

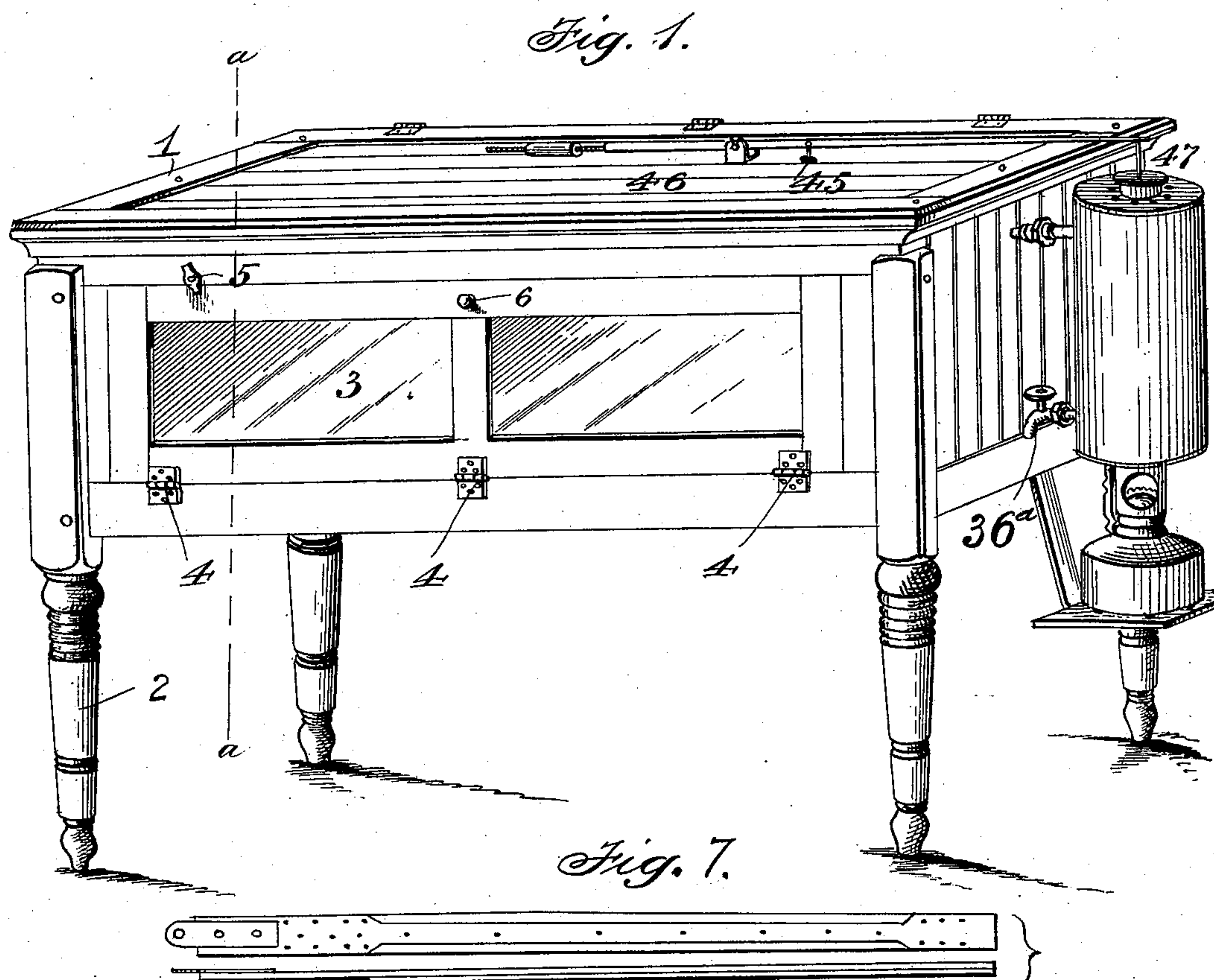
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3 Sheets—Sheet 1.

C. C. & G. E. SHOEMAKER.  
INCUBATOR.

No. 601,173.

Patented Mar. 22, 1898.



Witnesses  
Frank L. O'Rand  
A. H. Miller.

