

July 2, 1957

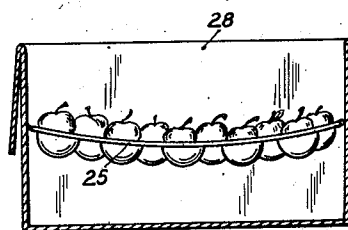
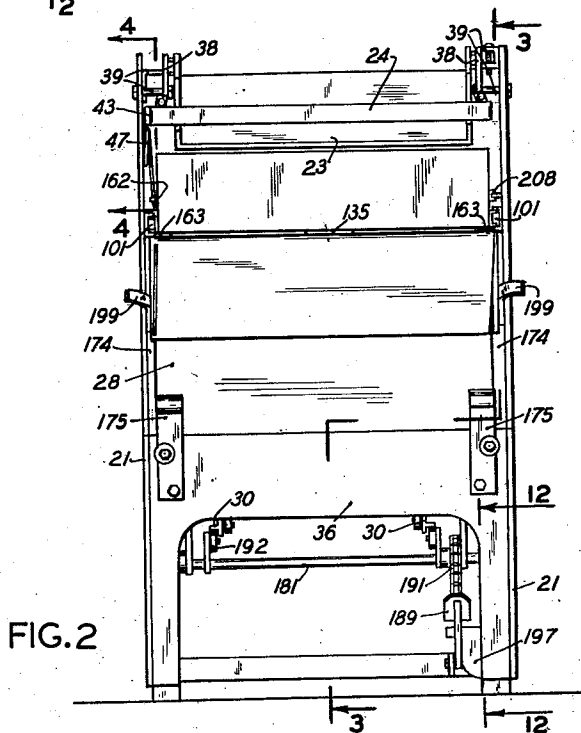
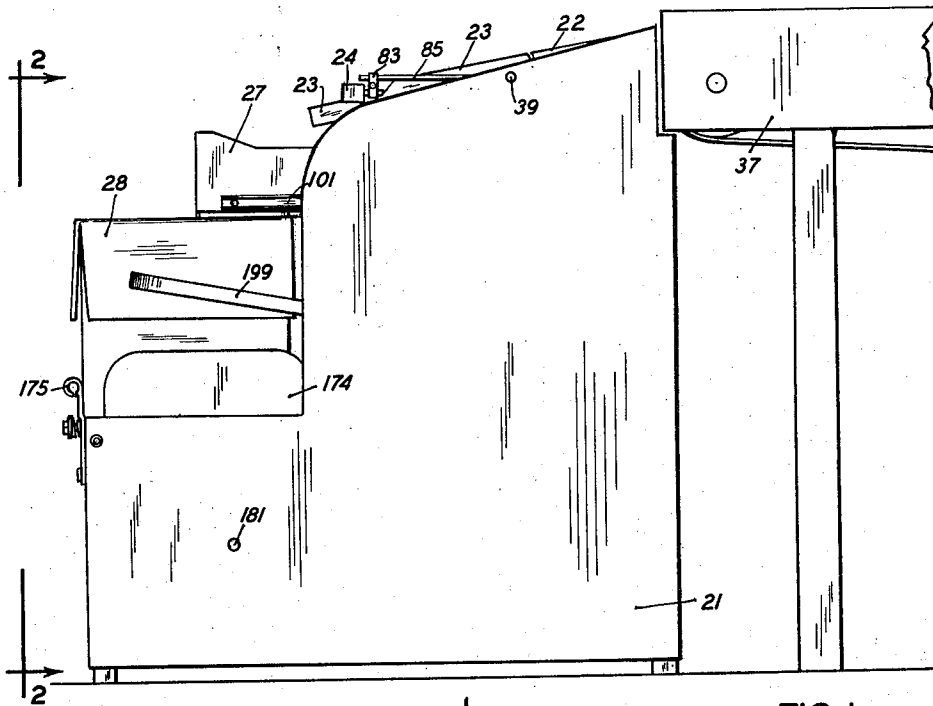
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2,797,540

