E. M. NICHOLS.

METHOD AND APPARATUS FOR PRESERVING EGGS.

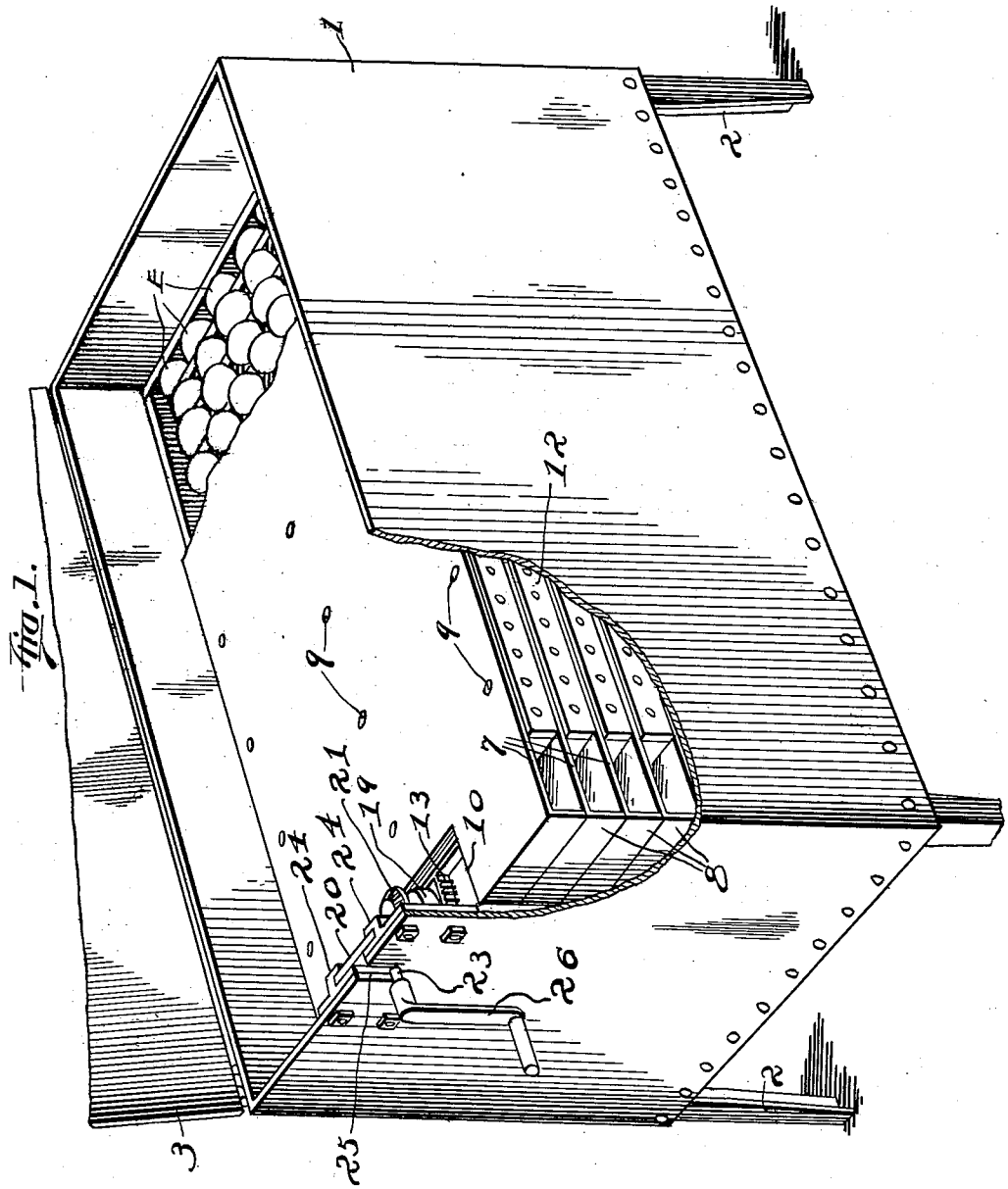
APPLICATION FILED OCT. 10, 1918.

1,302,955.

