

UNITED STATES PATENT OFFICE.

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PRESSING MACHINE.

Application filed April 3, 1918. Serial No. 226,503.

To all whom it may concern:

Be it known that we, DANA H. BENJAMIN and JAMES P. MCCARTHY, citizens of the United States, residing at Cleveland Heights and Chicago, respectively, in the counties of Cuyahoga and Cook, respectively, and States of Ohio and Illinois, respectively, have invented certain new and useful Improvements in Pressing Machines, of which the following is a specification.

This invention relates to pressing machines, and particularly to the work supports therefor. The invention is particularly adaptable for use in pressing sweaters, underwear or other knitted woolen fabrics or articles, but is capable of use with any desired materials or articles.

In pressing knitted sweaters or like knitted articles in a pressing machine, the article is usually laid upon a canvas or other fabric support over a yielding pressing bed and while thereon is subjected to the pressure of a heated superposed metal surface. Sometimes a layer of canvas or padding is interposed between the article and the heated upper surface. Experience has shown that when knitted woolen articles are pressed in this manner the heat and moisture cause the colors in the article to run, producing undesirable discoloration which materially detracts from the appearance and salability of the articles. The effect is probably also due to the action of the heated ironing plate exerted through only a canvas layer. Indeed, it is frequently found that an imprint of the threads of the canvas is produced upon the fabric of the knitted article, which is an additional detriment to its appearance.

The object of the present invention is to provide suitable means which enables sweaters or like knitted articles to be pressed in pressing machines and therefore rapidly and conveniently, but nevertheless without any liability of producing discoloration or an imprint of the pressing canvas upon the article. A further object of the invention is to provide suitable means for this purpose which is of simple form and can be readily applied to any form of pressing machine, and which in certain types of machine assists in holding the articles to be pressed in the proper shape and form.

The invention comprises the construction and arrangement of parts hereinafter described and claimed.

In the drawings, Fig. 1 represents an elevation of one form of pressing machine embodying the invention; Fig. 2 is a plan view of the work holder, parts being broken away to expose the lower layers; Fig. 3 is a cross section on the line 3—3, Fig. 2 the cover layer being shown in elevated positions; Fig. 4 is a plan view of the work supporting member of another form of pressing machine; and Fig. 5 is a cross section, on the line 5—5, Fig. 4, and illustrating the two co-operating pressing members with the cover layer for the garment in elevated position.

The invention may be applied with equal facility to various types of pressing machines. For purposes of illustration, and not in any sense as limiting the invention, Figs. 1 to 3 inclusive show the invention applied to what is known as an underwear press. This press, as to most of its features, is of the same form shown in the prior patent to Daniel M. Cooper, granted May 11, 1915, No. 1,139,346, to which reference may be had for a more complete description of said machine. Briefly described the machine comprises a suitable frame 1, having an upper pressing member or head 2 suitably heated, such as by steam introduced to its inner cavity, and which head co-operates with a padded lower pressing member or bed 3. The bed may also be heated in a manner similar to the head. It is located below and in registry with the head, and the work to be pressed is subjected to pressure between said members by relative movement thereof. One of said members 2 and 3, such as the bed 3, is vertically movable relative to the other, the operating mechanism therefor consisting of toggle members 4 connected to a nut 5 actuated by the rotating movement of a screw 6 operated by the driving gear 7. As the screw is rotated in one direction or the other the toggle is straightened or broken and the bed elevated or lowered along its vertical guides.

For conveniently handling the work the articles to be pressed are laid in turn upon a work holder 8, which is moved in laterally, by sliding movement along guides 8^a,

Nov. 18, 1924.

