

G. M. CURTIS.  
HEATER FOR BROODERS AND INCUBATORS.  
APPLICATION FILED AUG. 28, 1908.

967,173.

Patented Aug. 16, 1910.

FIG. 1.

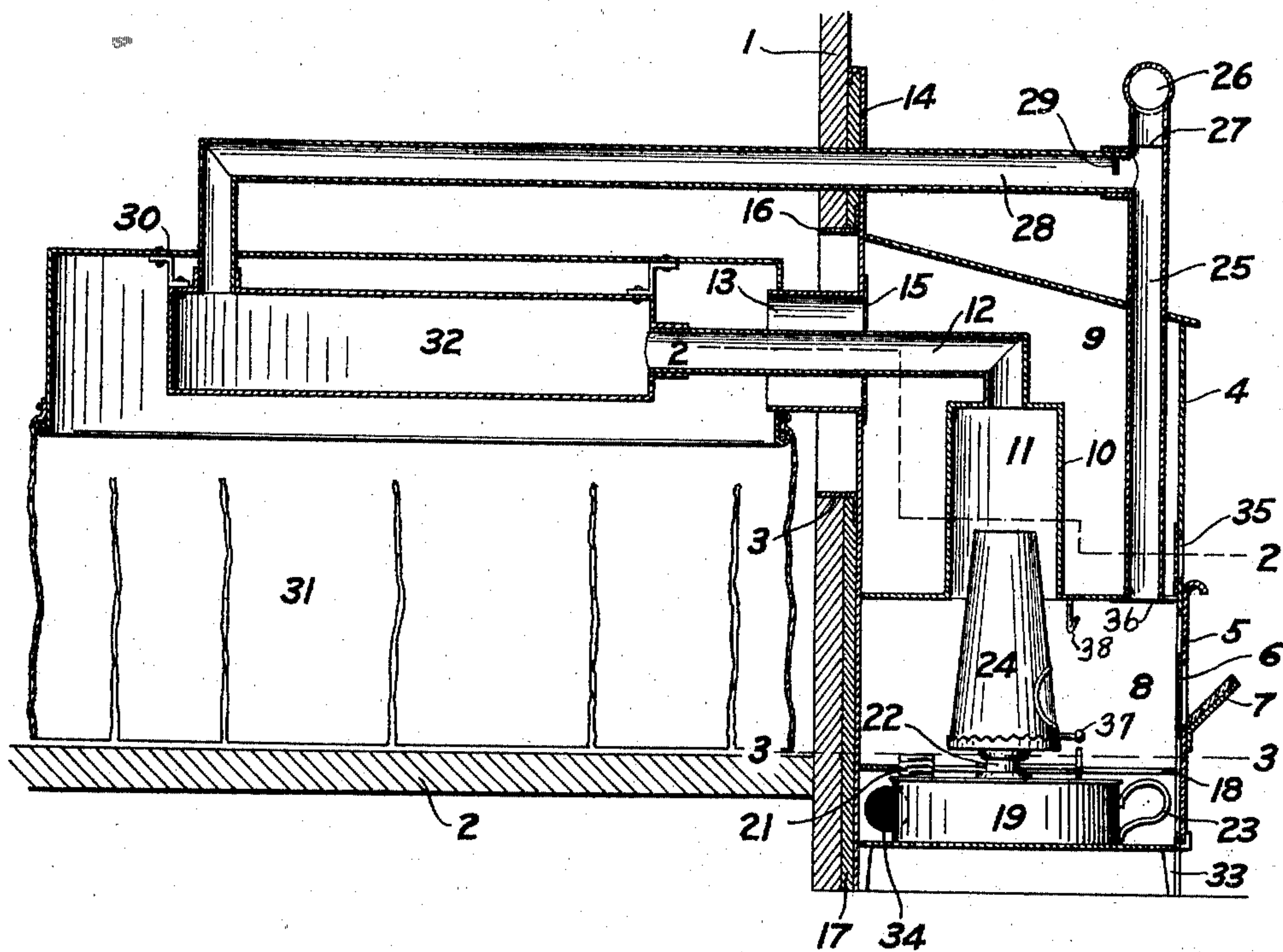


FIG. 3.