Patented May 6, 1919.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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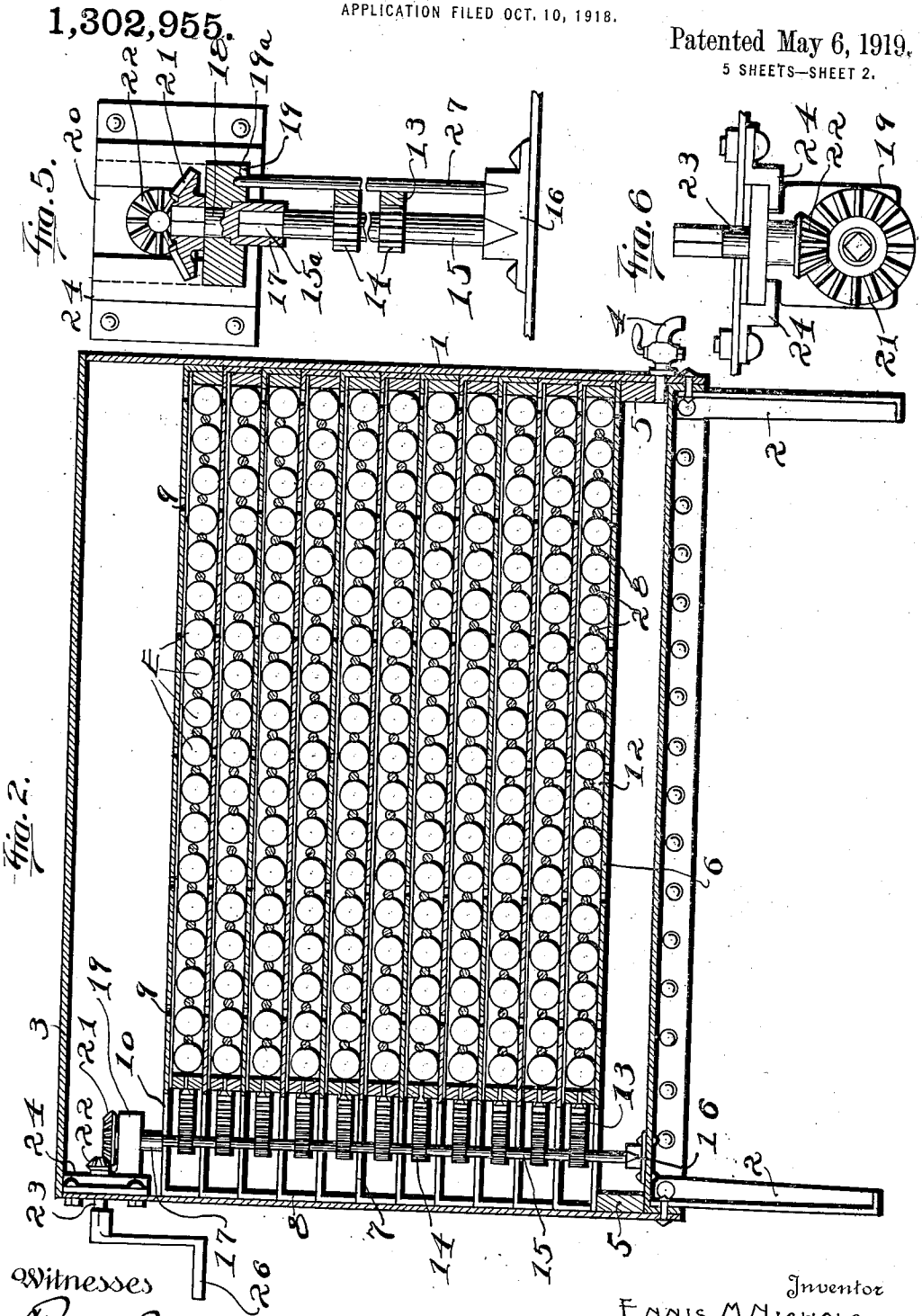
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Fig. 3.

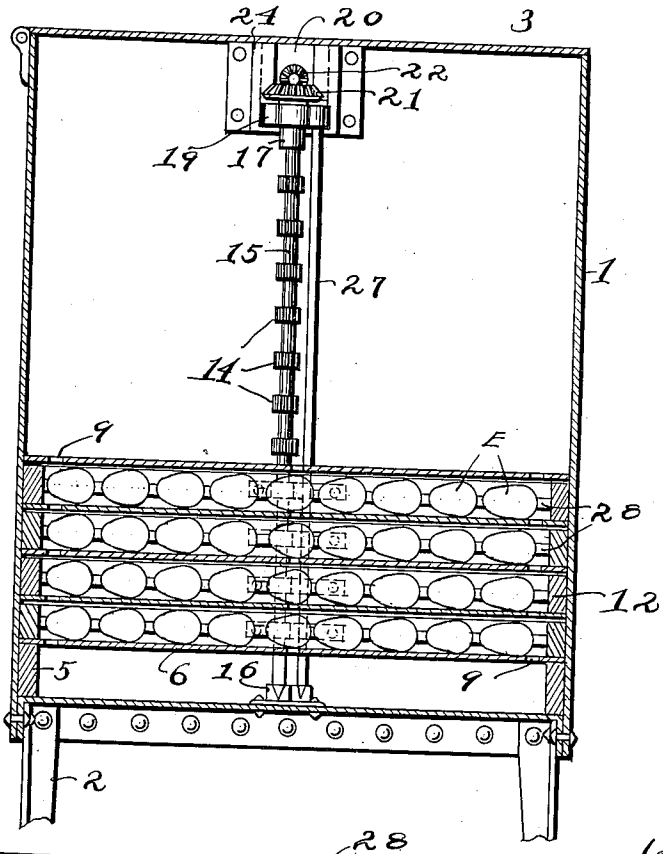
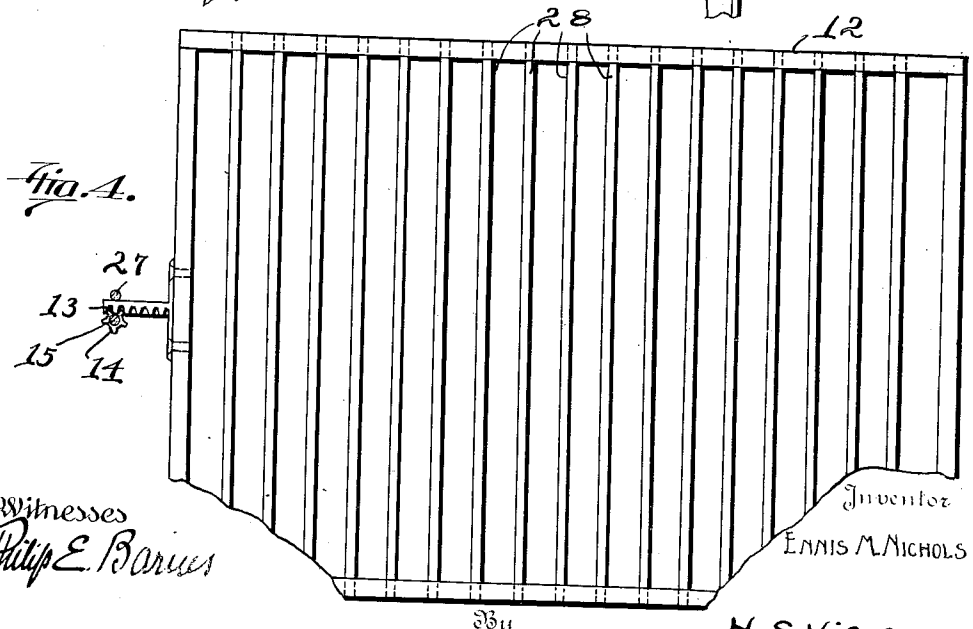


