May 20, 1941. H. C. JOHNSON 2,242,304

EGG CARTONING MACHINE AND METHOD

Filed April 10, 1939 2 Sheets-Sheet 1

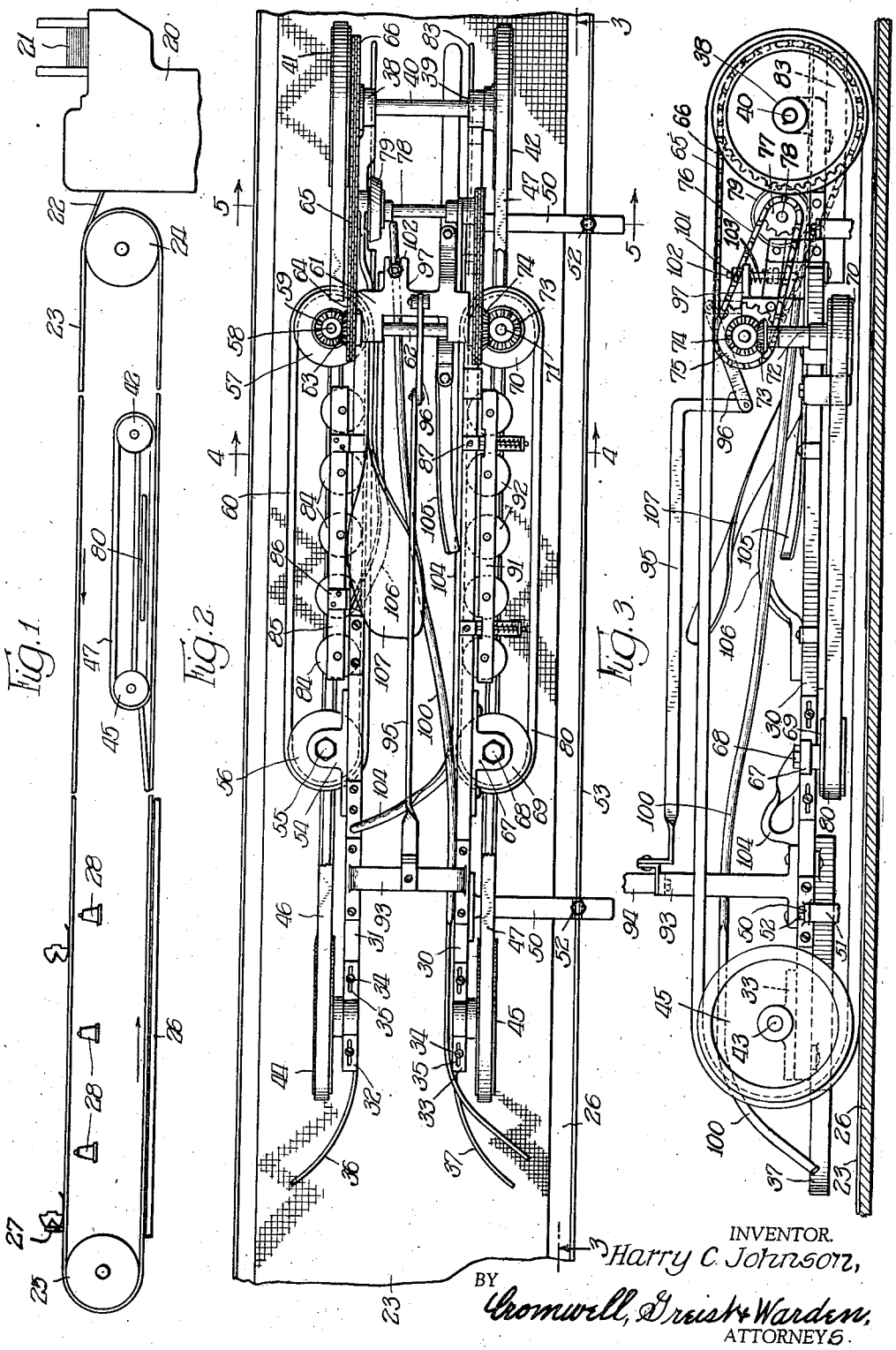


Fig. 1

Fig. 2

Fig. 3

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Fig. 4

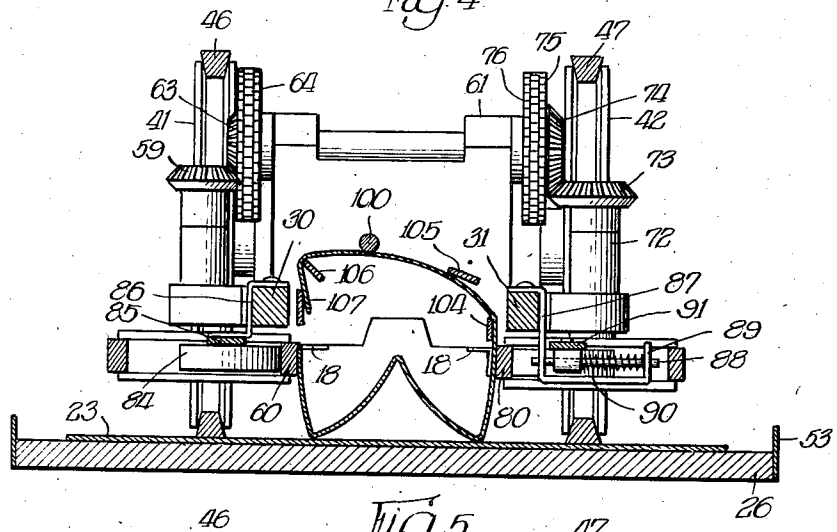


Fig. 5

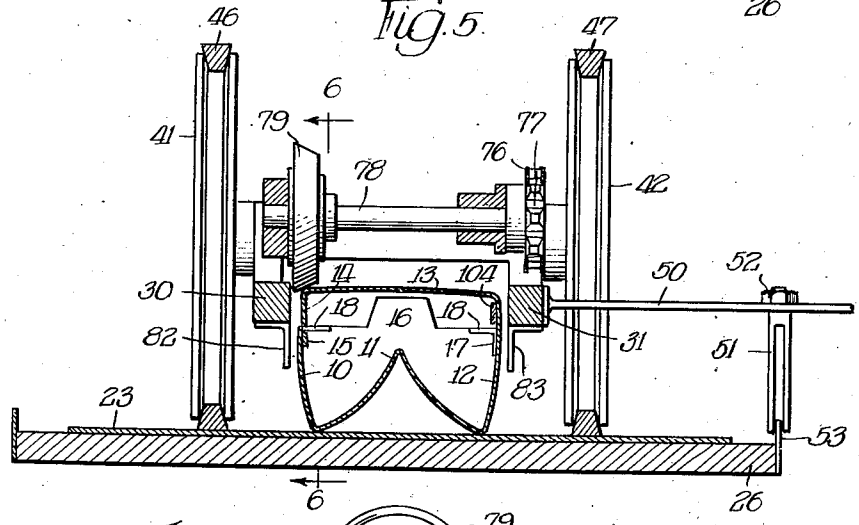
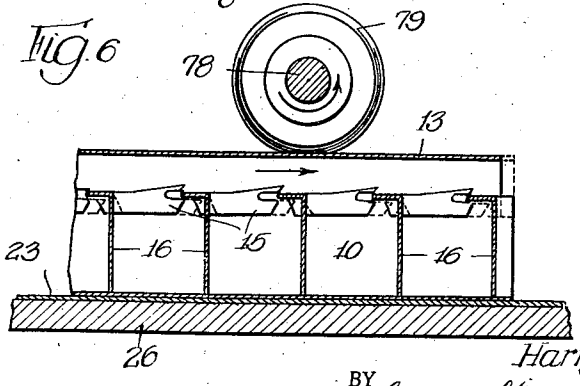


Fig. 6



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EGG CARTONING MACHINE AND METHOD

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7 Claims. (Cl. 93—3)

The present invention relates to an improved apparatus and method for packaging eggs, including the operations of loading them in cellular cartons after inspection, and closing the cartons for shipment.

A principal object of the invention is the provision of apparatus for use in packaging eggs, in which a main conveyor belt cooperating with a carton-erecting machine has positioned on it a carton-closing mechanism deriving its motivating power directly from the belt.