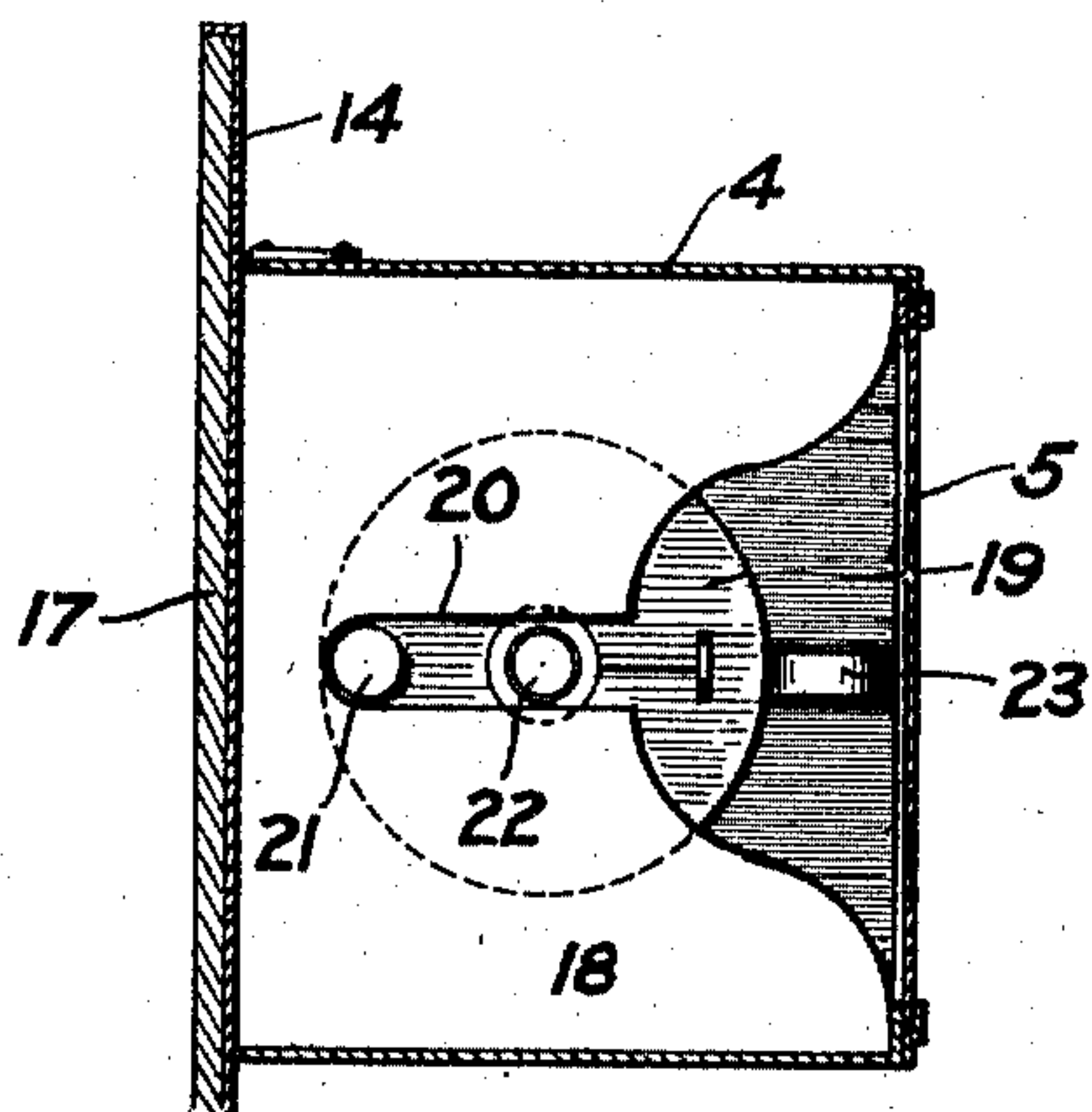
