

(No Model.)

R. T. KANSKI & E. S. FREEMAN.  
INCUBATOR.

No. 602,017.

Patented Apr. 5, 1898.

Fig. 1.

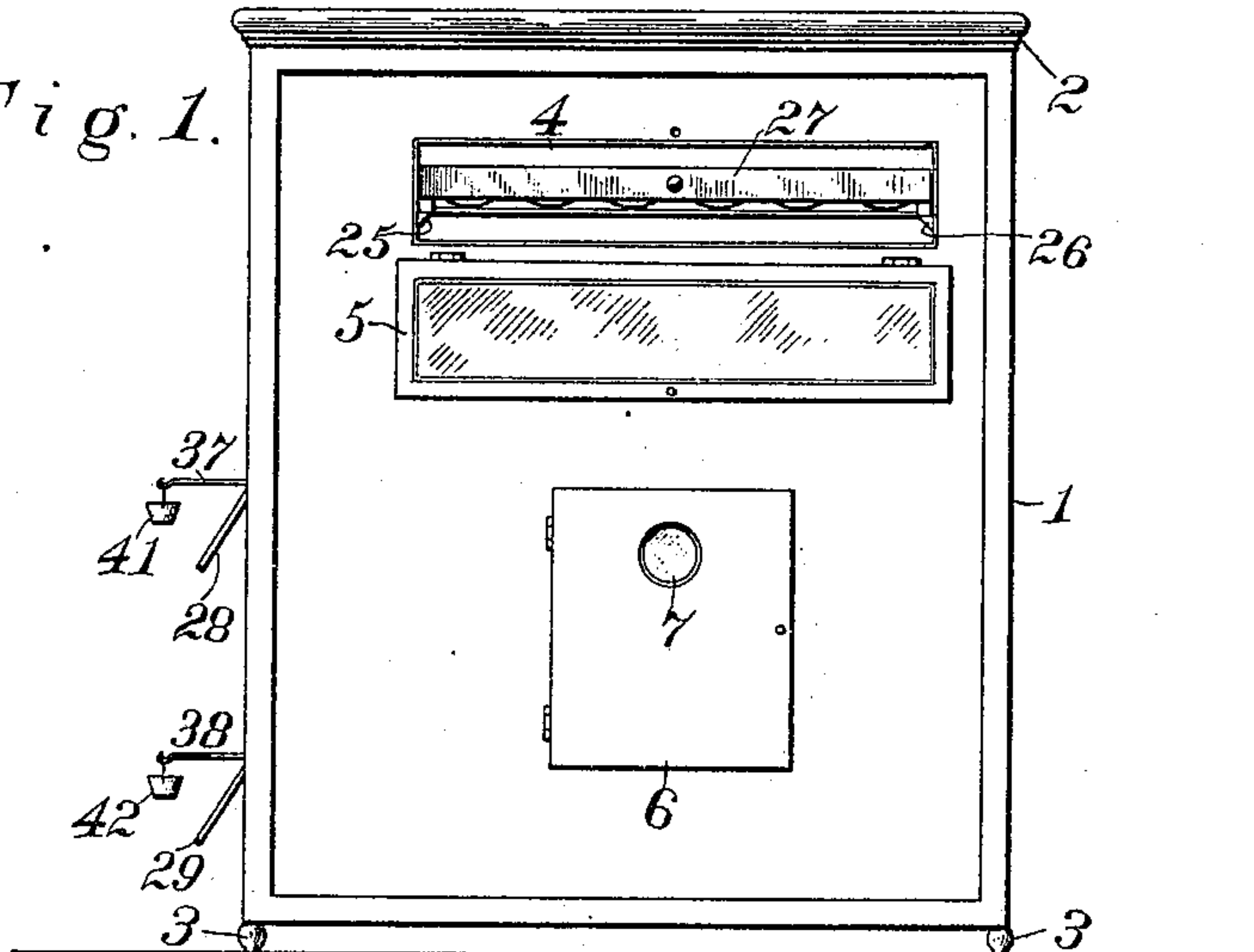


Fig. 2.

