

No. 786,450.

PATENTED APR. 4, 1905.

A. A. LINEBAUGH & C. LYMAN.  
INCUBATOR.

APPLICATION FILED MAY 17, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

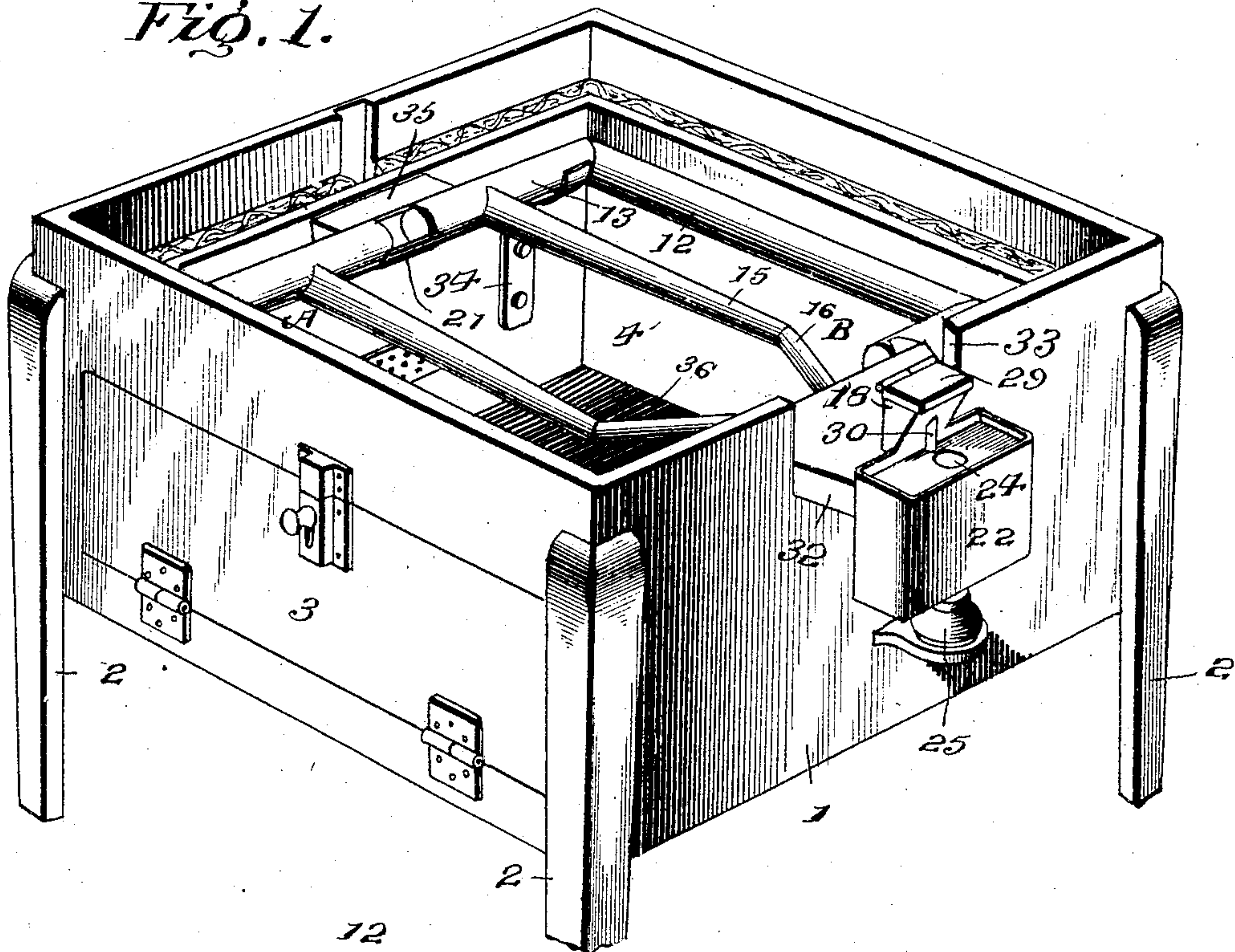
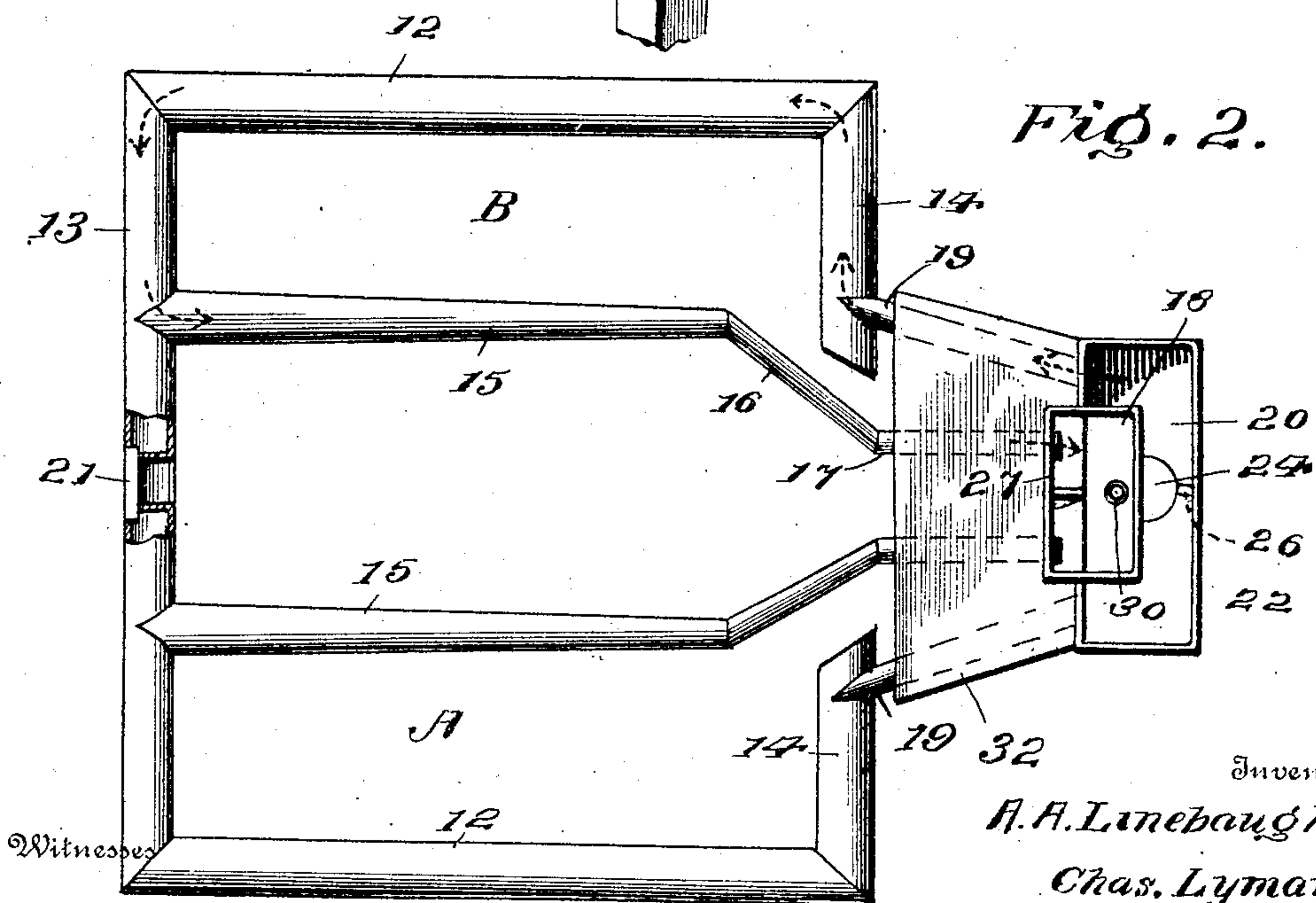