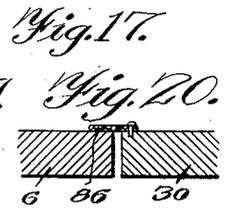
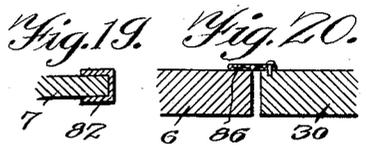
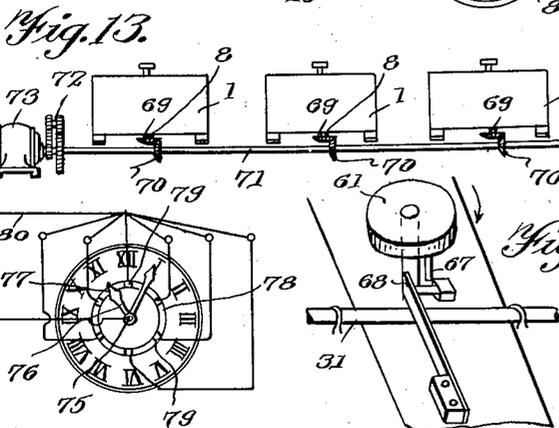
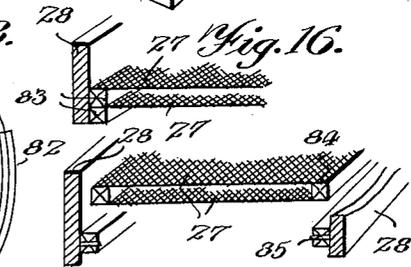
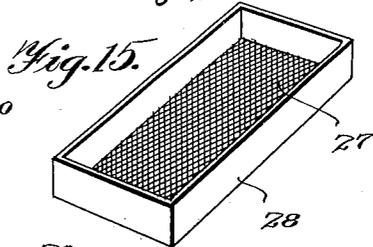
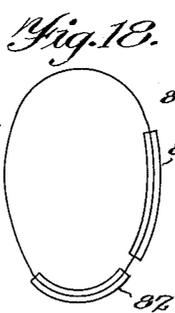
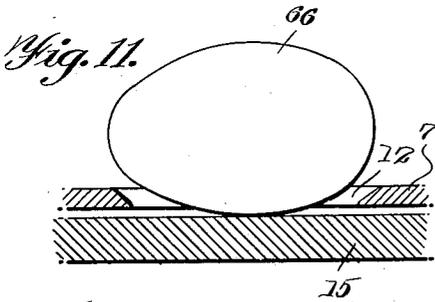
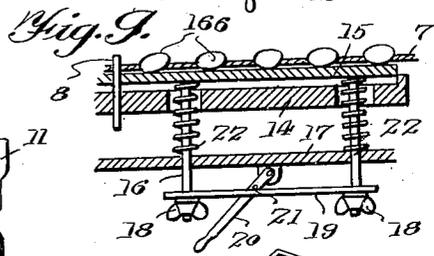
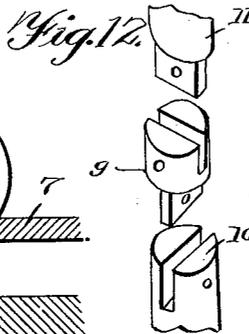
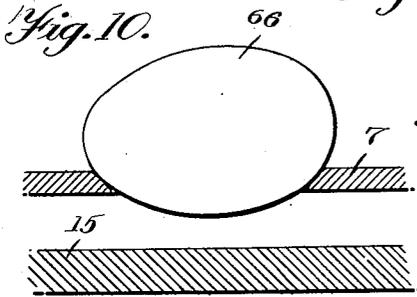
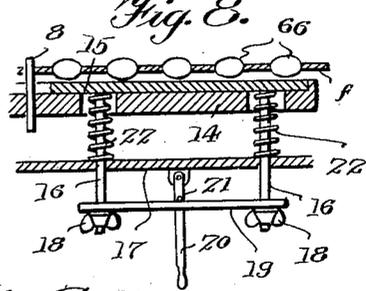
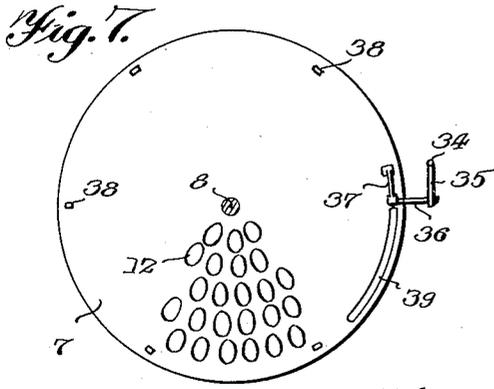
1,516,476

J. PERROT

AUTOMATIC INCUBATOR

Filed June 26, 1924

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

JACQUES PERROT, OF LIGUGE, FRANCE.