FRUIT PACKING APPARATUS

Filed Jan. 17, 1955

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

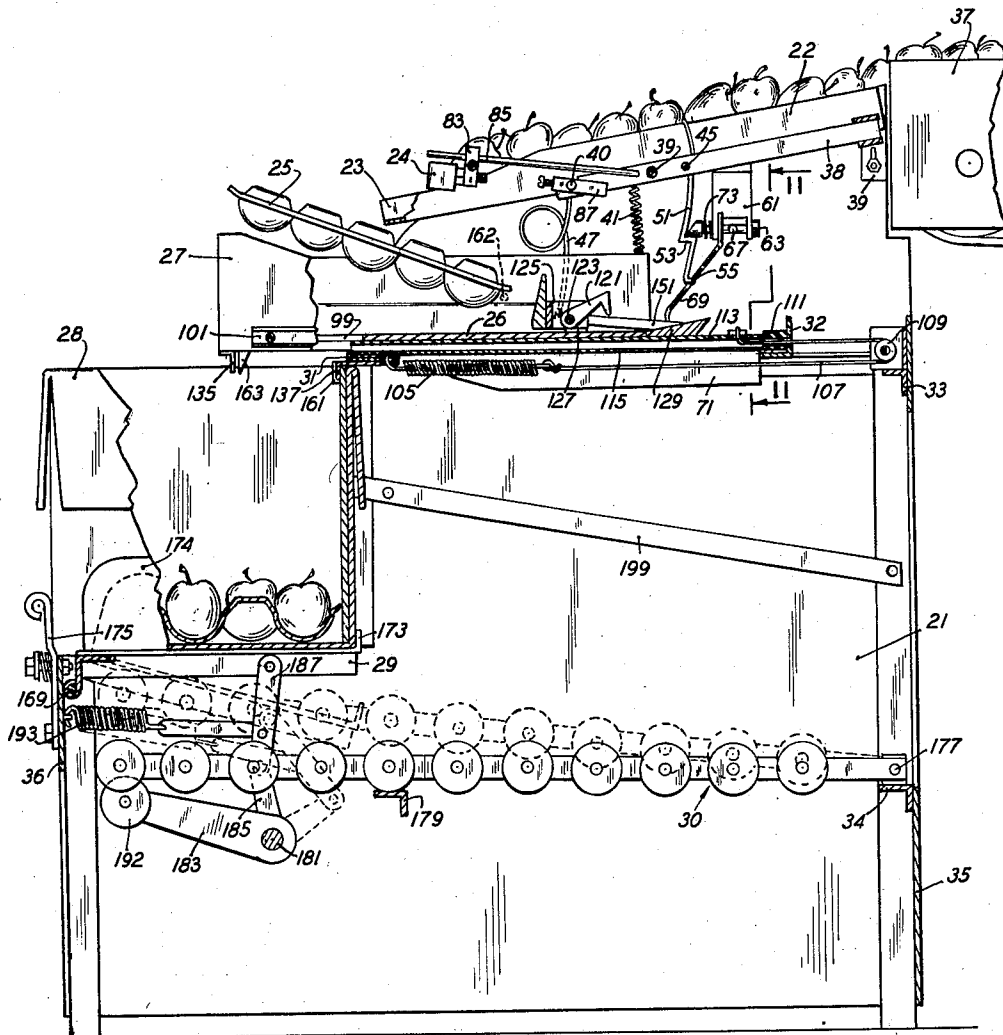


FIG. 3

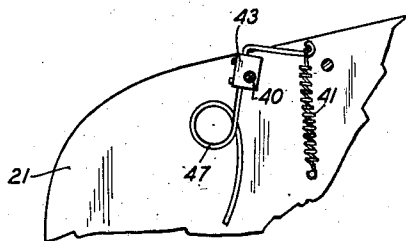


FIG. 4

