March 3, 1942. C. J. SMITH 2,274,640

INCUBATOR

Filed Oct. 28, 1940 2 Sheets-Sheet 1

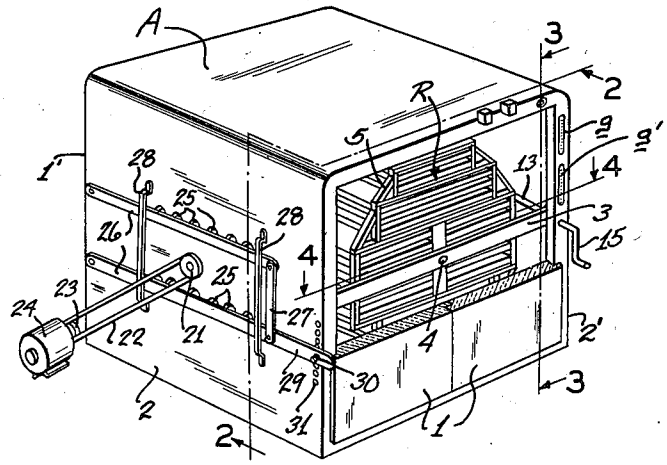


FIG. 1.

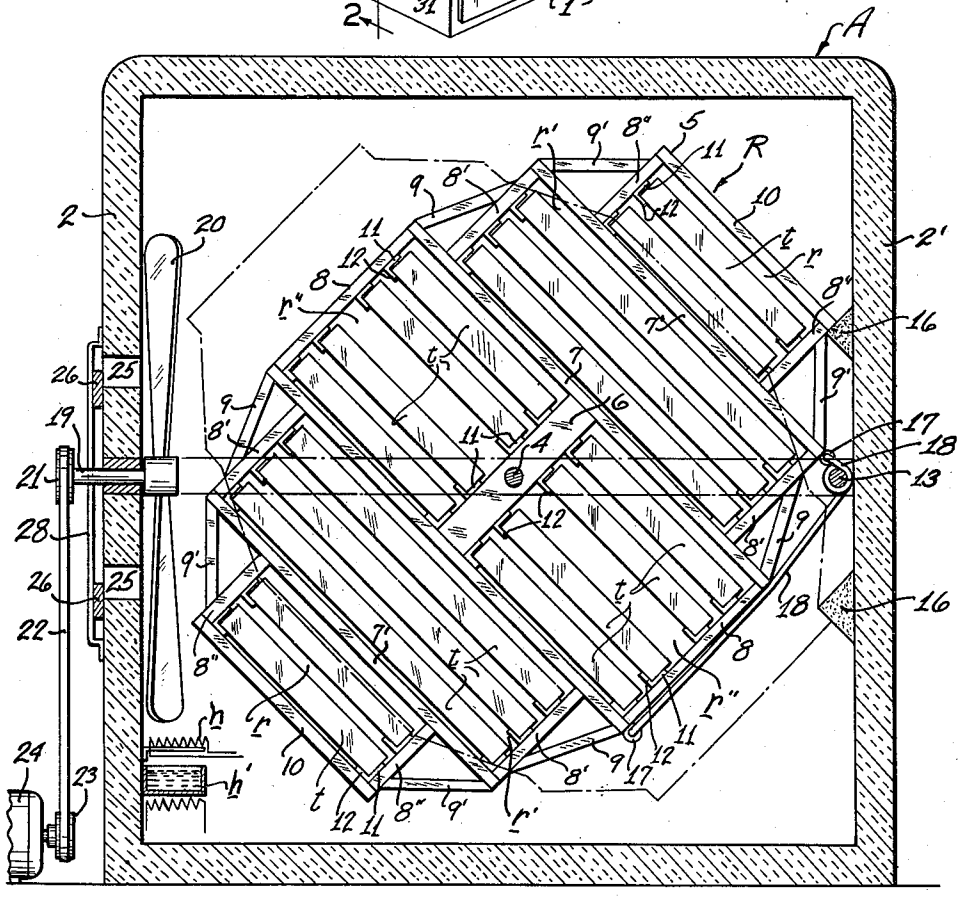


FIG. 2.