AUTOMATIC INCUBATOR.

Application filed June 26, 1924. Serial No. 722,583.

To all whom it may concern:

Be it known that I, JACQUES PERROT, a citizen of the French Republic, residing at Domaine de Givray par Liguge, Vienne, France, have invented certain new and useful Improvements in Automatic Incubators, on which an application for patent was filed by me in France on June 20, 1923, and of which the following is a specification.

My invention relates to an automatic incubator, i. e., an incubator in which all the operations relative to modifications of temperature, aeration of the eggs, the turning of the eggs, and the like, are automatically effected.

In the known incubators the eggs to be hatched are disposed in drawers, partitioned elements, flat pieces or like elements which must be withdrawn from the incubator when the eggs are to be turned over, but this has a prejudicial effect from the fact that the eggs pass at once from the temperature of 40° C. of the incubator to the room temperature. On the other hand, the eggs must be turned by hand, and this requires a considerable time as well as a marked interruption in the operation of the incubator. On the other hand, since the germs are sensitive to bad odours on the outside, it is most prejudicial to touch the eggs with the fingers. Further, during the incubation and chiefly when hatching, the eggs which are situated at the bottom of the drawers or on the same level as the chicks are so to speak immersed in a bath of carbonic acid gas which is prejudicial to the incubation, as concerns the respiration of the germs as well as of the hatched chicks.

The incubator according to the invention which avoids these drawbacks is chiefly characterized by the fact that the eggs are supported by a rotatable element or plate upon which they rest in recesses formed in the latter, extending to the proper degree below the under side of said plate; a surface or movable platform can be brought in a determined section adjacent the bottom of the said plate, in order to provide automatically by the rotation of the plate for the turning of all the eggs by their simple passage above the said platform.

In the appended drawings which show by way of example, a form of construction of an automatic incubator according to the invention:

Fig. 1 is a perspective view,

Fig. 2 is a plan view, with the cover in place.

Fig. 3 is a plan view with the cover removed.

Fig. 4 is a general vertical axial section through shafts 31 and 36.

Fig. 5 is an elevational view of the front part, with partial section.

Fig. 6 is a detail of construction of the body of the incubator.

Fig. 7 is a detail of the plate supporting the eggs.

Fig. 8 is a detail of the mechanism for the automatic control of the turning of the eggs.

Figs. 10 and 11 are details on a larger scale showing the respective position of the eggs in the case of Figs. 8 and 9.

Fig. 12 is a detail of the supporting shaft of the plate.

Fig. 13 is a diagram showing a group of automatic incubators and Fig. 14 a detail of device for automatic control.

Fig. 15 is a perspective view of a drying drawer.

Fig. 16 is a detail of Fig. 15.

Fig. 17 is a modification of Fig. 16.

Figs. 18 and 19 are respectively a plan view and a partial section of the plate supporting the eggs, with the regulating devices.

Figs. 20 and 21 relate to two modifications of the tight closing devices for the flaps of the cover.

Fig. 22 represents an aerating device.

The said incubator comprises an outer case 1, having for instance a square shape, suitably constructed in order to provide for the maximum heat insulation of the interior of the incubator relative to the room temperature. To this end, I dispose within the said outer case 1 an interior casing 4, leaving between the two an insulating layer of air of suitable thickness 2—2. The said layer of air is divided into two parts by the vertical frames 3 formed of or lined with a heat-insulating substance, preferably of wire or sheet asbestos slidable in grooves formed in the upright serving for assemblage in the angle 81, Fig. 6.

The said arrangement is mounted upon suitable feet 5 which maintain it at the proper distance from the ground. A tight cover 6 of wood, which is partitioned in the same manner as the walls, i. e., having between the two wood walls an insulating layer of air which is horizontally divided

into two parts by insulating sheets, serves to cover the apparatus; the tight joint is formed of any suitable substance by means of tongues mounted on the cover and entering suitable slots formed in the partitions 1 and 4 or in only a part thereof, or consisting of felt or other packing, or further, by these two means employed together. The tight closing of the cover is ensured, Fig. 1, by the cables 62 passing alternately over the thimbles 63, 64 attached respectively to the cover 6 and the outer partition 1 of the incubator and provided with tightening nuts 65 ensuring an energetic pressure of the said cover upon the entire periphery of the incubator and a tight and elastic closing at the same time, and one which is adapted to any warping or play of the wood.