Fig. 4.



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5 SHEETS—SHEET 4.

Fig. 9.

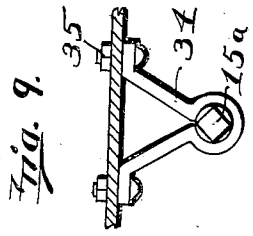


Fig. 14.

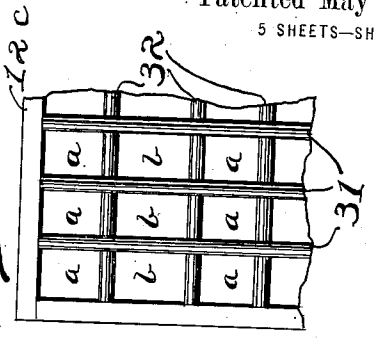


Fig. 7.

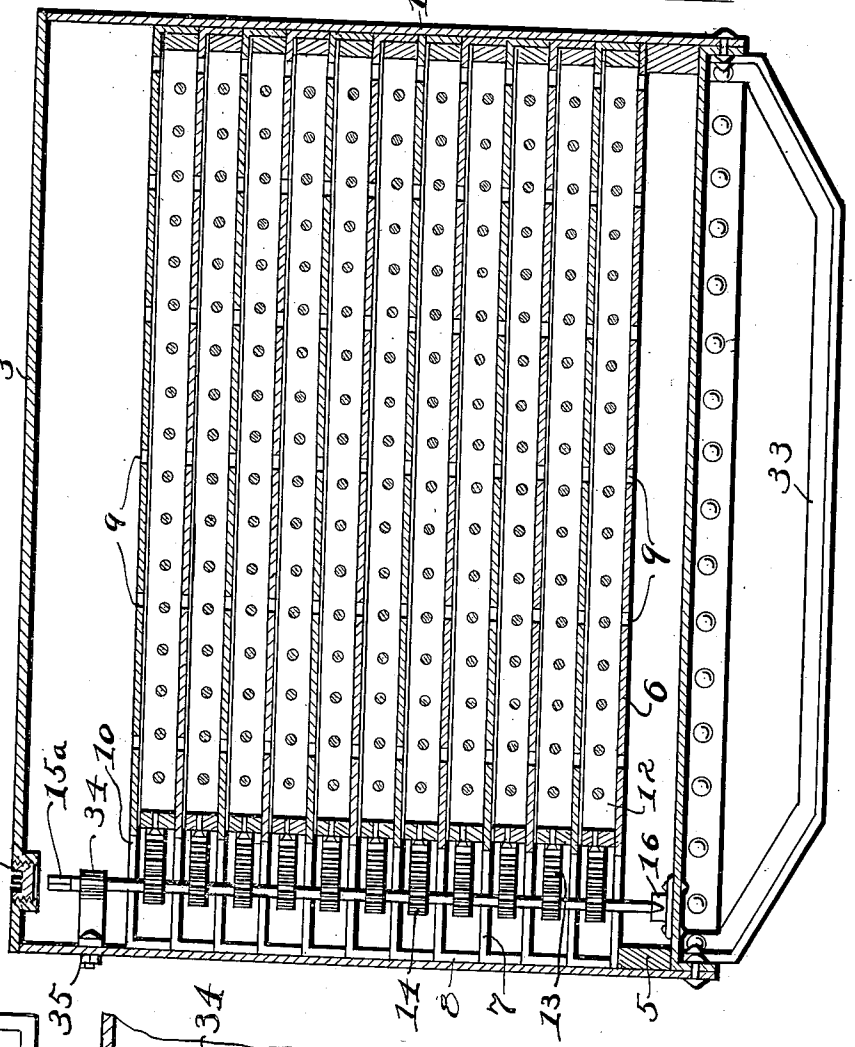
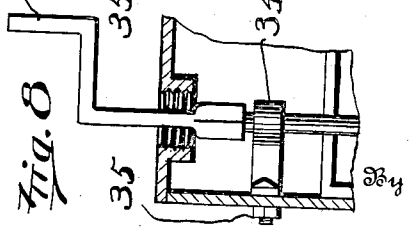


