

JACOB GRAVES.

Improvement in Electro-Magnetic Regulator for Incubators.

No. 127,972.

Patented June 18, 1872.

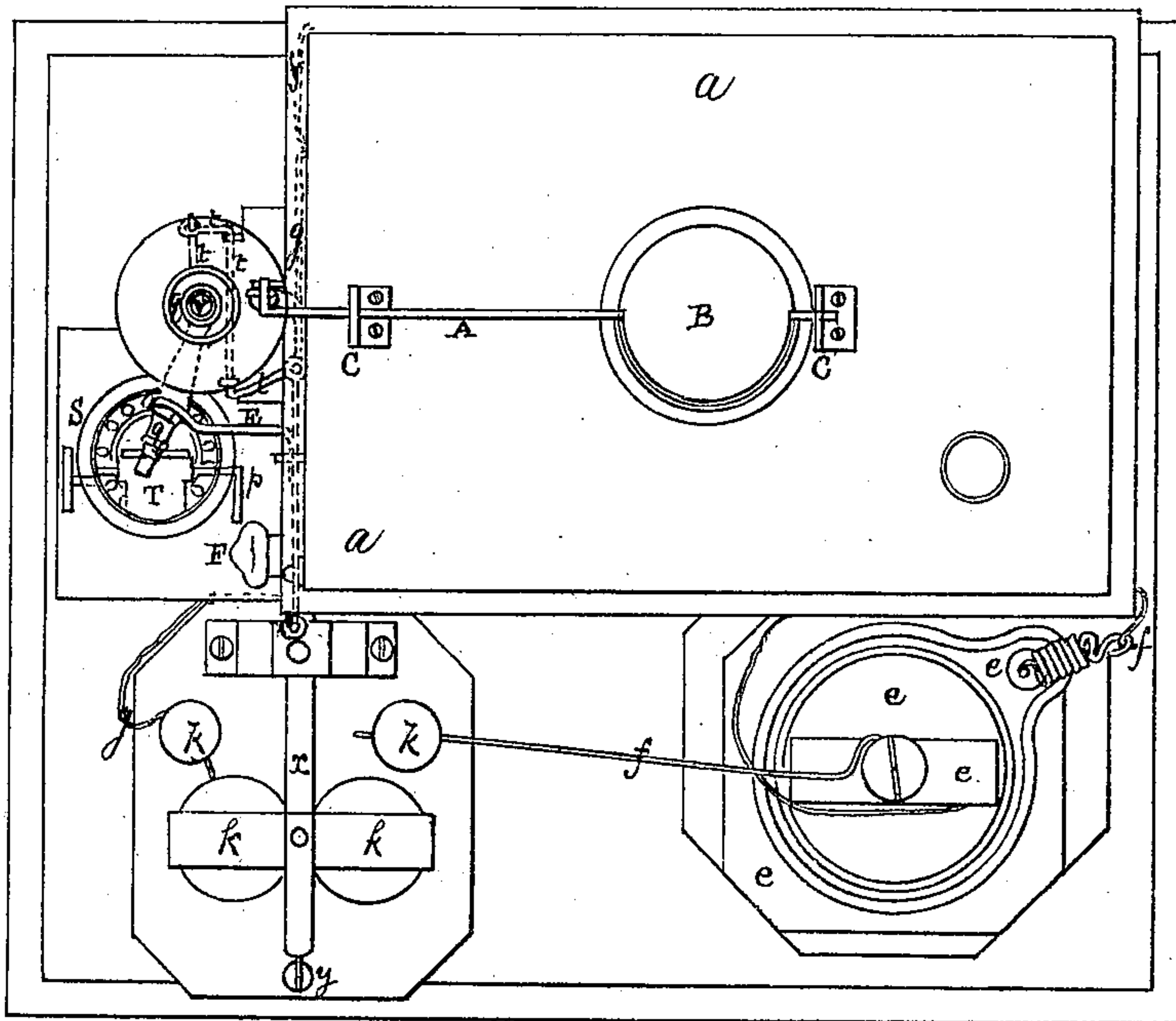


Fig. 1.