Within the chamber formed by the extreme inner partition 4 is disposed a plate 7, Figs. 3, 4 and 7, for supporting the eggs, it being mounted on a vertical shaft 8 suitably guided in the cover and in the bottom of the incubator by straight bearings or ball-bearings, but preferably supported upon the cover or the bottom (or both) by a thrust ball bearing or bearings of any suitable construction. In order to admit the rotation of the shaft 8, irrespectively of any possible differences of level between the guide bearings, I dispose at a suitable point on its length a double Cardan joint 9, Fig. 12, which is connected (with articulation) respectively with the lower portion 10 and the upper portion 11 of the shaft 8.

The plate for supporting the eggs has preferably a circular shape and is provided with recesses 12 having the radial direction and of suitable size and shape to receive the eggs to be hatched. In order that the size of said recesses may conform with the variable size and shape of the eggs, said recesses may be different as to shape and size, or may be alike. In the latter case, they are provided with small movable riders 82, Figs. 18 and 19, for example of metal and having a U cross section, and of suitable shape, these being mounted at the suitable place for reducing the opening, in order that all the eggs may extend below the said plate by the same amount.

The edges of the said recesses are suitably bevelled for the easy disposing of the eggs, and said plate is guided at its edge by the rollers 13, Fig. 4, employed in any suitable number and properly spaced upon the periphery of the plate, being mounted on supports which bear upon the partition 4 or on the cross-piece 14. Below the plate 2 is mounted a cross-piece 14 of suitable width, and upon one of the sections of said cross-piece extending for example below a radius of the said plate 7, I dispose a movable platform 15, Fig. 8, of adequate width and whose upper surface and edges are prefer-

ably rounded in an appropriate manner in the direction of motion of the eggs. The platform 15 is mounted upon rods 16, e. g., two in number, slidable in the cross-piece 14 as well as in the floor 17 of the incubator and having on their lower screwthreaded ends the wing nuts 18. Upon the nuts 18 of the two rods 16 is caused to bear a transverse bar 19 freely slidable on the rods 16. At a suitable point on the floor 17 is pivoted an oscillating lever 20 provided with an arm 21, disposed above the transverse bar 19 and thus enabled to act in order to lower the platform 15 in spite of the action of the springs 22 surrounding the rods 16 and abutting upon the floor 17, which constantly urge the platform 15 upwardly. The position of the nuts 18 on the rods 16 limits the upward motion of the platform 15 and prevents the contact of the latter with the lower face of the rotating plate 7, this position being however regulated so as to allow the platform 15 to raise the eggs placed in the recesses 12 when these eggs are above the platform 15.

The inner chamber of the incubator has thereon the lining 23, Fig. 3, made of a suitable substance, preferably metallic. This lining 23 has substantially the form of the inner case 4, leaving between the said lining and the reservoirs 26, chambers having a substantially triangular section 24 serving to receive the heating elements. Said elements consist preferably of electric lamps 25, each chamber 24 has therein one or more such lamps and at the level of said lamps the lining 23 supports the reservoirs 26 (preferably removable) containing a suitable liquid such as water. As shown in Fig. 4 each lamp 25 is so disposed that its heating filaments end substantially at the level of the upper edge of the corresponding reservoir 26, so as to provide for the gradual heating of the water in order to vary the vaporization of the water according to the state of progress of the incubation, and therefore the hygrometric degree of the incubator. Each reservoir 26 forms at the same time a screen preventing the direct transmission of the heat of the lamp 25 to the eggs to be incubated as well as a reflector sending upon the wall of the partition 4—suitably covered with a reflecting coating—the heat furnished by the lamp, so that the same will be diffused.

The plate 7 is supported at a certain height above the bottom or floor 17 of the incubator, and between the said plate and the bottom are disposed the network members, 27, Figs. 5 and 15, of wire and serving to receive the chicks when hatched, and upon which they will drop naturally through the recesses 12. Said network members are preferably two in number and superposed, being supported by suitable fram-

ing devices constituting drawers 28 mounted in adequate guides and to which access can be had by a door 29, Fig. 1, provided on the incubator at the level of the said drawers.

