

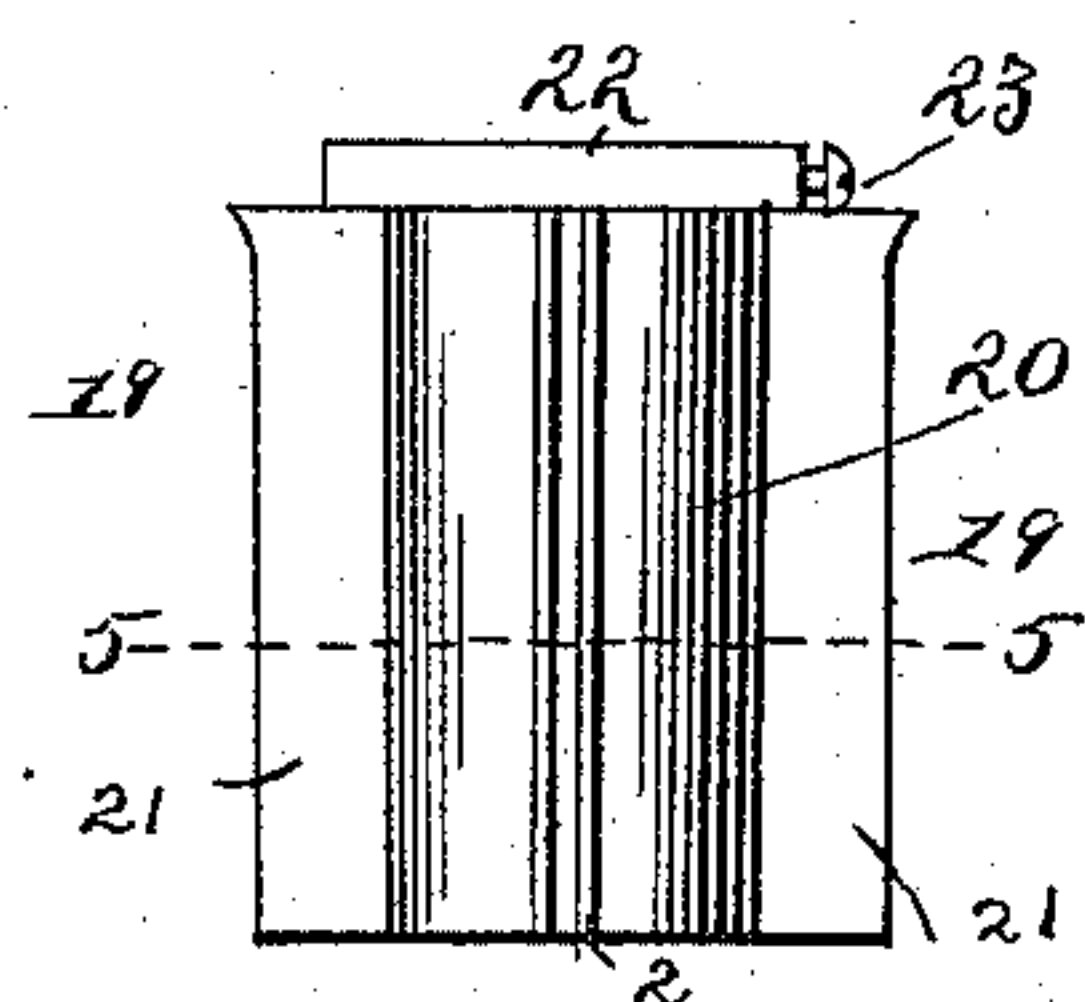
