

(No Model.)

J. DENNIS, Jr.
Incubator.

No. 230,247.

Patented July 20, 1880.

Fig 1.

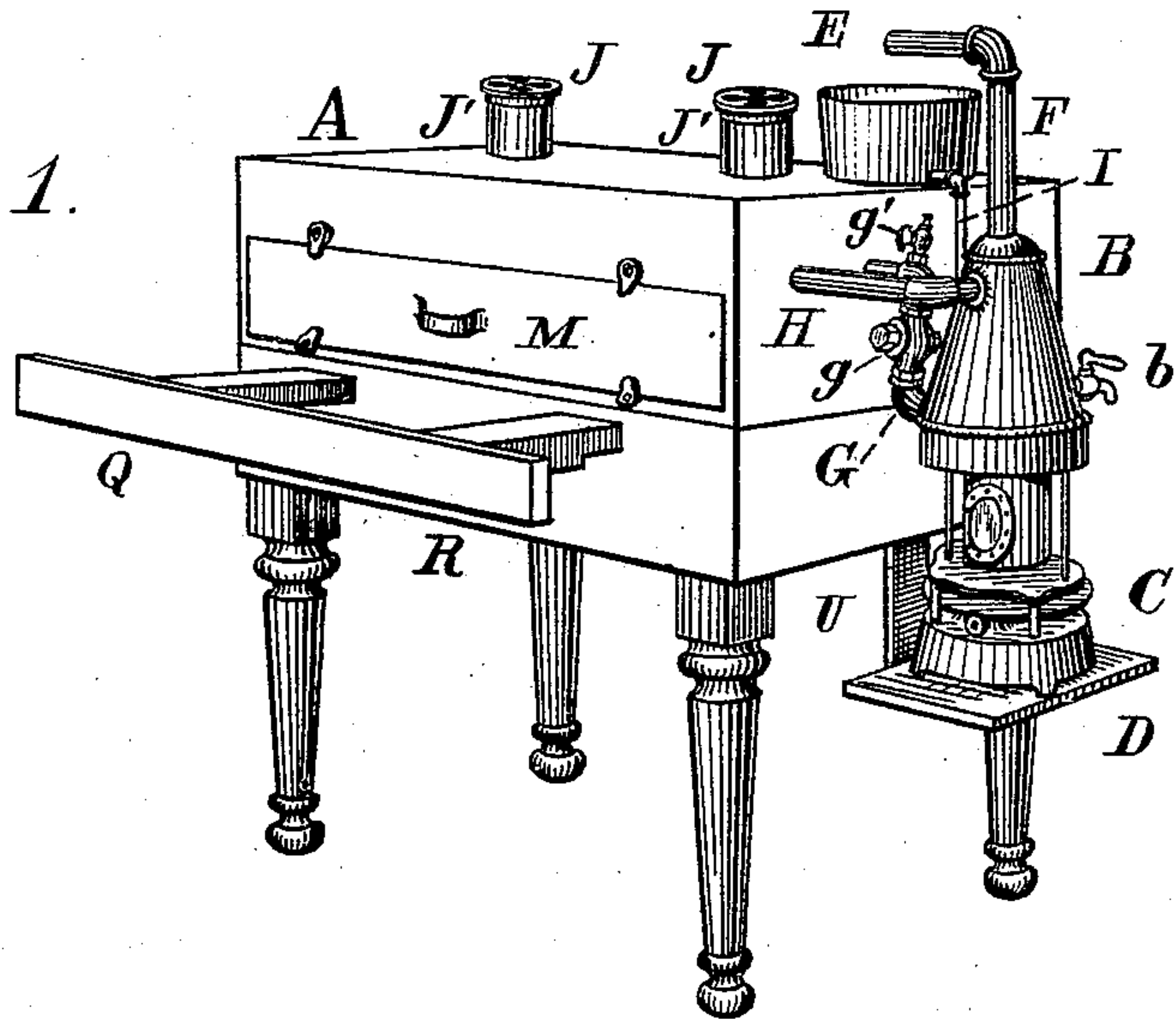


Fig. 2.