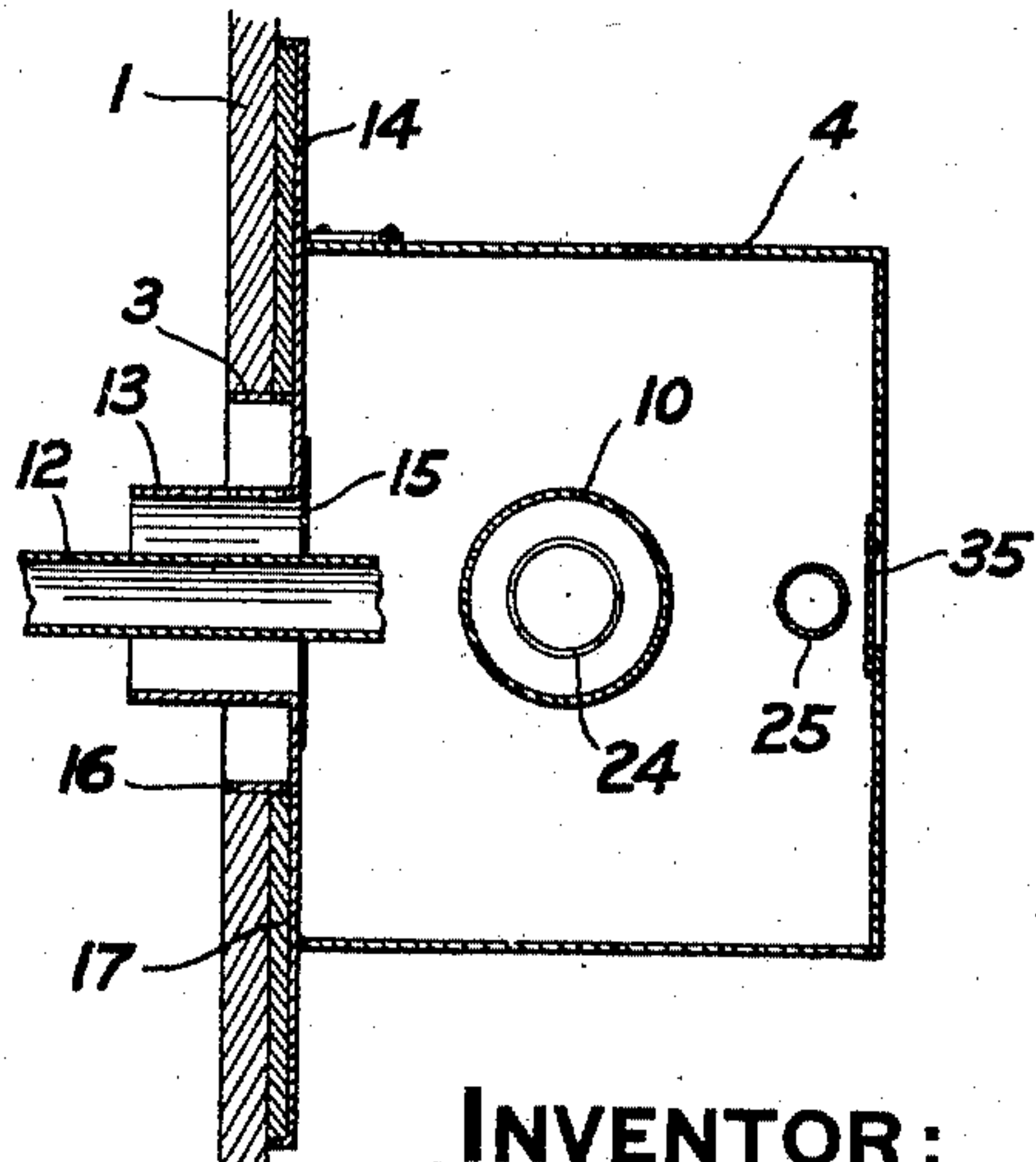


