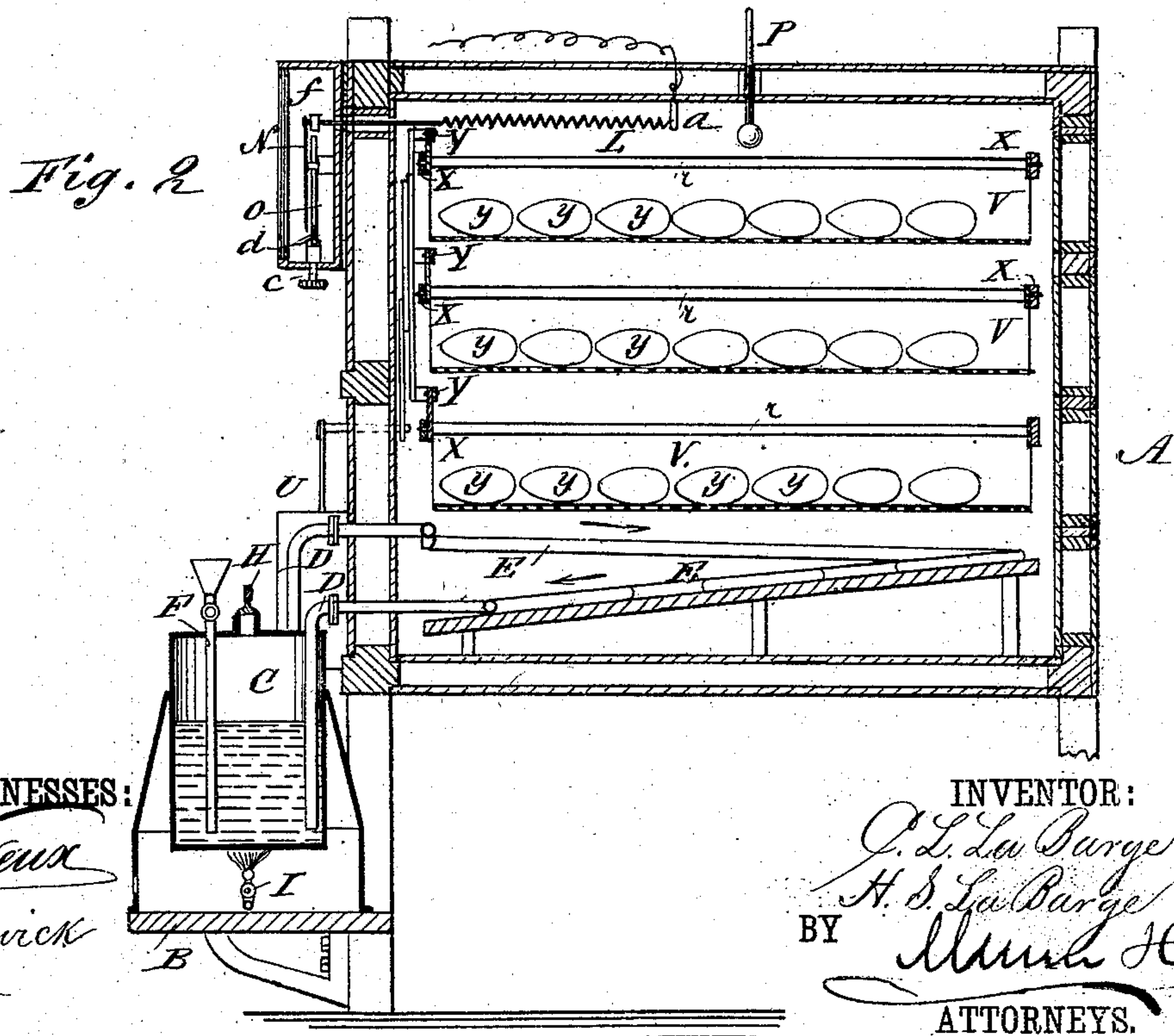