Another object of the invention is to provide an improved method of handling eggs in a packing room.

An additional object is the provision of an improved type of carton-closing device which is stationarily positioned adjacent a conveyor flight and provided with rotary mechanism engaging the conveyor and deriving power therefrom.

These and other objects will be observed upon a consideration of the following specification and by reference to the accompanying drawings, in which

Fig. 1 is a somewhat diagrammatic view of the apparatus by which the improved method of packing is carried out;

Fig. 2 is a plan view of the novel type of carton-closing equipment which constitutes a part of the invention;

Fig. 3 is a sectional view of the apparatus shown in Fig. 1 taken along line 3—3 thereof;

Fig. 4 is a transverse sectional view taken along line 4—4 of Fig. 2;

Fig. 5 is a transverse sectional view taken along line 5—5 of Fig. 2; and

Fig. 6 is a fragmentary longitudinal sectional view taken along line 6—6 of Fig. 5.

It has been customary for a number of years to package eggs in paperboard cartons. A carton which has met with particular favor in the industry is described in Troyk Reissue Patent No. 18,922. For the purpose of explaining the present invention the description will be with reference to this type of carton.

The carton is produced by suitably cutting, scoring and folding a paperboard blank to form a front wall 10, an inverted V-shaped bottom 11, a rear wall 12, a top 13, a closure flap 14 having cover-locking hooks 15, cross partitions 16 and an attaching strip 17 glued to the rear wall, the cross partitions being hinged to the front and rear walls by the triangular hinge sections 18. Reference is made to the Troyk reissue patent for a further description of the carton.

The cartons are manufactured in collapsed condition and it is customary to employ a machine which will set the cartons up into erect condition ready for the receipt of eggs. A machine of this general character is indicated diagrammatically at 20 in Fig. 1, a more particular description of the machine being given in Burger Patent No. 2,018,396.

In the machine collapsed cartons shown in stacked relation at 21 are erected in consecutive fashion and delivered from the platform 22 to the continuous conveyor 23. The conveyor 23 consists of a wide belt which passes about the end drums 24 and 25, one of the latter being driven at the desired speed as by a motor (not shown). A rigid support 26 is provided beneath the conveyor.

After traveling along the upper flight of the conveyor in the direction shown by the arrow in Fig. 1 the erected cartons form a horizontal stack against the stop member 27, which is shown located adjacent drum 25. This stop member also is located adjacent a candling station indicated by the candling devices 28.

Between the candling devices 28 and the setting-up machine there is positioned a carton-closing device which has rotary elements frictionally engaging and deriving power from the under side or return flight of the conveyor.

The improved closing device has two longitudinally extending frame bars 30 and 31, these bars being spaced apart a distance slightly in excess of the width of the carton to be closed. The receiving end of the bar 31 has mounted upon it a wheel-receiving journal 32. A similar wheel journal 33 is mounted on the corresponding end of the frame bar 30. Both of the wheel journals 32 and 33 are adjustable longitudinally of the frame bars by means of screws 34 and slots 35.

Secured to the under side of the frame bar 31 adjacent the member 32 is an outwardly turned guide plate 36. A similar guide plate 37 is attached to the under side of the frame member 30. It will be understood that a carton approaching the closing device on the conveyor will be received between the guide members 36 and 37 and thereby is properly positioned with respect to the closing mechanism.

At its opposite end the bar 31 is provided with the journal 38, and at the corresponding end of the frame member 30 is provided a similar journal 39. Extending through the journals 38 and 39 is a shaft 40. A channeled pulley 41 is secured to one end of the shaft 40 and a similar

channeled wheel 42 is secured to the other end of the shaft.

The journal member 32 has an outwardly extending shaft 43 upon which is mounted a channeled pulley 44. A similar channeled pulley 45 is similarly mounted on a shaft secured in the housing 33.

The flanged belt 45 extends about the pulleys 41 and 44 and is frictionally engaged in the channels of these pulleys to provide a positive drive therefor. A similar flanged belt 47 extends about pulleys 42 and 45.