C. C. Shoemaker  
G. E. Shoemaker  
Inventors.  
By *W. J. Fitzgerald*  
Attorneys

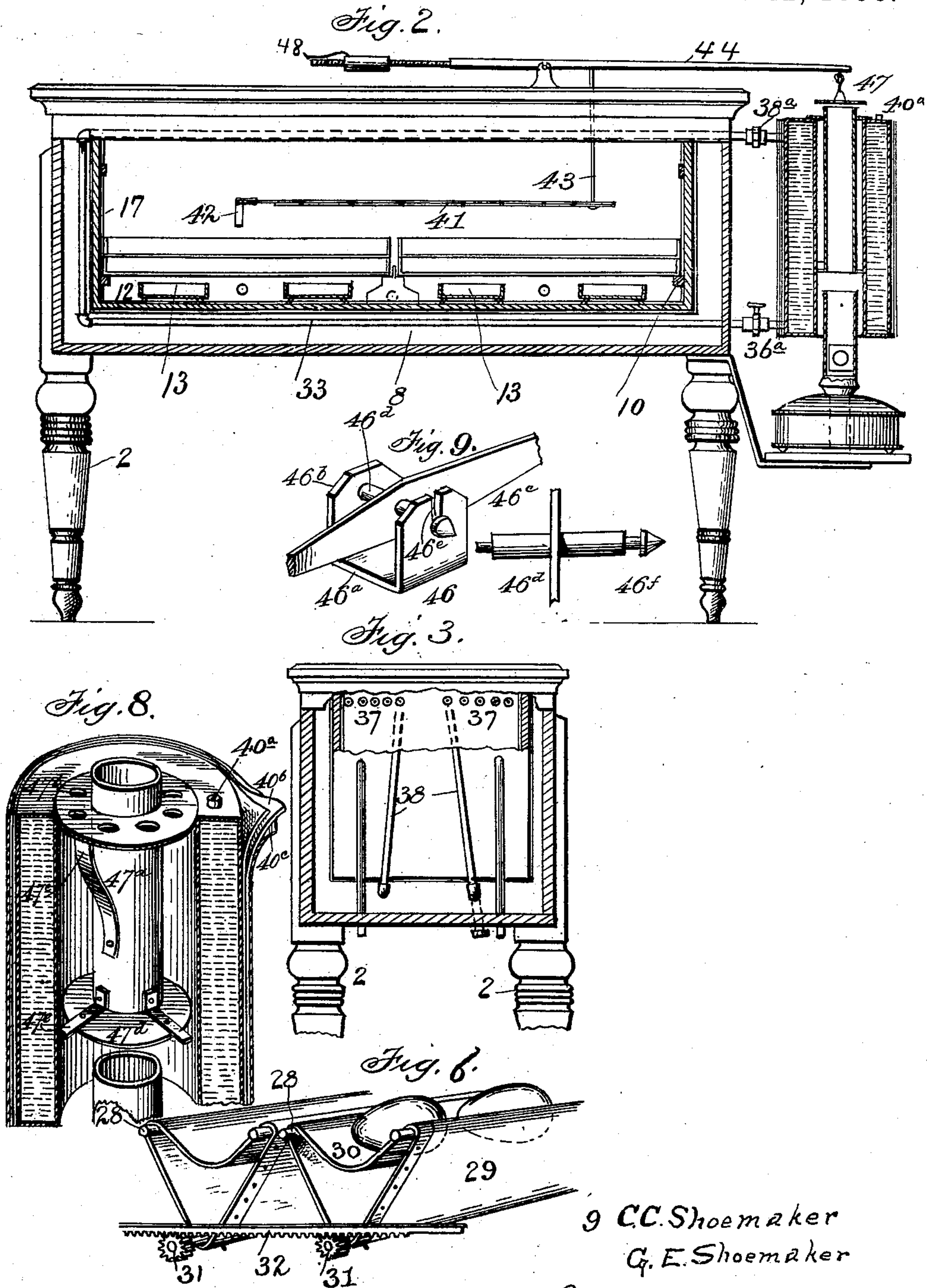
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