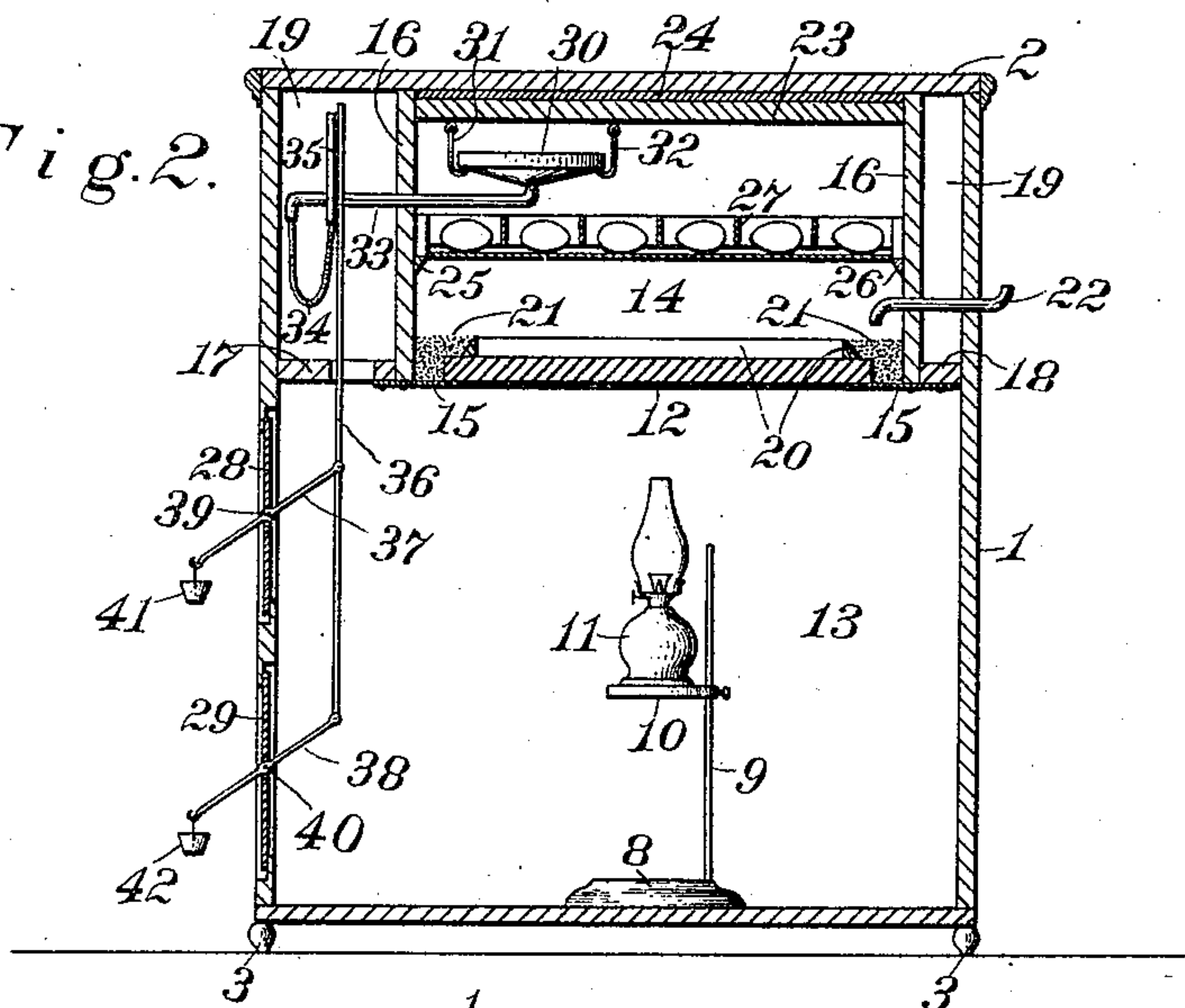