Fig. 8.



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5 SHEETS—SHEET 5.

Fig. 10.

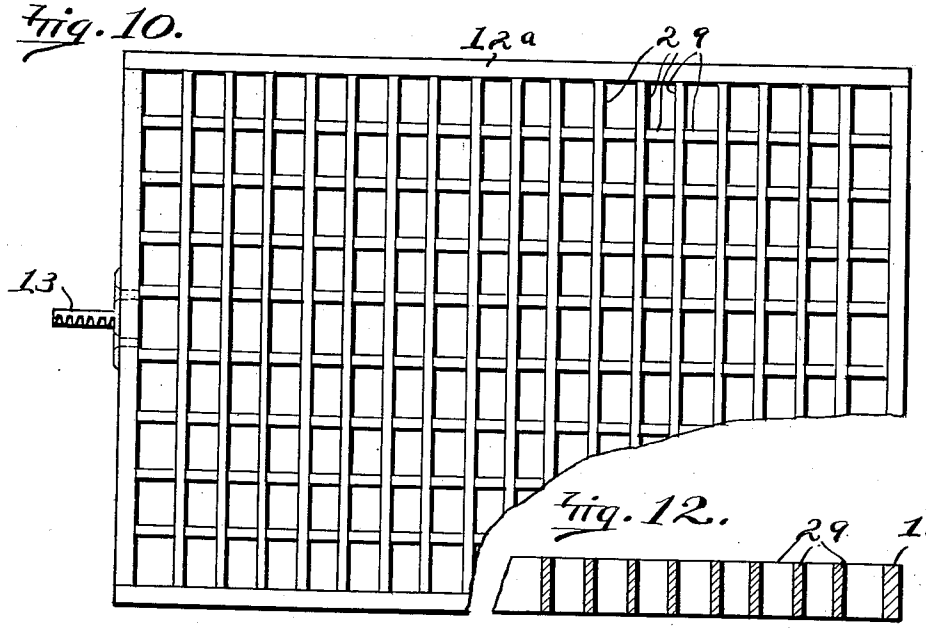


Fig. 12.

Fig. 11

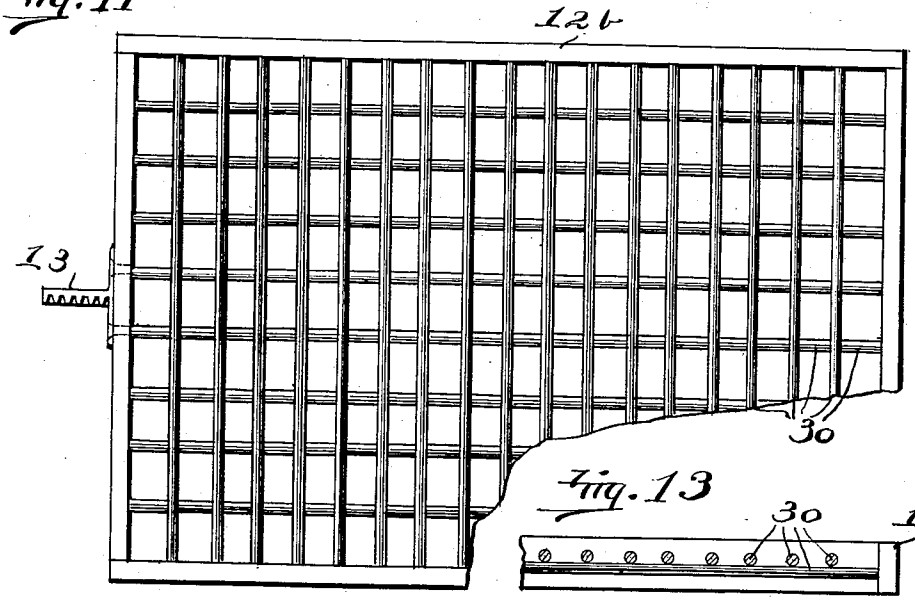


Fig. 13

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UNITED STATES PATENT OFFICE.