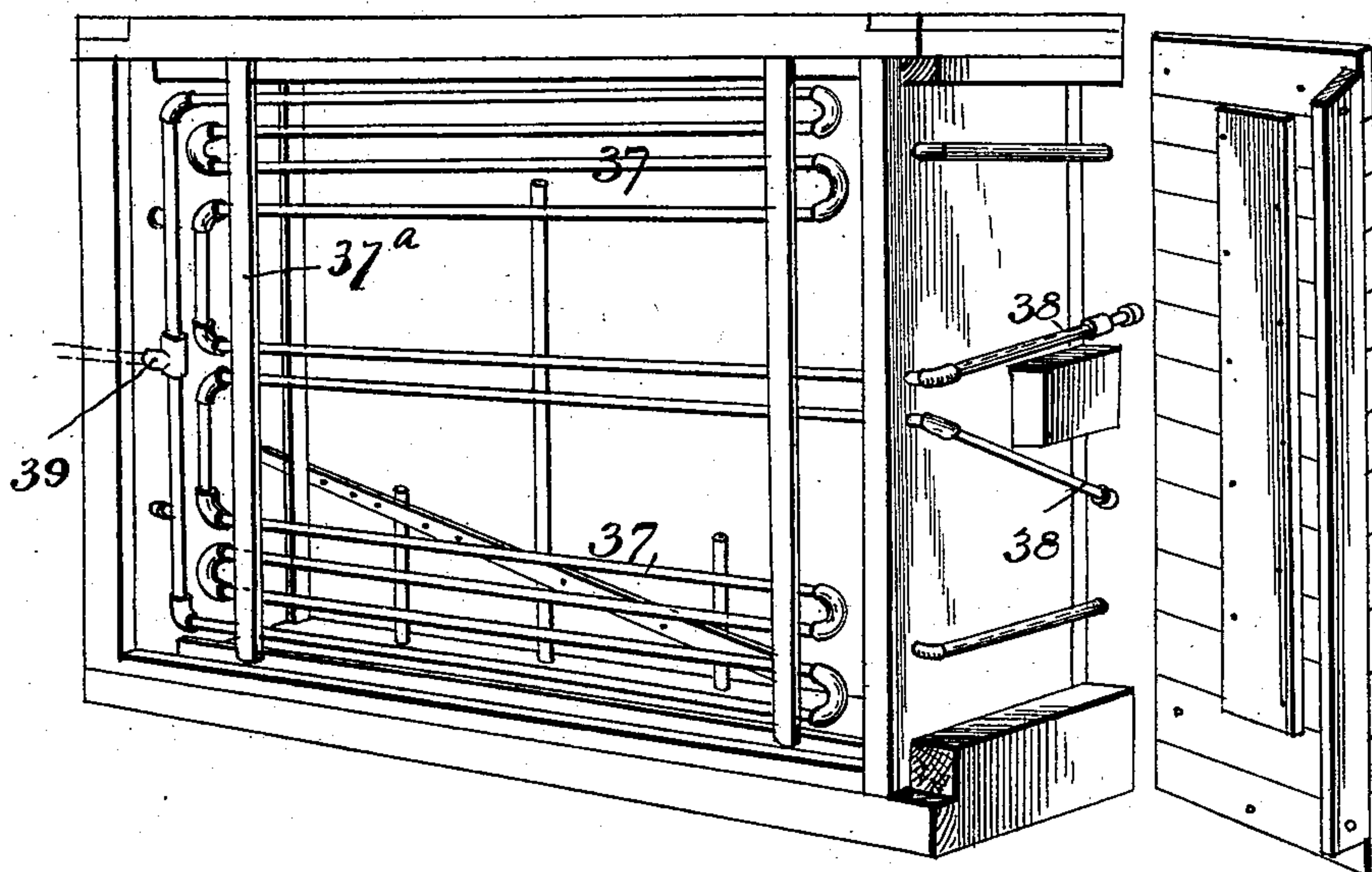
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C. C. & G. E. SHOEMAKER.  