Fig. 2.



Witnesses

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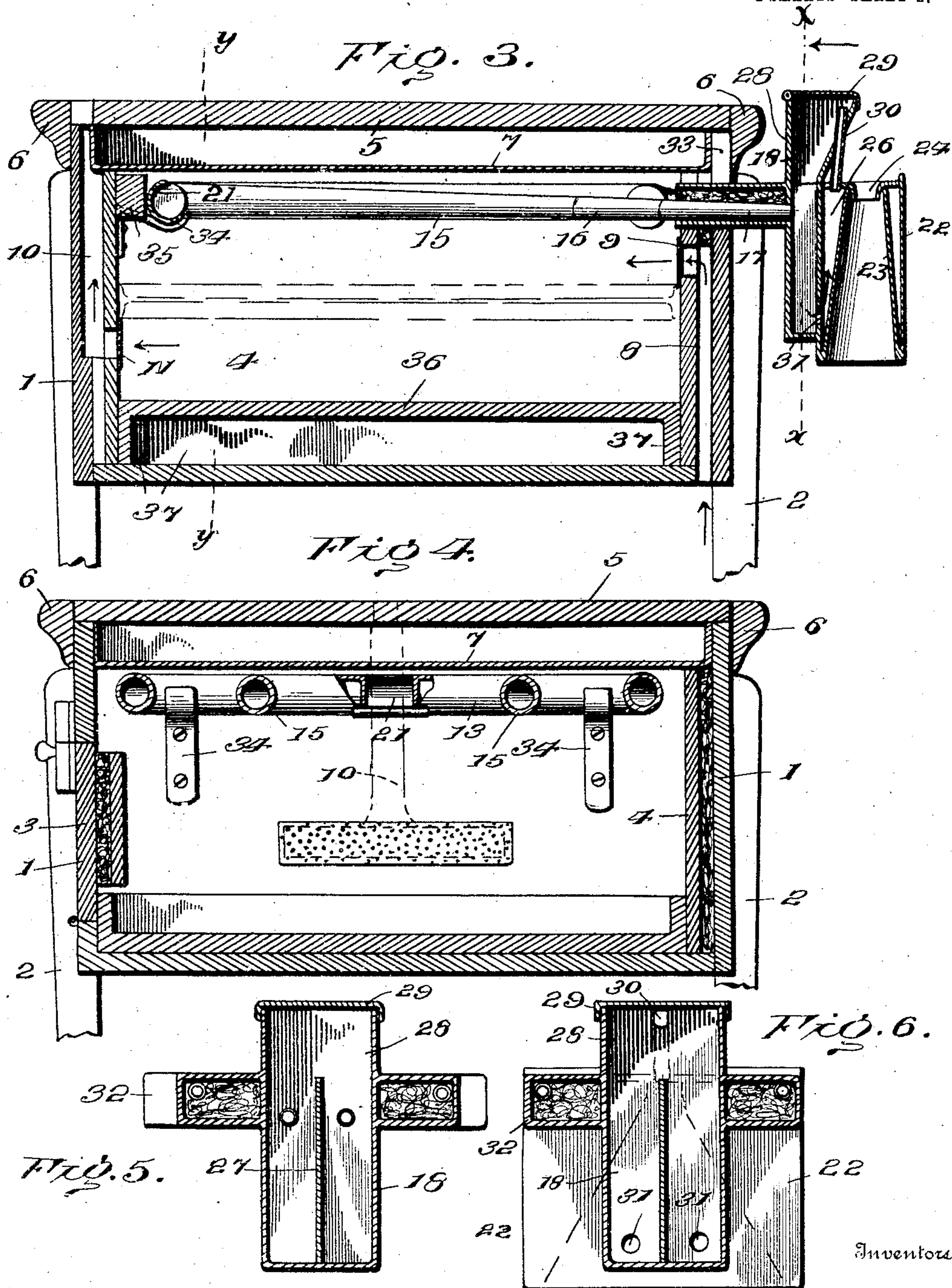
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# UNITED STATES PATENT OFFICE.

AMOS A. LINEBAUGH AND CHARLES LYMAN, OF CLARINDA, IOWA.

## INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 786,450, dated April 4, 1905.

Application filed May 17, 1904. Serial No. 208,447.

*To all whom it may concern:*

Be it known that we, AMOS A. LINEBAUGH and CHARLES LYMAN, citizens of the United States, residing at Clarinda, in the county of Page and State of Iowa, have invented certain new and useful Improvements in Incubators, of which the following is a specification.

In the construction of apparatus for hatching eggs it is desirable and essential to maintain a uniform temperature within the incubator and at the same time to insure a change of air without providing cool drafts, which are fatal and at best are objectionable. It is also desirable to economize in space and to minimize in the consumption of fuel, whereby the running expenses of the apparatus are as small as possible, so that the industry may be made profitable without too great a tax upon the consumer.

An essential feature of the invention is the peculiar construction of the heating means, which comprises a radiator, a boiler, and an expansion-tank, the parts being connected so as to form, in effect, a single structure.