To maintain the closing device in predetermined position with respect to the conveyor belt are provided the side flanges 50 secured in spaced relation to frame member 30. Each of the flanges 50 has a downwardly depending yoke 51 secured to it by a nut 52. The yokes 51 receive a guide plate 53 which is secured to the edge of support member 26, as shown in Fig. 5. It will be seen that although there is no rigid connection between the closing device and the conveyor, the yoke members 51 will act to maintain the closing device in fixed transverse position with respect to the conveyor.

On each side of the closing device there is provided a drive belt which assists in progressing the carton to be closed through the device. On the side of the closing device adjacent the frame member 31 is provided a side flange 54 which houses the vertical shaft 55 upon which is rotatably mounted the pulley 56, the latter rotating in a horizontal plane. Pulley 56 is mounted adjacent the feed end of the device and a similar pulley 57 is mounted adjacent the opposite end of the device but forward of the pulley 41. Shaft 58 upon which the pulley 57 is mounted is longer than the shaft 55 and extends upwardly to the beveled gear 59. A continuous beveled conveyor belt 60 encompasses the pulley wheels 56 and 57. The inner flight of the belt 60 extends slightly inwardly of the frame member so as to contact an egg carton passing through the device.

There is a standard 61 extending upwardly from the frame bars 30 and 31 and this standard carries a transverse shaft 62. One end of the shaft 62 carries a beveled gear 63 which meshes with the gear 59. Gear 63 has a sprocket 64 which carries a chain 65. The chain 65 also passes about a sprocket 66 which is rigidly mounted to the pulley 41. It will be seen that movement of the conveyor 23 causes movement of the belt 46 and sprocket 41, thereby rotating sprocket 66, chain 65, sprocket 64 and shaft 62. This drive also causes rotation of the pulley 57 and belt 60.

On the side of the machine adjacent frame member 30 is mounted a forward flange 67 which carries the shaft 68 upon which is rotatably mounted a pulley 69, this construction being similar to that on the opposite side of the machine. At the rear of the machine but forward of pulley 42 is mounted a pulley 70, this pulley having an upwardly extending shaft 71 provided with a journal 72 which is secured to the frame bar. On the upper end of shaft 71 is a beveled gear 73. This construction is the same, again, as the corresponding pulley construction on the opposite side of the machine.

The beveled gear 73 meshes with gear 74 which is mounted on the end of shaft 62. Gear 74 has a sprocket 75 and the sprocket carries a chain 76 which meshes with and drives the sprocket 77, the latter being secured to the transverse shaft 78. The shaft 78 extends between the frame bars and is mounted in journals secured thereto. On the opposite end of the shaft 78 from the sprocket 77 is a beveled rubber wheel 79 which is shown in detail in Fig. 5.

The guide plate 82 is secured beneath the frame bar 30 adjacent wheel 79 and extends backwardly therefrom as shown in Fig. 2. A similar plate 83 is secured to the bar 31, as shown in Figs. 2, 3 and 5.

A drive belt 80 passes about the pulleys 69 and 70 and presents an inner face in the path of travel of the carton passing through the device.

In order to provide contact between the inner flight of the belt 60 and a carton passing through the device there are mounted a series of rollers 84 which bear against the drive belt 60, as shown in Fig. 2. These rollers are carried by a bar 85 which is secured to the frame bar 30 by brackets 86, as shown in Fig. 4. As a carton presses outwardly against the inner face of belt 60, the belt contacts the rollers 84 and further outward movement is prevented. At the same time the rollers do not offer frictional resistance to the travel of the belt 60.

On the oppoosite side of the machine the brackets 87 are secured to and depend from the frame member 31, as shown in Fig. 4. Brackets 87 initially extend downwardly, then outwardly and then upwardly to form channel portions across which extend the rods 88. Rods 88 pass through the loosely fitted slip lugs 89 which are pressed inwardly of the device by means of compression springs 90. Across the upper portion of the slip lugs 89 extends a metallic strap 91. Depending from the strap 91 are a series of rollers 92 which correspond to the rollers 84. It will be seen that the action of springs 90 is to bias the rollers toward an inward position against the inner flight of the drive belt 80. Outward pressure against the drive belt 80 is against the resistance of spring 90.