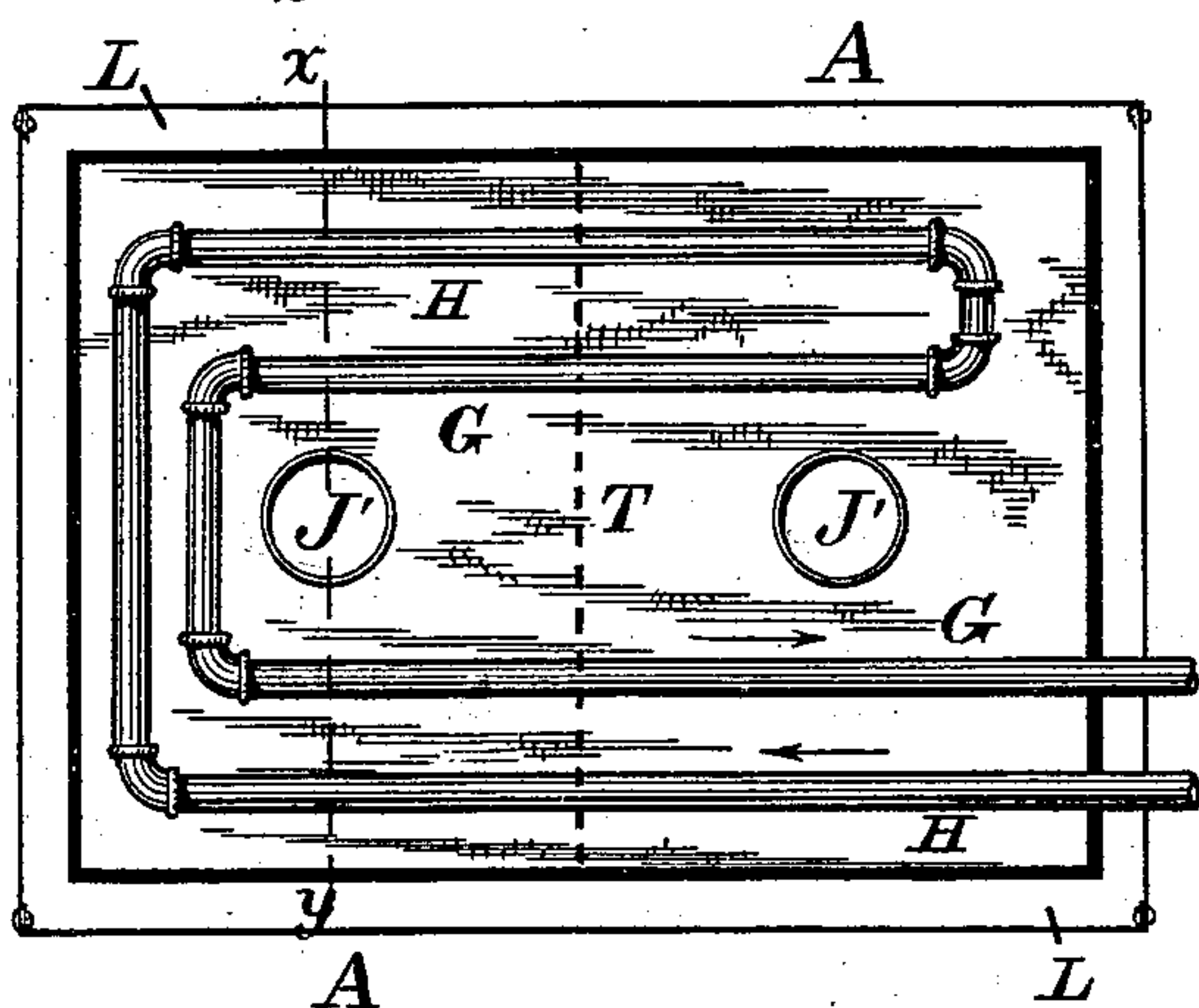


Fig. 3.

