

No. 620,487.

Patented Feb. 28, 1899.

G. A. McFETRIDGE.

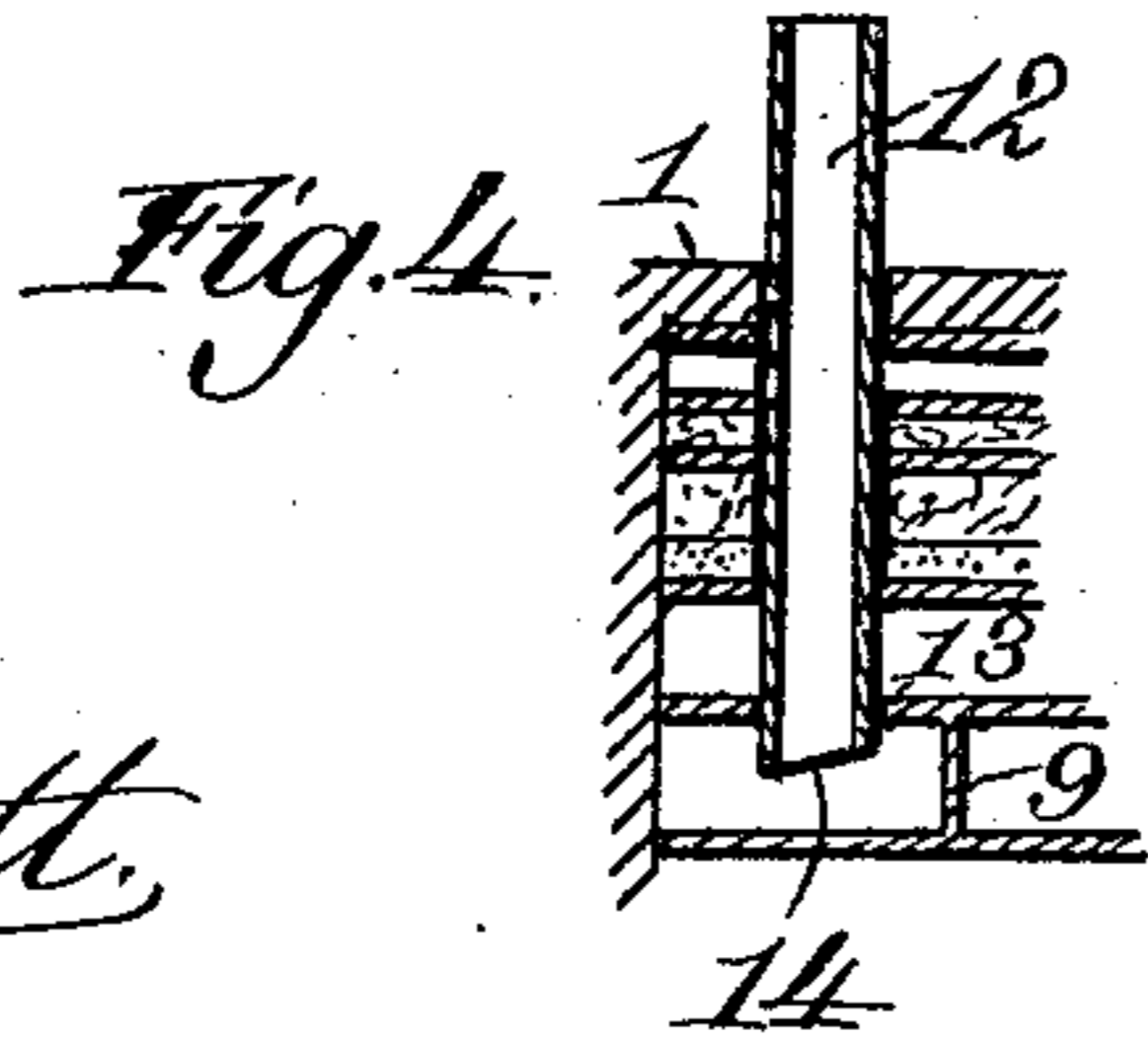
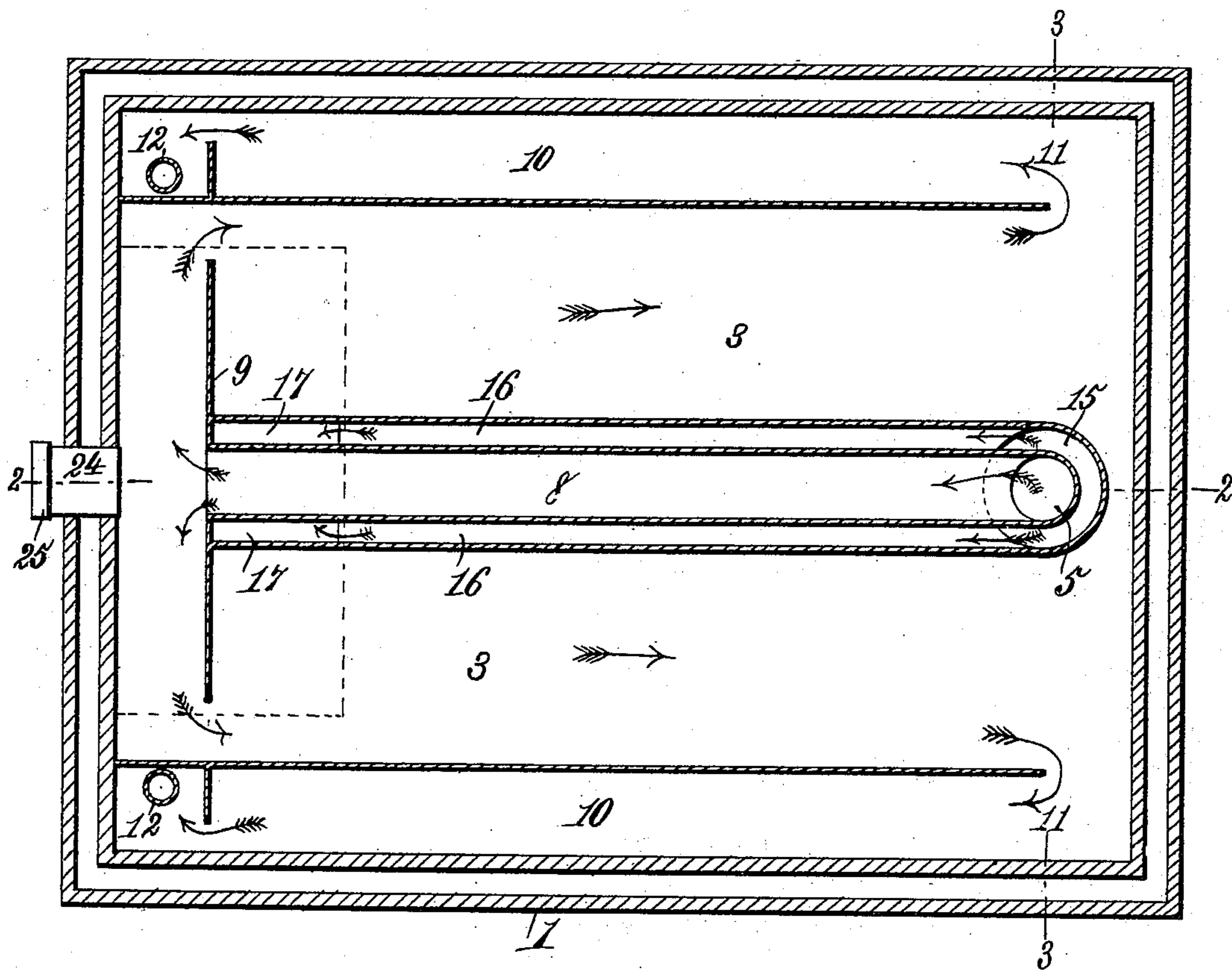
INCUBATOR.