Adjacent the front end of the device is mounted the standard 93. An upper extension of this standard is secured to a suitable rigid supporting member which is independent of the closing device and the conveyor mechanism, thus preventing the device from being carried along with the conveyor. A backwardly extending L-shaped lever arm 95 has one end secured to the standard 93. A second lever arm 96 pivotally connected to the free end of the lever arm 95 extends upwardly at an angle, as shown in Fig. 3, and is pivotally connected to an extension 97 which is rigidly connected to the standard 61. The action of this leverage mechanism is to increase the pressure of the carton-closing device against the conveyor when the resistance of the belts 46 and 47 is increased by a carton passing through the device.

The mechanism as described is particularly well adapted for conveying a carton loaded with eggs past closing devices which are operative to fold the cover of the carton over into closed position and to secure the cover-locking hooks 15 beneath the triangular hinges 18 of the carton. Specific mechanism for performing this function is shown in the drawings. This mechanism in general corresponds to the construction shown in Burger Patent No. 1,994,241.

An initial element of the carton-closing construction is the guide member 100 which extends transversely across the space between the frame member in the path of travel of the carton and is so shaped as to effect rotation of the cover from upraised position to a general horizontal

position. The guide bar 100 may be brazed or welded to the standard 93 for support. At the rear end of the guide rod 100 there is mounted a vertical bar 101. The upper end of the bar 101 carries a nut and the bar itself is slidably received by the bracket 102, the latter being secured to standard 61. A compression spring 103 biases the rear end of the rod 100 toward downward position, but the rod may be pressed upwardly against the resistance of the spring 103 to prevent breakage of eggs by reason of undue rigidity.

The second element of the carton-closing device consists of a guide member 104 which extends from the frame members 31 immediately across the space between the frame members and then backwardly substantially parallel thereto. The cover of a carton being closed passes over the rod 104 and the rear extension of the rod engages the inner portion of the rear wall of the carton, as shown in Figs. 4 and 5, thereby positioning the carton with respect to transverse movement.

The third element of the closing equipment consists of a guide member 105 which is shaped to engage the rear portion of the cover of a carton, as shown in Fig. 4, and to prevent the cover from buckling backwardly during the closing operation.

The fourth closing element consists of a guide member 106 which contacts the under side of the cover adjacent the fold lines between the cover and the cover-locking strip, as shown in Fig. 4.

The guide 106 cooperates with the fifth guide 107, which deflects the cover-locking strip inwardly beyond the front wall, as will be seen in Fig. 4.

The five guide members present the leading edge of the cover-locking strip of the carton in a position for engagement with the triangular hinges adjacent the front wall. At this point the carton passes beneath the driven roller 79, which presses the cover downwardly and inwardly sufficiently to complete the engagement of the cover-locking strip with the triangular locking hinges.

In the operation of the equipment described the action of the automatic carton setting-up machine 20 is such as to provide a continuous supply of erected cartons to the operators adjacent the candling devices 28. Cases of eggs are positioned adjacent the candling devices and the operator removes cartons from the upper flight of the conveyor belt 23, fills the cartons with candled eggs at this point and places the loaded cartons on the upper surface of the lower flight of the conveyor belt leading to the closing device. It is desirable that the equipment be operated at a speed which will allow about three candlers to work together in the manner described.

The loaded cartons are placed on the return flight of the conveyor 23 so that the front end of the carton will be received within the guide members of the closer. It is not necessary to space the cartons in any particular fashion, since the construction of the closing device is such that it will receive and operate upon cartons in adjacent relation or spaced apart. It will be noted that there are no carrying lugs on the conveyor belt 23, the construction of the closer being such as to make this unnecessary.

As the cartons travel longitudinally of the return flight of the conveyor they pass into the closing device and engage the guide members 100, 104, 105, 106 and 107 and the closing operation is completed by the beveled rubber wheel 79, as will be seen from Figs. 4 and 5. The closing device is maintained against longitudinal travel by the brace 94, and belts 46 and 47 frictionally engage the conveyor 23 by reason of the weight of the device pressing the belts downwardly against the conveyor. Thus, the pulleys engaging belts 46 and 47 rotate and rotation thereby is imparted to the horizontal drive belts 60 and 80. The belts 60 and 80 are positioned apart a distance which is sufficient to allow a loaded egg carton to pass therebetween, but close enough together to exert frictional engagement with the carton, thereby positively driving the carton through the guide members. If the carton tends to jam, the levers 95 and 96 cause the rear end of the closing device to press downwardly against the conveyor more firmly and thereby to provide greater traction for the belts 46 and 47 and more positive drive for the belts 60 and 80. In this way there is generated whatever power is necessary to pass the carton through the device.

