Nov. 4, 1941. H. C. JOHNSON 2,261,767

APPARATUS FOR PACKAGING EGGS

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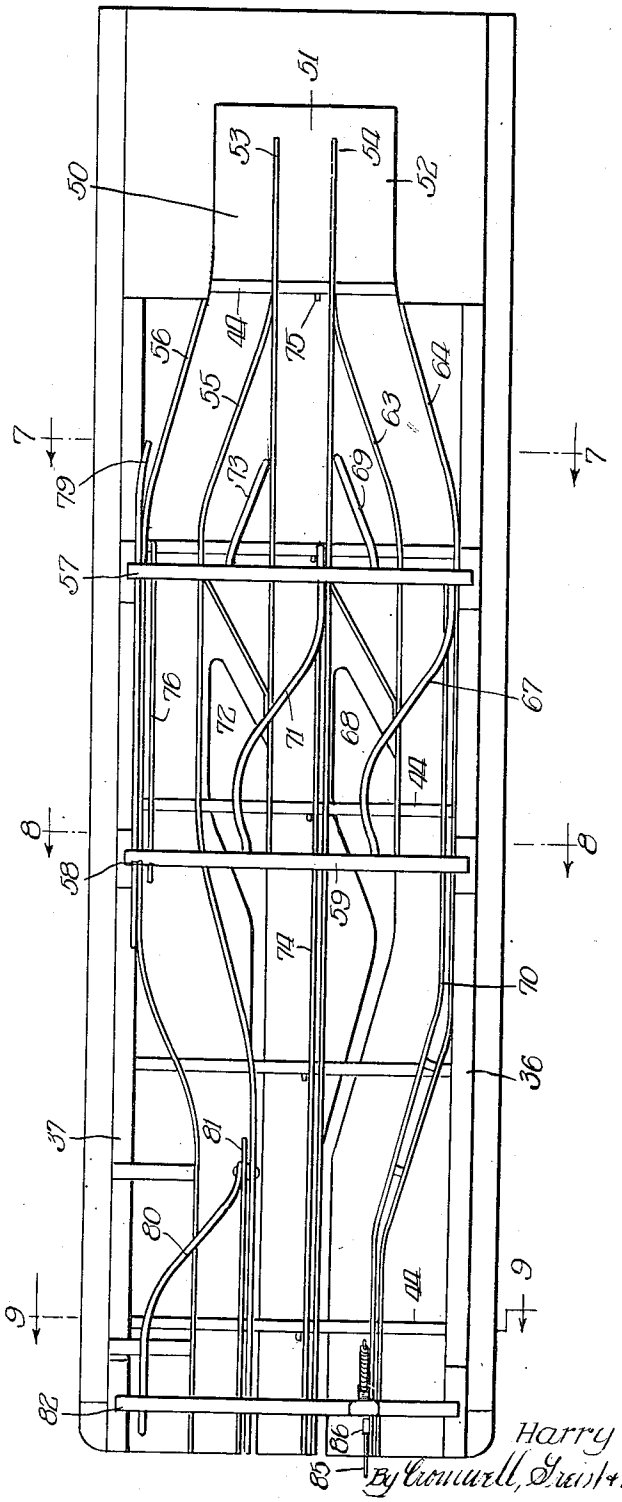


Fig. 1.

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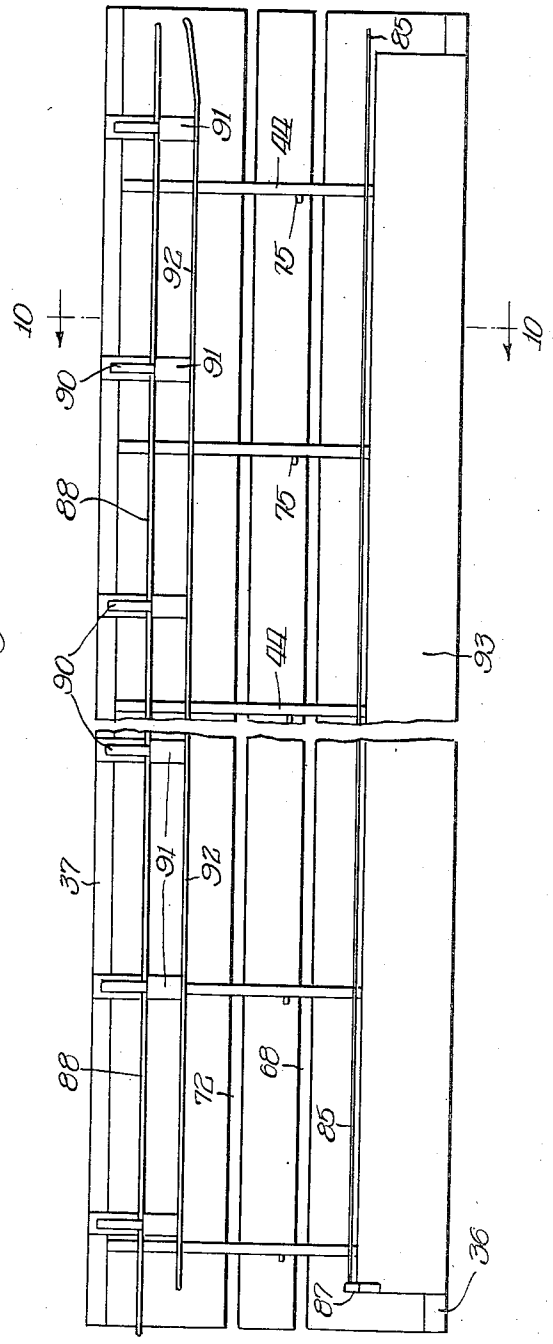


Fig. 2.

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APPARATUS FOR PACKAGING EGGS