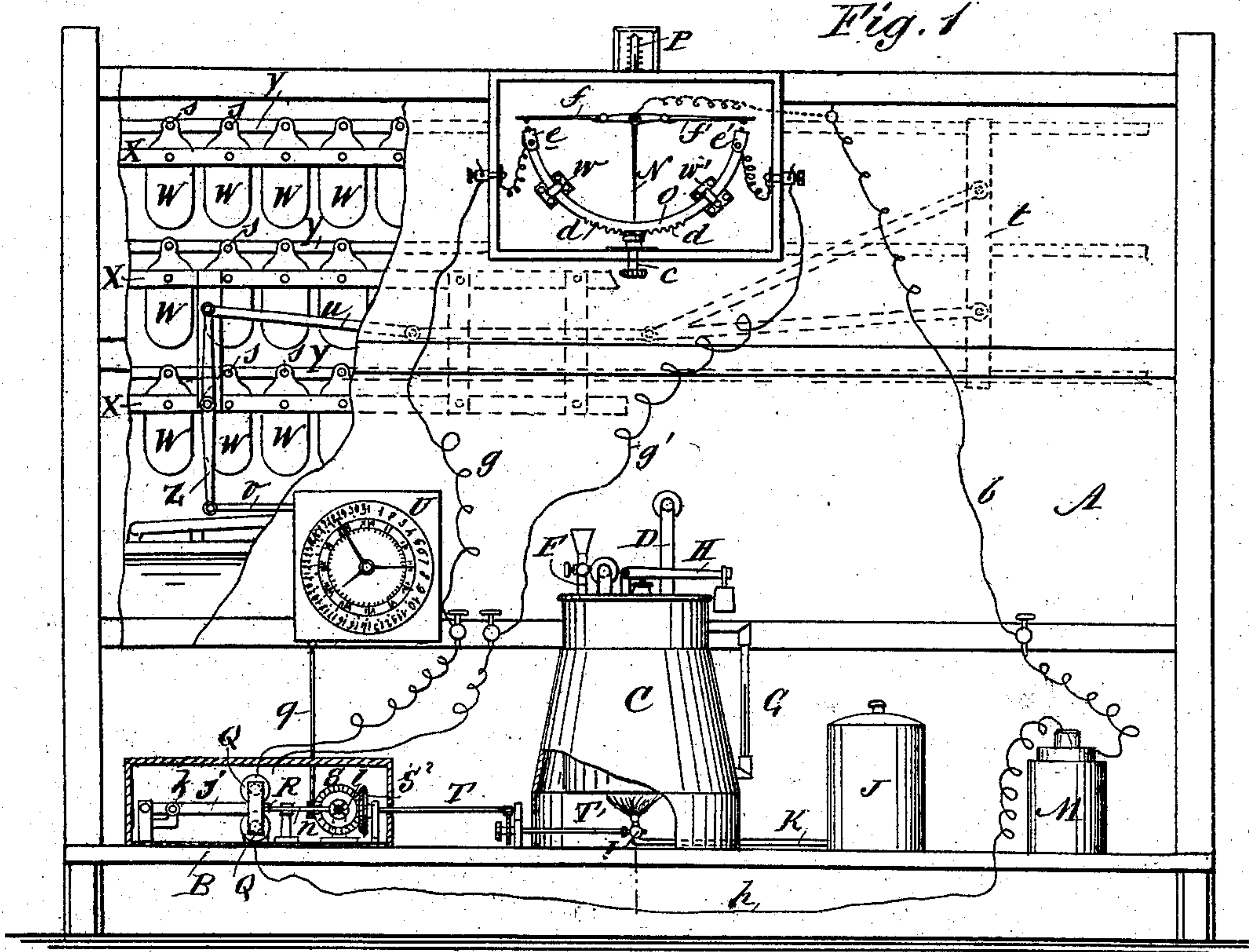


