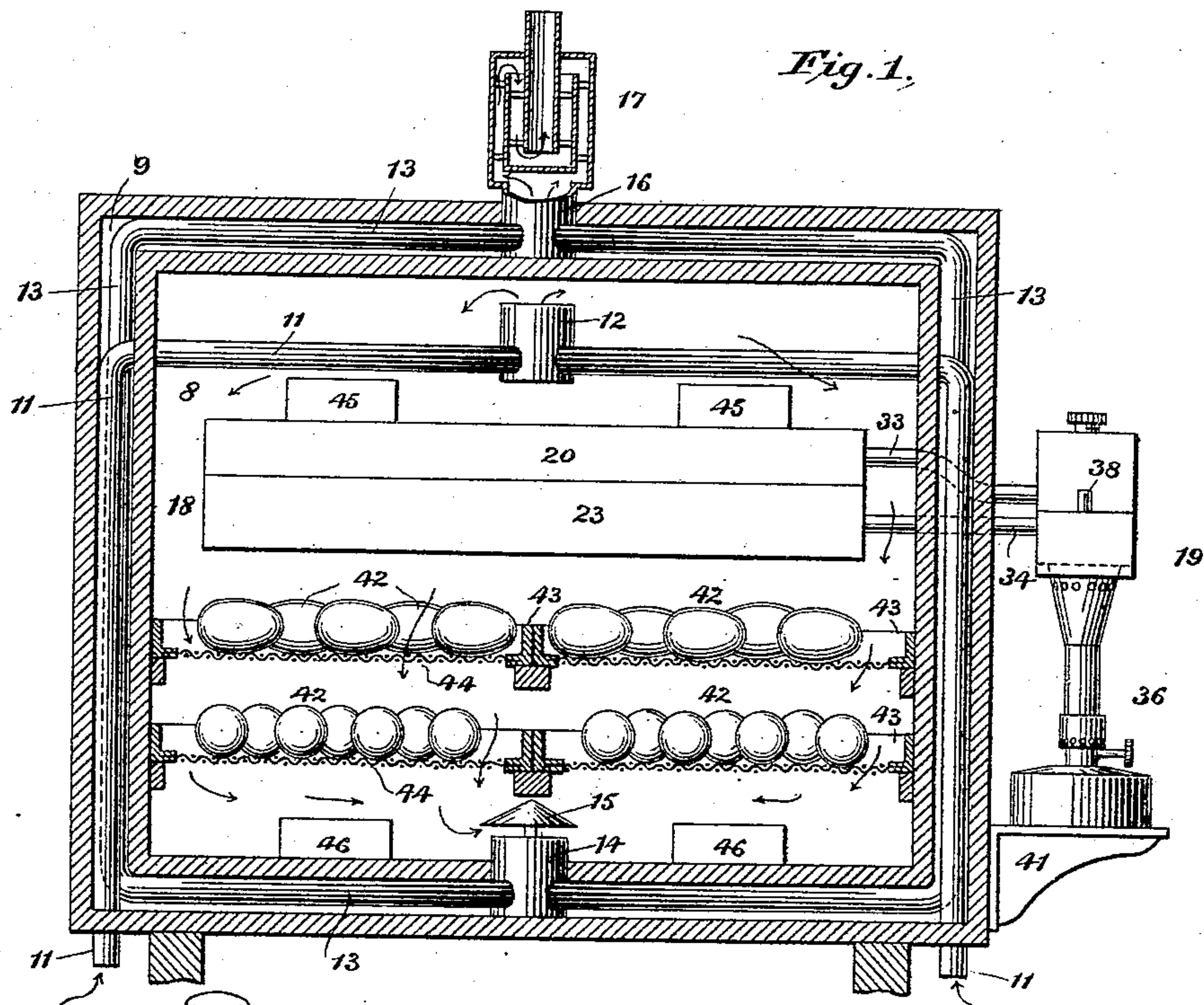
(No Model.)

2 Sheets—Sheet 1.

G. H. BISHOP.
INCUBATOR.

No. 435,387.

Patented Sept. 2, 1890.



