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TURNING RACK FOR INCUBATORS

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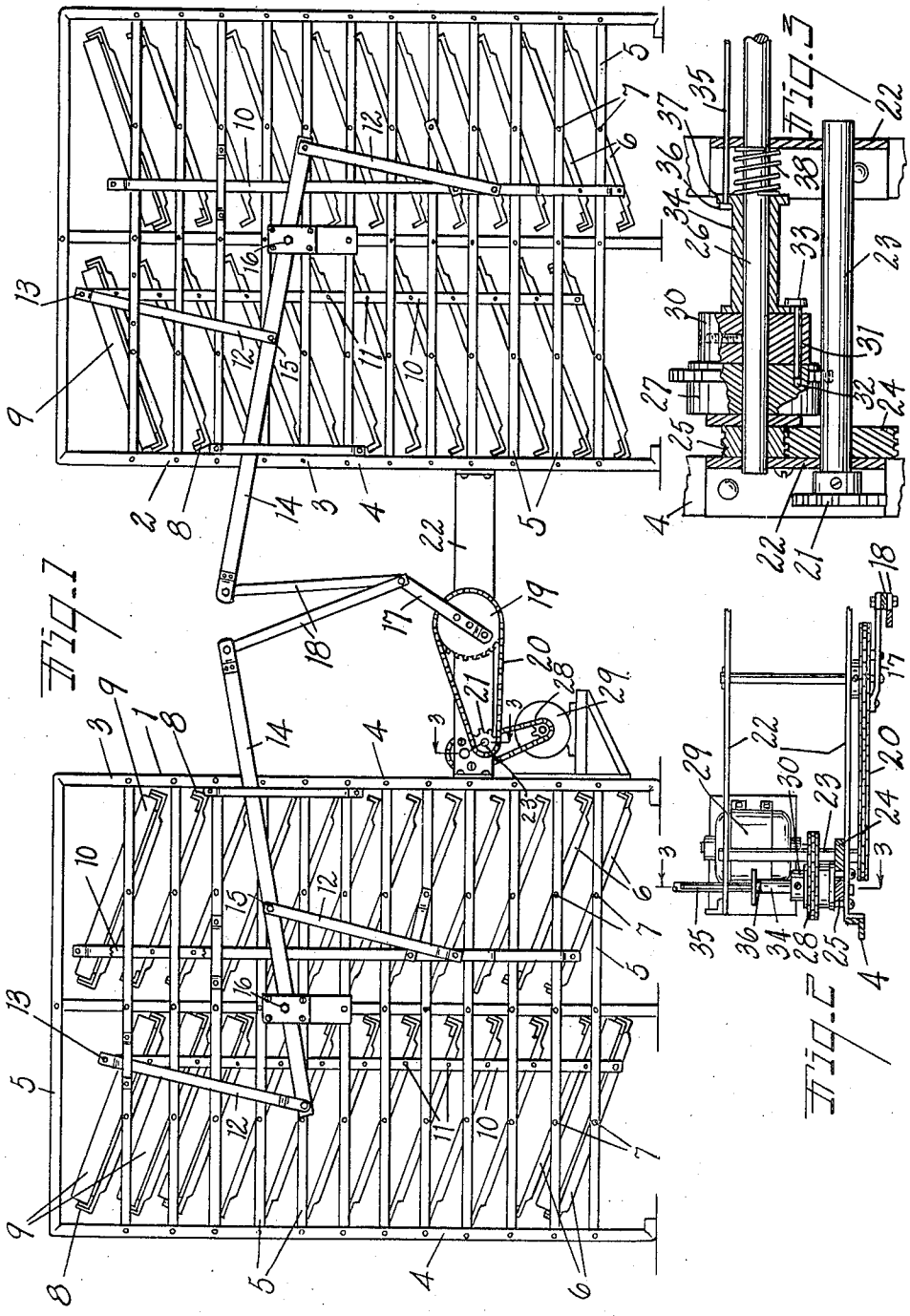


FIG. 1

FIG. 3

FIG. 2

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TURNING RACK FOR INCUBATORS

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6 Claims. (Cl. 119—44)

This invention relates to turning racks for incubators.