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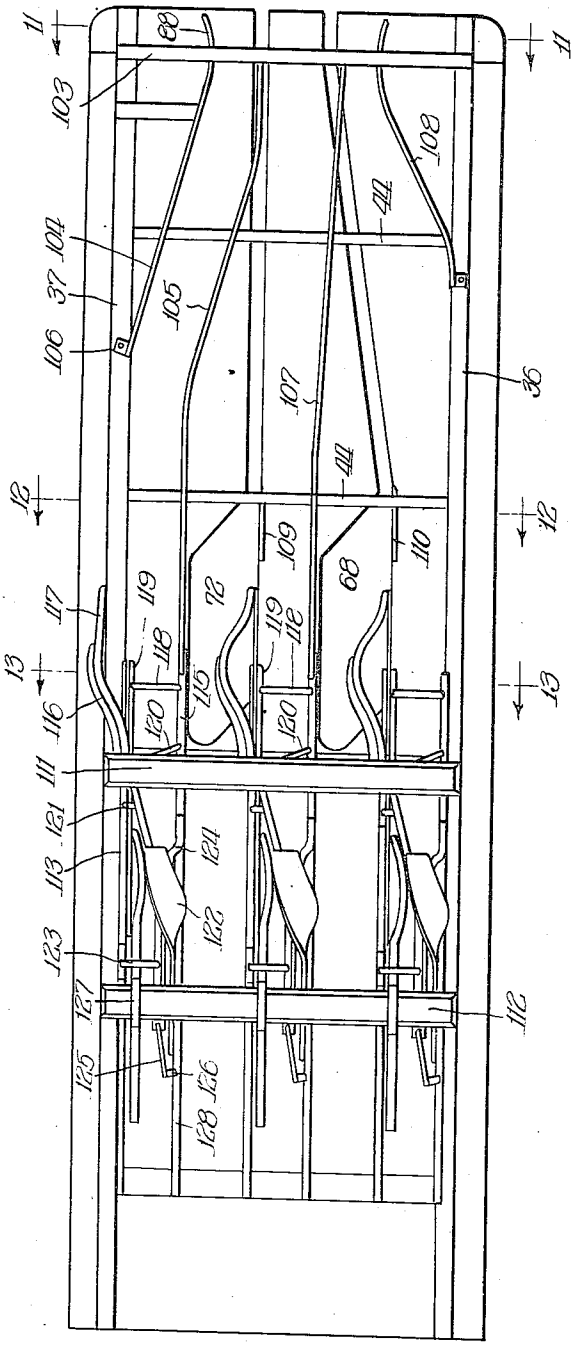


Fig. 3.

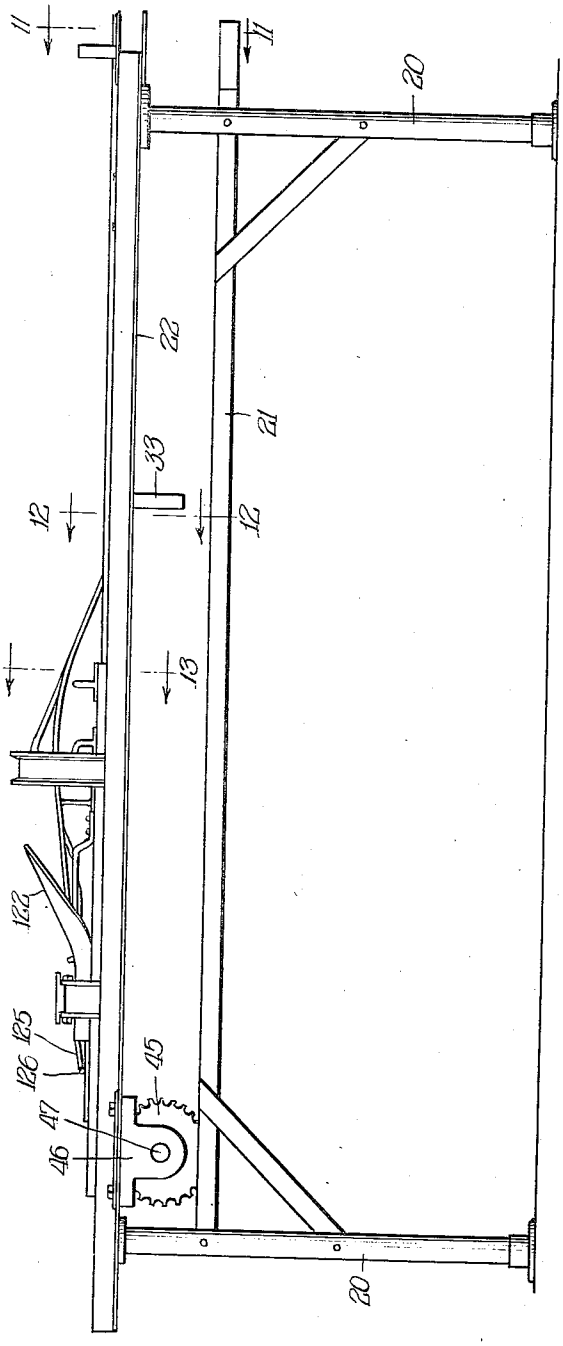
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APPARATUS FOR PACKAGING EGGS

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Fig. 4.



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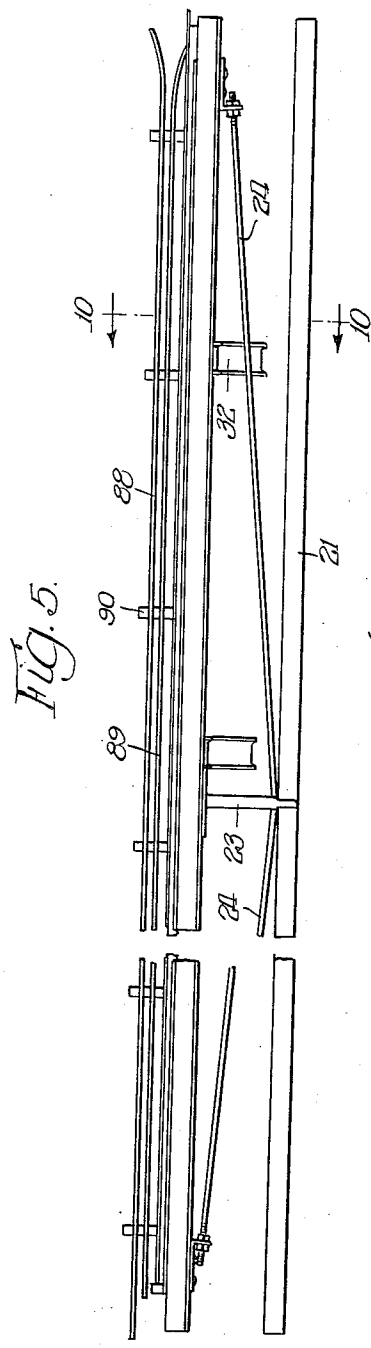


Fig. 5.