FIG. 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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HEATER FOR BROODERS AND INCUBATORS.

967,173.

Specification of Letters Patent. Patented Aug. 16, 1910.

Application filed August 28, 1908. Serial No. 450,751.

*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 Heaters for Brooders and Incubators, of which the following is a specification.

This invention relates to heaters for brooders and incubators and the like, and consists in the apparatus hereinafter described and claimed.

The object of the invention is to provide means for effectively heating a brooder or similar device by means of a lamp, and at the same time preventing fire risks in connection therewith.

In the drawings:—Figure 1 is a vertical section through a brooder embodying this invention; Fig. 2 is a section on the staggered line 2—2 of Fig. 1; and Fig. 3 is a cross section on the line 3—3 of Fig. 1.

This invention is adapted for use in connection with either indoor or outdoor brooders, and is capable of application to any sort of an outside inclosure, provided that there is a floor, walls and roof. It may be applied to any ordinary out-building by cutting a hole through the side wall thereof, in order to admit the heater inlet and outlet devices, and it may also be applied to any small chicken house, or to a brooder box made particularly for it.

In the drawings the character of the brooder box or house is left indefinite, but a vertical side wall 1 is shown, and a floor 2. The apparatus for producing the heat, whereby the brooder is warmed, is arranged to be set on the outside of the wall 1, while the hover of the brooder and the radiating apparatus for delivering heat therein, are set on the inside of said wall 1.

The outside or heat producing apparatus consists in a lamp chamber and a heating chamber separated, fire-tight, therefrom, with means for delivering heated air and products of combustion from the lamp chamber into the radiating device of the hover, and means for delivering heated air alone from the outside hot air chamber into the hover of the brooder. In addition the products of combustion are led from the radiating device of the brooder outside through the wall, and are discharged to the

air, and the discharge pipe for this purpose is connected by a branch to the lamp chamber of the outside heater. Means are provided for extinguishing the lamp if it smokes, and means are also provided for preventing back-drafts in the lamp chamber which would tend to extinguish, or cause improper combustion, of the lamp. Further, the different parts of the apparatus are separated by fire preventing screens, so that incandescent particles cannot pass them, nor can flame communicate through any of the screens. Further, the opening and shutting of a movable closure of an opening into the compartment containing the hover, does not in any way affect the burning of the lamp, nor produce drafts which could blow dust or flame in such a way as to cause danger of fire, or the flickering or improper combustion of the lamp. Further, the connection for delivering hot air from the outside hot air chamber into the hover is so formed as to require the cutting of a large hole through the side wall 1, in order to set up the device properly, and thus fire risk is further prevented.

The outside apparatus consists in a metal box 4, having a vertical sliding door 5, provided with a transparent window 6, and a mirror 7 adjacent to said window, so as to make it possible to examine the condition of the lamp from a convenient position above the door. The metal box 4 is divided into a lower or lamp chamber 8, and an upper or hot air chamber 9, by means of a suitable partition 10 having preferably a dome-like center portion 11. From the top of the domed portion 11 a hot air flue or pipe 12 turns at right angles, in order to pass out through the side of the device, and to pass through a vertical wall 1 of the hover container. Concentric with the flue 12, and of a considerably larger diameter is the hot air flue 13 attached to the rear wall 14 of the box 4. The space between the hot air flue 13 and the lamp flue 12 is protected by a fire screen 15, consisting of finely perforated metal or fine wire gauze, so as to prevent the passage of flame or of ignited dust particles, and therefore prevent the communication of any flame or fire from the hot air chamber 9 to the hover. Around the hot air flue 13 is a box-like frame 16 projecting from the box 4. This is intended to space the hot air flue



13 from any portion of the wall 1, through which communication between the outside and inside mechanism is effected. Between the back 14 of the box 4 and the wall 1 is placed a sheet of asbestos 17, as shown, or other means for preventing the communication of heat from the box 4 to the wall 1.