No. 235,787.

Patented Dec. 21, 1880.



WITNESSES:

C. Neveu
C. Sedgwick

INVENTOR:

BY *C. L. La Barge*
H. S. La Barge
Mum Ho
ATTORNEYS.

(Model.)

2 Sheets—Sheet 2.

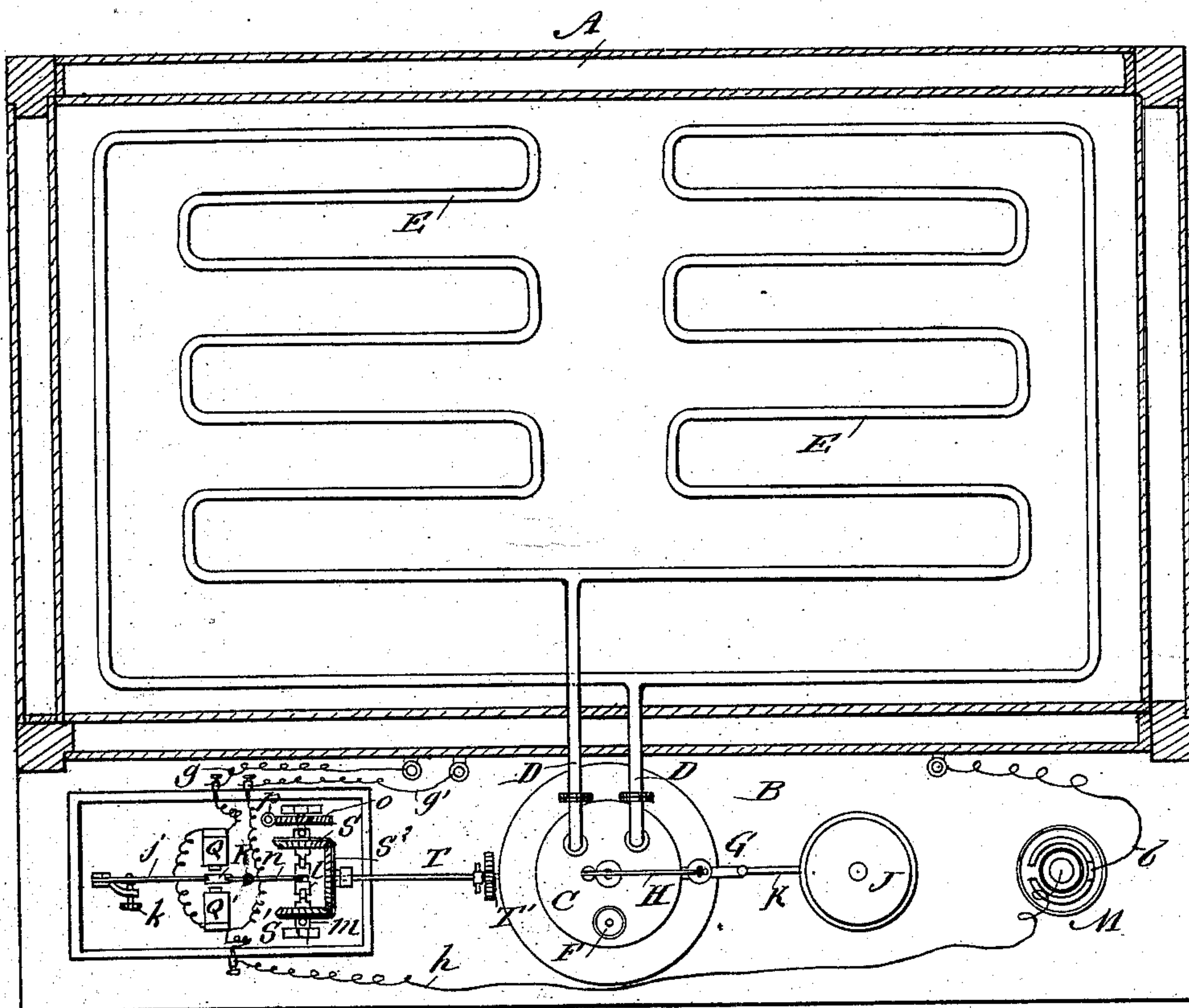
C. L. & H. S. LABARGE.

Incubator.

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Fig. 3



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UNITED STATES PATENT OFFICE.

CHARLES L. LA BARGE AND HENRY S. LA BARGE, OF ST. LOUIS, MISSOURI.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 235,787, dated December 21, 1880.

Application filed July 6, 1880. (Model.)