INVENTOR.
CLIFFORD J. SMITH
BY
ATTORNEY.

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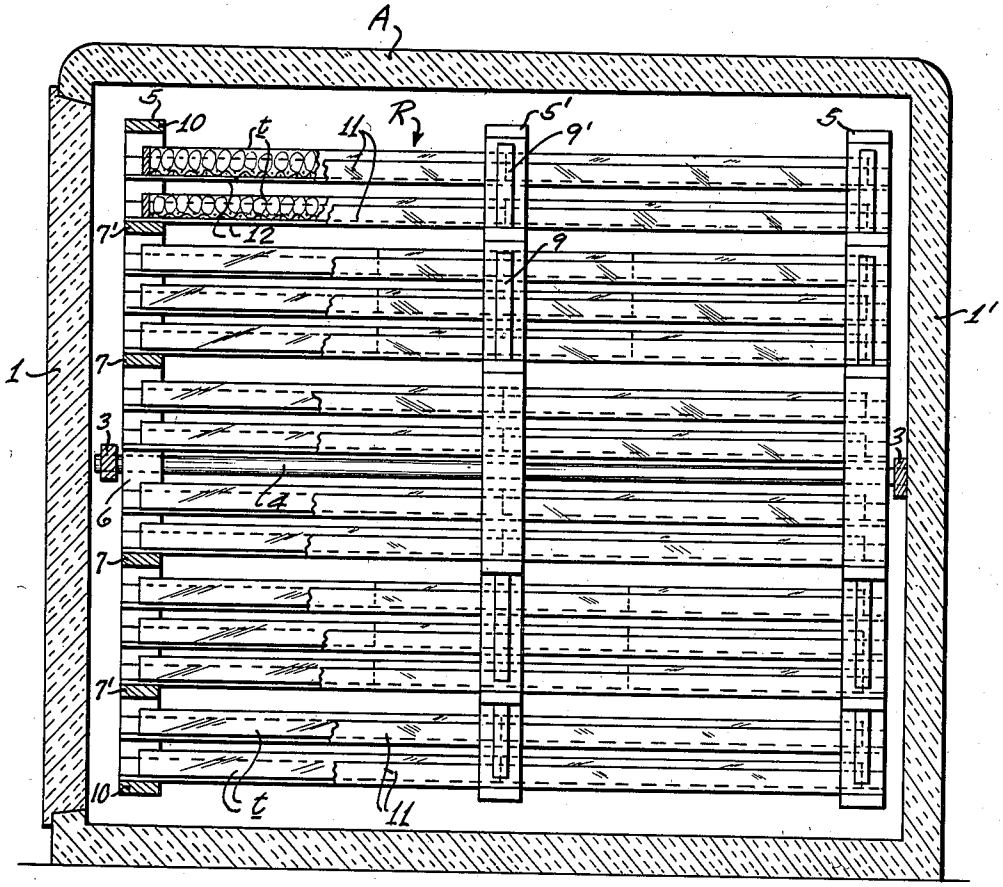


FIG. 3.