The invention also consists of the novel formation of the incubator, which admits of ventilation, while at the same time avoiding chilling-drafts, and which also provides for ready removal of the heating means, so that the interior of the incubator may be readily accessible.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of an incubator embodying the invention, the top and lining therefor being removed. Fig. 2 is a top plan view of the radiator, expansion-tank, and boiler detached from the framework. Fig. 3 is a vertical central longitudinal section of the incubator. Fig. 4 is a section on the line Y Y of Fig. 3 looking to the left. Fig. 5 is a sec-

tion of the expansion-tank on the line X X of Fig. 3 looking to the left as indicated by the arrows. Fig. 6 is a section on the line X X of Fig. 3 looking to the right.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The body of the incubator is indicated at 1 and is supported upon legs 2 and is provided in one side with a door 3, which admits of access being ordinarily had to the interior for placing the tray of eggs in position or removing the tray therefrom or for any desired purpose. The door 3, as well as the walls of the incubator, are lined, and packing of mineral wool or other material is interposed between the lining 4 and the walls of the incubator. A top 5 closes the upper end of the incubator and is removable and is provided at its edges with a pendent rim 6, which embraces the sides of the incubator and gives a finished appearance thereto. A lining 7 is arranged beneath the top 5 and consists of a shallow tray and is supported upon the upper edges of the lining 4 and extends over the spaces formed between the lining 4 and the walls of the incubator. The lining 7 is separate from the top 5 and is likewise made removable, so that access may be readily had to the interior of the incubator from above when it is required to remove the heating means or for any purpose requiring a large opening.

A vertical passage 8 is provided at one side of the incubator and extends through the bottom thereof and communicates at its upper end with a register 9, opening into the upper portion of the incubator. A corresponding passage 10 is provided at the opposite side of the incubator and extends over the top and opens into the lower portion of the incubator by means of a register 11. The cool air enters the lower end of the passage 8 and passes upward therein into the upper portion of the incubator, thence through the latter, and out through the register 11 and passage 10. In its travel the air comes in contact with the register and is warmed, thereby preventing any cool draft which would tend to chill the eggs in the process of hatching.



The radiator is located in the upper portion of the incubator immediately below the lining 7 and is composed of similar sections A and B, which are separate and independent, although connected to form, in effect, a single structure. Each radiator-section comprises a pipe 12, having end portions 13 and 14, and a pipe 15, the latter being gradually tapered throughout its length and the parts 12, 13, and 14 being of uniform diameter. By having the pipes 15 tapered the circulation of the water on its return is greatly retarded and the radiating-surface reduced proportionately to the cooling of the water, thereby materially assisting in equalizing the temperature within the incubator. The tapered pipe 15 has an offset portion 16 and a straight terminal portion 17, the latter communicating with a compartment of the expansion-tank 18.

A pipe 19 connects the end portion 14 of pipe 12 with a compartment of the boiler 20 and is in a higher plane than the pipe 17. The end portions 13 and 14 constitute branches of the pipe 12 and are arranged approximately at a right angle thereto. A coupling 21 unites the branches 13 and holds them in alinement as well as forming a substantial coupling for the radiator-sections. The several elements of the radiator-sections are approximately in the same plane, although the pipes 17 and 19 communicate with the respective parts 18 and 20 at different elevations, this being essential in order to create and maintain a circulation of the heating medium through the radiator.

The boiler 20 comprises an outer shell 22 and an inner shell 23, the latter being upwardly converged to an outlet 24. The heater is arranged below the boiler, and, as usual in devices of the character aforesaid, consists of a lamp 25, which is placed upon a bracket or suitable support. The heat from the lamp striking the inclined walls of the shell 23 serves to heat the water by conduction and radiation in the well-known manner. The boiler and lamp being wholly exterior to the incubator prevents any fumes or noxious odors entering the incubator, as is the case with incubators heated by direct circulation of the hot air therethrough. The boiler is subdivided, by means of a vertical partition 26, into two compartments, with which the pipes 19 of the respective radiator-sections communicate.