Witnesses
Geo. W. Brock
Edward Thorpe

By his Attorney

Inventor
G. H. Bishop
Charles W. Johnson

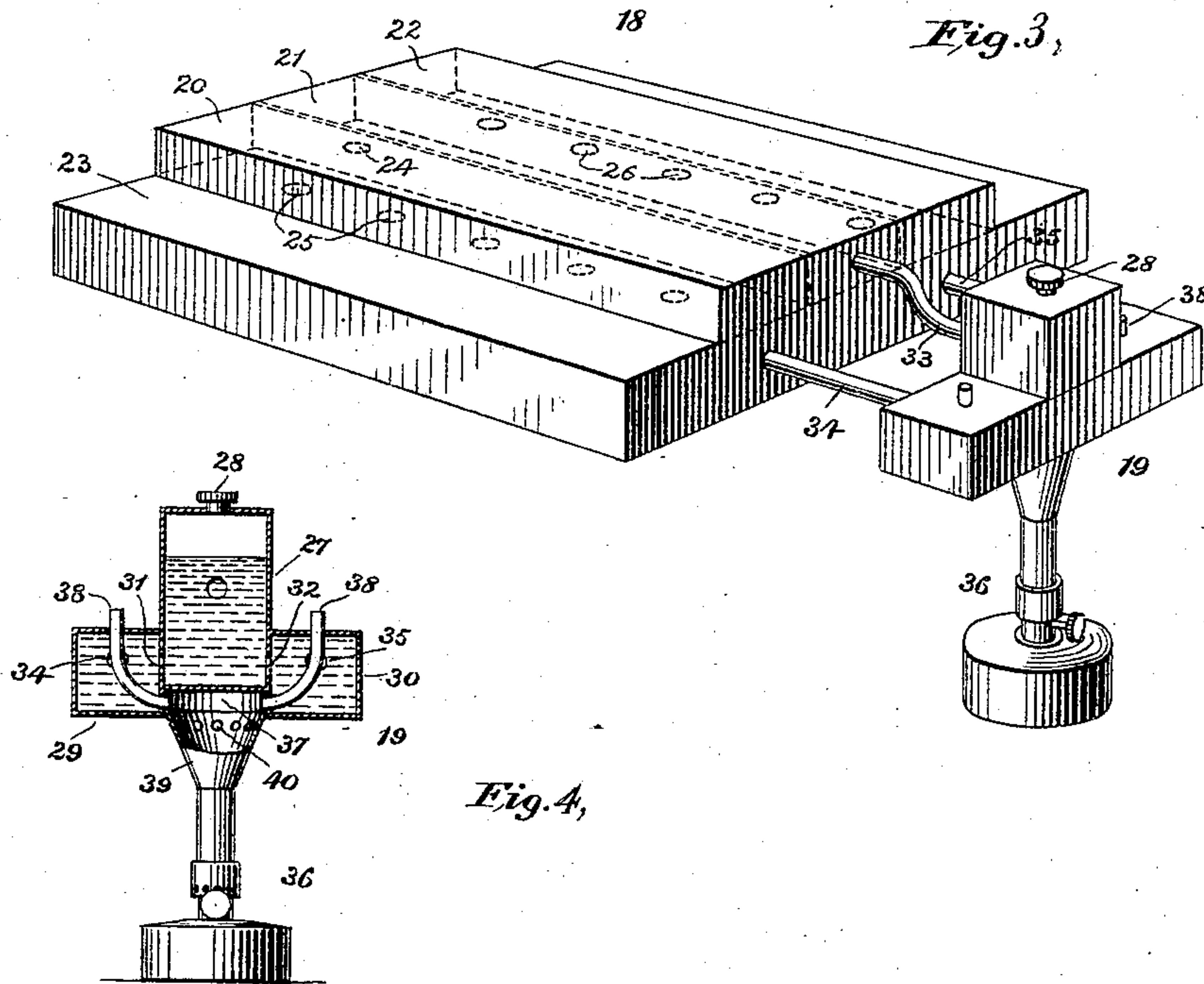
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UNITED STATES PATENT OFFICE.

GEORGE H. BISHOP, OF NORTHPORT, NEW YORK.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 435,387, dated September 2, 1890.

Application filed July 13, 1889. Serial No. 317,481. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. BISHOP, a citizen of the United States, residing at Northport, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Incubators, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to improvements in incubators for hatching eggs.

The objects of the improvements are to maintain a uniform temperature of the air in the incubator and cause the air to constantly circulate therethrough in such manner as to subject the eggs or chicks to the best action of the heated air, at the same time avoiding strong drafts through the chamber.