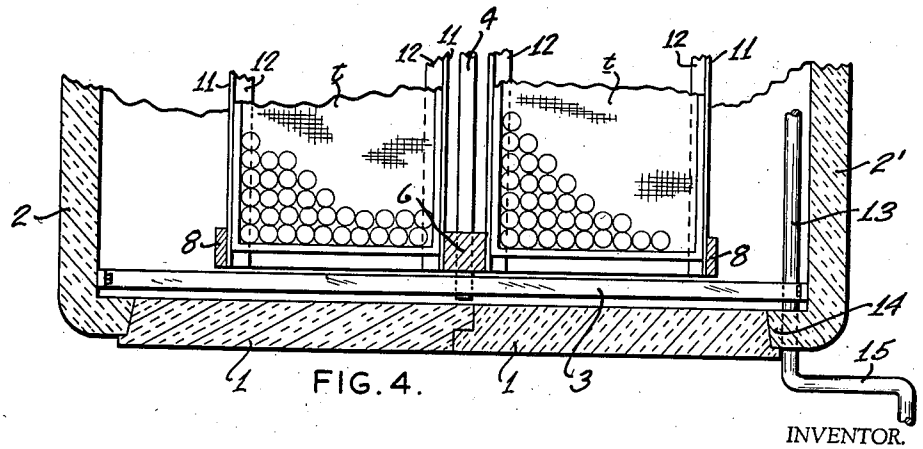


FIG. 4.

INVENTOR.
CLIFFORD J. SMITH

BY

ATTORNEY.

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UNITED STATES PATENT OFFICE

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INCUBATOR

Clifford J. Smith, Lebanon, Mo.

Application October 28, 1940, Serial No. 363,089

6 Claims. (Cl. 119—37)

This invention relates generally to a certain new and useful improvement in incubators.

My invention has for its primary object the provision in an incubator of an egg-tray supporting rack uniquely disposed for readily receiving the egg-trays and retaining the same in position during rack-movement without the employing of special locking means or the like.

My invention has for a further object the provision of an incubator which may be readily and inexpensively constructed, which is economical in operation and maintenance, which may be conveniently tray-filled and emptied, and which is highly efficient in the performance of its intended functions.

And with the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawings—

Figure 1 is a reduced perspective view of an incubator constructed in accordance with and embodying my invention, the front doors of the enclosing shell or housing being broken away for disclosing the interior construction;

Figure 2 is a transverse vertical sectional view of the incubator taken approximately along the line 2—2, Figure 1;

Figure 3 is a vertical sectional view of the incubator taken approximately along the line 3—3, Figure 1; and

Figure 4 is a fragmental transverse or horizontal sectional view of the incubator taken approximately along the line 4—4, Figure 1.

Referring now in more detail and by reference characters to the drawings, which illustrate a preferred embodiment of my invention, the incubator comprises a suitably heat insulated preferably rectilinear outer housing or shell A provided at its front or forward end with a pair of companion doors 1 beveled or otherwise formed for sealing engagement with each other and with the margins of the door-opening.

Secured at their respective ends upon the shell side-walls 2, 2', and extending horizontally across the interior of the shell A respectively adjacent the rear wall 1' and the doors 1, are two parallel beams 3, and journaled at its ends centrally in, and extending horizontally between, the beams 3 for oscillation, is a suitable shaft 4.

Fixed upon, and rockable with, the shaft 4, is a pair of identically shaped built-up end-frames 5, each including a substantially heavy central mullion-like member 6 embracing the shaft 4 and extending diametrally on opposite sides thereof and, at its outer ends, provided with cross-beams 7, which extend equidistantly on opposite sides of the mullion 6 and, in turn, at their outer ends are rigidly joined or cross-connected by stile-like side members 8 parallel to the mullion 6.

Tenoned or otherwise suitably joined to, and extending outwardly from, the beams 7, and positioned equidistantly inwardly from the opposite side members 8, are intermediate stiles 8' reinforced by oblique braces 9 and rigidly cross-connected at their ends by intermediate cross-beams 7'.

Similarly tenoned or otherwise joined to, and extending outwardly from, the cross-beams 7' and likewise positioned equidistantly from the opposite stiles 8', are outer stiles 8'' also reinforced by oblique braces 9' and rigidly cross-connected by outer or end beams 10.

Preferably, though not necessarily, the shaft 4 is provided, midway between the end-frames 5, with a central frame 5' identical in shape to, and built-up in the same manner as, the end-frames 5.