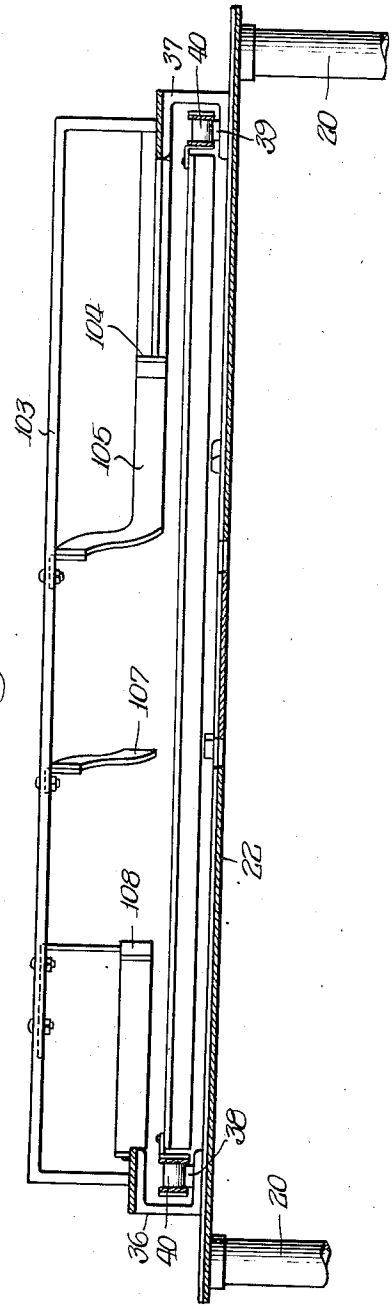


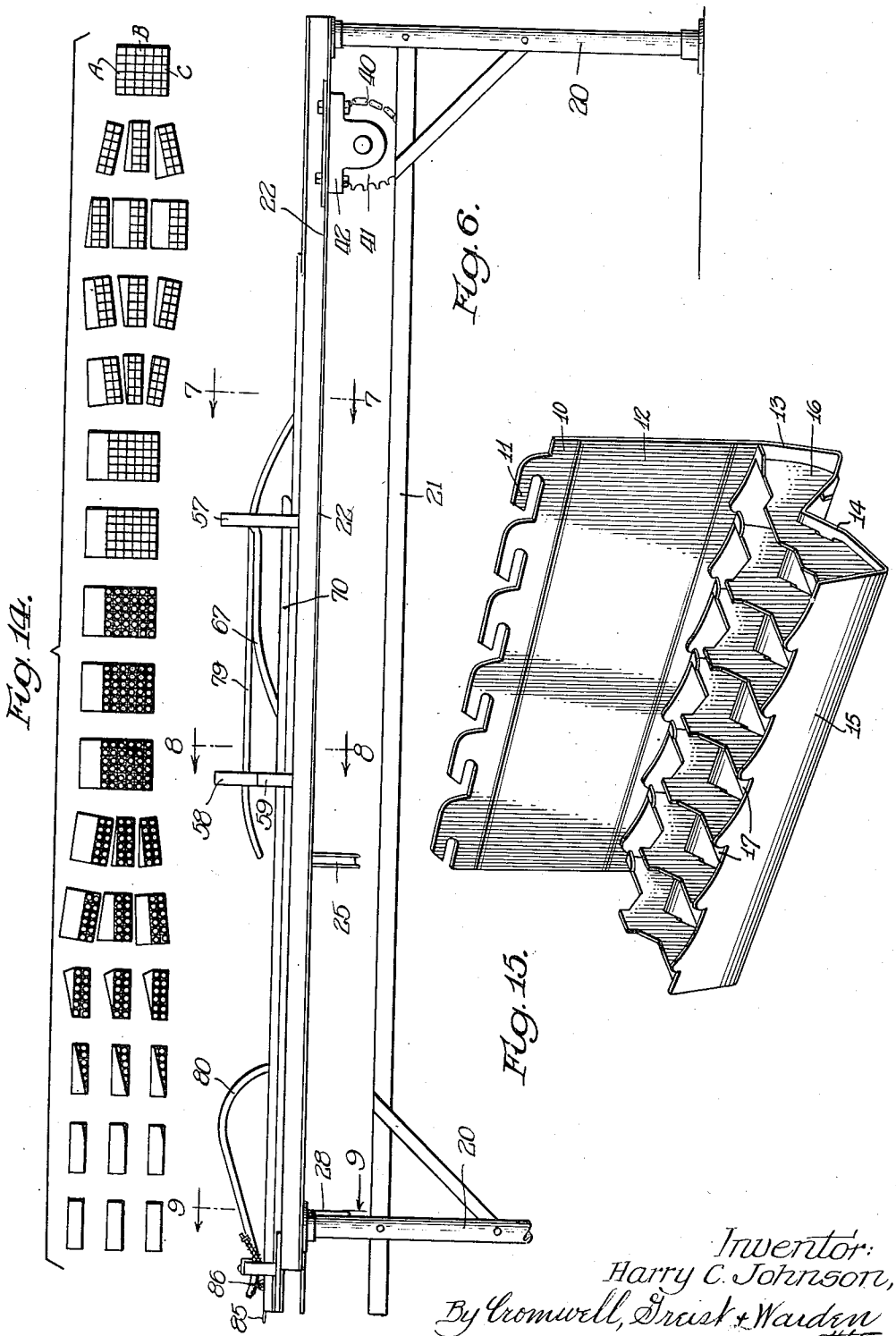
Fig. 11.

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APPARATUS FOR PACKAGING EGGS

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APPARATUS FOR PACKAGING EGGS

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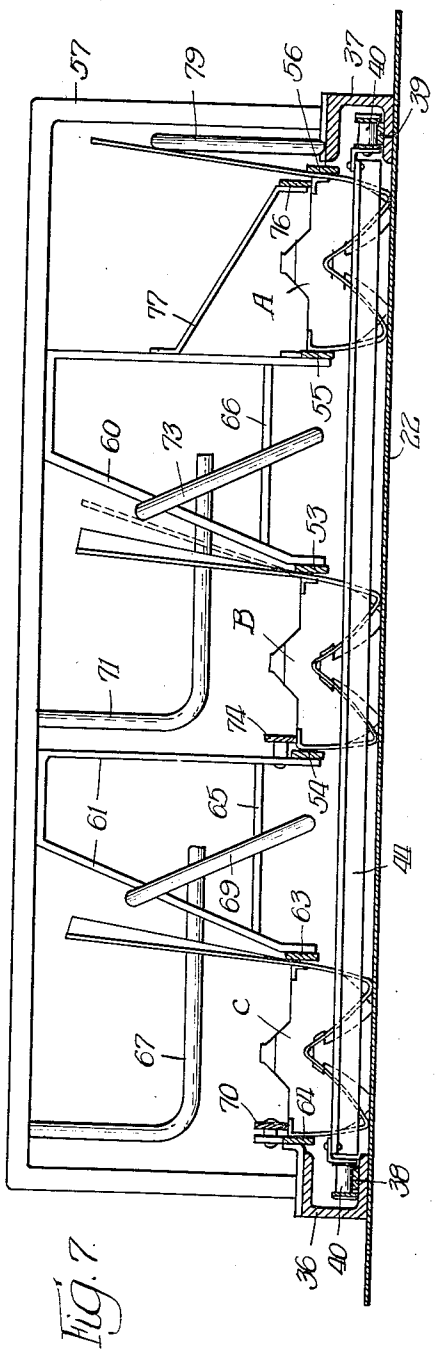


Fig. 7.