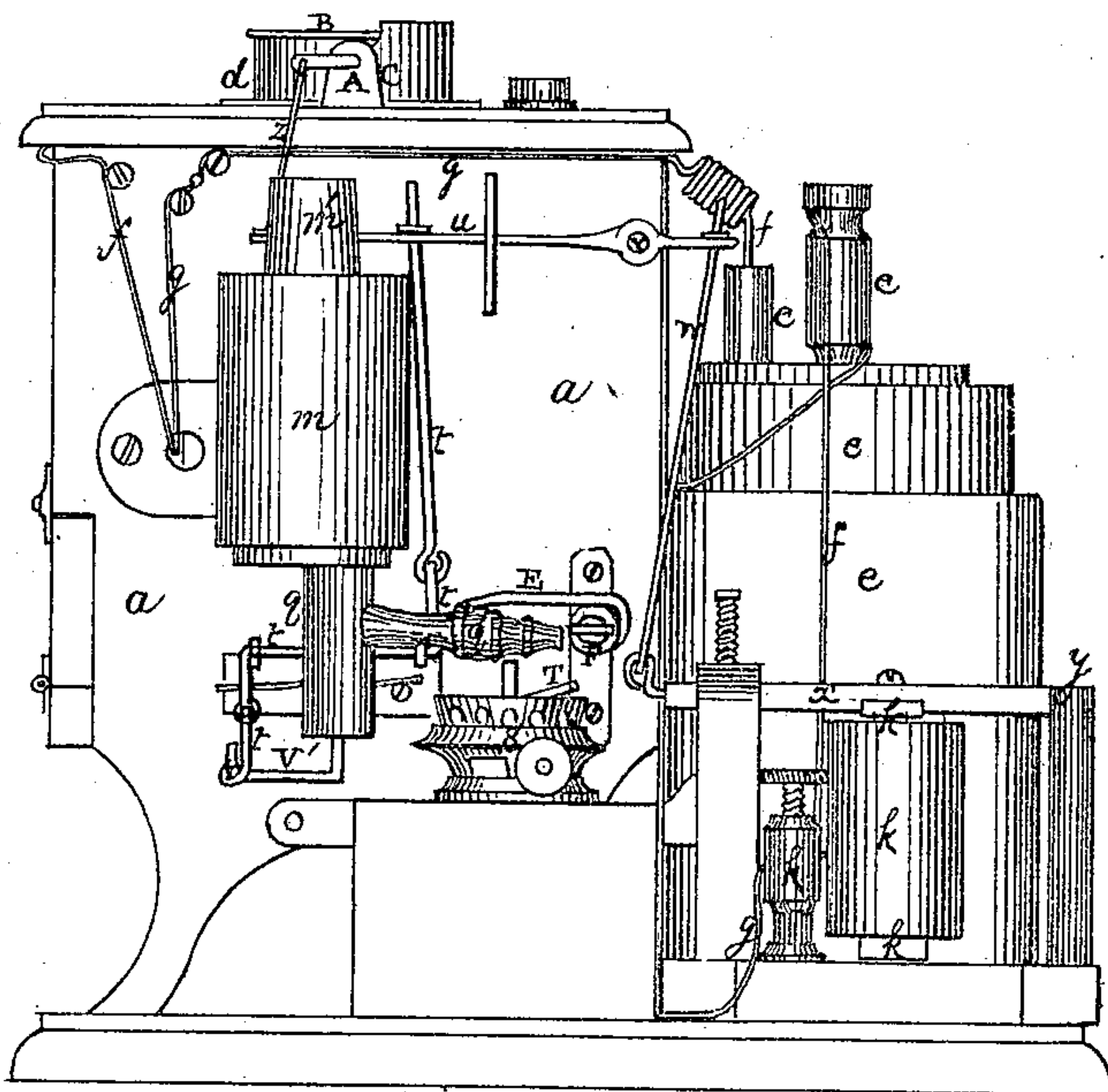


Fig. 2.

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Jesse Wheeler

Inventor.

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by his atty
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Fig. 3.