Fixed upon the inner faces of the stiles 8, 8', 8'', and the longitudinal faces of the mullions 6 of the frames 5, 5', and extending lengthwise of the shell A parallel to the shaft 4, is a plurality of suitably spaced angle sections 11 having inwardly presented way-providing flanges 12 arranged in aligned pairs in the provision of slide-ways for supporting a plurality of egg-trays *t*.

As shown, the end and center-frames 5, 5', as connected by the angle members 11, provide a skeleton rack R having upper and lower relatively narrow compartments *r*, intermediate wider compartments *r'*, and two narrow central compartments *r''*. The compartments *r* are each sized to accommodate two and the compartments *r''* are each sized to accommodate four superposed lengthwise inserted trays *t*, while the compartments *r'* are each preferably sized to accommodate three superposed trays *t* each inserted with its longer dimension extending transversely to the longitudinal axis of the rack R, all as best seen in Figures 2 and 3.

Journaled at its one end in the shell rear wall 1' and extending forwardly adjacent the inner face of a shell side wall 2, is a horizontal crank shaft 13 projecting at its forward end through the door stile 14 and provided at its outer extremity with a crank or handle 15.

Mounted upon the inner face of the shell side

wall 2 both above and below the shaft 13, are inwardly projecting triangular blocks 16 for abuttingly engaging the upper and lower corners of the rack R for limiting the movement of the rack R within the shell A, as shown in full lines and dot-dash lines in Figure 2, and for shifting or rocking the rack R from one to the other of such positions, the rack R is provided with a pair of screw-eyes or the like 17 for receiving the ends of a control-rope 18 intermediately coiled on the shaft 3. In this connection, it should be noted that the rack R is so positioned upon the shaft 4 that the longitudinal axis of the rack will lie substantially above the shaft 4, making the structure top-heavy, as it may be said. Thus it will be seen that the rack R will normally rest against one or the other of the stop blocks 16 and will of its own weight remain in either of the positions to which it is rocked by manipulation of the crank 15.

Rotatively mounted in, and extending through, the other side wall 2 of the housing A, is a short shaft 19 provided on its inner end with a conventional fan 20 and on its other end with a sheave 21, in turn, connected by means of a belt 22 to a drive pulley 23 of a conventional electric motor or other prime mover 24.

The shell wall 2 is also provided with two spaced rows of ventilation apertures 25, and pivotally mounted upon the outer face of the shell wall 2, is a pair of relatively wide bars 26 connected in parallel by means of a link 27 and adapted to be shifted rockably across the apertures 25 in gatewise fashion for regulating the quantity of air passing into the shell A as may be desired, the bars or strips 26 being retained operably against the shell wall 2 by means of a pair of conventional guide-brackets 28. Preferably the lower bar 26 is extended forwardly in the provision of a handle 29 having a transversely shiftable locking-pin 30 adapted for engagement in any one of a series of apertures 31 for securing the bars 26 in any one of several selected positions with respect to the apertures 25.

Disposed within the shell A, are a conventional heating unit *h* and a humidifying unit *h'*, and conventionally positioned upon the shell A, are external temperature and humidity gauges *g*, *g'*, for assisting the operator in maintaining proper conditions of temperature and humidity within the shell A at all times during periods of incubation.

It will be understood that the several compartments *r*, *r'*, and *r''* of the rack R may be conveniently and with facility loaded and emptied simply by opening the doors 1 and sliding the several egg-trays *t* directly into or from the rack R, the trays *t* being securedly held in place by the angle sections 11 during oscillations of the rack R and securing or locking devices for such purpose being wholly eliminated.

From time to time as the incubator operator may desire, the eggs may be turned by suitable manipulation of the handle 15, rocking the shaft 13 and swinging the rack R through an arc of 90°. From time to time, further, in the course of the incubation period, it may become necessary or desirable to vary the amount of fresh air admitted into the interior of the incubator A, whereupon the operator may suitably swing the bars 26 to any selected position of adjustment for suitably varying the quantity of fresh air thus admitted.