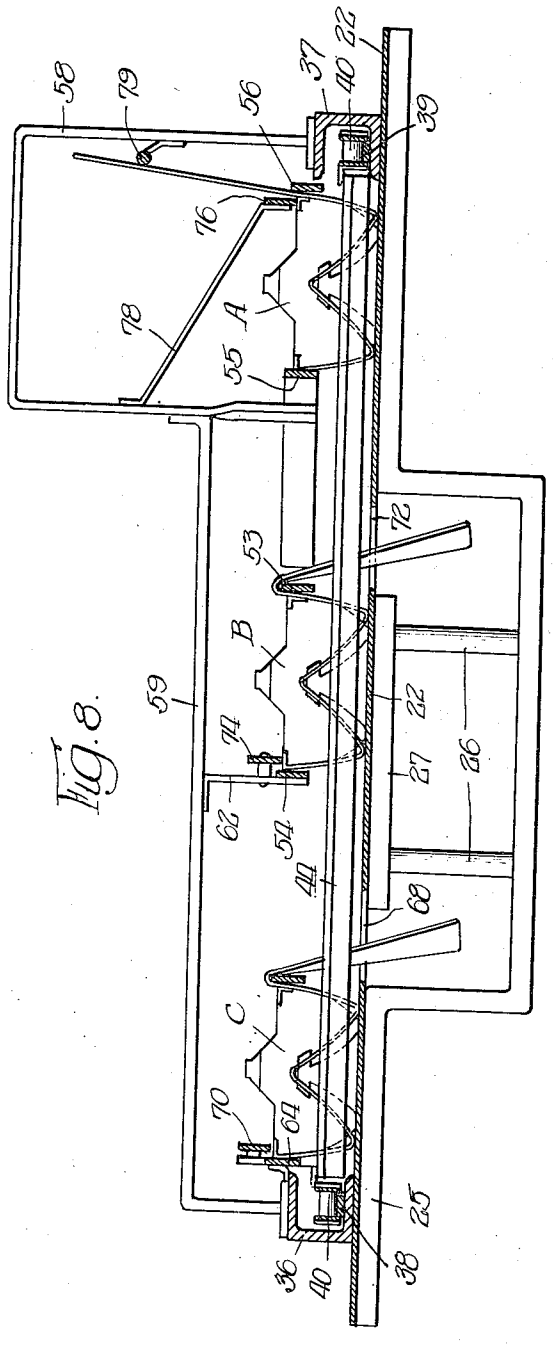


Fig. 8.

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APPARATUS FOR PACKAGING EGGS

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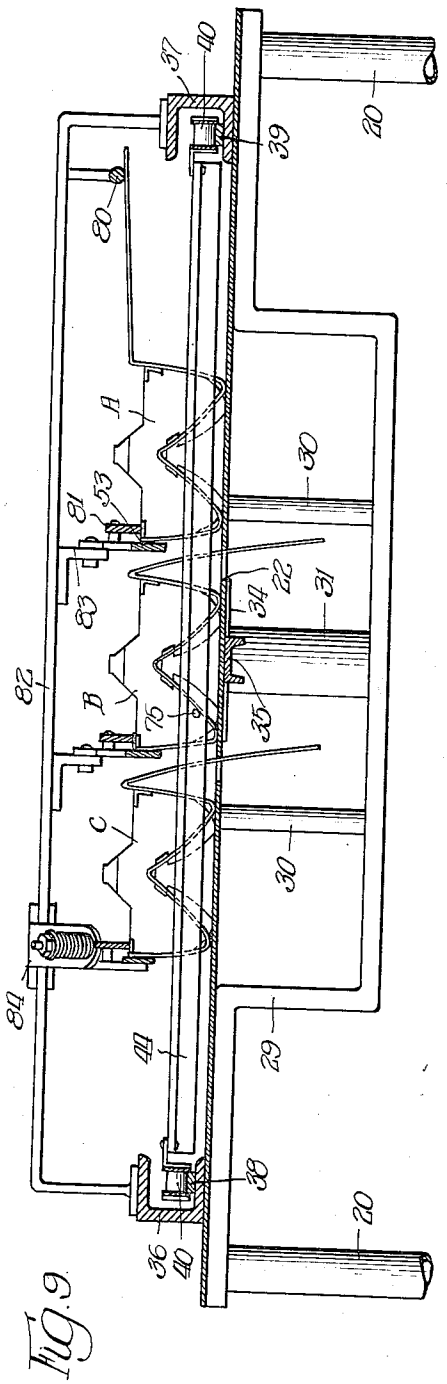


Fig. 9.

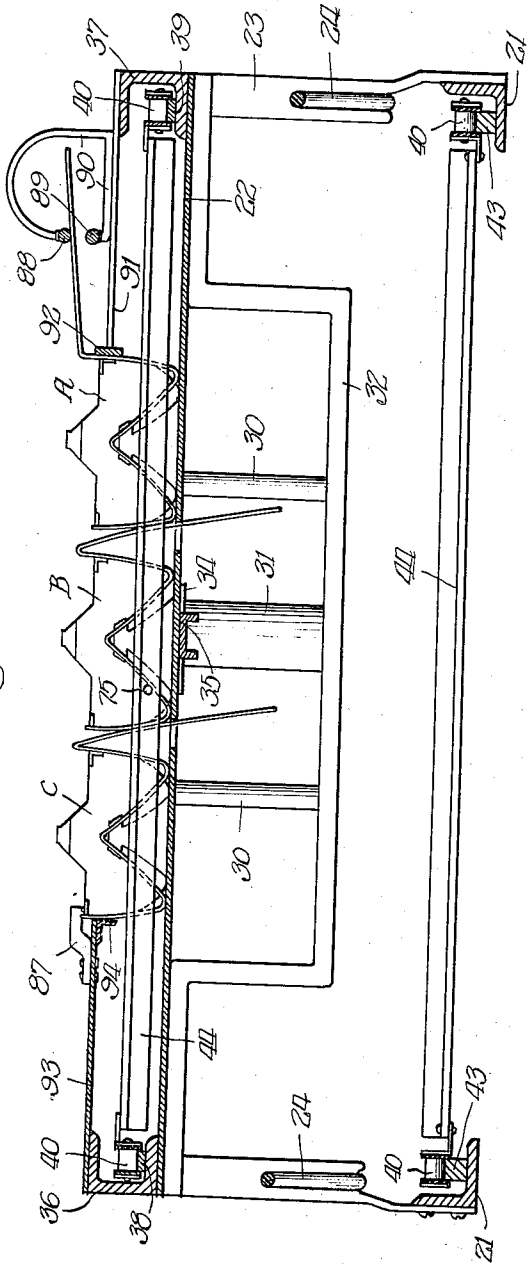


Fig. 10.