To all whom it may concern:

Be it known that we, CHARLES L. LA BARGE and HENRY S. LA BARGE, of St. Louis, in the State of Missouri, have invented a new and Improved Incubator, of which the following is a specification.

The object of our invention is to provide a new and improved incubator which regulates its temperature and shifts the eggs automatically at regular intervals in a reliable and effective manner.

The invention consists in an incubator provided with a series of longitudinal cloth hammocks or egg-receivers attached to end pieces pivoted to rigid supports and to movable bars which are automatically actuated so as to shift the eggs at regular intervals by suitable levers and a clock-work, also rotating a shaft upon which a sliding clutch is mounted, which clutch is brought in contact with one of a pair of beveled cog or friction wheels acting upon the gas or oil cock of the flame of the boiler for heating the incubator by means of a pair of electro-magnets connected with a battery and with a metal thermometer provided with an adjustable scale, whereby the temperature of the incubator is regulated automatically in a reliable manner.

In the accompanying drawings, Figure 1 is a partial front elevation and partial longitudinal sectional elevation of our improved incubator. Fig. 2 is a cross-sectional elevation of the same. Fig. 3 is a plan view of the same, showing the arrangement of the steam-heating pipes.

Similar letters of reference indicate corresponding parts.

The box A is constructed with rabbeted corner posts and a double casing, the space between which may be filled in with some non-conducting material. The box A is also provided with a shelf, B, upon which the boiler and automatic regulating devices rest.

The boiler C is provided with the pipes D D, for conducting steam to and from the heating-tubes E E, circulating in the box A and arranged in such a manner as to gradually pitch back to the boiler, as shown in Fig. 2. The boiler C is further provided with a tube, F, for filling it, with a water-gage, G, and a safety-valve, H, and is heated by means of a flame of

gas or of an oil-lamp preferably provided with an Argand burner, I. If oil is used, an oil-tank, J, connected with the burner I by a tube, K, must be provided on the shelf B.

As it is of the greatest importance to maintain a uniform heat in the incubator, we have devised a mechanism which automatically regulates the temperature.

A spiral metal thermometer, L, of some well-known construction is attached at one end to a button or binding-screw, *a*, rigidly attached to one of the walls, preferably the ceiling, of the box A, and connected with a battery, M, by a wire, *b*, whereas the other end of the thermometer L is attached to a hand, N, pivoted in the center of a curved scale, O, which can be adjusted by means of a journaled endless screw, *c*, which engages with the teeth *d d* on the lower edge of the scale, whereby the scale is moved one way or the other and is guided by the guides *w* and *w'*.

The hand N is provided with rectangular arms *f f'*, which are hinged in such a manner that they can only bend upward and can never form less than a right angle with the hand, so that if the thermometer L continues to rotate the needle or hand after the ends of the arms *f f'* rest on the end pieces, *e e'*, of the scale O the said arms will not break but will incline at the joint or hinge.

By means of the endless screw *c* the scale O, and consequently, also, the thermometer L, can be made to correspond with the mercury thermometer P. The end pieces, *e e'*, of the scale O are connected with the electro-magnets Q Q' by the wires *g g'*, which magnets are in turn connected with the battery M by the wire *h*.

The armature R of the magnets Q Q' is attached to a spring, *j*, which holds it in the center between the two magnets, and is adjustable by means of a set-screw, *k*.

A clutch, *l*, which rotates with a shaft, *m*, but is arranged to slide on the same, is held by the forked forward end of a lever, *n*, attached to the armature R, whereby the clutch *l* engages with either one of the beveled cog or friction wheels S S', loosely mounted on the shaft *m*, and engaging with a beveled cog or friction wheel, S², at right angles to the wheels S S', and mounted on a shaft, T, which oper-

ates a shaft, T', acting upon the burner I. The shaft *m* is rotated by means of a worm-wheel, *o*, mounted thereon, and actuated by a worm, *p*, on a vertical or other suitable shaft, *q*, which is rotated by the works of a clock, U, preferably arranged to run thirty days.