It should be understood that changes and modifications in the form, construction, arrangement, and combination of the several parts of the incubator may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In an incubator comprising a housing including a front wall having a door opening therein, closure means swingably mounted on the housing for co-operation with the door opening, a horizontal beam extending across the door opening interiorly of the incubator, a horizontal shaft journaled at its one end adjacent the rear wall of the housing and at its other end in the beam, a rack rockably mounted on the shaft having its center of gravity positioned above the shaft, vertically spaced blocks mounted upon a vertical side wall of the incubator and having obliquely presented faces for stopwise engaging the rack which is held thereagainst by its own weight, and means for rocking the rack from one position to another.

2. In an incubator, an egg-rack comprising a central axis-providing shaft, and a plurality of frames mounted in spaced parallel registration upon the shaft in planes at right angles to the longitudinal axis thereof, each of said frames including a central mullion mounted on the shaft and provided at its ends with cross-beams extending equidistantly on opposite sides thereof and being cross-connected at their ends by stile-members parallel with said mullion, said cross-beams being each provided with outwardly extending stile-members positioned equidistantly inwardly of the cross-member ends and being cross-connected at their ends by intermediate cross-beams, each of said intermediate cross-beams being in turn provided with a pair of stile-members respectively spaced equidistantly inwardly from the outer ends thereof and cross-connected by end-beams, said frames being laterally connected by a plurality of way-providing channels substantially parallel to the shaft for holding a plurality of egg-trays.

3. In an incubator, an egg-rack comprising a central axis-providing shaft, and a plurality of frames mounted in spaced parallel registration upon the shaft in planes at right angles to the longitudinal axis thereof, each of said frames including a central mullion mounted on the shaft and provided at its ends with cross-beams extending equidistantly on opposite sides thereof and being cross-connected at their ends by stile-members parallel with said mullion, said cross-beams being each provided with outwardly extending stile-members positioned equidistantly inwardly of the cross-member ends and being cross-connected at their ends by intermediate cross-beams, each of said intermediate cross-beams being in turn provided with a pair of stile-members respectively spaced equidistantly inwardly from the outer ends thereof and cross-connected by end-beams, said frames being laterally connected by a plurality of angle-shaped channels having flanges parallel to the planes of the cross-beams and arranged in opposing pairs in the provision of a skeleton structure having a plurality of egg-tray receiving channels parallel to the shaft.

4. In an incubator, a rockably mounted shaft and a rack mounted on said shaft, said rack having substantially symmetrically formed frame

parts on opposite sides of the shaft, in combination with a plurality of egg trays each having a length greater than its width, said rack being constructed for accommodating, in outer portions thereof, certain of the trays with their long axes in parallelism, and, in an inner portion thereof, others of such trays with their long axes transverse to the position of the long axes of the first trays and with two or more of said last named trays having their long axes parallel.

5. In an incubator, a rockably mounted shaft and a rack mounted on said shaft, said rack having substantially symmetrically formed frame parts on opposite sides of the shaft, in combination with tiers of egg trays each of said trays having a length greater than its width, said tiers being so arranged with respect to one another that the egg trays of the outermost tiers will be disposed with their long axes transverse to the long axes of some of the other trays.

6. In an incubator, a rockably mounted shaft and a rack mounted on said shaft, said rack having substantially symmetrically formed frame parts on opposite sides of the shaft, in combination with a plurality of egg trays each having a length greater than its width, said rack being constructed for accommodating, in outer portions thereof, certain of the trays with their long axes in parallelism, and in an inner portion thereof, others of such trays with their long axes transverse to the position of the long axes of the first trays and with two or more of said last named trays having their long axes parallel, said rack further accommodating in a central portion thereof others of such trays with their long axes parallel to the long axes of the trays accommodated in the outer portions of the rack, the trays in said central portion being arranged in two side-by-side tiers.

CLIFFORD J. SMITH.