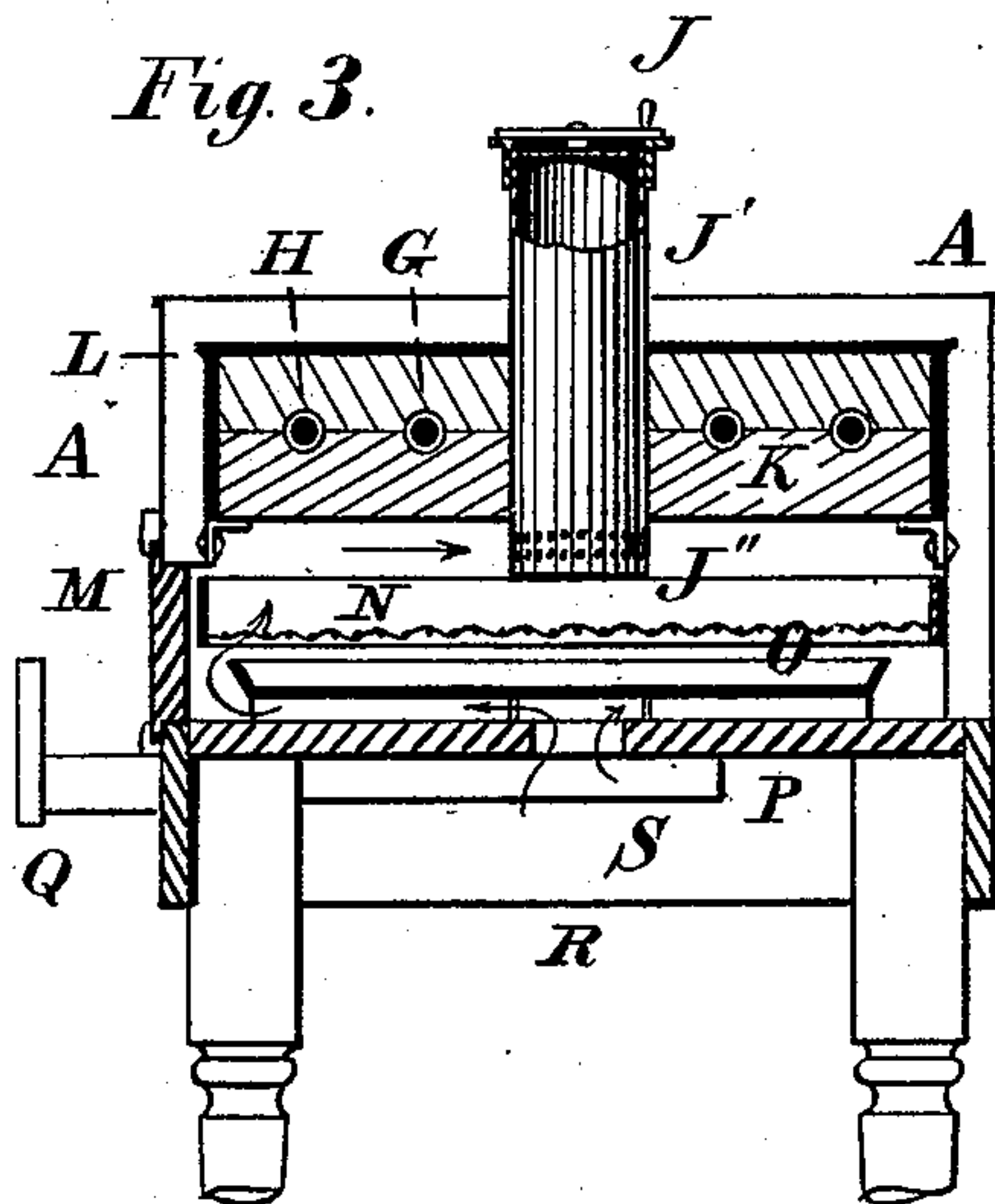


Fig. 4.