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APPARATUS FOR PACKAGING EGGS

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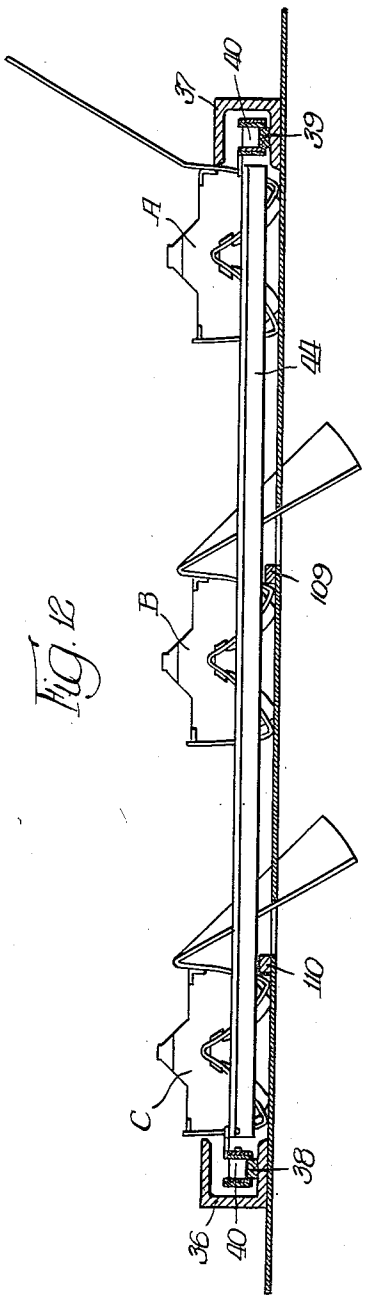


Fig. 12

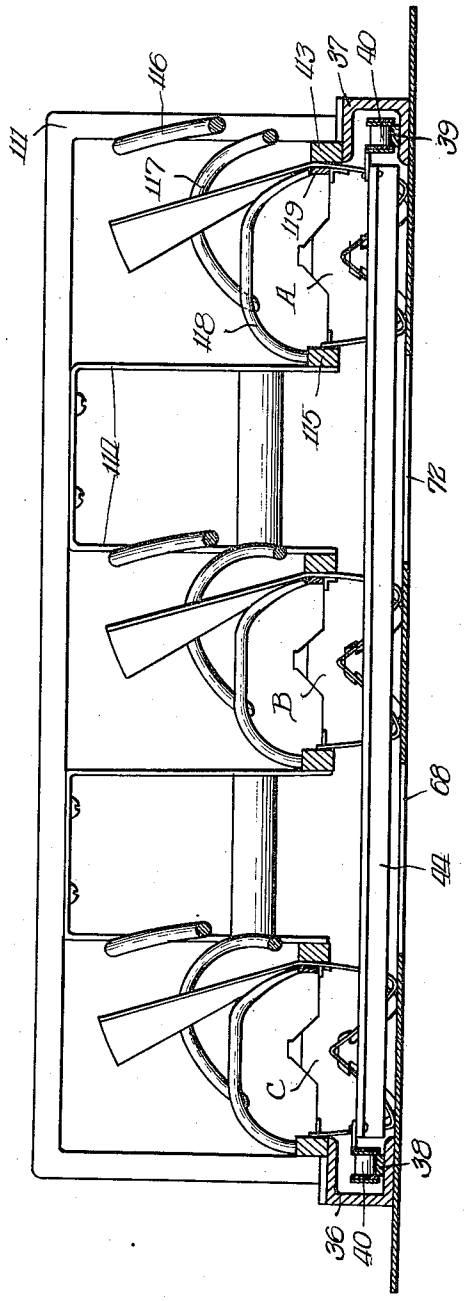


Fig. 13.

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APPARATUS FOR PACKAGING EGGS

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Fig. 16.

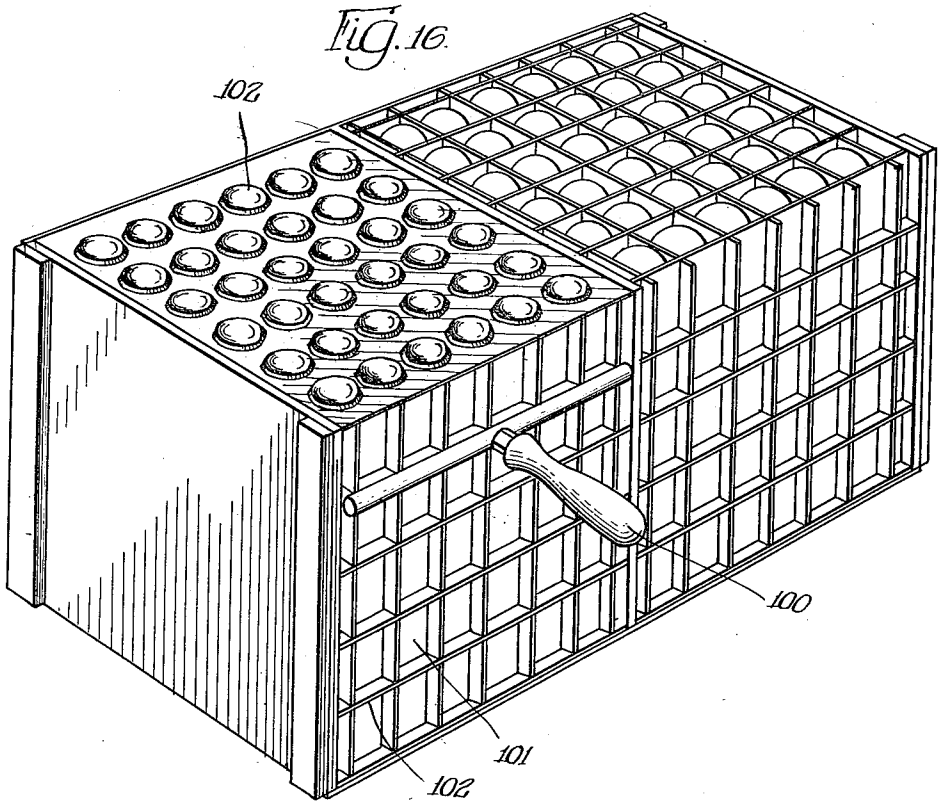
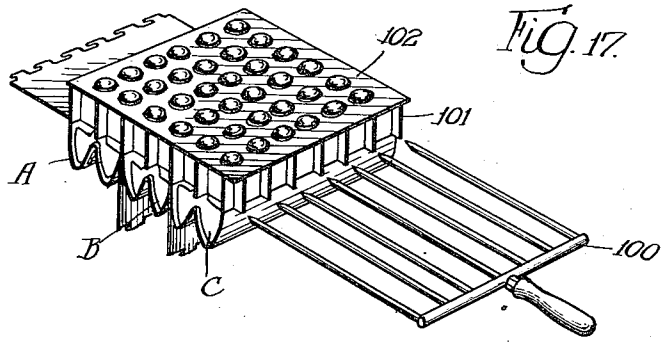


Fig. 17.



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Patented Nov. 4, 1941

2,261,767

UNITED STATES PATENT OFFICE

2,261,767

APPARATUS FOR PACKAGING EGGS

Harry C. Johnson, Chicago, Ill., assignor to Self-Locking Carton Co., Chicago, Ill., a corporation of Illinois

Application June 3, 1939, Serial No. 277,219

5 Claims. (Cl. 226—14)

The present invention relates to an improved type of device for the multiple loading of cellular egg cartons and the closure of these cartons.

A principal object of the invention is the provision of a device which will automatically open a plurality of adjacent cartons for the reception of eggs and then close the cartons for delivery in a plurality of units in succession.