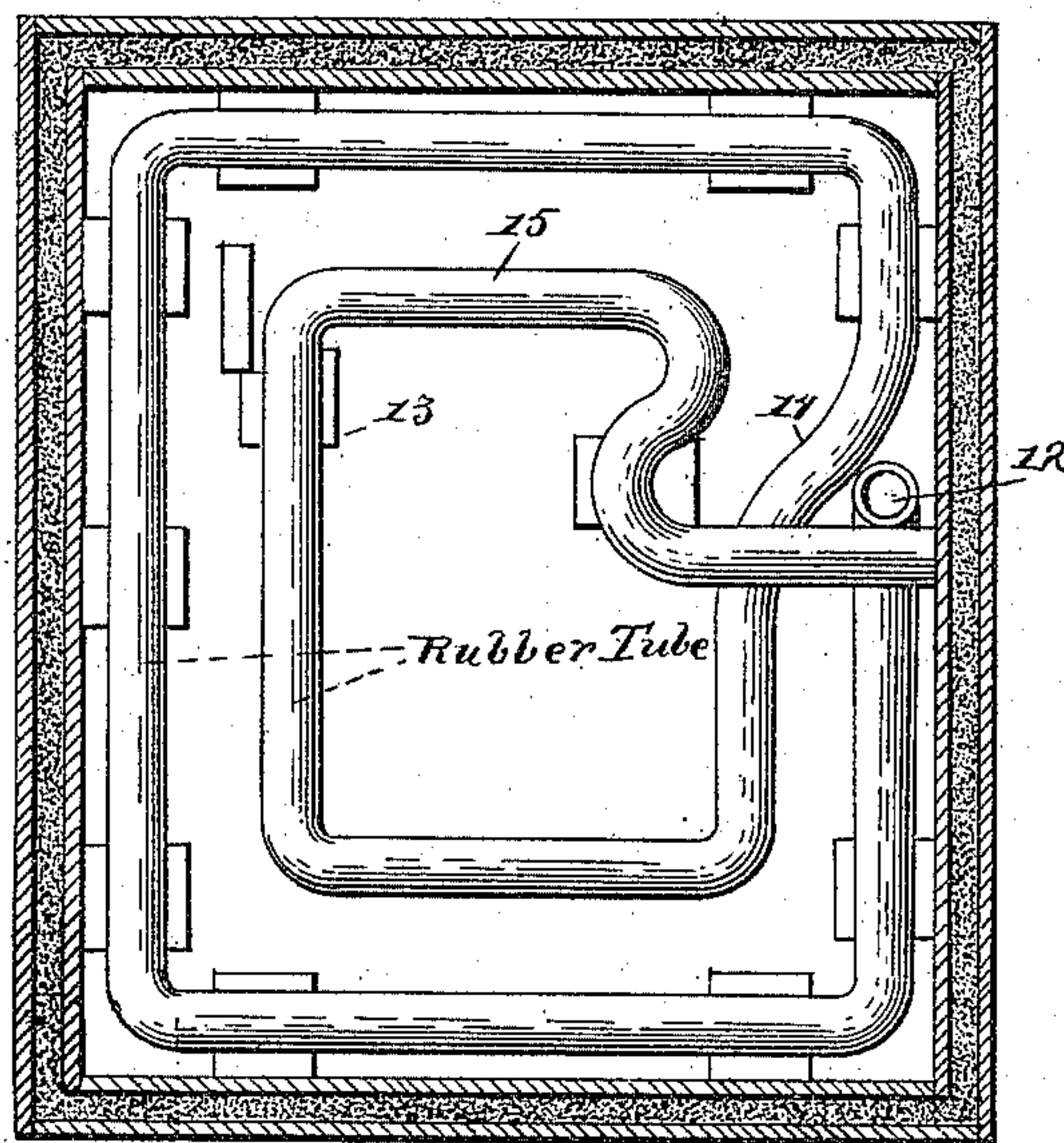