It will be noted that the rollers 92 press against the side of the cartons resiliently by reason of the action of springs 90. This affords sufficient friction for driving the carton through the device, but prevents breakage of eggs by too much rigidity.

After the closed carton passes from the closing device it is removed from the return flight of the conveyor 23 and packed in a case or otherwise suitably handled. It will be noted that the arrangement provides for a maximum efficiency in the packing of eggs. In fact, the candling operation is the only manual part of the method. The closing device may be used at any particular point along the conveyor and has a further advantage of eliminating the necessity for providing multiple drives for the conveyor and closing unit. Both flights of the conveyor are utilized to advantage. While inexpensive in construction and operation, the equipment is of great operative advantage.

It will be recognized that many changes may be made in the particular construction shown and described for purposes of explanation and illustration, and such changes are intended to be included in the appended claims.

I claim:

1. An egg packing device, comprising a continuous conveyor having an upper delivery flight and a lower return flight, and a carton-closing device positioned on and operated by said return flight, said closing device including guide means for cartons traveling on said conveyor, means for preventing longitudinal movement of said closing device along said conveyor, means frictionally engaging said conveyor for progressing cartons through said device, and means for closing the cover of cartons passing through said device.

2. A device for closing the covers of cartons of the type having front and rear walls, cross partitions connected to said walls by means of hinged members and a cover attached to the rear wall and provided with cover-locking hooks along the free edge thereof, which comprises a relatively wide belt conveyor and mechanism operated by said conveyor, said mechanism including guide members for cartons positioned on and traveling with said conveyor, means frictionally engaging said conveyor and gaining movement therefrom, means operated by said last named means for

progressing a carton, and means for rotating the covers of cartons into closed position and for engaging the cover-locking portions thereof with the hinged portions thereof during progress of said cartons.

3. A device for closing the covers of cartons of the type having cross partitions and front and rear walls, comprising a relatively wide conveyor for cartons, longitudinally extending spaced frame members positioned adjacent said conveyor, pulleys and belts carried by said frame members and engaging said conveyor and deriving motion therefrom, means operated by the motion of said belts for progressing cartons between said frame members, and means for closing the cover of a carton progressed between said frame members and engaging said cover with cross partitions.

4. A device for closing the cover of an egg carton of the type having a cover adapted to be folded over and engaged with cross partitions, which comprises a relatively wide longitudinally extending conveyor, spaced pulleys having a longitudinally extending continuous belt engaged thereabout and frictionally driven by said conveyor, means for preventing longitudinal motion of said pulleys and belts, means driven by said pulleys and belts for progressing a carton along said conveyor, and means for closing the cover of said carton and engaging the same with cross partitions during progress of said carton.

5. A device for closing the cover of an egg carton of the type having a cover adapted to be folded over and engaged with cross partitions, comprising a relatively wide conveyor, spaced frame members of less width than said conveyors positioned thereabove, means for preventing longitudinal movement of said frame members with said conveyor, fore and after pulleys carried on each side of said frame member, frictional belts engaging said pulleys and being positioned on said conveyor for movement thereby, side acting pulleys and belts driven by said first named pulleys and belts for progressing cartons between said frame members, and means between said frame members for closing the covers of cartons and engaging the same with cross partitions during progress of cartons between said frame members.

6. A device for closing the cover of a cellular egg carton, comprising a relatively wide conveyor belt, rotary members positioned on and driven by said belt, frame members for said rotary members, means for preventing movement of said frame and rotary members with said belt, and cover-closing means carried by said frame members.

7. The method of operating an egg packaging assembly, which comprises erecting cellular cartons, progressing said cartons along the upper flight of a conveyor to a candling station, removing said cartons, filling the cartons with candled eggs, progressing the filled cartons along the return flight of a conveyor, and closing said cartons during progress thereof along said return flight.

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