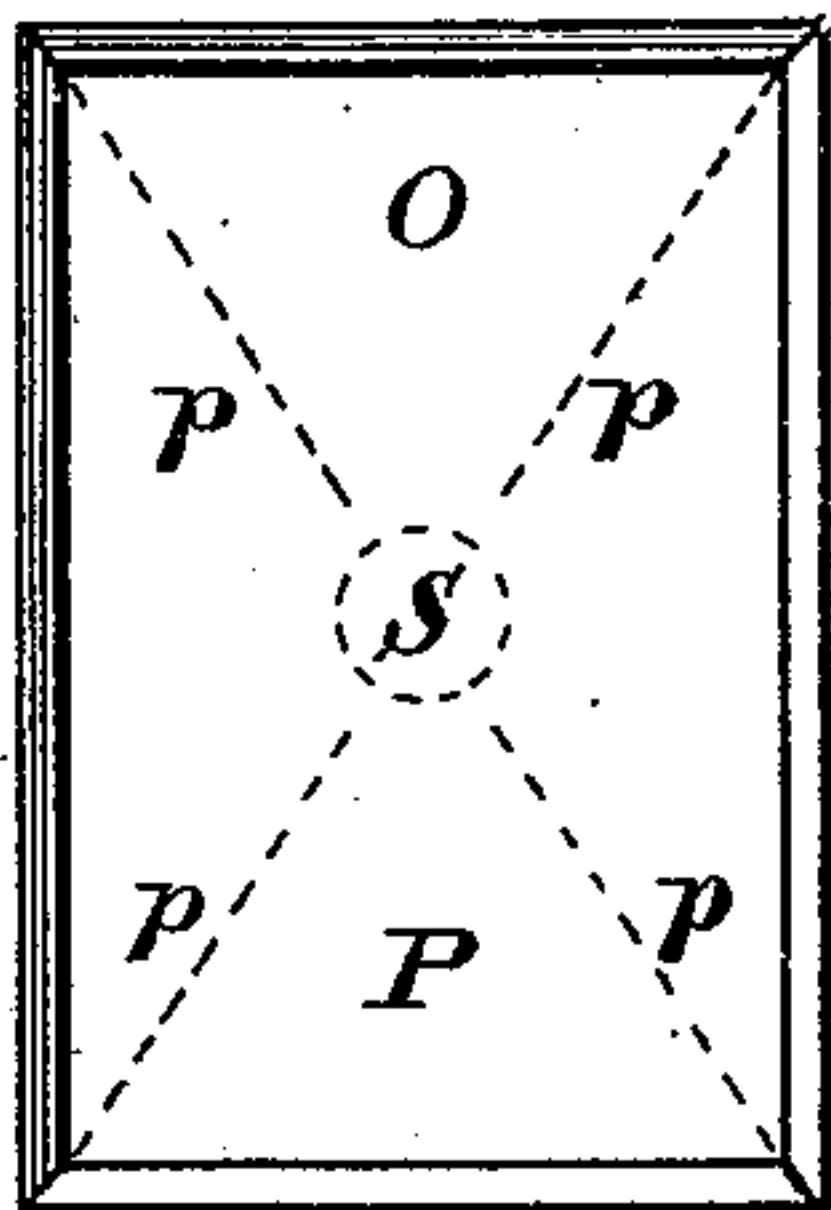


Fig. 5.



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JAMES DENNIS, JR., OF PROVIDENCE, RHODE ISLAND.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 230,247, dated July 20, 1880.

Application filed March 27, 1880. (No model.)

To all whom it may concern:

Be it known that I, JAMES DENNIS, Jr., of the city and county of Providence, State of Rhode Island, have invented a new and useful Incubator, of which the following is a specification.

My invention is of that class of incubators in which the eggs are warmed mainly by means of heat radiated from above, and is designed to give a steady, reliable heat, combined with a convenient, quickly operating means of regulating the same and a peculiarly constructed radiator or heater over the eggs, together with such an arrangement of the hatching-chamber and its adjuncts that a supply of moist fresh air is drawn into the chamber in a greater or less degree, as may be desired. Its nature is fully set forth in the following description of its construction and operation.

In the accompanying drawings, Figure 1 is a perspective view of a two-drawer incubator embodying my invention. Fig. 2 is a plan of the hot-water pipe and ventilators in the heater. Fig. 3 is a vertical cross-section, through one of the ventilators, of Fig. 1, as on the line *xy* of Fig. 2; and Figs. 4 and 5 are parts herein-after more fully described.

A is the case, made with double sides and top, so as to make a tight non-conducting air packing or jacket around and over the heater K and the hatching-chamber below it. The heater K is made by either taking two slabs of soapstone and half embedding the pipe H G in each and putting them together, or by reversing the case A and filling the same space with fine soapstone, combined with cement or other matter, if necessary, to make it adhere together around the pipe and stand its heat in use.

The pipe H G has a continuous flow of hot water from the boiler B. The boiler B, I make conical, so that the bubbles of air or steam as they rise shall be conducted to its top, to which the pipe F is attached, and up which they pass, the circulation-pipe H being connected to the boiler a short distance below the top. The hot water passes from the boiler through H H, as indicated by the arrow in Fig. 2, and back through G G to the boiler again, which it enters near the bottom. At *g* is a stop-cock, and

at *g'* a bib or escape-cock for convenience in filling, and at *b* a faucet for emptying the boiler when desired.

The pipe F extends up and out over the reservoir E, so that any water from it shall fall therein. The reservoir E contains the supply of cold water, and has a pipe, I, connecting it to the lower part of the boiler B.

Below the heater K is the hatching-chamber, occupied by the egg-drawer N and water-pan O below it.

J' is a ventilating-tube, its lower end projecting a little distance into the hatching-chamber, having its end closed, but with openings laterally, as shown in Fig. 3, the tube passing up through the heater K, and a short distance above is capped by the register J, Fig. 5, for closing or opening it.

The egg-drawer N is supported on suitable ways, and is made with an open or perforated bottom, so that the heat can radiate down between the eggs to the water-pan below and the fresh air pass up.