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METHOD AND APPARATUS FOR PRESERVING EGGS.

1,302,955. Specification of Letters Patent. Patented May 6, 1919.

Application filed October 10, 1918 Serial No. 257,591.

To all whom it may concern:

Be it known that I, ENNIS M. NICHOLS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a new and useful Method and Apparatus for Preserving Eggs; and I 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.

This invention relates to an improved method and apparatus for treating eggs and the process includes a novel sequence of steps, while the apparatus includes novel features all of which are hereinafter described and claimed.

An object of the invention is to provide means which when used in the treatment of eggs will indefinitely prolong their preservation and maintain them in a normal and marketable condition the same as fresh or new layed eggs.

In order to better understand and appreciate the advantages of the present invention a brief statement of the disadvantages and objectionable features incident to the methods now in vogue for storing and preserving eggs will be given. At the present time eggs are packed and placed in storage, where they remain at a state of rest and seldom, if ever, are moved, turned, or handled from the time they are placed in storage until they are removed therefrom for sale or consumption. During the time of storage the yolks of the eggs begin to settle inside of the shells, and if the said period of time is sufficiently extended the yolks will lodge against the inner sides of the shells or in the immediate vicinity thereof, and out of their normal positions at the central portions of the shell.

After the yolks have become thus displaced, it is an easy matter for a candler to determine the same when the eggs are subjected to test prior to being placed upon the market, and this objectionable condition constitutes one of the foremost reasons why eggs usually known as "storage" are considered inferior and consequently do not command the same price, in the open market, as fresh eggs.

In fact, the eggs which have remained in storage in an immobile state for any considerable length of time become damaged by reason of the displacement of their yolks. This is due to the fact that the weight of the yolk stretches the supporting tissues at one side of the egg and compresses the tissues at the opposite side thereof. This of course results in a deformed condition within the shell and in fact the tissues subjected to the greatest amount of stress or strain may, and frequently do, become ruptured and thereby destroy the value of the egg as food. Furthermore, the yolks assume a flat disk like shape of an extremely flabby nature which totally unfits the egg for use in many capacities even though the contents of the shell are preserved in an edible condition as an article of food. Such eggs can not be used for setting or incubator purposes owing to their physically damaged condition, nor can they be used where the firm, rounded condition and appearance of the yolk is demanded at the time they are served.

A prime object of the invention is to provide an easily executed and operated method and apparatus for causing the yolks of eggs to be retained at their normal positions within the shells irrespective of the length of time the eggs remain in storage. Thus the objectionable features and conditions hereinbefore explained are eliminated and avoided and the eggs are preserved in a condition to be used to advantage for all purposes to which strictly fresh eggs are put.

With this object in view the method for treating eggs to retain their yolks in normal position in the shell consists in partially rotating the eggs at intervals and permitting the eggs to remain in a state of rest during the interims between said intervals and thereby uniformly stretching and toughening the yolk sustaining tissues to retain the yolks in normal positions in the shells for an indefinite period of time.

The apparatus hereinafter described and used for putting the process into effect comprises a tank adapted to retain a suitable quantity of a desired preserving compound or agent. Spaced shelves are arranged within the tank and the eggs in any desired number are placed upon the said shelves and submerged in the said preserving agent or compound.

Frames are slidably mounted upon the shelves and surround the eggs located thereon. The frames are provided with cross bars which lie betwen the adjacent rows of

eggs. A mechanically operated means is provided and operatively connected with all of the frames whereby the frames may be simultaneously moved. Thus when the eggs are initially placed in position upon the shelves and within the frames they are permitted to remain at a state of rest for a short space of time. The mechanism is then operated whereby the frames are moved simultaneously and the eggs within the frame are partially turned upon the shelves. The eggs then remain at a state of rest for a desired short period of time when they are again partially rotated as above described and again permitted to remain at rest. This operation is repeated as often as necessary during the time that the eggs are retained in the tank. When the eggs are at rest during the interims between the intervals at which they are turned or partially rotated, the tissues which support the yolks from the uppermost portions of the eggs are slightly stretched, but are not strained while the tissues about the yolks at the lowermost portions of the eggs are slightly compacted or compressed. Inasmuch as the eggs are partially rotated at regular intervals and in a succession of uniform stress and compression from the weight of the yolks and consequently the said tissues retain the yolks in their normal central positions in the shells and the tissues and yolks are preserved in good physical condition so that the eggs may be used to advantage for all purposes. When the eggs are placed in the tank they become incased and surrounded by thin casings or envelops of the preserving agent or compound which may be permitted to remain upon them until they are used or are placed upon the market for final disposition.

By following the method and using the apparatus herein described great advantage and pecuniary gain accrues to the farmers, and the local purchasers of eggs from producers. The eggs may be collected in small lots and placed in the tank as collected. It is not necessary to completely fill the tank with eggs or place any predetermined number therein before subjecting those previously collected to the beneficial effects of the method. For instance five dozen or a less number per week may be placed in the tank and at each addition to the number of eggs in the tank, a sufficient amount of the preserving liquid or agent is added to keep all of the eggs in the tank submerged therein. The collection of the eggs in the tank may extend over the period of one year or more or until the preserving and treating tank is filled to the limit of its capacity.