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4 Sheets-Sheet 3

FIG. 5

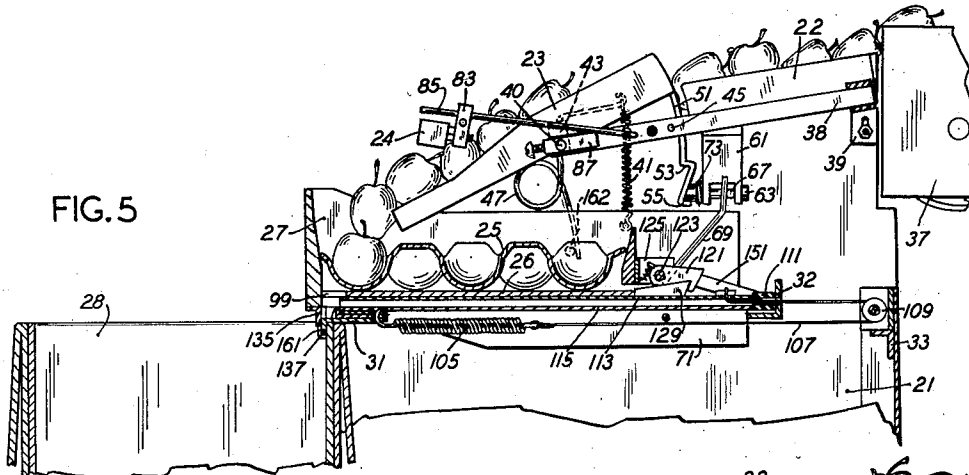


FIG. 6

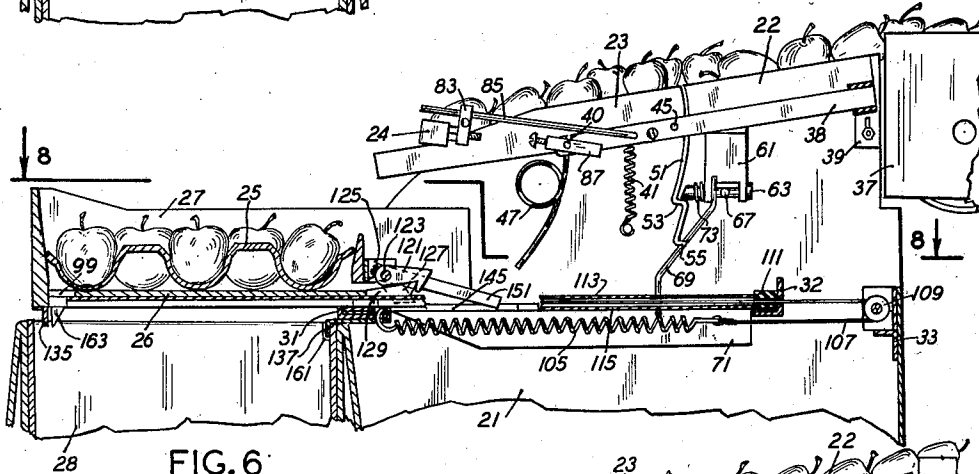
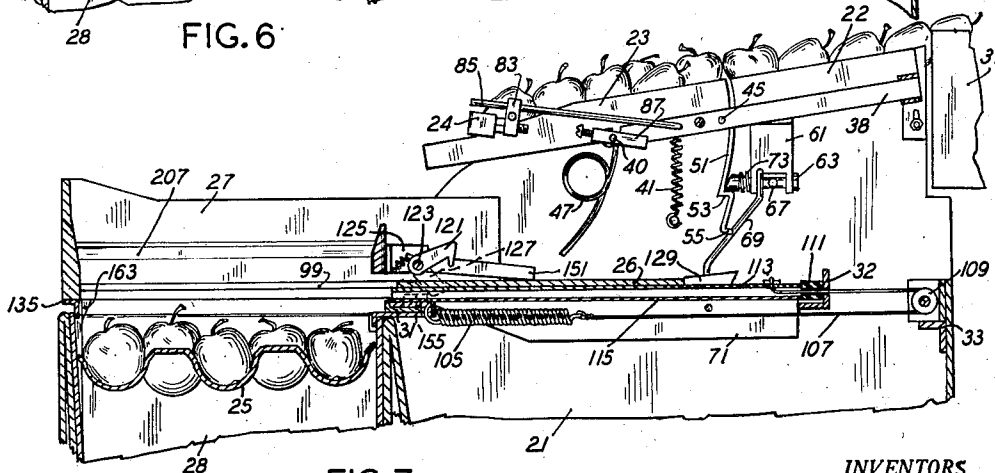