The hatching-chamber has a double door, M, to give easy access to the egg-drawer and water-pan.

The pan O is made smaller than the chamber, to leave an air-passage all around, and has ribs on its bottom, as indicated by the broken lines *p p p p*, Fig. 4, to support it and leave a space between the bottom of the pan and the bottom of the hatching-chamber, through which an opening, S, is made in the center. This construction gives a complete command over the circulation in the hatching-chamber by the manipulation of the register J.

At Q is a skeleton drawer or slide capable of being drawn out, so that its front part shall form a rest or support for the outer edge of the egg-drawer when drawn out, thus allowing the back part of drawer N to remain in and nearly close the opening into the hatching-chamber.

At C is a lamp or gas burner or other suitable heating apparatus under the boiler B, and it is supported by the shelf D, which is attached, by the spring-bracket U, to the frame R, which has suitable legs to form a supporting-table for the whole incubator, the object of the spring-bracket U being to give a ready means

of removing the lamp, and when replaced to hold it pressed against the bottom of the boiler to retain it.

This construction of the hatching-chamber applies to both shown in Figs. 1 and 2, the broken line T in the latter showing the position of a tight partition between them, each chamber with its accessories forming a complete incubator, though two are shown connected and more might be added, it being found most desirable to make each egg-drawer to hold one hundred eggs and increase the number of drawers to make the desired capacity.

To operate my incubator it is first essential that the boiler B and pipe H G be completely filled with water. To do this close the cocks *b* and *g* and open *g'*; then, filling the reservoir E, the water will flow from it to the boiler B, from which the air can escape by the pipe F. From B the water will fill the pipe H G (the air escaping at *g'*) and overflow at *g'*; then, opening the cock *g*, any air near it will escape at *g'*, after which *g'* should be closed and the reservoir E be left half full, or thereabout, and the pan O be filled with water. The apparatus is then ready for heat to be applied to the boiler. As the heated water rises the accompanying bubbles of air or steam are conducted up the sides of the boiler to the top and up the pipe F, while the rising water draws a fresh supply through G, which starts a current of hot water into H, thus establishing the desired circulation, it being found that the water in pipe F and the reservoir E and its pipe balance each other, both being open, and that the water in the boiler may be heated quite hot and continued so a long time with a perfect circulation through H G of hot water, and the water in the pipes F and I at a little distance from the boiler remain cold.

The form of the boiler B, with the pipe F from it, gives ample provision for the escape of all air or steam that may rise, though, as little or no hot water is exposed to the air, little or no steam is made after the water has been once heated, and therefore none will collect to impair the circulation.

The current of hot water through H G heats up the whole heater K, from which it radiates evenly on all the eggs in the drawer N and between them down to the water in the pan O, a thermometer in the drawer N showing the temperature.

In starting I prefer to open the register J about one-third open and heat up the boiler until the desired temperature is shown in the drawer N.

The draft of the tube J', taking the air from the sides at its bottom, draws it equally from all parts above the eggs, and not mostly from the middle, and the fresh air admitted at S (which may in some cases, as in cold rooms, be taken by means of a pipe from near the stove or lamp to take modified air) passing out in all directions under the pan O, up and over it, taking up the necessary moisture with it through the eggs.

The slightly-open register J gives ample means to increase or diminish the circulation of air, if desired, and the hatching-chamber may be kept at a very even temperature with very little attention.

The support Q makes the withdrawal of the eggs to cool or turn them very easily and quickly performed.

It is obvious that the arrangement or plan of the pipe H G, as well as the construction of the heater K, may be considerably varied without departing from the principles of my invention of a heater, which, receiving its heat from a continuous circulation of water through the pipe H G, shall give an even radiant heat from its whole lower surface to one or more hatching-chambers below.

For economy of heat I cover the boiler B and exposed parts of the pipe H G with a jacket of some non-conducting material as frequently used for such purpose.

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

1. The combination of the soapstone heater over the hatching-chamber with the egg-drawer and water-pan beneath and an adjustable system of ventilation, substantially as above described.

2. The tubes J', having a register at the top and holes in outside of its lower end which projects into the hatching-chamber, substantially as set forth.

3. The combination of the continuous circulation-pipe H G and the soapstone bed completely enveloping the same on all sides, as described, and receiving heat from it.

4. The combination of the draft-tube J', having a register at the top and radial apertures near the bottom, with the egg-drawer, a central air-supply, and space below the water-pan, substantially as and for the purposes described.

JAMES DENNIS, JR.

Witnesses:

KELO WANN,
JAS. G. ARNOLD.