Any number of the eggs may be removed from the tank at any time without disturbing those eggs left remaining in the tank and therefore the eggs may be sold at times when the market prices are highest and when the market price is low the eggs may be retained in the tank and others may be added to the collection. Therefore, a producer who collects one hundred dozen eggs per week on the same basis, has advantages equal to a producer who collects five dozen per week and vice versa. The preserving tanks may be made to accommodate anywhere from one hundred to four thousand dozen or more eggs.

In the accompanying drawings:—

Figure 1 is a perspective view of the apparatus for treating eggs with parts broken away.

Fig. 2 is a longitudinal sectional view of the same.

Fig. 3 is a transverse sectional view of the same.

Fig. 4 is a plan view of an egg turning frame used in the apparatus.

Figs. 5 and 6 are detail views of the gear which is utilized to reciprocate the egg receiving frames or trays.

Fig. 7 is a longitudinal sectional view through an egg preserving device which embodies a slight modification of the invention.

Figs. 8 and 9 are detail views of the modified tray actuating means embodied in the construction shown by Fig. 7.

Figs. 10 and 11 are plan views of modified constructions of the reciprocating frames or trays, one corner of each of the frames being broken away.

Fig. 12 is a fragmentary sectional view through one end of the frame shown by Fig. 10.

Fig. 13 is a similar view through one end of the tray construction shown by Fig. 11.

Fig. 14 is a fragmentary plan view of a further slight modification in which provision is made for packing eggs of different lengths.

As illustrated in the accompanying drawings the apparatus for treating eggs comprises a tank 1 which is preferably made of sheet metal and supported upon feet or legs 2. The said tank is also provided with a hinged cover 3 adapted to close tightly against its upper edges. The tank 1 is further provided with a draw off cock 4, located at one end thereof in the vicinity of the bottom. The tank is also provided with interiorly located cross pieces 5 positioned at the ends thereof and upon which rests a flat shelf 6. Shelves 7 are arranged one above the other and are spaced from each other by depending end flanges 8. The shelves 7 and their flanges 8 at one end are provided with slots 10 which are disposed longitudinally of the said shelves.

A series of frames 12 are slidably mounted upon the upper surfaces of the shelves 6 and 7, said frames having a length which is less

than that of the tank 1 so that clearance space is provided for reciprocating the frames. A short rack 13 projects longitudinally from one end of each of the frames 12 and these racks mesh with pinions 14 on a shaft 15 which extends vertically through one end of the tank, being received within the before mentioned slots 10 in the ends of the shelves 6 and 7. The lower end of the shaft 15 is tapered or pointed and rests loosely in a bearing block 16 secured to the bottom of the tank, while the upper end of the shaft has a polygonal formation, as indicated at 15^a, and is loosely received within a socket 17 at the lower end of a short shaft 18. This shaft 18 extends through and is journaled in a horizontal arm 19 projecting from a slide 20, the upper end of the shaft having a bevel pinion 21 secured thereto and said pinion meshing with a corresponding pinion 22 upon a short horizontal shaft 23 which extends through the slide 20 and is journaled therein. This slide 20 is removably engaged by vertically disposed guide strips 24 applied to the end of the tank 1 at the top thereof, and the upper edge of the tank is slotted at 25 to provide a clearance space for the horizontal shaft 23 when the slide 20 is inserted in position or removed therefrom. When the slide is in position the slot 25 is closed thereby so that the tank can be effectively sealed when the cover 3 is swung into a closed position. A removable crank handle 26 is adapted to be applied to the projecting end of the horizontal shaft 23 for the purpose of turning the same and rotating the upright shaft 15 to move the frames 12 longitudinally. When the crank handle 26 is removed the tank is substantially free from external projections so that it can be handled without difficulty and occupies a minimum amount of space. When the crank handle 26 is placed in position and actuated, the vertical shaft 15 is rotated and the pinion 14 thereon caused to coöperate with the racks 13 to move the frames 12 longitudinally. A vertical guide rod 27 is arranged in a parallel and spaced relation to the vertical shaft 15 and engages the back of the racks 13 to hold the same in mesh with the pinions 14. This guide rod 27 is removable, the lower end therof being received within a second socket 16^a in the bearing block 16, while the upper end thereof is received within a socket 19^a in the horizontal arm 19 of the slide 20.

The frames 12 are shown in Figs. 2 and 4 as provided with transversely extending spaced cross rods 28. The eggs E are placed in transverse rows between the cross rods 28, and with this construction it will be obvious that when the frames are moved longitudinally all of the eggs packed within the frames will be rolled on the respective shelves 6 and 7 so as to shift the positions thereof. Fig. 10 shows a modified frame 12^a which is provided with intersecting longitudinally and transversely extending partitions 29, pockets being thereby provided for the individual eggs. A further slight modification is shown by Figs. 11 and 13, in which the frame 12^b is provided with longitudinally and transversely extending rods which coöperate with each other to form individual pockets for the eggs. It will be obvious that in either instance the eggs will be packed in the pockets which are provided by the partitions or rods, and that the eggs will be held out of engagement with each other, although they are supported in such a manner that each egg will be rolled and the position thereof shifted when the frame is moved longitudinally.