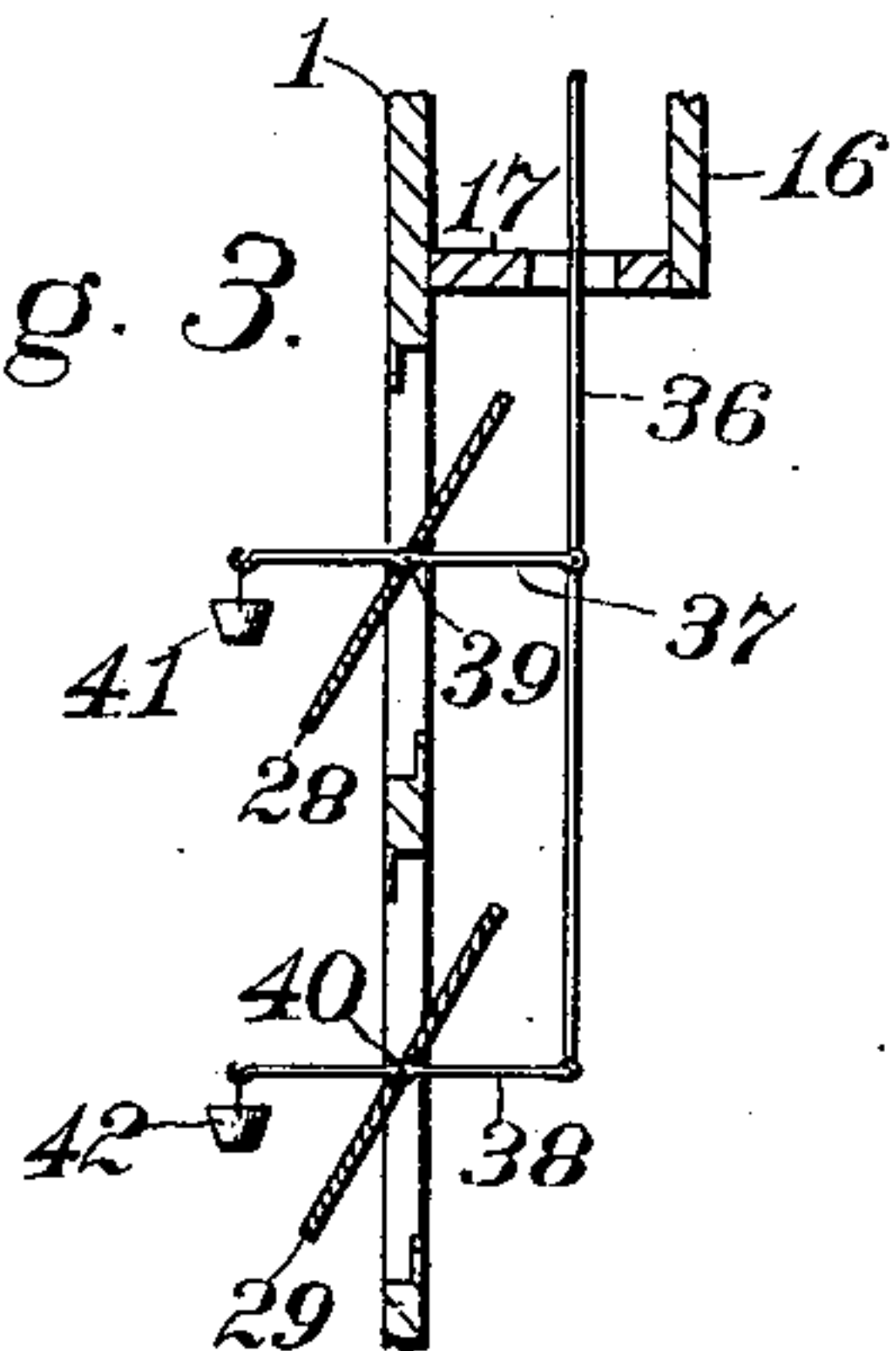