5 Said network members may be mounted on cleats 83, Fig. 16, secured to the frames 28 or preferably mounted upon the upper and lower face of a movable frame 84, Fig. 17, supported loosely upon the cleats 85.

10 The aeration of the incubator is ensured by means of the flaps 30, Fig. 1, mounted on the cover 6 and supported in such manner as to oscillate on a common spindle 31 mounted on the cover 6. Each flap may be
15 provided with one or more glazed sight holes having suitable insulating covers, e. g., of felt, and the two flaps are connected together by a fitting 32 whereby they may be controlled by hand. The tight closing of
20 each flap is ensured by means of a covering band 86, which is secured either to the flap or to the cover. I may also preferably form an offset 87, Fig. 21, in the flap or the cover wherein is disposed a packing member 88.
25 Further, the spindle 31 has at the end a lever 33, Fig. 1, connected by a link 34 with a crank 35 keyed to a shaft 36 traversing the partitions of the incubator and having at its end an arm of suitable shape 37, Fig. 7, dis-
30 posed in the path of suitable cams provided on the periphery of the plate 7. Said cams are preferably six in number, whereof five consist of simple tappets 38; the sixth 39 consists of a cam of suitable outline hav-
35 ing a projecting part which is sufficiently above the level of the said tappets 38 in order to ensure a more pronounced and a longer displacement of the flaps 30.

40 The aeration is completed by the use of the apertures 89, Fig. 22, suitably disposed in the bottom of the apparatus, and whereof a certain number are disposed below the sec-
45 tions of the triangular chambers situated in the angle 24. Said apertures may have fixed or adjustable dimensions according to the aeration to be given to the apparatus, by means of a movable diaphragm disc 90, Fig. 22, disposed below the bottom and provided
50 with adequate operating devices, in such manner that when the flaps 30 are opened, this will occasion a withdrawal of air through the apertures 89 situated below the sections 24; this triangular space 24 forms
55 a suction chimney, and the withdrawal of air is augmented by reason of the disposition of the lamp 25 at the centre of the said chimney and at its upper part.

60 The arrangement of the whole device as well as the use of the fine wire gauze will thus provide for the perfect aeration, total and intermittent, of the entire apparatus, at each opening of the flaps 30, and the pure air will never arrive cold upon the eggs, since it becomes heated when passing over
65 the metallic partitions and the wire gauze

disposed at the bottom of the drawers, whereof the fine meshes and fine wires offer an obstacle to the cooling. It provides for a permanent and continual evacuation of the carbon dioxide produced—which is heavier
70 than air—through the meshes of the fine wire gauze and the apertures in the bottom; on the other hand, since the eggs are raised above the said bottom they will never be
75 immersed in carbonic acid gas.

A temperature regulator 40 (Fig. 5) is inserted in the lamp circuit so as to control the heat given out by the lamps and to switch these off when the heat becomes too
80 great. A distant temperature indicating device 52 (Fig. 4) to which current is supplied from source 42 actuates an electric bell 43 or a lamp when temperature exceeds or falls below a certain limit.

For the operation of the incubator, the
85 shaft 8 traversing the cover 6 carries at its end a controlling element for example a hand wheel 61, Fig. 1, which may be manipulated by hand, in the case of the indi-
90 vidual operation of the incubator.

The operation is as follows, in the first place in the case of incubators which oper-
ate separately.

The eggs to be hatched are disposed upon
95 the plate 7, the eggs being placed in the recesses 12 by introducing them through the flaps 30, the said recesses having preferably such dimensions that the eggs shall extend to a certain degree below the under side of the
100 plate 7 while at the same time being well supported on the edges of the recesses. When thus filled, the said plate should be still susceptible of a free rotation, due to its suspension by means of the ball bearing or
105 bearings, not shown in the drawing, which are mounted upon its axle 8 and of the optional support of the edges of said plate upon the rollers 13. When the eggs are put
110 in position, water is placed in the reservoirs 26 to a suitable level, e. g., only a few centi- metres, and the flaps 30 are then closed.

It should be observed that by suitably vary-
115 ing during the incubation period the quantity of water contained in the reservoirs 26, one may reduce the distance between the level of this water and the heating lamps 25 thereby augmenting the temperature and
120 consequently—in a corresponding manner—the evaporation of the water, and hence the proportion of humidity in the atmosphere of the incubator, according to the progress of the incubation.