To the above purposes the invention consists in the peculiar and novel construction and arrangement of the various parts of the apparatus, all as hereinafter fully described, and then pointed out in the claims.

An incubator containing my invention is shown in the accompanying drawings, wherein—

Figures 1 and 2 show vertical and horizontal sectional views, respectively, of the incubator. Fig. 3 is a detached perspective view of the improved water tank and heater for heating the air of the incubating or brooding chamber. Fig. 4 is a view in section taken on a vertical plane centrally and lengthwise of the water-heater.

In the accompanying drawings, like numbers of reference designate like and corresponding parts throughout.

Referring to the drawings, the number 8 designates the incubating-chamber, the walls of which are double, with a considerable space 9 between them. This space 9 may be packed with a suitable non-conductor of heat, or may be left as an air-space to act as a heat-retaining jacket for the chamber to prevent the rapid radiation of heat therefrom. One side of the chamber is provided with a door 10, through which access may be gained to any part of the interior of the chamber.

The air is introduced into the upper part of

the chamber 8 through means of pipes 11 11, shown, preferably, as four in number, and located one near each corner and running from the outside of the bottom of the chamber vertically through space 9 to near the top, thence extending horizontally into the center of the chamber, where they open into a common discharge-pipe 12. The induction-pipe is arranged vertically and has a closed bottom and an open top or mouth that empties almost directly against the upper side of the chamber. The air is led from the chamber 8 by means of a set of pipes 13 13, that run radially from the centrally-disposed education-pipe 14, provided with deflector 15, and set down through the inner wall of the chamber. The outflow-pipes 13 13 are arranged within the space 9 and extend horizontally from the education-pipe 14, one to each corner of the chamber, thence upwardly to the top of the chamber, and horizontally inwardly to the center of the top side thereof, where they open into a flue 16, that is set down through the outer wall of the chamber, and is provided with a deflector 17 for checking the outflow of the air, in order to produce a sluggish movement thereof through the chamber and avoid strong drafts. The air is heated to the desired degree as it is introduced into the chamber by means of a hot-water tank 18, which is disposed horizontally in the upper part of the chamber, so that the air almost immediately upon entering the chamber may be passed over the radiating-surface of the tank, and thus warmed before passing down to the lower part of the chamber, where the eggs or chicks may be located. The tank 18 is metallic and comprises several communicating compartments for maintaining the circulation through the tank of hot water supplied thereto by the water-heater 19. The tank shown comprises three upper compartments 20 21 22 and a lower compartment 23. Compartment 21 is in communication with 23 through opening 24, 20 with 23 through opening 25, and 22 with 23 through opening 26.

The water-heater 19 comprises a heating-section 27, having a capped opening 28, through which the water may be supplied. At two sides of the central section 27 are located compartments 29 and 30, which are respectively in lateral communication there-

with through holes 31 and 32. The central section 27 of the heater 19 is connected with the upper central compartment 21 of the tank 18 by pipe 33, and the side sections 29 and 30 are in communication, respectively, with the bottom compartment 23 of the tank by means of the eduction-pipes 34 and 35, as will be readily understood. By this arrangement when the water is heated in section 27 of the heater 19 it will move through pipe 33 into the upper central compartment 21 of the tank, thence through opening 24 into compartment 23, from where it can circulate up into the side sections 20 and 22, and then by pipes 34 and 35 flow back to the heating-compartment 27 via sections 29 30 and openings 31 and 32. The water in the tank is thus maintained at quite a uniform temperature by virtue of its continual circulation in the heater, and in this way the air in the chamber 8 is kept at an equable temperature. Of course the side compartments 20 and 22 of the tank could be dispensed with, but I prefer to use them to prevent too rapid a circulation of the water.

The water in the heater 19 is heated by means of a suitable flame, in this instance the flame of a lamp 36 applied to the base of the heating-compartment 27, which base is countersunk at 37, so as to better concentrate the heat at the bottom of the heater.