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 602,017, dated April 5, 1898.

Application filed April 23, 1897. Serial No. 633,439. (No model.)

*To all whom it may concern:*

Be it known that we, ROMAN T. KANSKI, residing at New York, in the county of New York, and EDWARD S. FREEMAN, residing at New Rochelle, in the county of Westchester, State of New York, citizens of the United States, have invented certain new and useful Improvements in Incubators; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to incubators, and has for its object the production of an apparatus belonging to the class of devices for artificially hatching eggs embodying improved means for regulating the intensity of the applied heat, for evenly distributing the heat by radiation and convection within the egg-chamber, for supplying moisture to the egg-chamber and for ventilating the same, for effectively sealing the joints about the edges of the removable floor or partition between egg-chamber and heater-chamber, yet permitting the partition to be easily taken out, replaced, and resealed, and an adjustable automatic thermostatic damper or shutter controller governing the admission of external air to the heater-chamber and the outflow of relatively hot air therefrom, mechanisms for the purposes stated being common to the majority of this family of structures.

We accomplish the objective improvements stated by employing, in combination, a source of heat adjustable toward or from a soapstone-floor plate between heater and egg chambers. The stone plate becomes evenly heated throughout and thus distributes the heat regularly. A frame-plate supports the stone floor in such manner as to leave a space between the edges of the stone and walls of the egg-chamber, and this space is filled with sand kept suitably moist by water admitted through a pipe, which performs the additional office of ventilator for the egg-chamber. Our thermostatic shutter-controller consists of a suitable closed vessel, usually located within the egg-chamber, containing al-

cohol above mercury and connected by piping having a flexible portion with a vertical open tube outside of the egg-chamber. An upright rod supports the vertical tube and flexible piping, and a system of balanced levers bears the upright rod. The levers operate certain shutters. Upon expansion of the alcohol by heat above a predetermined degree an excess in weight of mercury is thrown upon the upright rod, and the contraction of the spirit results oppositely in its effect upon the rod and shutters.

Each constituent element of our invention is described in detail and its individual office, together with the mode of operation of the whole, fully explained hereinbelow.

Referring to the accompanying drawings, whereon like numerals are used to designate like parts throughout the several views, Figure 1 represents a front exterior view showing, above, the opening through which the egg-trays are introduced and withdrawn and the door to close the opening and, below, the door affording access to the heater-chamber and provided with a glass-covered orifice or "sight." Fig. 2 represents a vertical cross-section of our invention, showing the interior parts and construction; and Fig. 3, a detail view, partly in section, showing the open position of shutters and weighted levers.

In Fig. 1 numeral 1 marks the exterior casing, constructed usually with a removable top 2, the whole supported by feet 3 or otherwise, as convenient. Near the top is provided an opening 4 into the egg-chamber to be mentioned later. Opening 4 is tightly boarded all around to prevent entrance of fumes from the heater. 5 designates a door, glazed or solid, adapted to close opening 4. It is swung upon hinges and furnished with latch or lock. Through the closed door the condition of the eggs can be plainly seen at all times. Through the lower portion of casing 1 is a second opening, which leads to the heater-chamber and is closed by door 6. A glass-covered orifice 7 permits interior inspection.