Another object of the invention is the provision of a device which is operative to open or fold back the covers of adjacent cartons while in spaced relation, converge the cartons to a loading point, and then progress the loaded cartons divergently through a cover-closing operation.

Still another object of the invention is to provide a device which simultaneously will bend back the covers of three cartons, deliver these cartons in adjacent relation to a point of loading where three dozen eggs may be loaded in the three cartons simultaneously, and then simultaneously close the covers of the three cartons while in spaced relation.

These and other objects will be evident upon a consideration of the following description of a preferred embodiment of the invention and by reference to the accompanying drawings, in which

Fig. 1 is a top view of the portion of the device to which empty cartons are delivered;

Fig. 2 is a top view of the intermediate or loading portion of the device;

Fig. 3 is a top view of the delivery end of the device at which the covers of cartons are closed;

Fig. 4 is a side view of the delivery end of the device shown in Fig. 3;

Fig. 5 is a side view of the intermediate portion of the device;

Fig. 6 is a side view of the front end of the device;

Fig. 7 is a sectional view taken along line 7—7 of Fig. 1;

Fig. 8 is a sectional view taken along line 8—8 of Fig. 1;

Fig. 9 is a sectional view taken along line 9—9 of Fig. 1;

Fig. 10 is a sectional view taken along line 10—10 of Fig. 5;

Fig. 11 is a sectional view taken along line 11—11 of Fig. 3;

Fig. 12 is a sectional view taken along line 12—12 of Fig. 4;

Fig. 13 is a sectional view taken along line 13—13 of Fig. 4;

Fig. 14 is a diagrammatic view showing the steps of operation on egg cartons;

Fig. 15 is a perspective view of the type of carton upon which the mechanism may operate;

Fig. 16 is a perspective view of an egg case, partly broken away, and illustrates the removal of one layer of eggs therefrom; and

Fig. 17 illustrates the loading of the eggs removed from the case into three adjacent cartons.

For many years it has been customary to pack eggs in cellular cartons of the type having front and rear walls, a bottom, cross partitions hinged to the front and rear walls by triangular hinge portions, and a cover having a cover-locking strip which may be folded over and engaged beneath the hinges of the cross partitions to lock the cover in position. A popular carton of this type is described in Reissue Patent 18,922, dated August 22, 1933. Cartons of this type may be closed by the device described in Burger Patent 1,994,241. The present invention is an improvement over devices of the type described in the Burger patent and utilizes many features thereof.

In accordance with the present invention three adjacent cartons are passed through a cover opening portion of the machine and then brought into adjacent relation in which the three cartons are simultaneously filled. Thereafter the adjacent cartons are passed divergently to a cover-closing portion of the machine which delivers the cartons in a condition ready to be packed.

In order to explain the invention reference will be made to the carton shown in the Troyk reissue patent, No. 18,922. As shown in Fig. 15, this carton consists of a cover-locking strip **10** having cover-locking hooks **11**, a cover **12**, a rear wall **13**, an inverted V-shaped bottom portion **14**, a front wall **15**, and the transverse partitions **16** hinged to the front and rear walls by means of the integral hinges **17**.

The machine is provided with legs **20** and the L-shaped side brace members **21**, as shown in Fig. 6. On the top of the legs **20** is mounted a base plate **22**.

At the central portion of the device there are provided the downwardly extending brace members **23**, the lower end of these brace members being attached to the L-shaped side brace members **21**. The adjustable rods **24** pass beneath an intermediate portion of the brace members **23** as shown in Fig. 10 and are secured to the plate **22** at points remote from the brace members, thereby affording support for the central portion of the machine.

Beneath the front end of the machine there is

provided a support beam 25. This member extends inwardly beneath the bed plate 22 from the outer edges thereof, then downwardly and across the center of the bed plate to provide a lower support bar from which extend the vertical rods 26. The rods 26 support a platform 27 upon which the central portion of the bed plate rests. The outer wings of the brace member 25 are welded or otherwise secured to the under side of the bed plate 22, the relation of these elements being indicated in Fig. 8.

A second brace member similar in shape to the brace member 25 is provided in the position shown in Fig. 6, this brace member and its relation to the bed plate being indicated more particularly in Fig. 9. The brace 29 has the spaced, upstanding posts 30 supporting the inner ends of the outer sections of the bed plate 22. A central post 31 extends upwardly from the brace member 29 and supports the inner section of the bed plate 22, as shown in Fig. 9.

Other brace members 32 and 33 are positioned along the machine and each is provided with the upwardly extending supports 30 and a central post 31 for supporting the inner ends of the bed plate and the central portion of the bed plate, respectively. The central portion of the bed plate 22 is connected to the post 31 by plate 34, and a longitudinally extending brace member 35 is positioned on the under side of the central portion of plate 22 between the posts 31, as will be seen in Figs. 9 and 10.

Extending lengthwise of the bed plate 22 on one side thereof is a U-shaped channel member 36, the opening of which faces the central portion of the machine. On the other side of the machine there is a similar U-shaped channel member 37. Channel member 36 carries a track 38 and channel member 37 carries a track 39. These tracks support conveyor chains 40 which run the entire length of the machine through the channel members 36 and 37. On the delivery end of the machine conveyor chains 40 pass about the similarly positioned sprockets 41, one of which is shown in Fig. 6. The sprockets 41 are located on each side of the machine adjacent the channel members 36 and 37, and are rotatably mounted in bearing members 42 which are secured to the bed plate 22. The return flight of the chain 40 is provided by means of tracks 43 supported by the L-shaped brace members 21, as shown in Fig. 10.

The conveyor chains have secured therebetween a series of spaced conveyor bars 44 which pass about the ends of the bed plate 22 and travel along the upper portion thereof from the feed end of the machine adjacent sprocket 41 to the discharge end of the conveyor. At the delivery end of the conveyor the chains 40 pass about sprockets 45, one of which is shown in Fig. 4. Sprockets 45 are positioned on opposite sides of the machine and are supported by bearing members 46, one of which is shown in Fig. 4. The bearing members 46 are secured to the underside of the bed plate 22 adjacent the channel members 36 and 37. The two sprockets 45 are rigidly connected by a shaft 47 which is driven by any suitable conventional mechanism (not shown).

The conveyor mechanism is operative to push egg cartons along the bed plate from the feed end of the machine indicated in Fig. 1 through the intermediate portion of the device indicated in Fig. 2 and through the discharge end of the mechanism indicated in Fig. 3. At the feed end of the machine empty cartons are inserted in the outer lane 50, the intermediate lane 51, and the other outer lane 52. These lanes are separated by the raised bars 53 and 54. When positioned in the loading lanes the empty cartons are in adjacent relation and in the position indicated in Fig. 15. In this position the cover of the carton extends in substantially vertical position, since the score line between the cover and the rear wall of the carton has not been broken. The carton in lane 50 is indicated in Fig. 14 at A, the carton in the intermediate lane 51 is indicated at B, and the carton in the other outer lane 52 is indicated at C. In Fig. 14 is a diagrammatic illustration of the various operations through which the cartons pass in being conveyed from one end of the machine to the other. The conveyor bars 44 progress the cartons A, B and C from their initial positions through the three lanes indicated. Lane 50 and lane 52 immediately diverge from lane 51. The lanes 50 effect this divergence by means of the guide bars 55 and 56. The guide rods 55 and 56 are supported by the upstanding bar 57 shown in Figs. 1 and 7. A second upstanding support bar 58, the construction of which is shown in Fig. 8, also supports the bars 55 and 56. The inner section of support bar 58 is joined by a second support bar 59 which extends to the opposite side of the machine but at a lower level.