FIG. 7



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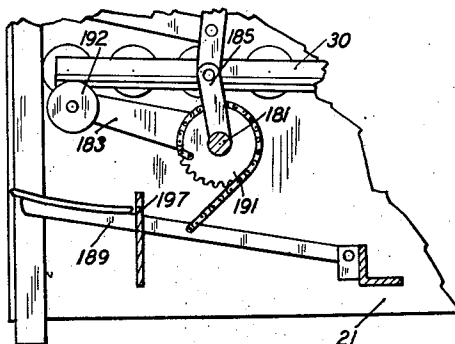
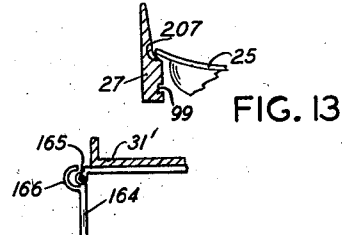
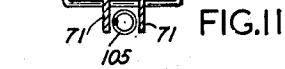
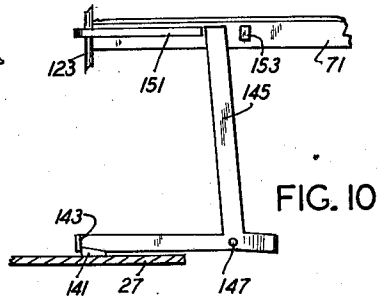
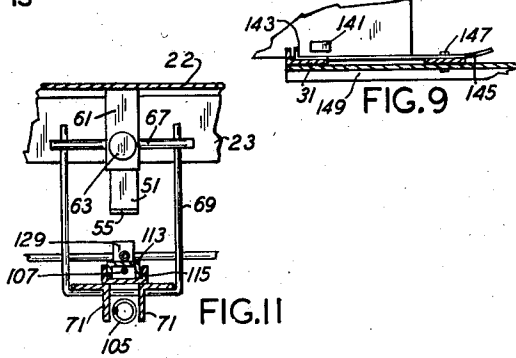
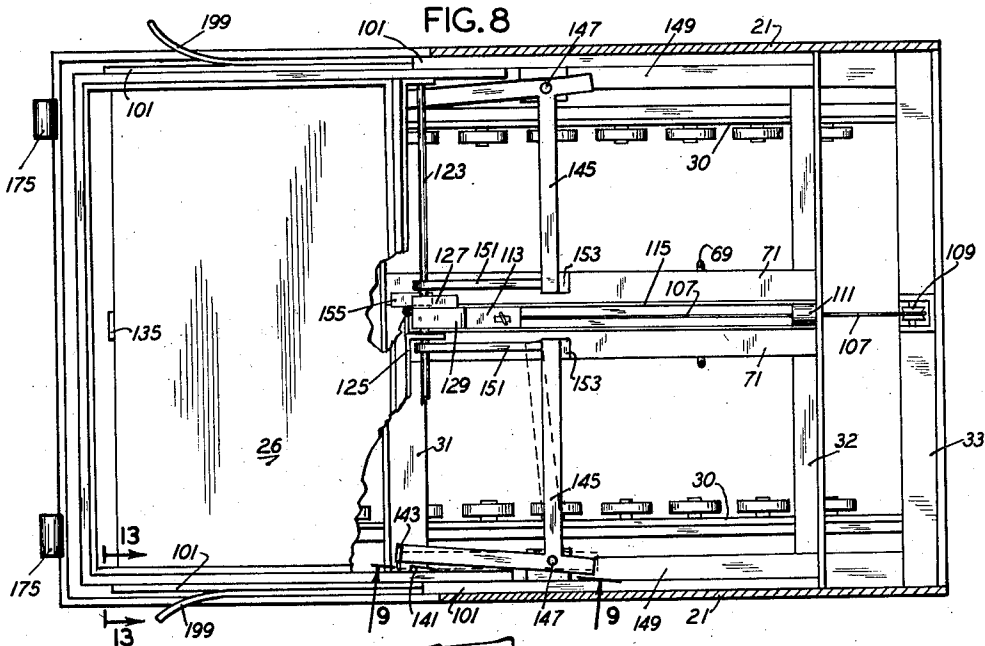
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FRUIT PACKING APPARATUS

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4 Sheets-Sheet 4



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2,797,540

FRUIT PACKING APPARATUS

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Application January 17, 1955, Serial No. 482,032

20 Claims. (Cl. 53—35)

This invention relates to methods and apparatus for packing articles, particularly methods and apparatus for packing fruits and vegetables, and more particularly apples.

It has been the prior practice, until very recently, to manually pack apples by wrapping each apple with paper and then placing the wrapped apples in a box. A new practice has evolved in the past few years which comprises manually placing an empty molded paper pulp compartmented tray in a carton and then filling the tray with bare apples to thus dispense with the necessity of individually wrapping the apples. Successive empty trays are placed in the carton and filled in the same manner to fill the carton. By this arrangement, the apples in each tray are separated from one another, and separated from the apples of the upper and lower layers. Thus, the apples are prevented from being bruised during transit. A molded paper pulp tray of the type under discussion is disclosed in the patent to Friday No. 2,351,754.

The practice up to the time of the present invention, therefore, has comprised manual operations for packing apples. These operations are obviously tedious and thus expensive.

It is a main object of the present invention to provide an apparatus by which articles in general, and particularly apples, may be packed in considerably less time than heretofore required, and particularly to provide an apparatus by which empty trays may be filled with apples and then placed into a carton.

A more particular object of the present invention is to provide an apparatus of the above type having a novel mechanism for filling trays with fruit without bruising the fruit.

Another object of the present invention is to provide an apparatus of the above-described type having a novel mechanism for depositing filled trays of fruit into a carton without bruising the fruit.

Another object of the present invention is to provide a novel method of packing apples.

In general, the apparatus of the present invention includes a supply chute beneath the discharge end of which a drawer is slidably supported for movement from an inward position substantially beneath the chute to an outward position substantially clear of the chute. The drawer is adapted to support a tray, and a gate on the chute is operated when the drawer is moved from its inward to its outward position to release apples from the chute to fill the tray. The drawer has a movable bottom panel which supports the filled tray and which is rapidly retracted when the drawer reaches its outward position to drop the filled tray into a carton supported beneath the drawer.