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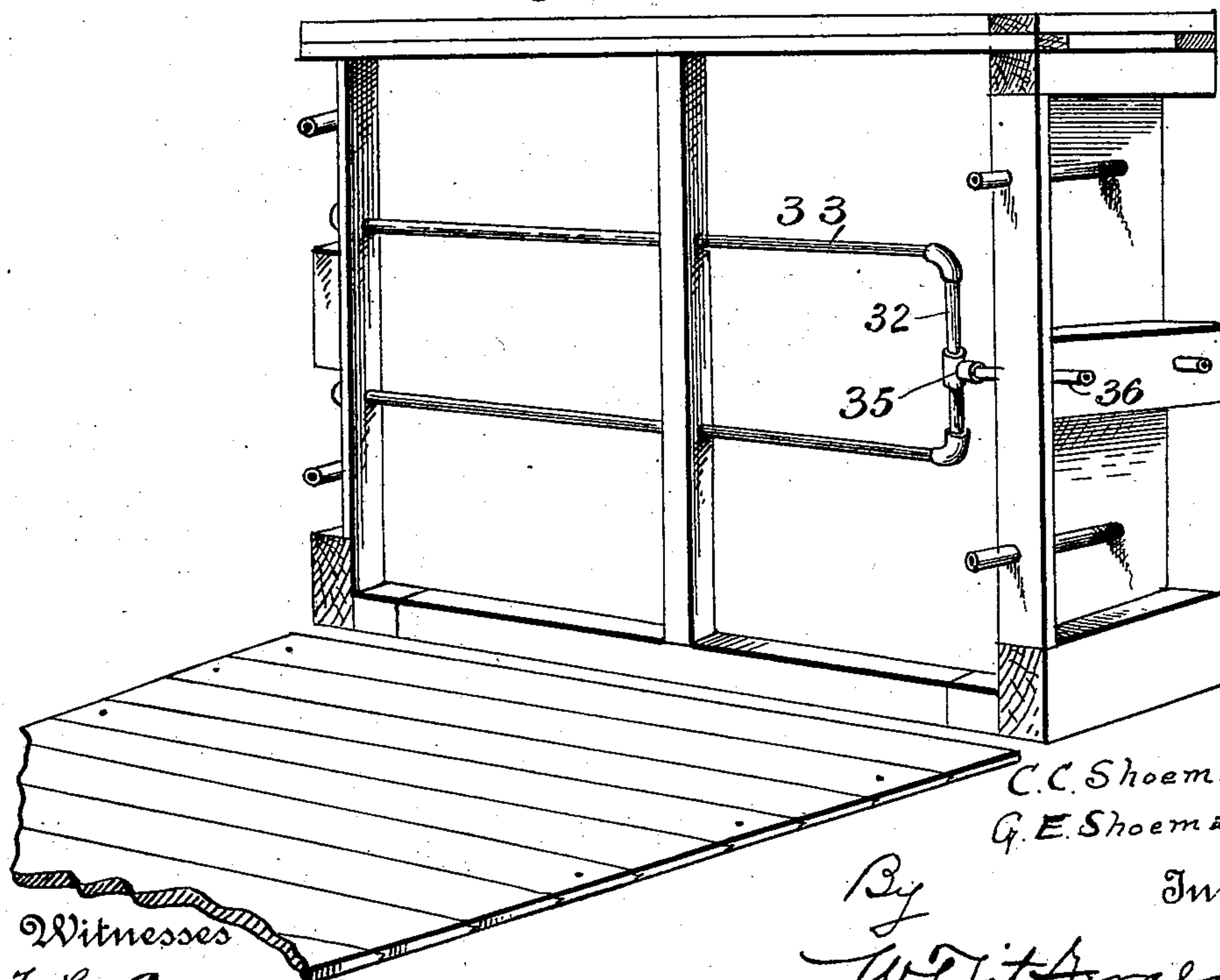
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*Fig. 4.*