The lane 51 is directly along the center of the machine. Guide bars 53 and 54 are supported by the brace member 57 by means of the strap 60 which extends from the rod 53 up to the brace member 57 and then down to the guide member 55. The guide member 54 is supported by the brace 57 by means of a strap 61 which extends upwardly and then downwardly. Guide bar 54 also is supported by the brace member 59 by means of the downwardly extending strap 62, as shown in Fig. 8.

The lane 52 diverges from the central lane 51 and is marked by the guide bars 63 and 64. Guide bar 63 is supported to the outer leg of the strap 61, as shown in Fig. 7, and the guide bar 64 is supported by the channel member 36.

In order to impart rigidity to the strap 61 a cross member 65 may be employed to join its lower edges. A similar cross member 66 may be employed to join the lower edges of the strap 60.

The function of the apparatus adjacent the feed end is to diverge the cartons from their adjacent relation and to bend the covers of the cartons outwardly and downwardly adjacent the rear wall. In the lane 52 the mechanism for performing this function includes a cover guide rod 67 which is operative to flex the cover of the carton backwardly and downwardly until it enters the cover-receiving opening 68 in the bed plate. A guide rod 69 is positioned in advance of the strap 61 to prevent jamming of the machine by the accidental engagement of the cover with the strap. As a carton progresses through the lane 52 it is diverged from the central lane 51 and its cover is bent backwardly and downwardly into the opening 68. Then the carton is in the position shown in Fig. 8. A giude rod 70 extends from the support member 57 along the lane 52 and engages the edge of the carton to prevent it from being displaced during the cover rotating operation, the operation of the guide member 70 being indicated in Figs. 7 and 8. After the cover of the carton C has been depressed into the opening 68 in lane 52 and as the carton progresses along the lane the carton again is converged toward the center of the

machine, the cover of the carton traveling along and extending through the opening 68.

As the carton B is progressed along lane 51 by the conveyor its cover engages the cover-folding guide bar 71 and this guide bar rotates the cover outwardly and downwardly into the entrance portion of the longitudinally extending opening 72. To prevent jamming of the machine by accidental engagement of the cover with the strap 60 there is provided a cover guide bar 73 which is similar to the guide bar 69. An overhanging guide bar 74 extends adjacent the guide bar 54 and prevents dislodgement of the carton when the cover is rotated backwardly by the bar 71. The guide bar 74 is secured to the same end of the strap 61 that supports the guide bar 54, as indicated in Fig. 7.

As the conveyor bar 44 engages the end of a carton the lug 75 thereon engages the end of the carton in the manner illustrated in Figs. 9 and 10, thereby preventing dislodgement of the carton from the lane 51.

It will be seen that the covers of cartons B and C are rotated outwardly and downwardly at about the same position in the machine and that these cartons progress together with their covers folded in downwardly extending vertical position.

Carton A is progressed divergently along lane 50 by the conveyor and the cross partitions adjacent the cover slide beneath the guide bar 76, this guide bar being suspended from the strap 60 by arm 77, as shown in Fig. 7. The opposite end of the guide bar 76 is supported by an arm 78 which is suspended from the bracket 58. In order to prevent accidental engagement of the cover of carton A with the vertical side of bracket 58 there is provided a guide rod 79 which maintains the cover of carton A in the position shown in Figs. 7 and 8.

The carton A then is converged toward carton B after the cover of the latter has been rotated downwardly and the cover of carton A is engaged by the cover guide rod 80 which extends transversely across the lane 50 and bends the cover of carton A into horizontal outwardly extending position, as shown in Fig. 9. The rod 80 is secured to guide member 53, as shown in Fig. 1. A guide bar 81 engages the tops of the cross partitions of the carton, as shown in Fig. 9, to prevent dislodgement of the carton when its cover is rotated into horizontal position. A relatively low bracket 82 extends upwardly from channel members 36 and 37 and across the machine to provide support for the carton guide bars 53 and 81, these bars being secured to member 82 by means of a downwardly depending arm 83.

The support bracket 82 carries an auxiliary bracket 84 through which passes a flexible wire 85, the end of the wire being provided with a stop and a spring between the stop and bracket 84. A pulley 86 guides the wire 85 along the path of travel of carton C in lane 52, as the carton passes from beneath the guide rod 70. The opposite end of the wire 85 is secured to a stationary bracket 87, as shown in Fig. 10. It will be understood that the wire 85 provides a flexible means for retaining the carton C in lane 52 against dislodgement. Thus, carton C is retained by the wire 85 and carton B is retained against dislodgement by the lugs 75 on the conveyor.

From the position shown in Fig. 9 cartons A, B and C are progressed in convergent relationship through the portion of the mechanism shown in Fig. 5. The cover of carton A passes between guide rods 88 and 89. These rods are carried by brackets 90 which are secured to the inwardly extending support members 91. The support members 91 are mounted on the channel member 37 and carry on their inner ends a guide bar 92 which retains the carton A in the position shown in Fig. 10.

On the side of the machine adjacent channel member 36 is mounted a side plate 93, upon the inner end of which is carried a carton guide member 94, indicated in Fig. 10, the guide 94 maintaining carton C in the position shown in Fig. 10. The bracket 87 to which wire 85 is attached is mounted on the end of plate 93, as shown in Fig. 2.

It is to be noted that cartons A, B and C progress along the portion of the mechanism shown in Fig. 2 in adjacent relation with their covers open. In this position the three cartons are loaded simultaneously with three dozen eggs. This operation is shown diagrammatically in Fig. 14. Eggs normally are packed in cases in which three dozen eggs are contained in each layer. The loading operation is effected by lifting one layer of three dozen eggs held in a cellular filler by means of a fork, the eggs supported by the fork being placed over the three opened cartons and the fork withdrawn so that the eggs may slip from the cells of the filler in which they were originally packed into the cells of the carton. In practice, this method of loading has proven to be highly satisfactory.

The method of operating the loading station is indicated in Figs. 16 and 17. In Fig. 16 is shown an egg case of the type holding thirty dozen eggs in layers of three dozen each. A fork 100 of the type shown in Fig. 17 is inserted between adjacent layers of eggs in the manner illustrated in Fig. 16 and the layer of eggs above the fork is lifted off and placed above the three opened cartons in the manner shown in Fig. 17. The fork then is withdrawn and the eggs fall into place in the opened carton. The filler 101 and the flat 102 then are removed from the carton to complete the loading operation. This method is quite rapid and avoids the handling that normally is necessary in filling an individual carton.