Various other objects of the present invention will be apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a side elevational view of an apparatus embodying the concepts of the present invention, a carton being shown in place on the apparatus;

2

Fig. 2 is a front elevational view of the apparatus disclosed in Fig. 1, taken in the direction of the arrows 2—2 of Fig. 1;

Fig. 3 is a sectional view, in side elevation, taken along line 3—3 of Fig. 2, showing the drawer of the apparatus in its tray-receiving position;

Fig. 4 is a sectional view taken along line 4—4 of Fig. 2 showing part of the mechanism associated with the chute of the apparatus;

Fig. 5 is a view similar to the upper portion of Fig. 3, but showing the drawer as being shoved inwardly to a position to initiate a tray filling operation;

Fig. 6 is a view similar to Fig. 5, but showing the drawer as having been pulled outwardly to its inspection position;

Fig. 7 is a view similar to Fig. 6, but showing the drawer as having been pulled outwardly to its tray discharge position;

Fig. 8 is a horizontal sectional view taken along line 8—8 of Fig. 6, showing more fully the construction of the drawer operating and control mechanism;

Fig. 9 is a sectional view taken along line 9—9 of Fig. 8;

Fig. 10 is a view of a portion of Fig. 8, showing one of the inspection stop members in locking position;

Fig. 11 is a fragmentary sectional view taken along line 11—11 of Fig. 3, showing part of the mechanism associated with the chute;

Fig. 12 is a fragmentary sectional view, in side elevation, taken along line 12—12 of Fig. 2, showing part of the carton discharge mechanism;

Fig. 13 is a fragmentary sectional view taken along line 13—13 of Fig. 8, more fully showing the construction of the drawer;

Fig. 14 is a sectional view through a carton showing a filled tray in the process of dropping into a carton; and

Fig. 15 is a fragmentary view showing a modified carton-engaging lug.

General description

Referring particularly to Figs. 1, 2 and 3 of the accompanying drawings, the apparatus has a frame including a pair of spaced side panels 21 between the upper ends of which is supported a chute including a fixed portion 22 and a tiltable tray filler or measuring portion 23. A gate at 24 is operable to releasably retain fruit on the tray filler. The tray filler is adapted to be tilted to the Fig. 5 position of the parts and the gate 24 elevated, by a mechanism to be described, to allow a measured quantity of fruit on the tray filler to slide downwardly toward the first row of compartments or pockets of a molded paper pulp tray 25 to fill such pockets. The tray is supported closely adjacent the delivery end of the tray filler 23 by the bottom 26 of a drawer at 27, the drawer being slidably supported beneath the delivery end of the tray filler by the side panels. When the drawer is pulled outwardly the remaining fruit progressively slides off the tray filler to properly fill the remaining pockets of the tray. The drawer is temporarily stopped at an outward inspection position by a latch mechanism, whereupon the tray may be inspected to see if the fruit is properly distributed. The latch mechanism then permits further outward movement of the drawer to a tray discharge position, in which the bottom 26 of the drawer is rapidly retracted to allow the filled tray to drop into a carton 28 therebeneath, the carton being supported on a carton platform 29. After the carton is loaded with filled trays it is discharged through the apparatus by a roller conveyor 30.

Specific description

Referring to Figs. 1, 2 and 3, the packer includes the two identical side panels 21 which are fixed in spaced,

parallel relation by a plurality of upper cross members 31, 32 and 33, a lower cross member 34, a rear panel section 35, and a front panel section 36. The particular configuration of the side panels 21 is of no importance to the present invention.

Arranged between the upper ends of the side panels is a fruit supply means which assumes the form of a chute which includes the fixed rear portion 22 and the tiltable tray filler 23. Each chute portion is shown as having a bottom and upstanding sides. The chute is adapted to be supplied with fruit from any conventional conveying mechanism, indicated at 37.

The chute is supported on a pair of support bars 38 (Figs. 2 and 3), which are held in fixed, slightly spaced relation relative to the side panels by suitable brackets 39. The fixed portion 22 of the chute is fixedly connected to the support bars 38, whereas the tray filler 23 is pivotally mounted on the forward ends of the support bars by trunnions 40, the support bars being notched as indicated to receive the trunnions.

Referring to Figs. 3 and 4, a tension spring 41 is connected at its lower end to the inner face of one side panel and at its opposite end to a block 43 which is fixed to the associated trunnion 40, whereby the tension spring urges the tray filler in a clockwise direction, as the parts are depicted in Fig. 3. A stop in the form of a rod 45 is mounted on and between the support bars 38 in position to engage the rear underside of the tray filler and limit clockwise movement of the tray filler to dispose it in a position with its bottom coplanar with the bottom of the fixed chute portion 22. In this position the tray filler is adapted to receive apples from the fixed chute portion 22, the apples moving under the influence of gravity because of the inclination of the chute.

A torsion spring 47 is also fixed to the block 43 and projects downwardly for a purpose to presently appear. At this time it is pointed out that the torsion spring 47 is connected to the block 43 on the opposite side of the associated trunnion 40 from that on which the tension spring 41 is located.