(Application filed Mar. 7, 1898.)

(No Model.)

2 Sheets—Sheet 1.

*Fig. 1.*



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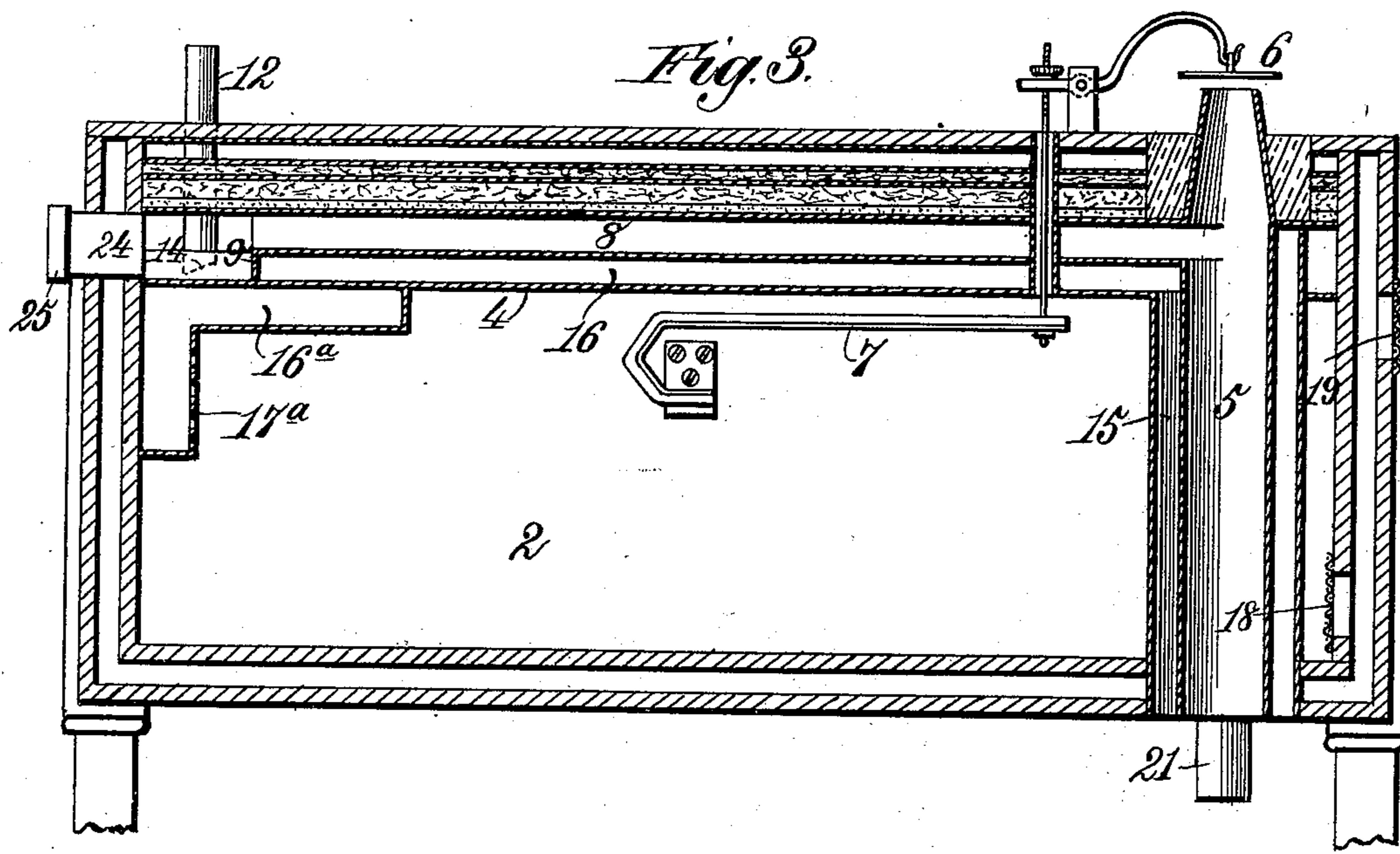
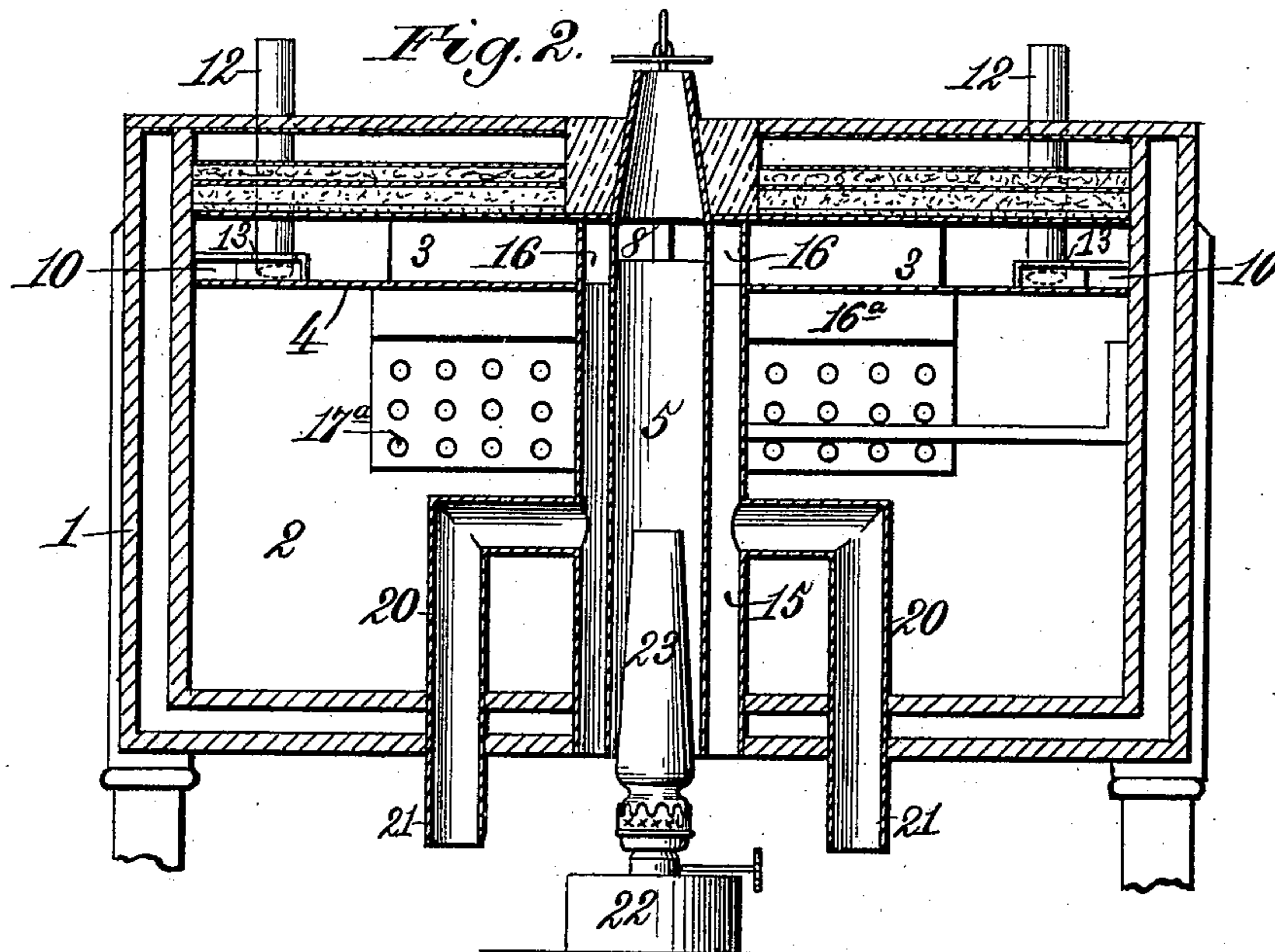
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(No Model.)