It has for its objects:

First, to provide a novel egg turning rack.

Second, to provide such a rack which is simple and may be made inexpensively.

Third, to provide such a rack which may be operated by a uni-directional motor.

Fourth, to provide such a rack which may be controlled automatically.

Further objects and advantages pertaining to details and economies of construction and operation will appear from the description to follow. The invention is defined in the claims. A preferred embodiment of my invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a view in side elevation illustrating a pair of incubator racks and turning mechanism associated therewith in accordance with my invention.

Fig. 2 is a fragmentary top plan view illustrating certain details of the actuating device for the turning mechanism, the view being taken in horizontal section.

Fig. 3 is an enlarged fragmentary view partially broken away and in section on a line corresponding to lines 3—3 of Figs. 1 and 2.

Referring to the drawing, the reference numerals 1, 2 designate respectively egg incubation racks, each of which has an angle iron frame 3, including uprights 4 and transverse members 5 suitably secured together as by riveting, welding or the like.

In accordance with my invention, the transverse members 5 have the egg supporting shelves 6 pivoted thereon at a pivot point 7 at the midpoint of the shelves, these shelves being arranged in a plurality of vertical tiers of any desired capacity. Shelves 6 have upstanding lips 8 adapted to restrainingly engage the egg trays 9 disposed therebetween so as to prevent sliding displacement of the latter from the shelves when they are swung about the pivot points 7.

The shelves of each tier are pivotally articulated for movement as a unit by the elongated, vertically extending rods 10 pivoted to each of the shelves at 11, whereby as the rod moves vertically upwardly or downwardly, each shelf is pivoted an equal amount. Vertical movement of rods 10 is produced by connecting rods or links 12, one for each tier, each of which is pivoted at one extremity to a rod 10, as at 13, and at the other extremity to a main rocker arm or lever 14, as at 15. The rocker arms 14 are suitably pivoted to the rack frame at 16 and the links 12 for the respective tiers are pivoted to the rocker arm at pivot points 15 equi-distant from the pivot point 16 of the rocker arm. It will be readily appreciated that as rocker arm 14 is oscillated about its pivot, the above described linkage produces a corresponding vertical pivoting of the several shelves 6.

In order to provide the aforesaid oscillation of the rocker arms, I pivotally interconnect the adjacent free ends thereof to a crank 17 by means of the elongated connecting rods 18. Crank 17 is fixed to a sprocket wheel 19 which is driven by chain 20 from a further sprocket 21, the sprocket and sprocket wheel being rotatably mounted in a pair of parallel mounting or supporting plates 22 secured to the racks. Sprocket 21, as clearly illustrated in Figs. 2, 3, is fixed to a shaft 23 rotatably mounted in plates 22, and this shaft also has secured thereto a helical gear 24 which is in mesh with a further helical gear 25 secured to a parallel drive shaft 26, likewise journaled in brackets or plates 22. These gears and the chain drive described constitute a reduced speed drive for crank 17 adapted to rotate the latter when shaft 26 is rotated.

Loosely mounted on the drive shaft 26 is a sprocket 27 which is driven by a chain 28 from the shaft of a motor 29 (see Figs. 1 and 2). For the purpose of drivingly connecting sprocket 27 to the shaft 26 for rotation of the latter by the motor, I employ a clutch collar 30 secured to shaft 26 by a set-screw, key or the like. Collar 30 is provided with an opening 31 extending therethrough parallel to the axis thereof, adapted to be brought in register with a lateral recess 32 formed in the side of sprocket 27 and slidable in opening 31 I provide a clutch pin 33. Pin 33 is engageable by a sleeve 34 telescopingly associated with shaft 26 to shift the pin in either direction of its length and thereby drivingly engage or disengage the clutch collar 30 with sprocket 27, hence the sprocket with shaft 26.