From the combustion-recess 37 extend the upwardly-curved smoke-pipes 38 38, which pass through the interior of the compartments 29 and 30, respectively, and empty to the outside thereof. This disposition of the smoke-pipes is an economic one, since it serves to heat the water in the side compartments 29 and 30. The heat from the lamp 36 is further concentrated upon the bottom of the heater 19 by means of the funnel-shaped tube 39, formed with lateral openings 40 and having its lower end mounted on the lamp-chimney and its upper end fitting into the recess 37 of the heater-base. Both the heater 19 and the lamp therefor are by preference located to the outside of the incubating-chamber 8, the lamp being set on a bracket 41 and in part supporting the heater 19, from which the pipes 33, 34, and 35 extend through the side wall of the chamber and connect with the tank 18, as before described.

The supporting means for the eggs is of suitable open-work to permit the free circulation of the warmed air about the same. Those parts are arranged between the heating-tank 18 and the bottom of the chamber 8, from where the air is withdrawn from the chamber, and in this way the heated air is caused to pass about the eggs.

In Figs. 1 and 2 the eggs 42 are shown as supported on trays 43, set on suitable brackets and provided with open-work or gauze bottoms 44. The heated air, after passing down over the tank 18, will circulate about the eggs and pass thence to the eduction-pipe 14, the draft of the outflowing air being checked and made sluggish by virtue of the

check-plate 15 and the deflector or damper 17 in the outflow-pipe connections, before described. In this way the eggs to be hatched are subjected to air-currents of quite a uniform temperature and incubation is effected.

To slightly moisten the air in the chamber 8, I have provided the open pans 45, located on the top of the tank 18, and the pans 46, located on the bottom of the chamber. These pans are to be filled with water, which in pans 45 will be maintained at the temperature of the tank, and in pans 46 will be kept at about the temperature of the air. By the evaporation of the water from these pans the air will be kept at a desirable degree of moisture.

Among the advantages of the invention, it may be stated that the air of the incubating-chamber is maintained at nearly a uniform temperature and caused to circulate slowly through the chamber, and it is kept pure and no injurious drafts occur.

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

1. In an incubator, the combination, with an incubating-chamber 8, provided with egg-trays and means for heating the air therein, of the set of inflow air-pipes 11, arranged one near each corner of said chamber and each leading upwardly from the exterior of the bottom thereof to near the top, thence extending inwardly to the interior of the chamber near the top thereof, where they empty, and the set of outflow air-pipes 13, extending from the interior of the chamber at the bottom thereof to near each corner, thence upwardly and again inwardly to about the center of the top of the chamber at the exterior thereof, so as to convey the vitiated air from the bottom of the chamber to the exterior of the top thereof, substantially as and for the purpose set forth.

2. In an incubator, the combination, with an incubating-chamber 8, provided with egg-trays and having means for heating the air therein, of a set of inflow-pipes 11, arranged one near each corner of the chamber and each extending from the exterior of the bottom thereof upwardly to near the top of the chamber, thence inwardly to the top of the interior of the chamber, a pipe 12, into which the said inflow-pipes 11 empty, an eduction-pipe 14, arranged at the bottom of said chamber, a discharge-pipe 16, arranged at the top of the chamber and provided with a damper for retarding the outflow of air, and a set of outflow air-pipes 13, connecting said pipe 14 with the pipe 16 and extending around the sides of the chamber, substantially as and for the purpose set forth.

3. The combination, with the chamber 8 of an incubator, of the tank 18, comprising the communicating compartments 21 and 23, the heater 19, comprising the three communicating compartments 27 29 30, the pipe 33, connecting compartments 27 with 21, the pipes 34 and 35, connecting compartments 29

and 30, respectively, with the compartment 23, and means for heating the water-compartment 27, substantially as and for the purpose set forth.

5 4. The combination, with the chamber 8 of an incubator, of the tank 18, comprising communicating compartments 20, 21, 22, and 23, the water-heater 19, comprising three communicating compartments 27 29 30, the pipe
10 33, connecting compartment 27 with 21, the pipes 34 and 35, connecting compartments 29 and 30, respectively, with compartment 23, and means for heating the water in the compartment 27, substantially as and for the purpose set forth.
15

5. The combination, with the chamber 8 of the incubator-tank 18, having communicating compartments, of the heater 19, comprising the communicating compartments 27 29 30, connected to the tank 18 by pipes 33 34 35 in 20 the manner described, and the smoke-pipes 38 38, leading from the combustion-recess 37 of the heater through the compartments 29 and 30, respectively, substantially as and for the purpose set forth.

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Witnesses:

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