2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

GEORGE A. McFETRIDGE, OF BOUND BROOK, NEW JERSEY, ASSIGNOR TO  
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## INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 620,487, dated February 28, 1899.

Application filed March 7, 1898. Serial No. 672,958. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE A. McFETRIDGE, a citizen of the United States, residing at Bound Brook, in the county of Somerset and State of New Jersey, have invented new and useful Improvements in Incubators, of which the following is a specification.

My invention relates to incubators, and has for its object certain improvements in the incubator shown and described in my application filed May 13, 1896, Serial No. 591,413. In my said application I have shown a machine having a direct fire-flue at one end and an indirect fire-flue connected therewith and extending to a point near the opposite end, where the products of combustion discharge into the tank above the egg-chamber. An indirect passage for the products of combustion is afforded by means of pipes in said tank at each side of the machine having their open ends located in the opposite end of the tank to that at which the products of combustion are discharged and terminating in their opposite ends in stand-pipes extending upward through the top of the incubator, through which the products of combustion escape from the machine. An air-flue is provided which surrounds the direct fire-flue, and an air-inlet is provided in the end of the machine, which communicates with said air-flue.

It is the object of the present invention to provide improved means for increasing or diminishing the rapidity of circulation of the products of combustion.

In the accompanying drawings, illustrating my invention, Figure 1 is a sectional plan view. Fig. 2 is a transverse vertical sectional view on the line 2 2 of Fig. 1, and Fig. 3 is a central vertical section on the line 3 3 of Fig. 1. Fig. 4 is a sectional view of a detail.

The numeral 1 indicates the incubator-casing, which may be of the usual or any preferred construction and incloses an egg-chamber 2 and a heat-chamber 3, the two chambers being separated by a diaphragm 4. In the end wall of the incubator I provide a direct fire-flue 5, which extends through the incubator from top to bottom and at its upper or outlet end is provided with a damper 6, controlled by a thermostatic bar 7 of the general construction of and composed of the mate-

rials described with reference to the thermostatic bar shown in my application above mentioned. Connected to and communicating with the direct fire-flue 5 is an indirect fire-flue 8, which extends at right angles to said direct fire-flue across the heat-chamber from one end to a point near the opposite end, where it communicates with said chamber. A deflector-plate 9 may be employed, if desired, to cause the products of combustion issuing from said indirect fire-flue to be distributed in said heat-chamber. Located on opposite sides of the heat-chamber are two outlet-ducts 10 10 for the products of combustion, the open ends 11 11 of which communicate with the heat-chamber at the end of said chamber opposite that at which the products of combustion discharge therein from the indirect fire-flue 8. Near the opposite or closed ends of said ducts 10 10 I provide the escape-flues 12 12, one for each duct, which flues extend vertically upward through the top of the incubator. The manner of arranging these escape-flues is as follows: The outlet-ducts are rectangular in shape, as shown in Fig. 2, and at a point near its closed end each duct is provided with an opening 13 in its upper side, which is adapted to receive an escape-flue 12. The escape-flues 12 are capable of vertical adjustment in said openings—that is, they may be raised or lowered; but the openings 13 13 and the openings in the top of the incubator through which these escape-flues pass fit said tubes sufficiently close to hold them in any adjusted position, as clearly shown in Fig. 4. By providing these adjustable escape-flues I can increase or diminish the rapidity of circulation of the products of combustion at will. Thus if the end of the egg-chamber opposite the lamp should be found for any reason to receive less heat than the lamp end of said chamber this defect can be remedied by raising the escape-flues 12, so that their lower ends will be near the tops of the outlet-flues 10. This will operate to afford a more ready passage for the escape of the products of combustion, and hence increase the rapidity of the circulation. If it is desired to decrease the temperature of the end of the egg-chamber opposite the lamp or if for any other reason it is found desirable