*Fig. 5.*



Witnesses

*F. L. Ourand*  
*A. H. Miller*

*C. C. Shoemaker*  
*G. E. Shoemaker*

Inventors:

*By*  
*W. J. Fitzgerald & Co.,*

Attorneys.



# UNITED STATES PATENT OFFICE.

CLINTON C. SHOEMAKER AND GEORGE E. SHOEMAKER, OF FREEPORT,  
ILLINOIS.

## INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 601,173, dated March 22, 1898.

Application filed February 3, 1897. Serial No. 621,872. (No model.)

*To all whom it may concern:*

Be it known that we, CLINTON C. SHOEMAKER and GEORGE E. SHOEMAKER, citizens of the United States, residing at Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Incubators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention as set forth in the following specification and the accompanying drawings has relation to incubators, and more particularly relates to certain details of construction and arrangement of parts thereof deemed necessary to complete an effectively operative machine of the character specified which may be depended upon at all times to perform its office.

The object of our invention is to render the incubator automatically operative, thus obviating the necessity of a close attendance of the operator.

A further object is to provide efficient means for turning and changing the position of the eggs from time to time, when deemed necessary, and to provide a regulated uniform temperature throughout the incubating-chamber.

All of these advantages will be fully set forth in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective exterior view of our invention complete. Fig. 2 is a longitudinal section of Fig. 1 on a line central to the boiler. Fig. 3 is a transverse section of Fig. 1 on line *a a*. Fig. 4 is a perspective detail of part of the casing and upper series of heating-pipes. Fig. 5 is a similar view of the lower pipes. Fig. 6 is a perspective view of our egg-turning device. Fig. 7 is a detail of the thermostat-bar. Fig. 8 is a central vertical section of the boiler, showing the flue in elevation. Fig. 9 is a perspective detail of the bearing for the damper-controlling bar.

In materializing our invention we provide the body or outer casing 1, made substantially in the usual manner and provided with the supporting base or legs 2. In the sides

of the casing we provide doors or swinging sections 3, hinged, preferably, at their lower edges that the upper edges may be swung down and outward, affording unobstructed access to the interior, as shown by the hinges 4 and the retaining-catches 5 and the operating handle or button 6. Within the casing or body thus provided we mount the incubating-chamber 7 proper, which is of such dimensions that it will be freely received by the outer casing and when mounted therein will be supported by suitable legs or brackets attached to the ends thereof, affording an air-space 8 of suitable size between the inner surface of the casing and the outer surface of the incubating-chamber. This air-space is an important feature of our incubator, providing, as it does, for the more reliable retention of heat within the incubator-chamber and a uniform degree of temperature thereof.

In order to more reliably conserve the heat within the incubating-chamber, it may be found desirable to line the interior thereof with one or more thicknesses of building-paper or other preferred material, while the outer surface thereof is preferably covered with sheet-asbestos, thus rendering the walls of the incubating-chamber absolutely non-conductive. By thus constructing and reinforcing the inner and outer surfaces of the walls of the incubating-chamber the heat conveyed thereto is reliably retained, thus making it possible to safely depend upon a minimum supply of heat, rendering the operation and control of the incubating-chamber effective and economical.

In order to provide for a reliably uniform degree of temperature within the incubating-chamber, we prefer to so mount the heating pipes or coils that they will be disposed in the upper part of said chamber, supplying heat thereto by a downward radiation in close imitation of the method of supplying heat by the mother hen.

It will be understood that an aperture suitably protected by a glass covering may be provided at a convenient point in the outer casing that the operation of turning the eggs may be closely observed.

In Fig. 6 we have illustrated the egg-turning mechanism, formed by mounting in a suit-



able frame a series of rollers 28, disposed in sets, each set marking substantially the angles of a triangle. Engaging with each set of rollers thus provided is the continuous belting 29, designed to extend loosely outward around said rollers, permitting that section thereof between the two upper rollers to drop downward and provide a seat 30, upon which a row or more of eggs may rest. By this arrangement the weight of the eggs will cause the canvas or other form of belting to become sufficiently taut to bring the same into engagement with the lower roller, by which it may be moved upon the other rollers and thus result in positively turning the eggs in either direction.

For convenience of simultaneously operating each of the series of rollers we prefer to attach to each of the lower rollers a suitable gear 31, designed to coact with the rack-bar 32, as shown. By this arrangement it will be seen that a simple longitudinal movement in either direction of the rack-bar 32 will act upon the series of gear 31 and cause them to rotate and incidentally move the belting and turn the eggs. In order to reliably engage the belting, the lower rollers may be provided at each end and at other points, if desired, with a toothed wheel designed to engage in apertures provided in the belting at this point.

Immediately below the incubating-chamber we dispose part of the heating-pipes 33, which may consist of as many as may be deemed necessary, though we prefer to locate but two pipes, as shown in Fig. 5, connected with each other by the intermediate sections 34 and the union 35, the latter receiving the exit-pipe 36, which connects directly with the lower end of the boiler.