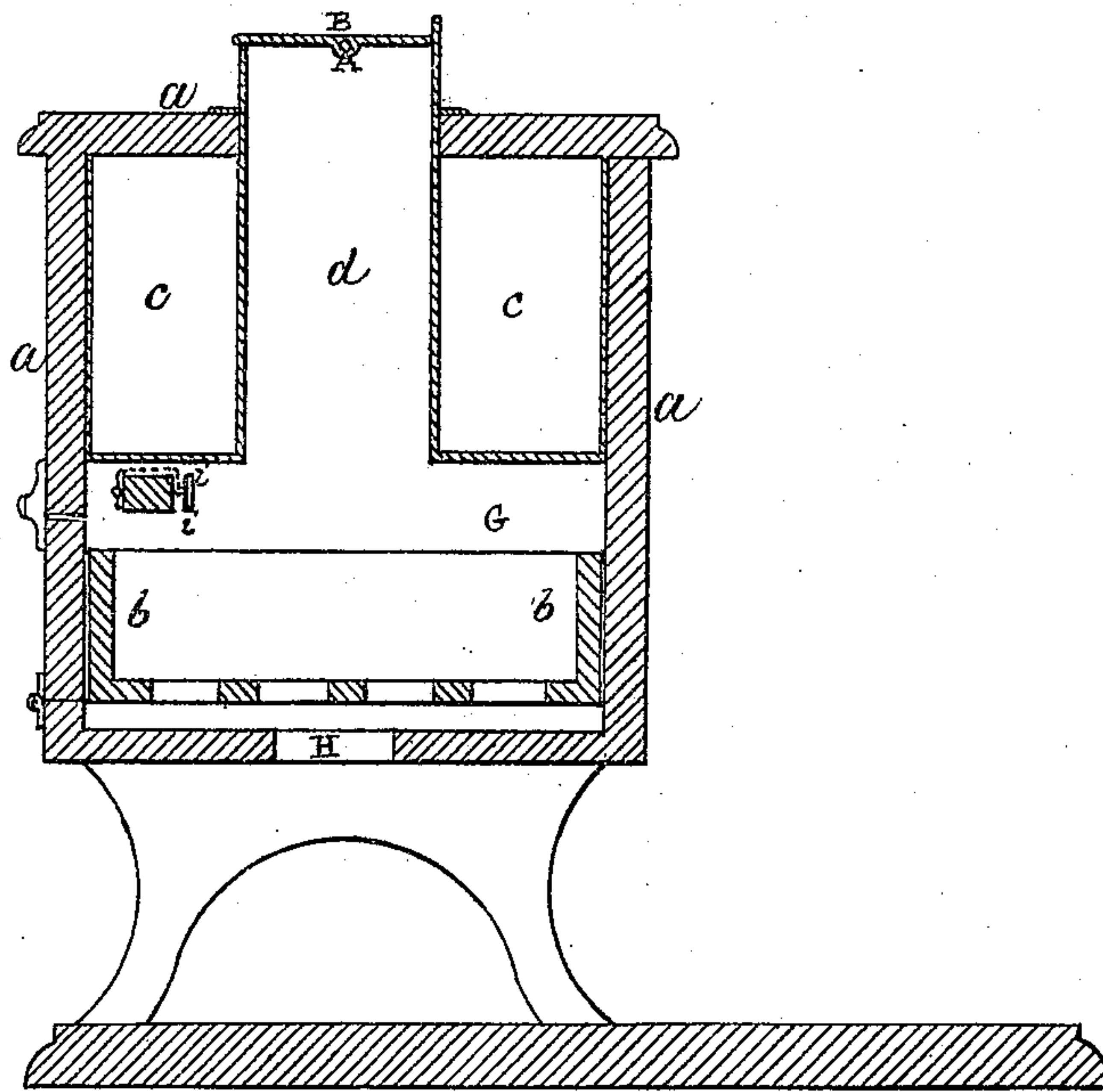
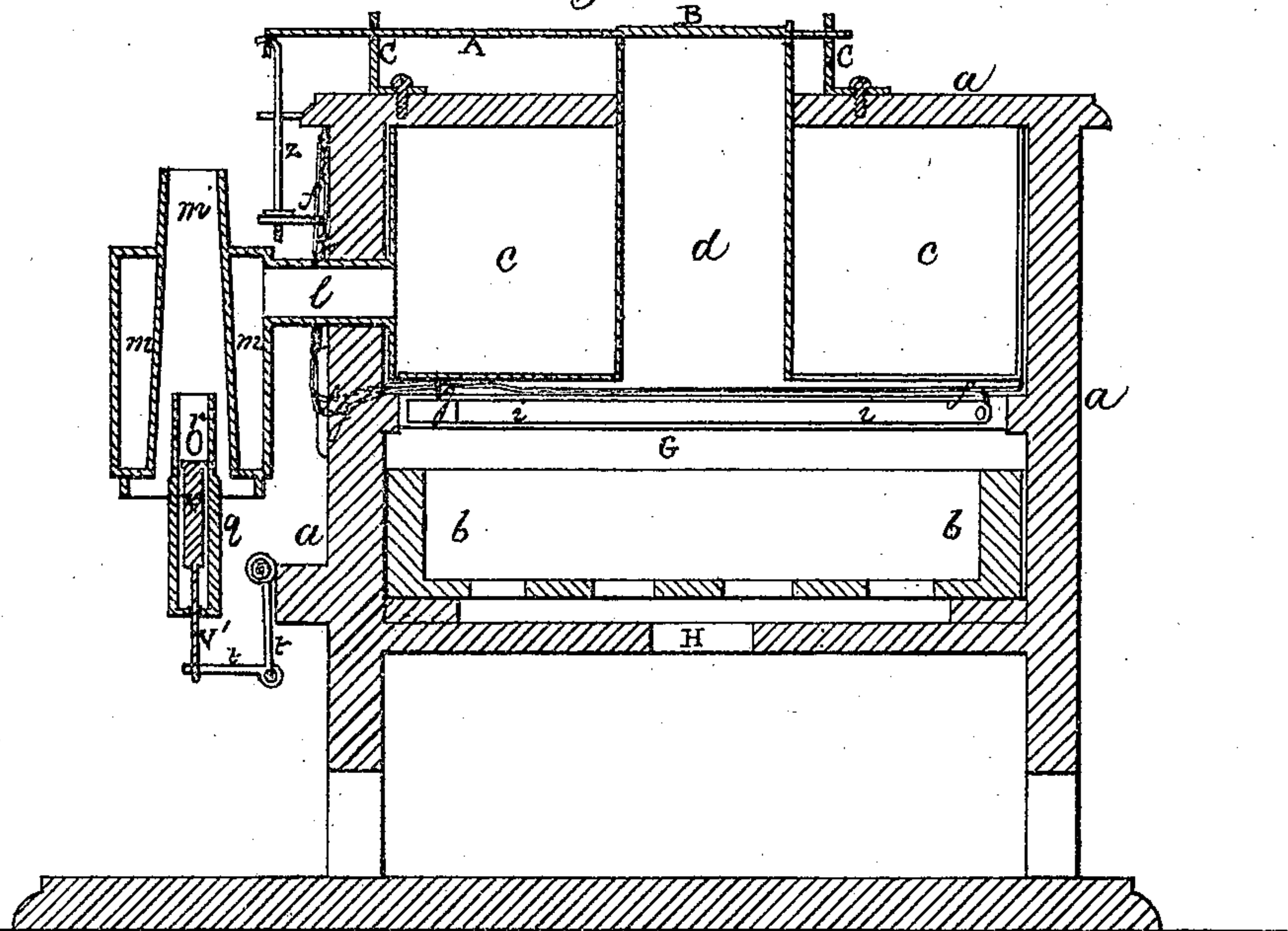