The expansion-tank 18 is arranged adjacent to the boiler and between it and the incubator and is subdivided, by means of a vertical partition 27, into two compartments, with which the pipes 17 of the respective radiator-sections communicate. The expansion-tank extends above the boiler, as shown at 28, and its upper end is closed by means of a hinged cover 29. The upper portion 28 of the expansion-tank is considerably enlarged, so as to hold a quantity of water and likewise admit of filling the boiler, expansion-tank, and radiator without

spilling the water. The vent-tube 30 connects the upper portion of the boiler with the upper portion of the expansion-tank and provides an escape for the air confined in the radiator and boiler when filling the same. By having the upper portion of the vent-pipe 30 extend into the upper part of the expansion-tank 18 overflow is prevented from wasting upon the floor or other place where the incubator may be located. The upper end of the vent-pipe terminates a short distance below the upper end of the extension 28 of the expansion-tank. By having the expansion-tank attached to a side of the boiler the separating-wall is common to the two and the structure is compact. An opening 31 establishes communication between a compartment of the expansion-tank and the corresponding compartment of the boiler. A box 32 projects rearwardly from the expansion-tank and forms a housing for the several pipes 17 and 19 and is packed with mineral wool or other material to prevent loss of heat by radiation. The box 32 fits in an opening 33, formed in the upper edge of the side of the incubator having the passage 8 and the register 9. This box supports the radiator at one end, and brackets 34 support the radiator at the opposite end. A block 35 is attached to the wall having the passage 10 and properly spaces the radiator therefrom.

When the top 5 and lining 7 are removed, the radiator and attached parts may be readily placed in position or removed, as desired. When the radiator is in place, the boiler and expansion-tank are wholly exterior to the incubator. The pipe 19 being in a higher plane than the pipe 17 constitutes an outflow for the water from the boiler and the pipe 17 an inflow to the expansion-tank. The circulation of the water is indicated by the arrows in Fig. 2 and is from the boiler through the pipes 19 12, branches 13 and 14, and pipe 15, as will be readily comprehended.

The brooder-board arranged within the incubator is indicated at 36 and is provided with a rim 37, which in one position of the board, as indicated in Fig. 3, elevates said board, thereby reducing the space within the incubator, thereby economizing in heat. After the chicks have been hatched and more space is required for nursing during the brooding period the board 36 is reversed, as indicated in Fig. 4.

Having thus described the invention, what is claimed as new is—

1. In an incubator, a hot-water radiator, a boiler, and an expansion-tank arranged between said boiler and radiator and having separate connection with each, substantially as specified.

2. In an incubator, a hot-water radiator composed of a series of sections, each having an independent circulation, an expansion-tank and boiler connected to each other and to the



respective radiator-sections, substantially as described.

3. In an incubator, the combination of a hot-water radiator composed of independent sections, an expansion-tank and boiler subdivided into compartments corresponding with the sections of the radiator and having each of said sections connected to the respective compartments of the radiator, substantially as specified.

4. In an incubator, a radiator therefor comprising a series of pipes, one of said pipes being tapered throughout its length, and means for circulating a heating medium through the radiator, substantially as set forth.

5. In an incubator, a radiator composed of independent sections, each comprising a series of pipes which are approximately in the same plane, means for connecting the several sections so as to form a single structure, and means for circulating a heating medium through the independent sections of the radiator, substantially as set forth.

6. In an incubator, the combination of a radiator, a boiler, an expansion-tank adjacent to the boiler and between it and the incubator, and means for establishing communication between the radiator and expansion-tank and between the latter and the boiler, and independent means connecting the radiator direct with the upper portion of the boiler, substantially as set forth.

7. In an incubator, the combination of a ra-

diator, an expansion-tank and boiler, and a box projected from the expansion-tank and enveloping the connecting-pipes between the expansion-tank and the radiator, substantially as set forth.

8. In an incubator, the combination of a radiator, a boiler, and an expansion-tank intermediate of the boiler and radiator and having its upper portion extended above the plane of the boiler and widened, substantially as set forth.

9. In an incubator, the combination of a radiator, a boiler, an expansion-tank having its upper portion projected above the plane of the radiator and boiler, and a vent-pipe extended upward from the boiler, substantially as set forth.

10. In an incubator, the combination of a radiator, a boiler, an expansion-tank having its upper portion projected above the plane of the radiator and boiler, and a vent-pipe extended upward from the boiler and terminating within the expansion-tank a short distance from the upper end thereof, substantially as specified.

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

AMOS A. LINEBAUGH. [L. S.]  
CHARLES LYMAN. [L. S.]

Witnesses:

JAMES TAGGART,  
J. M. RAHN.