Considering Fig. 2, numeral 8 designates a heavy base, from which rises a rod 9, supporting an adjustable frame or platform 10, that carries the lamp or other heater 11. The adjustment of the source of heat is thus pro-



vided for. Immediately above the lamp is located a soapstone slab 12, forming the top of the heater-chamber 13 and the bottom of the egg-chamber 14. Stone 12 rests on a rectangular iron frame 15, which is secured to the bottom edges of walls 16 16 of egg-chamber and to pieces 17 18, that are fitted between walls 16 and the inside of casing 1. It will be noted here that an air-space 19 results from the construction described and extends entirely around egg-chamber 14. It will be further observed that some interval remains between the edges of stone 12 and the walls 16 and that this interval is closed at the bottom by frame 15. Ordinarily the resulting recess or gutter around the stone is additionally deepened by an upright flange of metal 20, secured to or resting upon the upper face of stone 12. The gutter is filled with sand 21, and a bent pipe 22, passing through wall and casing to the open air, is utilized to conduct water to moisten the sand. Pipe 22 is often of sufficient size to act as a ventilator for chamber 14, and it may be continued upward outside the casing, if desired. Chamber 14 is closed near the top by cover 23, removable or fixed, and a thickness of non-conducting material 24 is introduced between cover 23 and top 2 of casing 1. Ways 25 26 are horizontally attached to walls 16, and upon the ways one or more compartment egg-trays 27 may be moved in or out through opening 4.

An important feature of our invention is the heat-operated contrivance for automatically opening and closing pivoted shutters 28 29 in connection with heater-chamber 13. (See Figs. 2 and 3.) A closed receptacle 30, having comparatively considerable exposed surface, is supported by hangers 31 32 from cover 23. Receptacle 30 may be formed either of glass or sheet metal in the shape of a shallow dish closed, top and bottom, gas-tight. While permitting the ready passage of external heat by conduction to the expansible fluid inclosed, the walls of the receptacle must necessarily be thick enough to withstand a slight internal pressure due to the weight of a vertical column of mercury acting upon them hydrostatically, as explained hereinbelow. A tube 33 passes from the receptacle through left-hand wall 16 and is connected by a flexible tube 34 to a second tube 35. A rod 36 supports tube 35 vertically and is itself pivotally borne by the inner ends of levers 37 38, which project through shutters 28 29, to which they are secured. Thus the pivot-pins 39 40 of the shutters afford fulcrums for the levers. At the outer ends of the levers are hung weights, and it is our practice to provide means for varying the amount or effect of these weights. As shown in the drawings, small buckets 41 42 are swung to the end of the levers, and they may be filled with fine shot or selected weights. We do not confine ourselves to this or to any particular expedient for balancing the levers with rod 36 and tubes 34 35 and contents.

The mode of operation of our invention

may be stated as follows: The part marked 12 we prefer to form of soapstone or equivalent material, for the reason that soapstone receives the heat from below and by conduction becomes evenly heated throughout. It parts with its heat into chamber 14 in the same even manner. Therefore no one portion of the egg-chamber is more heated than another. Again, the sand 21 hereinbefore mentioned acts as an efficient seal around stone 12, and no fumes can reach the eggs from the lamp. An additional office of the sand is to receive and distribute moisture by evaporation in the egg-chamber. Water poured through pipe 22 is at once absorbed by the sand and finds its way entirely around by capillarity. Moisture is thus evenly distributed throughout the egg-chamber.

It will be understood that in assembling the parts of our invention tube 33, flexible tube 34, and tube 35 are joined in their proper order, filled with mercury, and tightly corked. Receptacle 30 is inverted and filled either entirely or partly with alcohol. The free end of tube 33 being uncorked and tube 35 allowed to fall lower to prevent spilling the mercury, connection may be made with the receptacle by a screw-threaded or other suitable coupling. The receptacle may now be righted, tube 35 raised, part of the mercury poured from it, and the end exhausted and sealed. Upon arranging the parts as shown in Fig. 2 it will be found that the pressure of the mercury will hold the spirit within the receptacle and that some space remains in tube 35 to permit expansion of the fluids. As mercury is somewhat volatile even at common temperature, we find it advisable to exhaust the air from tube 35 above the metal and seal the end in the usual manner; but for oxidation and evaporation the tube might be left open. It is within the scope of our invention to extend tube 33 through casing 1, tubes 34 35 and rod 36 being assembled as before, the rod being jointed to the outer ends of the levers and buckets 41 42 swung from the inner extremities. This arrangement of the parts would enable one fluid, preferably mercury, to alone operate the shutters; but we find the employment of two fluids differing in expansibility best suited to the work demanded. The weight of metal retains the spirit in receptacle 30, and by trial a degree of heat proper for our purpose is found at which the shutters remain closed. Then the weights are so chosen and placed that an increase in temperature in the egg-chamber expands the spirit and forces an excess of mercury into tubes 34 35, more or less overbalancing the weights in buckets 41 42 with corresponding movement of the shutters. It is believed to be clear that the adjustments described herein may be varied to suit different conditions.