It should be remarked that due to the po-
125 sition of the lamps 25 in the rear of the reservoirs 26, I prevent the eggs disposed on a level with these lamps from directly receiving the heat produced by the latter, thus eliminating all excessive heating of the eggs which are close to the lamps. The heat pro-
130 duced by the lamps is radiated by the rear

face of the reservoirs 26, (Fig. 3), upon the covering 23 of the internal wall 4, so that the incubator is not heated by direct radiation but by the reflection of heat upon the walls, thus affording substantially equal temperature at all points of the incubator.

On the other hand, the action of the lamps 25 upon the reservoirs 26 will cause the heating of the water contained in these latter and the evaporation of this water, which will moisten to the required degree the internal atmosphere of the incubator. Further, the said water reservoirs form reserve supplies for regulating the temperature, as well as (optionally) the plate 7 which consists preferably of aluminum, which metal has the property of rapidly absorbing heat and giving it off only slowly.

At suitably determined intervals, for instance each morning, or each morning and evening, one acts upon the hand wheel 61 (Fig. 1) so as to impart a movement of rotation of the proper amplitude to the plate 7, after bringing the swinging lever so into the position shown in Fig. 9, in which the arm 21 when rising will allow the ascent of the cross piece 19 under the effect of the springs 22 which bring the movable platform 15 from the position shown in Figs. 8 and 10 to the position shown in Figs. 9 and 11 during the rotation of the plate 7. When the eggs 66 arrive above the elevated platform 15, they will be lifted out of their recesses 12 in the plate 7 as is more particularly shown in Fig. 11 and will roll upon the platform 15, being drawn along in the rotation of the plate 7. The width of the platform 15 is so calculated that each egg, after passing over the said platform, will have rolled for about one-half revolution and will then return into its proper position in the corresponding recess.

When it is desired to aerate the incubator, one opens the flaps 30 provided in the cover 6, and this allows the aeration of the incubator through the upper part and the apertures 89 in the bottom, Fig. 22, without bringing cold air into direct contact with the eggs.

When the chicks become hatched, the latter will break the shell and will drop together with the same into the drawers 28 constituting the dryer, being thus separated from the eggs which have not yet been hatched. The chicks will thus remain in the dryer 28 for the necessary length of time before being transferred to a suitable chicken-raising device.

The arrangement of the incubator allows the complete disinfection of all the parts after the eggs have been hatched, and also the transfer of the chicks to a raising device. One carefully removes the soiled parts in the first place, and chiefly the wire gauze parts 27, by removing, for this operation,

the frames 84, Fig. 17, from their cleats, and the wire gauze pieces are then exposed to flames.

As concerns the incubator properly so called, one may employ liquid disinfectants applied by means of a large or a small brush, or preferably cause the production of formic acid within the incubator, which is for example hermetically closed, by the combustion of suitable tablets, evaporation or spraying.

On the other hand, since each egg is supported in a separate recess, it is feasible to inspect the eggs when in the incubator itself, without being obliged to handle the eggs, by bringing a suitable illuminant under each egg.

For the operation of the incubators in a certain number, I dispose on each axle 8 a controlling hand wheel which may be for instance the wheel 61 shown in Fig. 1, or preferably a suitable pulley or gear wheel mounted upon a lower extension of the axle 8 and connected with a suitable transmission by belting, gearing or sprocket chain. For this automatic action, the upper hand wheel 61 carries an arm 67, Fig. 14, provided on its lower face, and upon whose path is disposed a spring contact 68 comprised in the circuit of the lamps. As shown diagrammatically by way of example in Fig. 13, to the vertical shaft 8 of each incubator is keyed a bevel gear 69 engaging a like gear 70 keyed to a horizontal shaft 71 extending below the group of incubators constituting the set, and connected, through the medium of a reducing mechanism 72 having a suitable speed, with an electric motor 73. A clockwork mechanism 74 disposed in the incubator room or in any other suitable place, serves for the automatic control of the starting of the motor 73 actuating the incubators. For this purpose, the pivot shaft 75 of the hour hand 76 is connected to one terminal of the circuit supplying the electric motor 73, either directly or through the medium of relays and contact devices of an adequate nature; the point of the said hand carries a contact 77, for example of carbon, movable upon a disc 78 which is suitably insulated and comprises a plurality of contact pieces 79 suitably spaced apart and connected to a common conductor 80 completing the supply circuit of the motor 73. By way of example, the contact pieces 79 are placed opposite the even-numbered hours in order that the motor 73 shall operate every two hours. When the small hand 76 attains for example the figure 12, the circuit of the motor is closed, the motor is started, and it actuates the transmission shaft 71 which actuates through the gearing 69 and 70—the shafts 8 of the different incubators, the several platforms 15 having been preliminarily