From the loading portion of the device indicated in Fig. 5 the loaded cartons again are diverged by being progressed through the portion of the device shown in Fig. 3.

A transversely extending bracket 103 rests upon the channel members 36 and 37. Adjacent lane 50 the bracket 103 carries an outwardly diverging carton guide bar 104 and a corresponding outwardly diverging guide member 105 for the opposite side of the carton A. After passing beneath the bracket 103 the cover of carton A is released and assumes the position shown in Fig. 12. The end of guide member 104 is secured by means of bracket 106 to the channel member 37.

The lane 51 is provided with a guide member 107 which also is secured to bracket 103.

Lane 52 is provided with a guide bar 108 secured to bracket 103 and to the channel member 36, as shown in Fig. 3 and Fig. 11.

The slots 68 and 72 diverge in the manner shown in Fig. 3 to cause the carton C to move outwardly with respect to the carton B. Guide members 104 and 105 cause the carton A also to

move outwardly with respect to carton B. The terminal portions of openings 68 and 72 are enlarged sufficiently, as shown in Fig. 3, to allow the covers of cartons B and C to rotate upwardly when these enlarged openings are reached as the cartons travel along lanes 51 and 52. It is preferred to employ the side guide portions 109 and 110, respectively, for lanes 51 and 52, so that the cartons are maintained in proper position in the lane when the covers rotate upwardly.

At this point each of the three cartons has its cover rotated somewhat upwardly due to the natural tendency of the paperboard from which the cartons are constructed to go back to its original position. This position may be substantially as shown by the carton A in Fig. 12.

Extending across the spaced lanes adjacent the discharge end of the device are the raised brackets 111 and 112. These brackets carry substantially duplicate cover-closing mechanism which simultaneously closes and locks the covers of the three cartons.

In lane 50 there is provided a longitudinally extending guide bar 113 which rides along the upper edge of channel member 37, as shown in Fig. 13. From the bracket 111 there depends an inverted U-shaped strap 114. A guide member 115 is secured to the outer leg of the strap 114 and this guide member engages the inner wall of carton A in the lane 50. A cover guide bar 116 prevents the machine from jamming by accidentally engaging the downwardly extending leg of the bracket 111. A second cover guide member 117 is carried by the bracket 111 and acts to rotate the cover of carton A toward closed position, as shown in Fig. 13.

From the guide member 115 there extends across the carton a transverse arm 118, from the outer end of which is mounted a guide member 119, this guide member engaging the upper portion of the cross partitions of the carton in the manner shown in Fig. 13 to retain the carton against dislodgement during the cover-closing operation. A second support rod 120 also extends from the guide member 115 across the carton and in engagement with the guide member 119.

As carton A passes beneath the bracket 111 the cover is rotated toward closed position by the cover guide member 117. Bracket 121 extends upwardly from the guide member 113 and supports the cover guide member 117. The cover-locking section of the top of the carton passes beneath the guide element 122 which is secured to the inner face of the guide member 115.

An additional bracket 123 extends from the guide member 113 into connection with the guide member 117 adjacent the bracket 112 to afford end support for the guide member 117.

An inner cover guide member 124 extends from the guide member 115 adjacent the guide member 122, so that the cover-locking strip may be bent into vertical position thereabout. The guide members 122 and 124 bend the cover-locking strip into a position which will permit the hooks thereon to be depressed beneath the triangular hinges adjacent the front wall of the carton. The guide member 117 and the terminal portion 125 thereon depress the free edge of the cover downwardly so that the hooks on the cover-locking strip engage beneath the cross partitions to complete the closure of the carton. The free end 125 of the guide member 117 has a roller 126 which rotates along the top of the carton adjacent the front side.

A bracket 127 extends downwardly from the support bracket 112 and carries a guide member 128 which engages the top of the cover adjacent the rear wall as the carton is pressed through the closing guide.

The closure elements for lanes 51 and 52 are identical with the closure elements for lane 50, and have been provided with the same numerals. The cover-closing elements largely involve the principles of operation described in the Burger patent to which reference has been made.

By way of summary of the operation of the machine, three empty cartons with raised covers are inserted in adjacent relation in lines 50, 51 and 52. These cartons then are progressed by the conveying mechanism through the positions diagrammatically indicated in Fig. 14 in which carton B follows a central line while cartons A and C initially are diverged therefrom for a cover-opening operation. After the covers of the cartons are opened into the position shown in Fig. 17 the cartons are brought into adjacent relation and simultaneously loaded with eggs. Thereafter the cartons again are diverged and the covers are rotated into upright position. The final operation of the device includes closing the covers and locking them with the cross partitions of the carton. Only three operators are required. One operator loads the empty cartons into the lanes, another operator loads the cartons at the intermediate station and another operator disposes of the loaded and closed cartons passing from the discharge end of the machine. The operations are so simple and rapid that the three operators can load a great many more cartons than possible with the methods and devices known heretofore.

It will be recognized that a great many changes may be made in the particular structure described herein without departing from the scope of the invention as defined by the appended claims.

I claim:

1. Apparatus of the type described, comprising a conveyor for moving cartons; carton guide means for providing three lanes which are spaced, then converge, and then diverge; means for rotating the covers of cartons into open position in said lanes while spaced; and means for closing the covers of said cartons in the diverged portions of said lanes.

2. Apparatus of the type described, comprising a relatively wide bed plate, a conveyor running longitudinally of the bed plate and adapted to move a plurality of cartons longitudinally thereof in varying transverse positions, carton guide means operable to diverge a plurality of cartons, means for rotating the covers of said cartons to downwardly extending vertical position, said bed plate having relatively large openings for receipt of said covers and relatively narrow openings communicating therewith along the path of travel of said conveyor, means for guiding said cartons into adjacent position, carton-diverging guide means adjacent relatively large openings in said bed plate for release of said covers, and means for closing said covers.

3. Apparatus of the type described, comprising a bed portion, a conveyor operative to progress a plurality of cartons longitudinally of said bed portion, means for diverging said cartons during progress along said conveyor, means for rotating the covers of said cartons into downwardly extending vertical position, and carton guide means for bringing said cartons into adjacent relation.

4. Apparatus of the type described, comprising a bed plate having spaced carton cover-re-

ceiving openings extending from relatively wide portions convergently and then divergently to additional relatively wide portions, means for progressing cartons along said bed plate, means for rotating the covers of cartons into said first named relatively wide portion and for guiding said cartons along said openings into convergent relation and then into divergent relation to said last named relatively large openings.

5. Apparatus of the type described, comprising a longitudinally extending carton-supporting means, a plurality of transversely extending raised brackets extending across said support means, means carried by said brackets for forming converging lanes which extend in adjacent relation and then diverge, additional means carried by said brackets for rotating the covers of cartons in said lanes into downwardly extending position before said cartons converge.

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