Having thus explained our invention, what we claim, and desire to protect by Letters Patent of the United States, is—



1. In an incubator, the combination of an exterior casing having suitable openings and doors, a heater, an interior casing constituting the egg-chamber and having an outlet or passage through said exterior casing, a heat-transmitting partition forming the floor of said egg-chamber but less in area than the bottom of said egg-chamber, a frame constructed and arranged to support said floor, a sand seal following the edges of said floor within the egg-chamber, a closed receptacle suspended within said egg-chamber, pivoted doors in said exterior casing, levers attached to said doors, a vertical rod pivotally jointed with the levers, a tube secured vertically to said rod, piping connecting said closed receptacle and vertical tube and having a flexible portion, said receptacle, piping and tube containing an expansive liquid, and variable weights borne by said levers, substantially as described.

2. In an incubator, an exterior casing, an interior casing supported by said exterior casing and constituting the egg-chamber, a partition arranged as the floor of said egg-chamber, said partition consisting of a stone plate less in area than the bottom of said egg-chamber, a frame supporting said plate, a detachable flange or ridge upon the upper surface of said plate near its edges, and a sand seal contained between said flange and the walls of said egg-chamber and covering the edges of said plate, the sand acting also as a receiver and distributor of moisture, substantially as described.

3. In an incubator, the combination of a casing having suitable openings and doors, a stone slab arranged to divide said casing interiorly into an upper egg-chamber and a lower heater-chamber, said egg-chamber having independent side walls forming an air-space within said casing, a heater adjustable toward or from said stone, said stone being so formed and supported as to leave, within the egg-chamber, a recess or gutter between its edges and the casing, absorbent material filling said gutter thereby forming a seal to exclude fumes from the heater, a pipe for serving water to said absorbent material and for

ventilating said egg-chamber, removable egg-trays and supports therefor, a walled passage leading into said egg-chamber from a casing-opening, pivoted shutters forming part of said casing, levers attached to said shutters, a receptacle and tubing containing expansible fluids, said tubing having a flexible portion, a rod attached to said tubing and pivotally jointed to said levers, adjustable weights arranged to act upon said levers and to balance the weight of said rod with the tubing and contents borne thereon, substantially as described.

4. In an incubator, the combination of a casing having suitable openings and doors, a soapstone slab arranged to divide said casing interiorly into an upper egg-chamber and a lower heater-chamber, said egg-chamber having independent side walls forming an air-space within said casing, a heater adjustable toward or from said soapstone, said stone being so formed and supported as to leave, within the egg-chamber, a recess or gutter between its edges and the casing, sand filling said gutter thereby forming a seal to exclude fumes from the heater, a pipe for serving water to said sand and for ventilating said egg-chamber, removable egg-trays and supports therefor, a walled passage leading into said egg-chamber from a casing-opening, pivoted shutters forming part of said casing, levers attached to said shutters, a receptacle and tubing containing fluids of different expansibility, said receptacle being located within the egg-chamber, said tubing having a flexible portion, a rod attached to said tubing and pivotally jointed to said levers, adjustable weights arranged to act upon said levers and to balance the weight of said rod with the tubing and contents borne thereon, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

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EDWARD S. FREEMAN.

Witnesses:

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CHARLES H. DEVEAU.