placed in the position shown in Figs. 9 and 11. The plates 7 of all the incubators are then rotated at a suitable speed, and when passing over the platform 15, this will effect the turning of the eggs. Each contact piece 79 has such dimensions that the rotation of the several plates 7 is limited to a fraction of one-tenth of a revolution, this rotation taking place during some two minutes, except for one of the six operations, as will be further indicated.

During the rotation of each disc 7, the cams 38 of the plate will actuate the arm 37 (Fig. 7) in turn, so as to rotate through a suitable angle the shaft 36, Fig. 1; whose crank effects—through the rod 34 and the lever 35 an oscillation of the shaft 31 and of the corresponding flaps 30 of the incubator; these latter will therefore open for only a short time, for instance one or two minutes, and to a small extent, so that the vitiated air in the incubator will be renewed every two hours by reason of the offtake of the hot air and also by the draught due to the lamps.

The eggs which are disposed upon one-sixth of the surface of the plate which during the rotation of the latter are caused to move above the overturning platform 15, will be overturned in such manner that after a complete rotation of the small hand 76 of the clockwork, i. e., after twelve hours, all the eggs on each plate 7 will have been turned over. On the other hand, it is necessary that once in twelve hours, for example, the eggs shall be considerably cooled and the incubator entirely opened for the total evacuation of the prejudicial gases. This operation is controlled by the cam 39, Fig. 7, of the plate 7 which replaces one of the tappets 38 and has a suitably designed outline whereby the flaps 30 shall be fully opened during a suitable time, e. g., $\frac{1}{4}$ hour or 20 minutes. In order to obtain an adequate cooling of the eggs during this time, the arm 67, Figs. 1 and 14, carried by the hand wheel 61 acts upon the spring contact 68 so as to break the circuit of the lamps 25 and to extinguish the same. A suitable synchronism being established between the movement of the cam 39 actuating the flaps 30, and the action of the arm 67 upon the spring contact 68 making the short circuit, this will provide for the aeration and the cooling which are obtained by the interruption of the heating.

The said arrangement allows of disposing the eggs in the best possible conditions for the hatching, by reason of the constant temperature which is obtained, this being due on the one hand to the method of heating which avoids any sudden heating of the eggs, and on the other hand to the disposition of the heat accumulators constituted by the water reservoirs as well as by

the disc itself supporting the eggs. It overcomes the drawback in the known types of incubators wherein the eggs must change in place in the holders in order that each may in turn be brought into the warmest parts of the apparatus or central parts—and the coldest parts—or the walls—of the apparatus. This is true (a) because the walls themselves which heat by reflection will ensure a perfect equality of temperature between the centre and the periphery, (b) because if this equality should be disturbed for instance by the breaking of a lamp, the rotation of the plate, which is essential for the overturning, operates every two hours.

The disposition of the dryer below the egg-carrying plate helps to maintain the hatched chicks at a suitable temperature below that which is necessary for the hatching whilst the device for aeration by means of the flaps provided in the cover will ensure a suitable renewing of the air in the incubator without causing a fall of temperature which would be prejudicial to good working.

An important feature lies in the disposition of the rotating plate and of the overturning platform which permits, by a simple rotation of the plate after placing the said platform in a suitable position, of ensuring the automatic overturning of the eggs, which may be performed once or several times per day for the incubators employed singly.