In the embodiment illustrated, the shifting of sleeve 34 is manually performed by means of a control rod 35 slidable in plate 22 and provided with an enlarged head 36 coacting with a flange 37 on the sleeve. It will be understood that rod 35 carries an external hand piece adapted to be manipulated from any convenient position at the front side of the rack. A coil compression spring 38 interposed between plate 22 and the aforesaid sleeve 34 serves to resiliently urge the

same to the left to a position to engage the clutch pin 33 with sprocket 27.

The motor 29 is preferably a uni-directional motor which is less expensive than the standard reversible motors and which will operate satisfactorily with my mechanism. This motor may be controlled by any suitable switch so that the operator can run the motor for a sufficient length of time to tilt the egg trays the desired amount. It will be appreciated that automatic time controls could be employed.

In the event that it is desired to pivot the shelves manually, it is only necessary to pull the control rod 35 outwardly, thereby drivingly disengaging sprocket 27 and motor 29 from the shaft 26. The latter may then be manually turned the required amount by any suitable crank means to tilt the shelves the desired degree.

It will be evident from the foregoing description that the turning mechanism of my invention may be associated with any desired number of racks arranged in gangs in any desired manner. It will likewise be appreciated that a power take-off from a single shaft extending longitudinally of a line of racks may be utilized in lieu of individual motors 29 by means of a suitable spiral and worm gearing arrangement such as will readily suggest itself to those skilled in the art, thereby adapting the turning mechanism for use in incubators of practically any capacity.

I have illustrated my improvements in a highly practical and comparatively simplified embodiment, but it is perfectly evident that various of the instrumentalities thereof can be altered without departing from the invention. The present construction has the great advantage of consolidating turning instrumentalities for a large number of shelves arranged in tiers in a single mechanism. Thus, as illustrated, two tiers, each of twelve shelf capacity, can be turned in each of two racks at the same time, enabling large numbers of eggs to be simultaneously handled.

An embodiment of the invention which incorporates the principles of the invention in a highly desirable manner has been illustrated and described, though I am aware that other embodiments within the intent of the invention will suggest themselves to those skilled in the art. It should be understood that the foregoing terminology is used only descriptively rather than in a limiting sense, and with full intention to include equivalents of the features shown and described, within the scope of the following claims.

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

1. An egg turning incubator rack construction comprising a pair of frames each having a pair of tiers of shelves, each tier comprising a plurality of substantially horizontal shelves pivoted medially of said shelves on said frame on parallel axes, the axes of each tier being vertically alined, a rocker arm pivoted on each frame on an axis parallel with the axes of tilting of said shelves at a point between said tiers of shelves, a crank disposed between said frames and rotatable on an axis parallel with the axes of tilting of said shelves, a link connecting each of said rocker arms to the free end of said crank, whereby on rotation of said crank said rocker arms are rocked, a vertical member for each tier of shelves having pivotal connections to each shelf of its tier for simultaneously tilting said shelves upon vertical movement, and a pair of links for each frame, each having a pivotal connection at one end to one of said vertical members and at the other end to the rocker arm pivoted to said frame, the pivotal connections between the rocker arm and the pair of links of each frame being spaced equally from the pivot point of said rocker arm and on opposite sides thereof, and a uni-directional motor and means operatively connecting said motor to said crank to rotate the same.

2. An egg turning incubator rack construction comprising a pair of frames each having a pair of tiers of shelves, each tier comprising a plurality of substantially horizontal shelves pivoted medially of said shelves on said frame on parallel axes, the axes of each tier being vertically alined, a rocker arm pivoted on each frame on an axis parallel with the axes of tilting of said shelves at a point between said tiers of shelves, a crank disposed between said frames and rotatable on an axis parallel with the axes of tilting of said shelves, a link connecting each of said rocker arms to the free end of said crank, whereby on rotation of said crank said rocker arms are rocked, a vertical member for each tier of shelves having pivotal connections to each shelf of its tier for simultaneously tilting said shelves upon vertical movement, and a pair of links for each frame, each having a pivotal connection at one end to one of said vertical members and at the other end to the rocker arm pivoted to said frame, the pivotal connections between the rocker arm and the pair of links of each frame being spaced equally from the pivot point of said rocker arm and on opposite sides thereof.