Referring particularly to Fig. 3, a latch mechanism for the tray filler is provided and includes a downwardly extending, generally arcuate flange 51, which may conveniently be provided by forming the tray filler of a sheet metal piece and leaving a projecting, central, rearwardly extending portion which can be bent downwardly to provide the flange. The flange 51 is bent to provide a first stop in the form of a ledge at 53 and a second and lower stop furnished by a lip 55.

Adjacent the flange 51 is a latch device including a bracket 61 secured to the fixed chute portion 22 and slidably supporting a latch plunger 63, the forward end of which is beveled to permit clockwise movement of the tray filler 23, but to releasably prohibit counterclockwise movement. The ledge 53 is located so that the plunger will hold the tray filler 23 down against the stop 45 when the tray filler is in the position shown in Fig. 3.

The latch plunger is provided with two oppositely extending fixed pins 67 (Fig. 11) which are adapted to be engaged by a latch trip member 69 which is shown as constituting a resilient U-shaped member, such member being fixed to a longitudinally extending support plate 71, the support plate being in turn supported by cross members 31 and 32. The plunger 63 is urged by a compression spring 73 toward the left, as the parts are depicted in Fig. 3, to normally dispose the plunger in latching engagement with the stop provided by the ledge 53.

Disposed across the forward discharge end of the tray filler 23 is the gate 24 (Fig. 3) which is connected at each end by a split clamp 83, to a support rod 85 at each side of the tray filler. The rear ends of the support rods are pivotally mounted on the support bars 38.

The gate 24 is normally disposed in a blocking position across the forward discharge end of the tray filler. However, when the tray filler is released by the latch

device and pivots, as will be explained hereinafter, a pair of gate lifting levers 87 (Fig. 3), which are fixed respectively to trunnion 40, engage the support rods to elevate the gate to permit free discharge of the apples on the tray filler.

The tray filler 23 is adapted to contain a predetermined number of fruit, namely, just sufficient to fill the tray 25. The gate 24 may be adjusted forwardly or rearwardly by means of split clamps 83 so that the number of fruit may be maintained constant with a change in the size of the fruit being packed. Also, it is possible to vary the number of fruit, if desired, by an appropriate adjustment of the split clamps 83 along the support rods 85.

Mounted between the side panels 21 for movement back and forth under the discharge end of the tray filler 23 is a drawer including an open frame 27, which is adapted to receive and support an empty tray to be filled, and the relatively movable bottom panel 26, which supports a filled tray and is slidably received within grooves 99 formed in the sides of the open frame 27. The open frame is itself slidably supported on the side panels by conventional drawer slides at 101 (Fig. 2). The side panels of the open frame extend rearwardly of the rear panel (Fig. 3) to permit the tray support 26 to be moved rearwardly of the inner face of the rear panel of the drawer without becoming disengaged from the drawer.

The tray support 26 is constantly urged by a rather strong tension spring 105 to the right, as the parts are shown in Fig. 3. The tension spring is connected at one end to the cross member 31 and at its opposite end to a cable 107 which is trained around a sheave 109 which is rotatably supported by cross member 33. The cable then passes through an opening in the cross member 32 and through an opening in a resilient bumper 111 and is then connected to a movable slide member 113, the slide member being fixedly connected to the underside of the tray support 26. The slide member 113 slidably engages a fixed slide member 115 (Fig. 8) mounted on plate 71.

Cooperative latch means are provided on the back panel of the open frame 27, which frame hereinafter will be referred to as a tray receiver, and the rear portion of the tray support 26. This latch means includes a hook or dog 121 (Fig. 3) freely pivotally mounted on a cross-rod 123, which is mounted by a pair of brackets 125 (Figs. 3 and 8) on the rear panel of the tray receiver 27. The dog 121 fixedly carries a release finger 127, the function of which will presently appear. It is pointed out, however, that in Fig. 3 the finger is shown as riding on the upper surface of the tray support 26 and thus serves to elevate the dog 121, as shown. When the finger rides off the tray support 26, the dog may drop.

When the tray receiver 27 is shoved inwardly to the Fig. 5 position, the dog 121 engages a companion latch element 129 which is fixed to the tray support by being fixed to the slide member 113. In this position of the parts, the tray support 26 substantially closes the bottom of the tray receiver 27.

Inward movement of the tray receiver is limited by the engagement of a centrally disposed spreader 135 (Figs. 2 and 5) on the front panel of the frame and a centrally disposed spreader 137 on the cross member 31. Considerable outward movement of the drawer is now permitted against the increasing resistance of the tension spring 105, during which time tray 25 is filled with apples, as will be presently explained. Such outward movement is limited by the engagement of a pair of stops 141 (Figs. 8 and 10) on the side panels of the tray receiver with a pair of stop flanges 143 formed on a pair of inspection stop members 145 of bell crank shape. The stop members are pivoted at 147 to strips 149 secured to the inner faces of the frame side panel 21.