A further slight modification is shown by Fig. 14 in which the frame 12^c is provided with uniformly spaced cross bars 31, and with intersecting longitudinally extending bars 32 which are not uniformly spaced, said bars being arranged in such a manner as to provide short cells *a* for short eggs, and long cells *b* for longer eggs. Provision is thus made for economically packing long and short eggs and holding them in a spaced relation so that they will not smash against each other and cause breakage if the tank is tilted or given a sudden or abrupt movement.

A slight modification is shown by Figs. 7, 8 and 9 in which the tank 1 is mounted upon runners 33 instead of the legs 2, thereby enabling the tank to be readily moved from place to place. It will also be noted that in these figures the upper end of the vertical operating shaft 15 extends loosely through and is journaled in a horizontal bracket 34 which projects from one end of the tank and is rigidly secured thereto by fastening members 35. The cover 3 is provided at a point directly over the vertical shaft 15 with a threaded opening which is normally closed by a removable plug 36. This plug is flush with the top of the cover when it is screwed into position, thereby avoiding any exterior projections which might catch upon outside objects and cause inconvenience or difficulty when handling the tank. However, when it is desired to turn the eggs it is merely necessary to unscrew the plug 36 and apply the socketed end of a crank handle 37 to the polygonal upper end 15^a of the shaft 15. The shaft can then be readily rotated to slide the frames 12 and turn the eggs. In other respects the construction of the egg preserving device shown by Fig. 7 is identical with that previously described.

Any suitable liquid preservative may be used in the tank, and a solution of silicate of soda in water has been found most effective for this purpose. By partially rotating

the eggs at intervals the yolks are held in proper normal position at the centers of the eggs, and consequently the disadvantage of displacement hereinbefore mentioned is eliminated. The eggs as treated are in fine marketable condition, and may be collected when eggs are plentiful and cheap, and disposed of when they are scarce and high in price. When it is desired to remove the eggs the cock 4 is opened and the liquid preservative permitted to flow from the tank, thereby draining the preservative from the layers of eggs which it is desired to remove.

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

1. An apparatus for treating eggs, including a closed tank containing a liquid preservative, superposed and spaced plates extending transversely across the tank and removably mounted in position therein, egg receiving frames slidably mounted upon the various plates and having open bottoms so that the eggs rest upon the plates, said plates and frames being submerged in the liquid preservative in the tank, and means operable from the exterior of the tank for reciprocating the frames to rotate the eggs.

2. An apparatus for treating eggs, including a closed tank containing a liquid preservative, a series of superposed and spaced shelves extending transversely across the tank and removably mounted in position therein, said plates being provided with spacing flanges so that they rest loosely upon each other when assembled, egg receiving frames slidably mounted upon the respective plates and having open bottoms so that the eggs rest upon the plates, said plates and egg receiving frames being submerged in the liquid preservative in the tank, and means actuated from the exterior of the tank for simultaneously reciprocating all of the frames to rotate the eggs.

3. An apparatus for treating eggs, including a closed tank containing a liquid preservative, a series of superposed plates extending transversely across the tank and removably positioned therein, each of said plates being provided with flanges so that the plates are held in a spaced relation and rest loosely upon each other when assembled in position within the tank, egg receiving frames slidably mounted upon the respective plates and having open bottoms so that the eggs rest upon the plates, a vertical shaft removably mounted within the tank and operatively connected to the several frames, the frames and plates being submerged in the liquid within the tank, and means actuated from the exterior of the tank for rotating the shaft to reciprocate the frames and rotate the eggs.

4. An apparatus for treating eggs, including a closed tank containing a liquid preservative, a series of superposed plates arranged within the tank and resting loosely upon each other, said plates being formed with spacing flanges and also having the ends thereof correspondingly cut away, egg receiving frames slidably mounted upon the respective plates and having open bottoms so that the eggs rest upon the plates, a vertical shaft removably mounted within the tank and extending through the cut away portions of the plates, a rack and pinion connection between the shaft and each of the frames, the frames and plates being submerged in the liquid preservative within the tank, and means for actuating the shaft to reciprocate the frames and rotate the eggs from the exterior of the tank.

5. An apparatus for treating eggs, including a closed tank containing a liquid preservative, a series of spaced and superposed plates extending transversely across the tank and resting removably upon each other, said plates being provided with corresponding cut away portions, egg receiving frames slidably mounted upon the respective plates and having open bottoms so that the eggs rest upon the plates, a bearing on the bottom of the tank, a horizontal bracket projecting from one of the side walls of the tank and having a complemental bearing therein, means for removably mounting the horizontal bracket upon the side wall of the tank, a vertical shaft extending through the cut away portions of the plates and journaled in the bearing at the bottom of the tank and the bearing of the bracket, an operative connection between the vertical shaft and the several frames, said frames and plates being submerged in the liquid preservative within the tank, and means operable from the exterior of the tank for rotating the shaft and reciprocating the frames to rotate the eggs.