In the upper part of the incubating-chamber is located the coil formed by the longitudinal sections 37, suitably connected with each other and all securely attached to the ceiling of said chamber by cleats 37<sup>a</sup> or otherwise. The pipes 33 below the floor of the incubating-chamber are connected at their receiving ends with the discharging ends 38 of the coils 37, and since said coils receive their supply of hot water or steam from the union 39, which is connected to the upper end of the boiler by union 38<sup>a</sup>, a complete circulation is thus provided throughout the upper and the lower pipes and the boiler 40.

It will of course be understood that we do not wish to be confined to the exact arrangement of the pipes as shown, as a disposition thereof may be made to meet the requirements of individual preference or of special circumstances.

In order that the dead-air space between the outer casing and the incubating-chamber may be properly ventilated, a series of inlet and exit ports or pipes may be provided in said casing, preferably at the lower and upper sides thereof. Said ports or apertures may be provided, if desired, with a suitable damper or closing device that may be readily

drawn to one side or arranged to entirely close the opening.

In order that the desired degree of temperature may be automatically provided, we arrange the sensitively-poised thermostat-bar 41 within the incubating-chamber. Said bar is constructed of a thin strip of wood and another of vulcanized rubber, securely riveted together, and in such position the bar is disposed, preferably, with the rubber side up. One end of said bar is pivoted to a convenient part of the interior of the incubating-chamber, as by bracket 42, while the free end thereof extends nearly to the opposite end of the incubating-chamber, where it is connected by a link 43 with the balanced bar 44. Said link extends upward through the aperture 45, and its upper end is pivotally attached to the balanced bar, upon which it is designed to act. Said balanced bar is pivotally and removably mounted upon the upper side of the casing between the ends of the bifurcated bearing seat or standard 46. The bearing 46 is preferably formed of a piece of heavy sheet metal so bent as to form the base 46<sup>a</sup> and the vertical members 46<sup>b</sup> 46<sup>c</sup>. One of said members is provided with an aperture adapted to receive one end of the shaft 46<sup>d</sup>, while the other member is provided with a vertically-disposed slot 46<sup>e</sup>, designed to receive the recessed end 46<sup>f</sup> of said shaft. By this construction it will be observed that the shaft 46<sup>d</sup>, being rigidly secured to the balanced bar, is readily removed or replaced from the bearing thus provided.

The balanced bar 44 is connected at its outer end to the damper 47, adapted to open or close the upper end of the chimney-flue as it protrudes through the boiler. Said bar is adjusted in a horizontal plane by means of the weight 48, which is preferably seated upon the threaded end of said bar.

After the parts are assembled in their operative positions it will be clear that as the temperature rises within the incubating-chamber the rubber side of the thermostat-bar will lengthen by expansion and cause the outer end thereof to be depressed, inducing a corresponding movement upon the balanced bar 44, and thus lower the damper into a closed position, resulting in a lower degree of heat from the lamp. When the incubating-chamber becomes too cold, the rubber side of the bar will contract and thereby elevate the end of said bar and also the outer end of the balanced bar and the damper, thus producing a freer action of the lamp and a greater degree of heat.

We desire to call attention to the construction provided for the end of the casing, by means of which the entire end section may be removed, thus providing free access to the pipes when it is desired to remove or replace the same. The end section may be attached to the casing in any well-known way. In the present instance two threaded apertures are shown, one at each corner at the top of the



section and one in the bottom of the same. Screws are inserted and the end is secured to the casing.

As a convenient means for replenishing the boiler the threaded nozzle 40<sup>a</sup> is provided, while the water may be withdrawn from the boiler and the coils by a conveniently-located spigot 36<sup>a</sup>, as shown in Fig. 1.

In order to more reliably retain the heat within the boiler, it is preferred that the same may be covered upon its outer surface with one or more sheets of asbestos, as indicated by 40<sup>b</sup>. Said casing of asbestos may be additionally reinforced and protected by a covering of sheet metal 40<sup>c</sup>, as zinc or the like. In Fig. 8 we have illustrated a detachable chimney or flue 47<sup>a</sup>, provided with a cap 47<sup>b</sup>, having a series of perforations, as shown. Said cap is preferably held in position by the spring-arms 47<sup>c</sup>, attached to said cap and flue. It will be observed that the cap extends from the flue thus provided to the inner edge of the boiler, upon which it is designed to rest. The lower end of said flue is provided with the flange 47<sup>d</sup>, integrally or otherwise attached. Said flange is of a less diameter than the cylindrical opening in the boiler, and the lower end of the flue is therefore held in a vertical position by the contact-point 47<sup>e</sup>, designed to bear against the inner face of the boiler, permitting the heat to rise between the edges of the flange and the boiler.