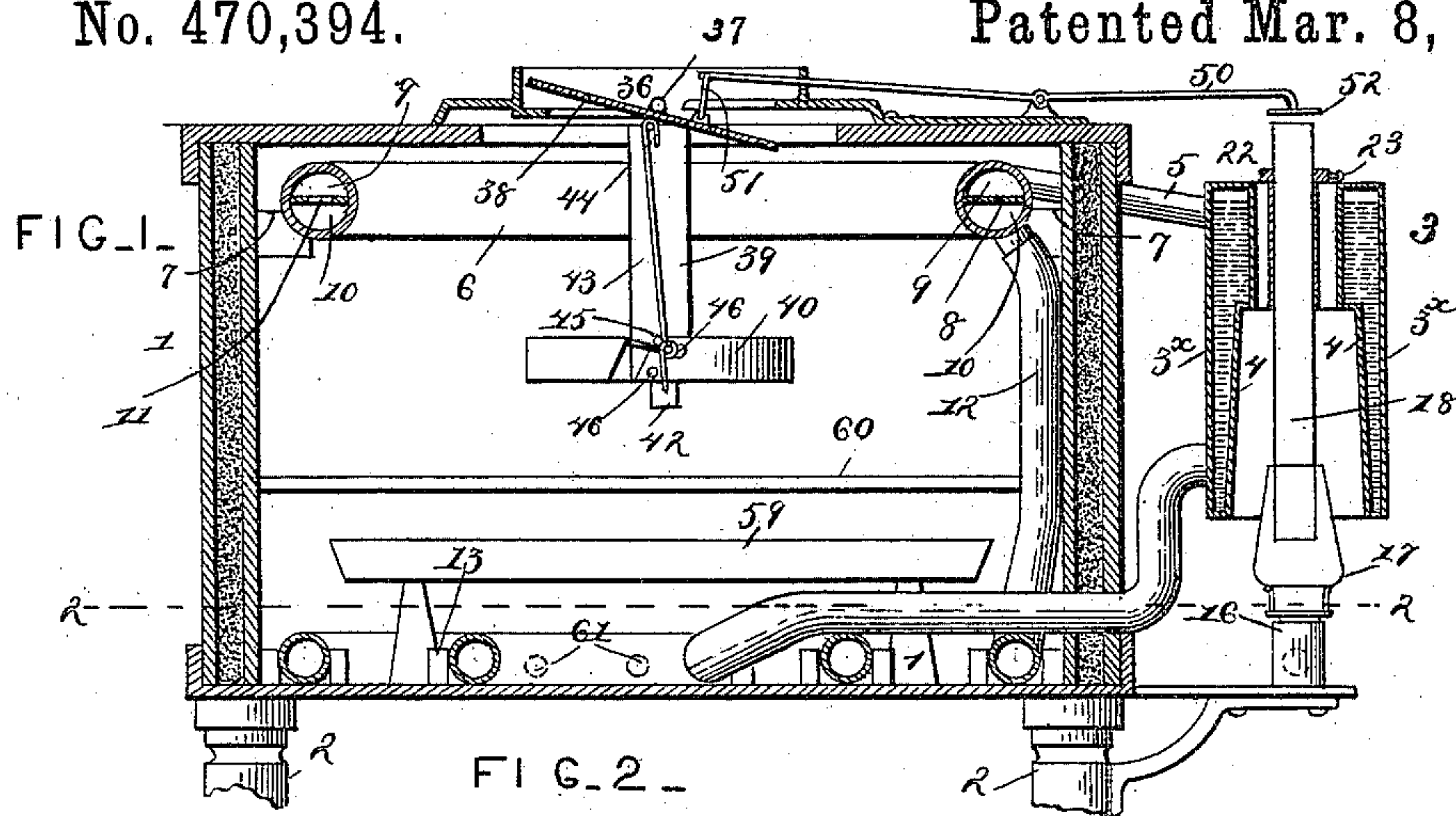
(No Model.)