Fig. 4.



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JACOB GRAVES, OF READING, MASSACHUSETTS.

IMPROVEMENT IN ELECTRO-MAGNETIC REGULATORS FOR INCUBATORS.

Specification forming part of Letters Patent No. 127,972, dated June 18, 1872.

SPECIFICATION.

I, JACOB GRAVES, of Reading, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Incubators, of which the following is a specification:

Figure 1 in the drawing is a top view. Fig. 2 is an end view. Fig. 3 is a central transverse vertical section, and Fig. 4 is a central longitudinal vertical section, of my improved incubator.

The present invention relates to certain new and useful improvements in incubators, and has for its principal object the instantaneous regulation of temperature by automatic action. My improvements consist in so arranging an adjustable bar or spring composed of different metals in connection with the contacts of an electrical battery and the several devices of a heating apparatus, to be hereinafter described, as to cause, by the expansion and contraction of the said bar or spring, the electric current to be connected or broken, and the flame of the heating apparatus to be increased or diminished, and at the same time the cover of a ventilating device to be opened or closed, so as to instantaneously regulate the temperature within the incubator to a constant degree of heat.

In the drawing, *a a a* represent an incubator-case, provided with an egg-receptacle, *b b*, hot-water tanks *c c*, ventilator *d*, and other usual appurtenances applicable to incubators, but constituting no part of the present invention. Connected with the incubator *a a a* is a battery, *e e e e*, provided with contacts *f f f f* and *g g g g*, that operate in connection with an electro-magnet, *k k k k*, and also with a spring or bar, *i i*, which is composed of different metals, and which connects at one end with the case of the incubator *a a a*. Connecting with the hot-water tank *c c* by the tube *l* is a reservoir, *m m*, provided with a chimney, *m'*, under which is placed a heating device, which may be either a lamp, *S*, provided with an adjustable regulator or guard, *T*, with crank-lever *p*, as already patented, or a gas-burner, *q*, having an aperture, *r*, on two opposite sides of its periphery, a vertical movable stem or valve, *V*, provided with and operated by a bent rod or stem, *V'*, that connects with movable rods *t t t t*, which are operated by a lever-arm, *u*, turning on a pivot, *v*, and attached at one end