6. An apparatus for treating eggs, including a closed tank containing a liquid preservative, a series of spaced and superposed plates extending transversely across the tank and resting removably upon each other, said plates having corresponding cut away portions, egg receiving frames slidably mounted upon the respective plates and having open bottoms so that the eggs rest upon the plates, a bearing on the bottom of the tank, a horizontal bracket projecting from one of the side walls of the tank, a plate carrying the bracket and removably mounted upon the side wall of the tank, a short vertical shaft journaled in the horizontal bracket and carried thereby, a vertical shaft extending through the cut away portion of the plates and having the lower end thereof journaled in the bearing at the bottom of the tank while the upper end thereof is detachably engaged by the short vertical shaft, an operative connection between the vertical shaft and the several frames, said frames and

plates being submerged within the liquid preservative in the tank, and means operable from the exterior of the tank for rotating the short vertical shaft of the bracket to move the frames and rotate the eggs.

7. An apparatus for treating eggs, including a closed tank containing a liquid preservative, a series of spaced and superposed plates extending transversely across the tank and resting loosely upon each other, said plates being formed with corresponding cut away portions, egg receiving frames slidably mounted upon the respective plates and having open bottoms so that the eggs rest upon the plates, a bearing block at the bottom of the tank, a horizontal bracket projecting from one of the side walls of the tank, means for removably mounting the bracket upon the side wall of the tank, a short vertical shaft journaled in the bracket, a vertical shaft extending through the cut away portions of the plates and having the lower end thereof journaled in the before mentioned bearing block while the upper end thereof is detachably engaged by the short vertical shaft, pinions on the vertical shaft, racks projecting from the frames and meshing with the pinions, a guide bar engaging the backs of the racks to hold them in mesh with the pinions and held removably in position between the bearing block and the bracket, the plates and frames being submerged in the liquid preservative within the tank, and means operable from the exterior of the tank to rotate the short vertical shaft and reciprocate the frames and rotate the eggs.

8. An apparatus for treating eggs, including a closed tank containing a liquid preservative, a series of spaced and superposed plates extending transversely across the tank and resting loosely upon each other, said plates being provided with corresponding cut away portions, egg receiving frames slidably mounted upon the respective plates and having open bottoms so that the eggs rest upon the plates, a bearing at the bottom of the tank, a horizontal bracket projecting from one of the side walls of the tank, a vertical plate carrying the bracket and having a detachable sliding engagement with the side wall of the tank, a short vertical shaft journaled in the bracket, a horizontal shaft journaled in the vertical plate and projecting on the exterior of the tank when the parts are assembled, gearing between the horizontal shaft and the short vertical shaft, a vertical shaft extending through the cut away portions of the plates and having the lower end thereof engaged by the bearing at the bottom of the tank while the upper end thereof has a detachable connection with the short vertical shaft, an operative connection between the vertical shaft and the several frames, the frames and plates being submerged in the liquid preservative within the tank, and means for operating the horizontal shaft from the exterior of the tank to move the frames and rotate the eggs.

9. An apparatus for treating eggs, including a closed tank containing a liquid preservative, a series of superposed egg receiving frames slidably mounted within the tank, a bearing at the bottom of the tank, a horizontal bracket projecting from one of the side walls of the tank, means for removably securing the bracket in position, a short vertical shaft journaled in the bracket, a long vertical shaft extending through the tank and having the lower end thereof journaled in the bearing at the bottom of the tank while the upper end thereof is detachably engaged by the short vertical shaft, an operative connection between the long vertical shaft and the egg receiving frames, said frames being submerged in the liquid preservative within the tank, and means operable from the exterior of the tank to rotate the short vertical shaft and reciprocate the egg receiving frames.

10. An apparatus for treating eggs, including a closed tank containing a liquid preservative and having a notch in the upper edge thereof, a series of superposed egg receiving frames slidably mounted within the tank and submerged in the liquid preservative, a bearing at the bottom of the tank, a horizontal bracket projecting from one of the side walls of the tank, a removable slide carrying the bracket, guideways receiving the slide and extending to the top of the tank, a short vertical shaft journaled in the bracket, a horizontal shaft journaled in the slide and received within the before mentioned notch in the upper edge of the tank, gearing between the horizontal shaft and the short vertical shaft, a cover for the top of the tank and arranged to engage the slide to lock the same in position when the cover is closed, a long vertical shaft extending through the tank and having the lower end thereof journaled in the bearing at the bottom of the tank while the upper end thereof is detachably engaged by the short vertical shaft of the bracket, and an operative connection between the long vertical shaft and the several egg receiving frames.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ENNIS M. NICHOLS.

Witnesses:
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GEORGE G. SCHROEDER.