2 Sheets—Sheet 1.

M. T. GREENLEAF.
INCUBATOR.

No. 470,394.

Patented Mar. 8, 1892.



Witnesses

Geo. C. Frick.

Wm. Bagger

By his Attorneys,

Chas. Snow & Co.

Inventor
M^r T. Greenleaf

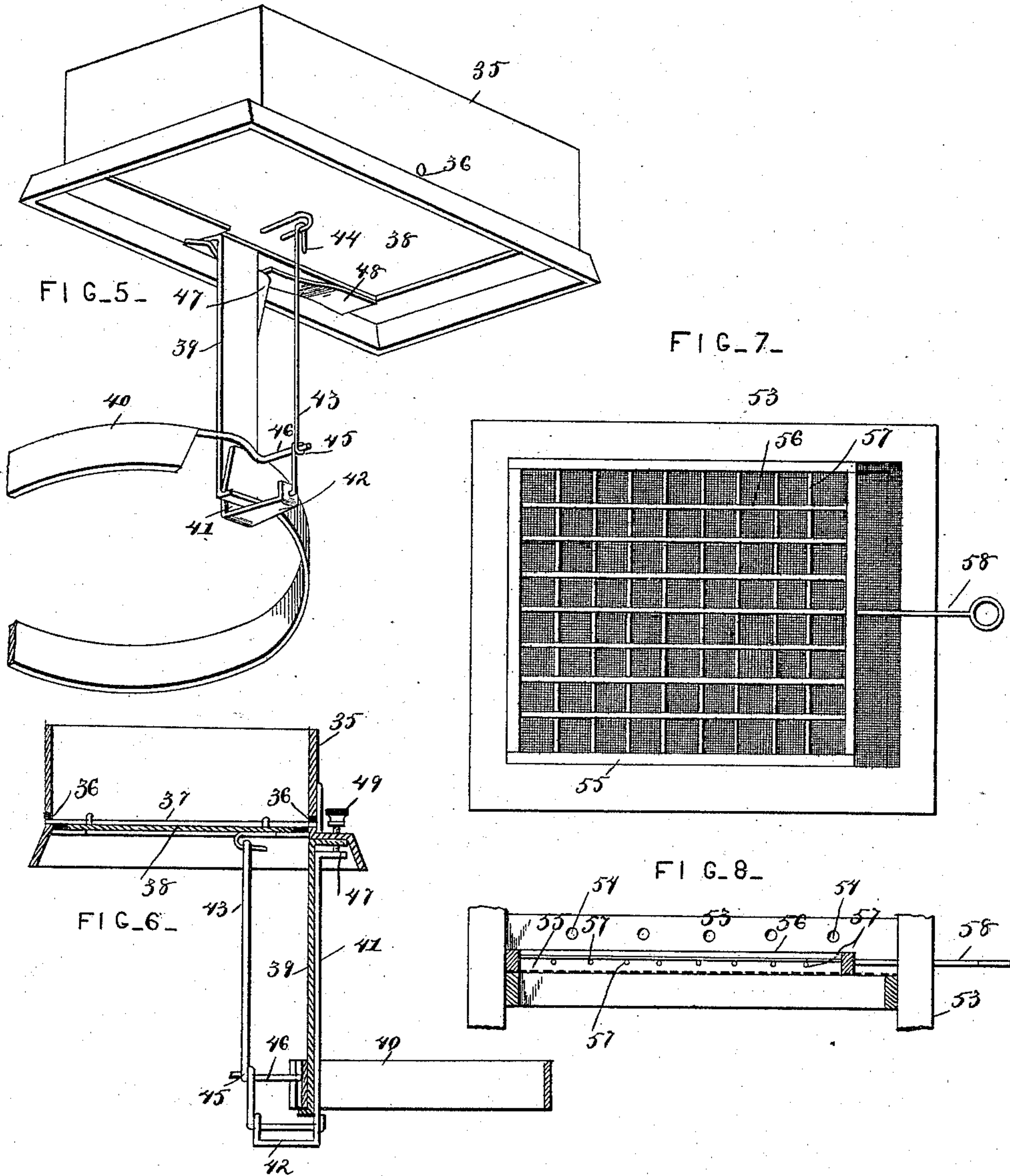
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Geo. E. French

Wm. Baggett

By *his* Attorneys,

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Inventor
Miller T. Greenleaf

UNITED STATES PATENT OFFICE.

MILLER T. GREENLEAF, OF QUINCY, ILLINOIS.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 470,394, dated March 8, 1892.

Application filed December 13, 1890. Serial No. 374,618. (No model.)

To all whom it may concern:

Be it known that I, MILLER T. GREENLEAF, a citizen of the United States, residing at Quincy, in the county of Adams and State of Illinois, have invented a new and useful Improvement in Incubators, of which the following is a specification.

This invention relates to incubators; and it has for its object to provide a device of this class which shall be simple in construction and efficient in operation.