to diminish the rapidity of the circulation of the products of combustion, I lower the escape-flues 12 in the outlet-ducts 10, thus obstructing, as it were, the circulation. In order  
5 that the circulation may not be entirely stopped by pressing the ends of the escape-flues down on the bottoms of the outlet-ducts, I incline or cut away a portion of the bottoms of said escape-flues, as indicated by the numerals 14 14.  
10

The numeral 15 indicates the direct air-flue, which surrounds the direct fire-flue 5. Connected to and communicating with the direct air-flue is an indirect air-flue 16, which extends across the heat-chamber and surrounds the indirect fire-flue on three sides. Toward its outer end the indirect air-flue 16 communicates with a distributor 16<sup>a</sup> by means of perforations 17 in the diaphragm 4, which  
15 diaphragm constitutes the bottom of said indirect air-flue as well as of the outlet-ducts 10. The distributor 16<sup>a</sup> in turn communicates with the egg-chamber through the perforations 17<sup>a</sup>. The circulation of the heated  
20 fresh air in the egg-chamber is the same as that described in my application above named. In the present case, however, the air after passing out of the egg-chamber through the outlets 18 passes up through the wall of the  
25 incubator and discharges through an opening 19 near the top of the incubator, which is controlled by suitable slides in the ordinary manner.  
30

The numeral 22 indicates the lamp, the chimney 23 of which extends upward in the direct fire-flue 5.  
35

The numerals 20 indicate the air-inlet ports, located one on either side of the lamp, which extend vertically upward in the end wall of the casing and then inward at right angles to the  
40 direct air-flue, with which they communicate. In order to prevent any fumes arising from the lamp passing up these inlet-ports, and thereby being carried into the egg-chamber, the air-inlet ports 20 are continued downward  
45 in the form of tubes 21, the lower ends of which are below the plane of the lamp-flame. Any fumes therefore coming from the lamp will rise upward and be dissipated by the currents of air in the room without entering the  
50 air-inlet ports.

In the end wall of the incubator opposite the lamp I provide an opening 24 in line with the indirect fire-flue 8, which opening is normally closed by means of a screw-cap 25. By  
55 removing this cap access can be had to the interior of the indirect fire-flue for the purpose of removing by means of a suitable implement soot and dust which from time to time collect in said flue. By this means all  
60 danger of fire in the flues is avoided, an even temperature in the egg-chamber is insured, and the cause of bad odor in the room removed.

By the gentle circulation of heated air in the egg-chamber afforded by my construction  
65 of incubator I am enabled to utilize the moisture arising from the eggs, and hence I have shown no moisture-pan in connection with the distributor 16<sup>a</sup>, as the practical use of my machine has demonstrated that no artificial  
70 moisture is required. Said distributor 16<sup>a</sup> is in other respects similar to the one described in my application above mentioned, comprising a rectangular metallic casing secured to the end wall of the egg-chamber and to the  
75 bottom of diaphragm 4.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an incubator, the combination with a  
80 heat-chamber of an indirect fire-flue discharging at one end of said heat-chamber, outlet-ducts for the products of combustion communicating with said heat-chamber at the opposite end thereof, and escape-flues seated  
85 in said outlet-ducts and vertically adjustable therein for the purpose set forth.

2. In an incubator, the combination with outlet-ducts for the products of combustion, of escape-flues, having cut-away lower ends  
90 seated in said outlet-ducts and vertically adjustable therein to increase or diminish the rapidity of circulation of the products of combustion, substantially as described.

In testimony whereof I have hereunto set  
95 my hand in presence of two subscribing witnesses.

GEORGE A. McFETRIDGE.

Witnesses:

WM. H. BACHE,  
LEIGH S. BACHE.