by a vertical rod, *w*, with a lever-bar, *x*, turning on stem *y*, and operated by the magnet *k*, the other end of the lever-arm *u* connecting by a rod, *z*, with a horizontal rod, *A*, turning in standards *C C*, and attached to and operating a cover, *B*, of the ventilator *d*. The gas-burner *q* is formed with an arm, *q'*, to which is attached a bent rod, *E*, one arm of which is formed to fit around and be held by a thumb-screw, *F*, to the incubator-case *a a a*.

The operation of my invention is as follows: When the water in the tank *c c* becomes heated above the standard temperature required for hatching the eggs, the expansion of the bar or spring *i i*, produced by the extra heat, causes it to be brought in contact with the contact-wire *g*, thus opening the electric current of the battery *e e e e*, connected by the contact-wire *f* with the other end of the bar or spring *i i*, and operating the lever-bar *x* by the contact of its magnet *k*, so as to raise the stem or valve *V* above the aperture *r* and diminish the flame of the gas or other heating substance, and at the same time and by the same operation of the lever-bar *x* the rods *w z A* and lever-arm *u* are so actuated as to raise the cover *B* of the ventilator *d*, thereby admitting cool air through the ventilator *d* into the incubator, and with the diminishing of the flame of the heating device at once lowering the temperature to the desired standard. When the temperature of the incubator is reduced below the proper standard, the spring or bar *i i* contracts so as to be thrown off from the contact-wire *g*, and the electric current is broken and the lever-arm *u* is raised, thereby operating the several rods and arms connected with it, as above mentioned, so as to lower the stem or valve *V*, thus increasing the flame of the heating device, and at the same time operating the rods *t, w, z, A*, and *V'*, so as to lower the cover *B* and close the ventilator *d* to the admittance of the cold air, thereby raising the temperature of the incubator to the proper degree of heat required.

By the instantaneous action of the electric currents on the bar or spring *i i* an automatic action is produced, which will at once, by the repeated opening of the ventilator *d* and the decreasing of the flame of the gas-burner *q* or other heating device when the temperature is above the required degree, and the closing of

the former and increasing of the latter when the temperature is below the proper point, secure the constant even temperature necessary for the hatching of the eggs.

In place of the gas-burner *q* above described, the lamp *S*, included in the patent granted to Henry Graves and myself, may be used, the arm *p* connected therewith being operated by the action of the electric current on the lever-bar *u*, so as to raise or lower the guard or regulator *T* in such a manner as to decrease or increase the flame of the light.

The bottom of the incubator-space *G* is provided with an aperture, *H*, for the passage of air through the egg-drawer.

Having thus fully described my improvements, what I claim as my invention, and desire to have secured to me by Letters Patent, is—

1. An incubator provided with a battery, *e e e e*, magnet *k k k k*, and conducts *f f f f g g g g*, and having a bar or spring, *i i*, composed of different metals, operated by its expansion and contraction, produced by the admission of heated or cold air into the incubator, so as to open or close an electric current and operate a lever-bar, *x*, in such a manner as to raise and lower the valve *V* of a gas-burner, *q*, or other suitable heating device, and at the same time open or shut the cover *B* of a ventilator, *d*, so as to produce automatically a constant and

even temperature within the incubator, substantially as specified.

2. The battery *e e e e* and magnet *k k k k*, with their contacts *f f f f g g g g*, and lever-bar *x* and stem *y*, in combination with the bar or spring *i i*, rods *t t t t w z A V'*, and lever-arm *u*, operating the valve *V* of the gas-burner *q* or guard *T* of other heating device, and the cover *B* of the ventilator *d*, substantially as specified.

3. The gas-burner *q*, with arm *q'*, apertures *r*, stem or valve *V*, rod or stem *V'*, operated by the expansion and contraction of the bar or spring *i i*, in connection with the electrical current of the battery *e e e e* and magnet *k k k k*, substantially as specified.

4. The lamp *S*, with crank-rod *p*, guard or regulator *T*, in combination with the rods *t t t t* and *w*, lever-arm *u*, and lever-bar *x*, operated by the expansion and contraction of the bar or spring *i i*, in connection with the electrical current of the battery *e e e e* and magnet *k k k k*, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JACOB GRAVES.

Witnesses:

SAML. M. BARTON,
CARROLL D. WRIGHT.