The stop members 145 will be disposed in the full-line position, as shown in Fig. 10, at the time of outward movement of the drawer, for reasons to be presently ex-

plained. However, for now, it is pointed out that, upon release of the tray receiver 27, the tension spring 105 urges the tray receiver to its inward position, but such inward movement is slight because of the engagement of a pair of latch bars 151 (Figs. 3 and 8) with the inner ends of the stop members 145 to pivot such stop members slightly until the inner ends of such stop members strike a pair of stop blocks 153 fixed to the mounting plate 71.

The latch bars 151 are freely pivotally mounted on the crossrod 123. Pivotal movement of the stop members from the dotted-line position in Fig. 8 to the full-line position functions to dispose the stop flanges 143 out of longitudinal register with the stops 141 on the tray receiver, thus conditioning the tray receiver for subsequent outward movement. The position of the tray receiver 27 and tray support 26 in Fig. 6 is the inspection position of the tray receiver, as will be more fully explained hereinafter.

When the drawer is subsequently pulled further outwardly, the stops 141 pass by the stop flanges 143 and the finger 127 is brought into engagement with a single stop block 155 (Fig. 8) carried at the forward end of the mounting plate 71. This action trips the dog or hook off the companion latch member 129 to release the tray support 26. The tension spring 105 immediately operates to rapidly retract the tray support to drop the filled tray 25 into the carton 28. Inward or retracting movement of the tray support knocks the latch bars 151 off the inner ends of the stop members 145, thus releasing the tray receiver 27 for inward movement. However, since the tray receiver is not urged to an inward position, it will remain in its discharge position. The rapid inward movement of the tray support is halted by the engagement of the slide member 113 with the bumper 111.

The tray receiver may now be shoved inwardly. During such movement stops 141 engage the rear ends of stop members 145 and pivot such members back to position to stop the tray receiver upon subsequent outward movement. It is pointed out that the tray receiver carries a lug 162 (Fig. 3) on the side thereof, in longitudinal alignment with the lower end of the torsion spring 47, so as to engage the torsion spring prior to the time that the drawer reaches its innermost position. The reason for this will presently appear.

In addition to the central spreaders 135 and 137, the apparatus is provided with four lugs arranged to square up the carton at the time that a filled tray is to be deposited or dropped into the carton and to attain accurate vertical register of a filled tray and a carton so as to insure the ready reception of the filled tray by the carton. These four lugs comprise two pairs, a first laterally spaced pair 161 provided on the cross member 31 (Fig. 3) in position to engage the inner rear corners of the carton or the rear wall adjacent such corners, and a second laterally spaced pair 163 provided on the opposite lower front corners of the tray receiver 27 (Figs. 2 and 3) which are operable to engage the forward inner corners of the carton or the front wall adjacent such corners when the drawer is pulled to its outermost position. As is apparent from Fig. 3, the lugs 163 are disposed slightly rearwardly of the spreader 135, whereby the lugs are operable to square up the box, whereas the spreaders are operable to actually spread the central portions of the carton.

Fig. 15 shows a modified lug 164 hinged at 165 on the cross member 31', and prevented from clockwise movement by a finger or stop 166. Thus, the carton may readily be placed in position on its platform.

Referring to Fig. 3, the carton 28 rests on the platform 29 which is pivoted at 169 on the frame of the apparatus, the platform being normally retained in a horizontal position by a control and operating mechanism to be presently described. The platform is provided with laterally spaced stop flanges 173 against which the rear

wall of the carton is placed. The platform also includes upwardly projecting side pieces 174 (Fig. 1) between which the carton is placed. Mounted on the front panel 36 of the packer is a pair of laterally spaced, spring biased, yieldable stop strips 175, between which and the stop flanges 173 the carton is placed. With some cartons it has been found possible to eliminate strips 175 and also in some cases to eliminate stop flanges 173, but with other cartons both the strips and the flanges are required.

Associated with the platform 29 are the forward ends of a pair of laterally spaced roller conveyors 30 (Fig. 3) which are pivoted at 177 to the cross member 34. The conveyors 30 are supported on a cross piece 179 of the frame of the packer. A crank assembly is provided for actuating the platform and the conveyors, and this assembly includes a crank shaft 181 journaled in the frame of the packer, crank arms 183 for the roller conveyors 30 and crank arms 185 for the platforms 29, the crank arms 185 being pivotally connected to links 187 which are pivoted to the platform. The crank assembly is operated by a pedal 189 (Figs. 2 and 12) through a chain-and-sprocket unit 191.