The said incubator has a square shape at the exterior so that it may receive in the corners the lamps required for heating purposes, but I may obviously give to the incubator any other shape than the one indicated, such as polygonal, circular or the like. Instead of placing in the corners the independent reservoirs serving to moisten the air, I may employ a single annular reservoir disposed at the periphery of the plate 7, and said reservoir may be surrounded by adequate heating elements which may be either an electric lamp of special form or an electric resistance or set of resistances, or further a pipe for hot water circulation, or any other suitable device. The plate 7 may be made of any suitable material having a sufficient strength, and the body as well as the cover of each incubator may instead of being made of wood be constructed for example of sheet metal with double walls having between them a suitable filling or simply an air cushion providing a suitable heat insulation.

The above-described arrangement for turning the eggs might be reversed, and instead of imparting to the plate 7 carrying these eggs a movement of rotation, the plate 7 might be held in the fixed position and the platform be given a movement about the shaft or axle 8. The platform 15 in-

stead of extending radially at only one side of the shaft 8 might have a diametrical position and act at the same time upon diametrically opposite groups of eggs. Instead of supporting the eggs upon a circular plate, I may also dispose them upon a rectangular plate of suitable size below which may be displaced, with a reciprocating motion, the platform 15.

For the operation of groups of incubators, the shafts 8 of the incubator plates may be actuated by any suitable driving means other than an electric motor, e. g., by a compressed air, water, weight or like motor.

The said invention may also serve for the raising of chicks and other fowl (or birds) in all cases in which bodies or objects are to be maintained at a given temperature or subjected to a treatment by heat or other agents and requiring a periodic modification of their proper or relative position, or both at once.

What I claim is:

1. In an incubator, the combination of a closed case, a platform member arranged in the case, an egg supporting member arranged in the case above the platform member and provided with slots dimensioned so as to support the eggs and allow them to extend below the supporting member a certain distance, said members being normally spaced a sufficient distance apart to prevent the eggs from contacting with the platform member and to allow circulation of air all around the eggs, means for moving one of said members toward and away from the other member to contact the eggs with the platform member, means for moving one of said members in a horizontal plane to cause the eggs to roll on the platform member, and a heating device for furnishing heated air to the interior of the closed case.

2. In an incubator, the combination of a closed case, a rotatable supporting member in said case provided with slots dimensioned so as to hold the eggs and allow them to extend below the supporting member a certain distance, a platform member arranged in the case below the supporting member and normally spaced a sufficient distance from the latter to prevent the platform from contacting with eggs carried by the supporting member, means for raising the platform member to cause the latter to contact with the eggs carried by the supporting member and to form a rolling surface for the eggs when the latter are moved through rotation of the supporting member, and a heating device for furnishing heated air to the interior of the case.

3. In an incubator as claimed in claim 2, ports at the top of the case, air flaps for controlling the passage of air through said ports, ports arranged in the floor of the case, means for regulating the last mentioned ports, and means whereby air is caused to circulate through said heating device before coming into contact with the eggs.

4. An incubator as claimed in claim 2 in which the means for moving the platform member toward the supporting member includes a combination of springs for moving the platform upwardly into contact with the eggs, and a lever for maintaining said platform normally in its lower position.

5. An incubator as claimed in claim 2 in which the top of the case, is removable, cables extending around the case and connecting the top of the case to the body of the latter, and stretchers provided on said cables for tensioning the latter.

6. In an incubator as claimed in claim 2, a transmission gear for automatically controlling said rotatable supporting member, a motor actuating said transmission gear, and a clockwork mechanism controlling said motor and causing it to operate at predetermined intervals.

7. In an incubator as claimed in claim 2, air ports in the top of the case, movable air flaps for controlling said ports, a number of cams arranged on the peripheral portion of said supporting member, a device actuated by said cams and causing variable opening of said flaps at predetermined times, an electrical heating circuit for the heating device, and a spring contact actuated by the supporting member once per revolution for interrupting the heating circuit.

8. In an incubator, the combination of a closed case, a rotatable plate in said case provided with slots dimensioned so as to hold the eggs and allow them to extend below the plate a certain distance, a platform arranged below the plate and normally spaced from the eggs carried by the plate to permit circulation of air around the eggs from below, means for raising said platform to permit the same to contact with the eggs and function as a rolling surface during rotation of the plate, a metallic heat reflecting lining in said case, electric lamps arranged in the case and associated with the reflecting lining, water reservoirs arranged in the case in front of the lamps, and a thermostat in the case for controlling the operation of said lamps.

In witness whereof I have hereunto set my hand.

JACQUES PERROT.