In the lamp chamber 8 is a horizontal diaphragm or guide plate 18, Fig. 3, underneath which the oil pot 19 of the lamp fits. The guide plate has a slot 20 in which fits the filling cap 21 on the top of the oil pot and the burner tube 22, so that the filling cap 21, and the orifice which it covers, must be placed at the extreme rear side of the apparatus most remote from the door 5. The size of the oil pot 19 and the shape and size of its handle 23 are such that, if the lamp is set in place in any way except with the filling cap 21 at the rear end of the slot 20, the parts will be obviously ill fitting, and the attention of the attendant will be brought to the fact. One way of producing this is so to arrange the position of the chimney 24 that it will not fit upon its support, unless the filling cap is at the back of the slot; and the handle 23 will strike the back of the case and prevent the oil pot taking its proper position. From the lamp chamber 8 a flue 25 extends upward and terminates in a T-end 26, and near said T-end is provided with a perforated metal or woven wire fire screen 27, for preventing the passage of sparks, and also for extinguishing a smoking lamp, as will be described. Below the fire screen 27, a side branch flue 28 connects with the vertical flue 25, and near the juncture of the two flues there is in the flue 28 a diaphragm 29 extending from the top of the flue half way to the bottom thereof, for a purpose to be described. The lower end of the flue 25 is protected by a screen 36, similar to the screen 27, to prevent the passage of flame through the flue in case oil from the lamp should become ignited within the lamp chamber. For convenience in removing and replacing the lamp, the lamp chimney 24 is provided with a pin 37 adapted to engage a hook 38 depending from the top of the lamp chamber. When the lamp is to be removed, the chimney is raised and held in raised position in the dome 11 by means of the pin and hook.

Within the brooder box is a drum 30, closed on top and open on the bottom. Around the open bottom edge is fastened in any suitable manner a hover curtain 31 of a usual type. Within the drum 30 is the radiator 32, consisting of a box into which the flue 12 leads, and from which the smoke flue 28 leads. This smoke flue 28 is carried through and above the top of the drum 30 for a short distance, and then turning at right angles runs horizontally and parallel

to the flue 12 until it joins the vertical flue 25. It passes through an upwardly extended portion of the back 14 of the outside metal box, and is supported thereby.

The bottom of the heater box 4 is raised above the ground or floor in any suitable way. If desired, legs 33 may be used for this purpose. An air inlet opening 34 is made through the wall of the metal box 4 below the level of the diaphragm 18, and is covered by a fire screen made of finely perforated metal, or of wire gauze of fine mesh. The hot air chamber 9 is provided with an air inlet protected by a screen 35 of finely perforated metal, or of wire gauze of fine mesh.

The operation of the device is as follows:—After the lamp has been inserted through the door 5 with its chimney 24 in the dome 11, and is lighted, heat from the lamp in the dome 11, and in that portion of the flue 12 which is within the hot air chamber 9, heats the air in said hot air chamber. Fresh air is admitted to said hot air chamber by an opening 35 in the wall thereof, covered by a fire screen, which may be a sheet of finely perforated metal, or of wire gauze of fine mesh. The air entering is heated by contact and by radiation from the flue 12 and the dome 11, and is discharged through the hot air flue 13 into the interior of the hover. The products of combustion of the lamp pass through the flue 12 into the interior of the radiator drum 32, and radiation from said drum assists in the heating of the interior of the hover. The products of combustion pass out of the drum 32 through the flue 28, and then upward through the flue 25, the fire screen 27, and out through the T-end 26. The T-end has the well known function of reducing the effect of puffs of wind from various directions. A portion of the air heated by the lamp in the lamp chamber 8 passes upward through the flue 25, and tends to assist in heating the air in the hot air chamber 9, and also tends, in passing the end of the flue 28, to assist the draft from said flue 28.