3. An egg turning incubator rack construction comprising a pair of frames each having a pair of tiers of shelves, each tier comprising a plurality of substantially horizontal shelves pivoted medially of said shelves on said frame on parallel axes, the axes of each tier being vertically alined, a rocker arm pivoted on each frame on an axis parallel with the axes of tilting of said shelves at a point between said tiers of shelves, a crank disposed between said frames and rotatable on an axis parallel with the axes of tilting of said shelves, a link connecting each of said rocker arms to the free end of said crank, whereby on rotation of said crank said rocker arms are rocked, a vertical member for each tier of shelves having pivotal connections to each shelf of its tier for simultaneously tilting said shelves upon vertical movement, and a pair of links for each frame, each having a pivotal connection at one end to one of said vertical members and at the other end to the rocker arm pivoted to said frame, the pivotal connections between the rocker arm and the pair of links of each frame being spaced from the pivot point of said rocker arm.

4. An egg turning incubator rack construction comprising a frame having a pair of tiers of shelves each tier comprising a plurality of substantially horizontal shelves pivoted medially of said shelves on said frame on parallel axes, the axes of each tier being vertically alined, a substantially horizontal rocker arm pivoted on the frame on an axis parallel with the axes of tilting of said shelves at a point between said tiers of shelves, a crank rotatable on an axis parallel with the axes of tilting of said shelves, a link connecting said rocker arm to the free end of said crank whereby on rotation of said crank said rocker arm is rocked, said link being pivotally connected to said rocker arm laterally and substantially horizontally of the pivotal supporting axis of said rocker arm, a vertical member for each tier of

shelves having pivotal connections to each shelf of its tier for simultaneously tilting said shelves upon vertical movement, a pair of links each having a pivotal connection at one end to one of said vertical members and at the other end to the rocker arm, the pivotal connections between the rocker arm and the pair of links being spaced equally from the pivot point of said rocker arm and on opposite sides thereof, and a uni-directional motor, and means operatively connecting said motor to said crank to rotate the same.

5. An egg turning incubator rack construction comprising a frame having a pair of tiers of shelves each tier comprising a plurality of substantially horizontal shelves pivoted medially of said shelves on said frame on parallel axes, the axes of each tier being vertically alined, a substantially horizontal rocker arm pivoted on the frame on an axis parallel with the axes of tilting of said shelves at a point between said tiers of shelves, a crank rotatable on an axis parallel with the axes of tilting of said shelves, a link connecting said rocker arm to the free end of said crank whereby on rotation of said crank said rocker arm is rocked, said link being pivotally connected to said rocker arm laterally and substantially horizontally of the pivotal supporting axis of said rocker arm, a vertical member for each tier of shelves having pivotal connections to each shelf of its tier for simultaneously tilting said shelves upon vertical movement, a pair of links each having a pivotal connection at one end to one of said vertical members and at the other end to the rocker arm, the pivotal connections between the rocker arm and the pair of links being spaced equally from the pivot point of said rocker arm and on opposite sides thereof.

6. An egg turning incubator rack construction comprising a frame having a pair of tiers of shelves each tier comprising a plurality of substantially horizontal shelves pivoted medially of said shelves on said frame on parallel axes, the axes of each tier being vertically alined, a substantially horizontal rocker arm pivoted on the frame on an axis parallel with the axes of tilting of said shelves at a point between said tiers of shelves, a crank rotatable on an axis parallel with the axes of tilting of said shelves, a link connecting said rocker arm to the free end of said crank whereby on rotation of said crank said rocker arm is rocked, said link being pivotally connected to said rocker arm laterally and substantially horizontally of the pivotal supporting axis of said rocker arm, a vertical member for each tier of shelves having pivotal connections to each shelf of its tier for simultaneously tilting said shelves upon vertical movement, and a pair of links each having a pivotal connection at one end to one of said vertical members and at the other end to the rocker arm, the pivotal connections between the rocker arm and the pair of links being spaced from the pivot point of said rocker arm.

CHARLES A. LINDBERG.