The eggs *y y* are placed in longitudinal hammocks V, or receivers, made of canvas or like material, attached to bars *r r*, which are fastened to end pieces, W, of wood or metal.

The end pieces, W, are pivoted to fixed bars X X, and are pivoted to movable bars Y Y by means of pins *s*, passing through the top of the said end pieces. The movable bars Y Y are connected, by a bar, *t*, attached thereto, which bar is connected with a lever, Z, by a connecting-rod, *u*, pivoted to the upper end of the lever Z, whereas a rod, *v*, is pivoted to the lower end of said lever and is acted upon by the works of the clock, which are constructed similar to the striking mechanism of an ordinary clock, so that the levers *v* and Z are actuated at regular intervals.

The operation is as follows: The eggs having been placed into the hammocks V, the metal thermometer L is regulated and adjusted according to the liquid thermometer P by turning the screw *c* either to the right or left, so that a line connecting the ends *e e'* of the scale O will always be parallel with the arms *f f'*. If the flame of the burner I is too large too much steam will be generated and the air in the box A will become overheated. The thermometer L expands, and thereby moves the hand N and arms *f f'*; but if these arms move only the shortest distance they come in contact with one of the ends—for instance, *e'*—of the scale O, whereby the electric circuit is closed, the current passing from the battery through wire *b*, thermometer L, arm *f'*, end *e'*, wire *g'*, magnet Q', wire *h*, and to the battery; but by the closing of the circuit the armature R is drawn toward the magnet Q', whereby the clutch *l* engages with the wheel S', causing the same to rotate with the shaft *m*, and as the beveled wheel S² engages with the wheel S' the former will also be rotated; but the shaft T, upon which the wheel S² is mounted, acts upon the shaft T', which by its rotation turns down the flame of the burner I. If the air in box A is too cold the above operation is repeated, but all parts move in the inverse direction, and in this manner the temperature can be controlled automatically. If desired, alarm-bells may be arranged to ring when the temperature rises too high or falls too low.

The clock U is so arranged that the levers *v* and Z are actuated every twelve hours; but any movement of the said levers will cause the connecting-rod *u* and bars Y Y to move

in the direction of their length, either forward or backward. By such movement the hammocks V will be slightly inclined as the end pieces, W, are pivoted to the rigid bars X X, and the eggs will be turned over by the inclination of the hammocks.

Shallow vessels containing water will be placed above the steam-tubes for the purpose of supplying the air in the incubator with necessary quantity of moisture.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an incubator, the combination, with the box A, of the boiler C, pipes E, metal thermometer L, battery M, magnets Q Q', friction or spur wheels S S' S², and shaft T, acting upon the burner I of the lamp of the boiler, substantially as herein shown and described, and for the purpose set forth.

2. In an incubator, the combination, with the scale O of a metal thermometer, of the hand N, the hinged or articulated arms *f f'*, and of the electric wires *g, g'*, and *h*, substantially as herein shown and described, and for the purpose of closing the electric current, as set forth.

3. In an incubator, the combination, with the scale O, having teeth *d d* on the lower edge, of the endless screw *c* and guides *w w'*, substantially as herein shown and described, and for the purpose of regulating the scale of the metal thermometer according to the liquid thermometer, as set forth.

4. In an incubator, the combination, with the electro-magnets Q Q' and the armature R, of the clutch *l*, shaft *m*, clock U, spur-wheels S S' S², shafts T and T', and burner I, substantially as herein shown and described, and for the purpose of regulating said burner automatically according to the temperature in the box A, as set forth.

5. In an incubator, the hammocks V, constructed substantially as herein shown and described, with end pieces, W, pivoted to a fixed bar, X, and a movable bar, Y, substantially as herein shown and described, and for the purpose of shifting and turning the eggs, as set forth.

6. In an incubator, the combination, with the hammocks V V, of the end pieces, W W, connecting-bar *t*, connecting-rod *u*, lever Z, and clock U, as herein described, and for the purpose of moving the hammocks to shift and turn the eggs, as set forth.

CHARLES L. LA BARGE.
HENRY S. LA BARGE.

Witnesses:

GEO. S. CASE,
JNO. B. LA BARGE.