The invention consists in certain details of construction and arrangement of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a vertical sectional view of an incubator constructed in accordance with my invention. Fig. 2 is a horizontal sectional view taken on the line 2 2 in Fig. 1 and showing the arrangement of the heating-coils in the bottom of the incubating-chamber. Fig. 3 is a side elevation of the device for holding the supplemental lamp-chimney. Fig. 4 is a sectional view taken on the line 5 5 in Fig. 4. Fig. 5 is a perspective detail view of the thermostatic valve. Fig. 6 is a vertical sectional view of the thermostatic valve. Fig. 7 is a plan view of the egg-drawer removed from the incubator. Fig. 8 is a vertical sectional detail view of the egg-drawer.

Like numerals of reference indicate like parts in all the figures of the drawings.

1 designates the casing of the incubator, which is constructed of double walls, between which non-conducting packing of any suitable kind may be placed for the purpose of maintaining as nearly as possible an even temperature in the incubating-chamber. The casing is supported upon legs 2.

3 designates the heating-chamber, which is composed of an annular tank constructed of suitable tubes 3^x and 4, connected at their upper and lower edges. The outer tube 3^x is preferably cylindrical in shape, while the inner tube 4 is made tapering upwardly and with an upper cylindrical portion. The upper end of the annular heating-chamber 3 is connected by a pipe 5 with an annular or rectangular tank 6, which is supported upon suitable brackets 7 in the upper portion of the

incubating-chamber. The tank 6 is constructed of ground-pipes suitably connected, and it is provided with a central horizontal partition or diaphragm 8, whereby it is divided into compartments 9 and 10, with the upper one of which 9 the pipe 5 is connected. There may be two pipes 5 located beside each other in order to cause the heated water from the heater 3 to flow in opposite directions to the diametrically-opposite sides of the tank 6, where the partition 8 is provided with a perforation 11, through which the water may pass into the lower compartment 10 and through the latter to the downwardly-extending tube 12. Thus by the provision of the partitioned tank the heat from the hot water equalizes itself throughout the incubator, inasmuch as the water is caused first to make a circuit of the upper partitioned chamber before it finds ingress to the lower chamber, in which it has to retrace its course before finding an exit, whereby a circuitous circulation is obtained. The latter is an ordinary rubber hose or tube of suitable dimensions, which is extended downwardly to the bottom of the incubator, which is provided with racks 13 to support several coils of the said rubber tube, as shown at 14 and 15. The said tube is eventually extended through the side of the casing and is connected with the lower end of the heating-chamber 3.

Below the heater 3 is arranged the lamp 16, having the chimney 17, which extends into the central space of the said annular tank.

18 designates a supplemental chimney, which is mounted in a holder 19. The latter is composed of a single piece of sheet metal bent so as to form a circular band 20, having laterally-extending wings 21, as will be clearly seen in Fig. 3 of the drawings. This holder is provided at its upper edge with a collar 22, having a set-screw 23, to hold the auxiliary chimney, which latter may be constructed of sheet metal. The holder 19 is mounted in the upper cylindrical portion of the inner tube 4 of the heating-tank and is held there by friction. The chimney 18 may be readily adjusted to its proper position by loosening the set-screw 23.

In the top of the incubator is mounted the thermostatic regulating-valve, which I now

shall proceed to describe. 35 designates a casing, which is preferably rectangular in shape and the sides of which are provided with perforations 36 for the knife-edge bearings of a rock-shaft 37, carrying the valve or damper 38. A bracket 39 extends downwardly from the casing, and to the lower end of said bracket is secured the thermostatic band 40, which is nearly circular in shape and which is constructed in the usual manner of metals—such as brass and steel—of different indices of expansion. To the rear side of the bracket 39 is pivoted a plate 41, the lower end of which has a loop 42, through which passes a wire 43, which is extended upwardly, and the upper end of which has a loop 44 which is suitably connected with a damper 38. The wire 43 is also provided with an eye 45, which is connected with an arm 46, extending from the free end of the thermostatic band 40. The upper end of the pivoted plate 41 has a flange 47, one end of which is pressed by a spring 48 and the other end of which is adapted to rest against an adjusting-screw 49, which is mounted in the casing 36, said adjusting-screw serving by its pressure against the flange 47 of the pivoted plate 41 to determine the extent of the movement of the damper-plate.