The lamp-chimney proper is preferably so disposed that its upper end will not be in contact with the lower end of the flue. By this arrangement it will be observed that a strong direct draft is at once induced when the damper is raised and that an indirect draft results when said damper is lowered.

When the damper is in a raised position, the heat, taking the most direct route, will pass directly through the flue; but when the damper is lowered sufficiently to close the opening of the flue the heat will pass around the edges of the flange upon its lower end and out through the series of perforations provided in the cap 47<sup>b</sup>, incidentally acting upon the inner face of the boiler.

It will be understood that any preferred form of lamp may be employed for the purpose, though in practice it is thought that one having a central draft will be found to be most reliable.

If desired, side doors extending the full length of the incubating-chamber may be provided for the free introduction of the egg-turning frame, or such frame may be introduced into said compartment before the same is secured together, in which case but a small door will be necessary to provide access to the interior.

Believing that the advantages, operation, and construction of our improved incubator will be readily apparent in the foregoing description, further reference is deemed unnecessary.

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

1. In an incubator having a series of endless egg-holding belts, rollers controlling said belts located in the form of a triangle and means to move the belts to turn the eggs thereon, as set forth.

2. An incubator having an egg-holder consisting of an endless belt having a depressed upper section, rollers sustaining said belt and a turning-roller located beneath said depressed section and means to operate said roller in either direction.

3. An incubator having a series of continuous perforated belts, each series consisting of upper supporting-rollers, and a lower turning-roller having pins to take into said perforations and also having a gear, and a rack-bar engaging the gears on said turning-rollers, and means to operate said rack-bar whereby all the series of belts will be turned in either direction, as set forth.

4. An incubator having an egg-holder consisting of a continuous perforated belt having an upper section depressed between rollers, said rollers supporting the belt, and a turning-roller having pins to take into said perforations, located underneath the depressed section and means to operate said turning-roller in either direction, as set forth.

5. An incubator having a series of continuous belts having depressed upper sections to carry the eggs, said belts resting on rollers, another roller located beneath the supporting-rollers having a gear-wheel and a rack-bar engaging said gear-wheel, all operatively combined as set forth.

6. As an improvement in incubators, the combination of an inner and outer casing, a thermostat mounted in the former, a balanced bar mounted on the outer casing connected to, and operated by the thermostat, a closing-damper connected to the free end of the balance-bar, a tubular boiler having a central removable flue spaced from the boiler and provided with a perforated cap and a lower flange of less diameter than the flue, whereby the products of combustion will pass between the flue and boiler when the damper is closed, as set forth.

7. The combination of an incubator having coils of pipe connecting a boiler thereto, the boiler having a central draft-flue containing a chimney of less diameter than the flue, a perforated cap surrounding said chimney near its top and resting on the boiler, and a damper to regulate the draft of the chimney, as set forth.

8. The combination of an incubator having coils of pipe connecting a boiler thereto, the boiler having a central draft-flue containing a chimney of less diameter than the flue, a perforated cap surrounding the chimney and covering said flue, flanges on the lower end of the chimney of less diameter than the flue,



and a damper for said chimney and automatic means to control said damper, as set forth.

9. The combination of an incubator carrying coils of pipe connecting a boiler thereto, the boiler having a draft-flue provided with a removable chimney surrounded near its top with a perforated cap covering the flue when in position, a flange on the lower part of the chimney of less diameter than the flue, a damper controlling the draft of the chimney, and devices connecting the damper and a thermostat in said incubator, as set forth.

10. An incubator having an egg-holder and means connected therewith for turning the eggs, and coils of pipe surrounding said holder, a boiler connected to said pipes and having

a central draft-flue containing a chimney of less diameter than the flue, a perforated cap surrounding said chimney near its top and resting on the boiler, and means directing the products of combustion between the chimney and boiler when the temperature falls below the desired point whereby the eggs will be kept at a uniform temperature, all combined as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

CLINTON C. SHOEMAKER.  
GEORGE E. SHOEMAKER.

Witnesses:

D. S. BREWSTER,  
OWEN T. SMITH.