In case the lamp should smoke, soot is immediately formed and, being carried on by the draft in the pipes, will catch upon the fire screen 27, and after a short time will so clog the draft that fresh air will not be supplied to the lamp, and the lamp will soon be extinguished by lack of oxygen.

In case of cross drafts blowing through the T-end 26, it will be noted that, if it should happen that an excess of draft should occur downwardly through the pipe 25, the current would separate, and part would pass through the pipe 28, thus tending to balance the draft in the lamp chamber 8. The diaphragm 29 operates to prevent an excessive rush of air through the flue 28 since it substantially constricts this flue, but it does not



substantially interfere with the normal flow of hot gases through the flue owing to the limited length of the flue which is so constricted.

5 It will be noted that the device contains a large number of securities against the communication of fire to the brooder, as well as to the walls and different parts of the apparatus. The fire box 8 and its connecting flues, &c. are separated fire-tight from all other parts of the apparatus, there being only the air inlet 34 and the outlet at the T-end 26, and both the said inlet and outlet are protected by fire screens therein. 10 No spark, or flame, existing in the fire box or its connections can communicate itself to any other part of the apparatus. The door 5 being a vertical sliding door falls automatically into place as soon as the lamp is inserted into the lamp box, and the attendant releases the door; the filling cap 21 is placed in such a position that the attendant cannot fill the lamp while the lamp is in place in the lamp chamber 8, but such 25 lamp must be removed from the lamp chamber for filling.

The hot air apparatus, consisting of the hot air chamber 9, the flue 13, and the hover, are protected against communication of fire 30 from the outside box 4 to the interior of the hover, by the absolute separation of the lamp chamber from the hot air chamber, by the diaphragm 11, and its connections; by the air inlet 35 protected by the fire 35 screen; by the closure of the hot air flue 13, by the fire screen 15, and by the separation of the flue 13 from contact with any wood work by means of the surrounding wall 16.

What I claim is:—

40 1. In a heater for brooders and incubators, the combination with a lamp chamber, of a lamp therein provided with a chimney, a radiator, a flue into which the chimney directly discharges for conducting products of combustion from the lamp to the radiator, a discharge pipe from the radiator, and a flue connecting the lamp chamber with the discharge pipe and entering the

lamp chamber at one side of the lamp chimney. 50

2. In a heater for brooders and incubators, the combination with a lamp chamber, of a lamp located therein and provided with a chimney, a radiator, a flue into which the chimney directly discharges for conducting products of combustion from the lamp to the radiator, a discharge pipe from the radiator, a flue connecting the lamp chamber with the discharge pipe and entering the lamp chamber at one side of the lamp chimney, and a fire screen in the discharge pipe beyond its connection with said flue. 55 60

3. In a heater for brooders and incubators, the combination of a lamp chamber provided with an upper opening for a lamp chimney and a lateral opening for the insertion of the lamp, and a lamp having a chimney, a filling opening and a handle, said filling opening and handle being located on opposite sides of the chimney, said upper opening for the lamp chimney being located at a distance from the side of the lamp chamber opposite to said lateral opening less than the distance between the chimney 65 70 75 and the extremity of the handle of the lamp, so as to prevent insertion of the lamp with the filling opening adjacent to said lateral opening.

4. In a heater for brooders and incubators, the combination of a lamp chamber provided with a lateral opening for the insertion of a lamp, a guide in said chamber having a horizontal slot open at the end toward said lateral opening and extending 80 85 away therefrom, and a lamp having a body adapted to be inserted in the lamp chamber below said guide and having a filling cap and a burner tube both projecting upwardly into and closely fitting the slot in the guide 90 to prevent rotation of the lamp body when in the lamp chamber.

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Witnesses:

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