50 designates a lever, which is suitably mounted upon the top of the incubator-casing and the inner end of which is connected by a link 51 with the damper 38. The outer end of the lever 50 carries a plate 52, adapted to close the upper end of the auxiliary chimney 18 of the heating apparatus, above which it is mounted.

53 designates the egg-drawer, which is used in connection with my invention and which is composed of a suitable frame, the bottom of which is composed of wire-cloth. The sides of the drawer have ventilating-openings 54.

55 designates a frame longitudinally movable in the drawer and provided with longitudinal and transverse wires 56 and 57, whereby it is divided into compartments about two inches square, in each of which an egg may be placed. The frame 55 has a handle-rod 58, which extends through the front of the drawer and by means of which it may be manipulated for the purpose of simultaneously turning all the eggs contained in the drawer, which may thus be evenly and equally exposed to the heat of the incubating-chamber.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains. The water from the heater 3 will circulate through the tank 6 and through the coils 14 and 15 of the rubber tube 12 and eventually pass back into the lower part of the heating-tank. The comparatively low degree of heat which will radiate from the rubber tubing will be just sufficient to cause sufficient moisture to be evaporated from the water-pan 59, which is

arranged in the usual manner below the egg-drawer, which latter has not been shown in Fig. 1, but is adapted to be supported upon suitable cleats 60. If the temperature within the casing should rise above the desired limit, the damper 38, which is operated by the thermostat and which is exceedingly sensitive, will be opened for the escape of the heated air, cool air being supplied, if desired, through suitable ventilating-openings, such as 61, which have been shown near the bottom of the casing. When the valve 38 is opened, it will at the same time operate to actuate the lever 50 and to remove the plate 52 from the upper end of the auxiliary chamber 18, through which the flame and products of combustion from the lamp or heating apparatus may thus escape. When the temperature in the incubating-chamber is restored or sinks below the desired limit, the operation is reversed. The valve or damper 38 is closed, as is the upper end of the chimney 18, by the plate 52. The products of combustion will thus be forced to escape through the space between the chimney 18 and the heater 3, the temperature of the contents of which will thus be speedily raised, thereby supplying additional heat to the incubating-chamber. It is obvious that by this mechanism, which is exceedingly sensitive and entirely automatic in its operation, the temperature of the incubating-chamber may be very accurately regulated and maintained at a certain point.

I have in the foregoing described what I consider to be the preferred construction of my improved incubator; but I desire it to be understood that I reserve the right to any changes and modifications which may be resorted to without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

1. In an incubator, the combination, with the casing, of an annular encircling tank having communicating circulation-apartments, mounted in the upper portion of said casing, a coiled heating-tube arranged in the bottom of said casing, an annular heater arranged outside of the casing, and pipes connecting the upper and lower ends of said heater, respectively, with the said tank, and the coiled pipe arranged within the casing, and a pipe connecting said tank and heating-coil, substantially as set forth.

2. In an incubator, the combination, with the casing, of an annular tank arranged in said casing near its upper end, a horizontal partition or diaphragm within said tank, a pipe connecting the upper compartment thus formed with a heater, and a rubber pipe or tube extending from the lower compartment of said tank, coiled upon the floor of the incubator, and connected with the lower end of the heater, the diaphragm of the annular tank being provided with an opening at a point opposite to the connecting-pipes, substantially as herein set forth.

3. The combination, with the annular heating-tank, the inner portion of which has an upper cylindrical portion, of the holder consisting of the central band having radially-
5 extending wings and provided at its upper end with a collar having a set-screw, and the auxiliary lamp-chimney mounted in said holder, substantially as set forth.

4. In an incubator, the herein-described
10 heating apparatus, comprising a lamp, an annular heating-tank having an upper cylindrical portion, an auxiliary lamp-chimney mounted adjustably in the said heating-tank

within said cylindrical portion, and means for automatically regulating the passage of 15 the products of combustion through said auxiliary chimney, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in 20 presence of two witnesses.

MILLER T. GREENLEAF.

Witnesses:

S. M. WALLACE,
HARRY W. SMITH.