When the pedal is depressed, the conveyors 30 are tilted in a clockwise direction around the pivots 177 to the broken-line position shown in Fig. 3, whereas the platform 29 is pivoted downward in a clockwise direction about the pivot 169. The upward movement of the conveyors is sufficient to lift the carton 28 off the platform whereby the rollers of the roller conveyors 30 permit the carton to gravitate through the packer to the rear end thereof where it may be removed in any suitable fashion, such as by another conveyor (not shown). The cranks 183 merely ride, by virtue of the rollers 192 at their free ends, on the underside of the rails of the roller conveyors 30. Normally inactive tension springs 193 are provided for insuring that the crank assembly returns to its inoperative position after the pedal 189 has been depressed.

The platform 29 may be fixed, if desired, and the conveyors 30 elevated sufficiently to lift a filled carton off the platform and convey it away. The carton platform 29 is normally in a horizontal position because the cranks 185 cannot move further in a counterclockwise direction, as the parts are depicted in Fig. 3, because of the engagement of the pedal 189 with a stop plate 197 provided on the frame (Fig. 12).

A pair of guide strips 199, one being provided for each side panel 11 on the inner wall thereof, are operable for guiding a carton through the packer. The forward ends of the guide strips project outwardly and are bent laterally outwardly so as to guide a carton into proper position on the platform and to hold the end flaps of the carton against the ends of the carton when the carton is on the platform 29.

The operation of the packer is as follows. The parts of the packer in Fig. 3 are disposed in position for commencing a cycle of operation of the machine with the drawer shoved inwardly somewhat to permit a carton to be readily placed on the platform 29 between the stop flanges 173 and the stop strips 174, and between the side pieces 174 and guides 199, care being taken to insert the upper margin of the rear wall of the carton behind the spreader flange 137 and the lugs 161. In Fig. 3, a filled tray is shown as having been already deposited into the carton.

An empty tray 25 is inserted into the tray receiver 27, the tray being temporarily supported by the side and front and rear panels of the tray receiver, the receiver being dimensioned to snugly receive the tray. In this connection, reference is made to Fig. 13 where it is apparent that the side panels of the tray receiver have pronounced ledges provided at 207 to engage the ends of the tray 25 which is flexible since it is formed of paper pulp. Fig. 5 shows that the front and rear panels of

the tray receiver have their inner walls tapering downwardly, as indicated, the front and rear margins of the tray engaging such tapered portions. However, these tapered portions have slight inward extension in comparison with the ledges 207 of the side panels of the tray receiver.

With the tray receiver disposed in approximately the position shown in Fig. 3, and after the tray 25 is placed into the tray receiver, the tray receiver is shoved inwardly to the position shown in Fig. 5. During such inward movement, the lug 162 on the side of the tray receiver engages the torsion spring 47 to thus urge the tray filler to a dumping position. However, the latch at 63 prevents such dumping movement until the drawer reaches its innermost position.

As the drawer reaches such position, the crossrod 123 engages the resilient trip member 69 to trip the latch 63. The spring 47 when so stressed is stronger than the coil spring 41 so that under the influence of the torsion spring 47, the tray receiver tilts forwardly and the gate 24 is raised by the levers 87 to allow the measured quantity of fruit in the tray filler to slide downwardly toward the tray 25 and the tray receiver, while at the same time the flange 51 temporarily blocks off the supply of fruit from the fixed chute portion 22 to the tray filler 23. Forward tilting movement of the tray filler is limited by the engagement of the lip 55 with the latch plunger 63. The first row of fruit is thus deposited in the first row of compartments or pockets of the tray filler, the wall of the tray receiver functioning to confine the discharged apples within the area of the tray.

It is pointed out that the inclination of the tray filler is limited to a position where the fruit will not tumble over one another, but will tend to slide off the tray filler only as available compartments or pockets are disposed beneath the lower or discharge end of the tray filler.

While the above operation is taking place, the dog 121 snaps over the cooperative latch element 129 to connect the tray support 26 to the tray receiver 27 for in-unison movement.

The operator now pulls the tray receiver outwardly, and as the tray receiver moves from the position shown in Fig. 5 to the position shown in Fig. 6, row after row of fruit from the tray filler 23 will be deposited in row after row of compartments or pockets in the tray 25. Because of the curvature of the fruit, the fruit will find its way into the compartments of the tray 25, the lands between the compartments of the tray being of such configuration that the fruit cannot rest on such lands. In fact, the fruit tends to find its way into the pockets of all types of trays whether or not such trays are of the particular form shown in the aforementioned Friday patent.

As the tray receiver is pulled outwardly, the lug 162 disengages torsion spring 47, but the tray filler 23 will not immediately tilt back up under influence of the spring 41 because the weight of the apples on the tray filler will hold it in its discharge position until such apples are discharged into the pockets of the tray. When the tray filler does return, apples from the fixed chute portion 22 will roll down onto the tray filler and fill it.

Outward movement of the tray receiver is stopped at the Fig. 6 position of the parts because of the engagement of the stops 141 on the tray receiver with the stop flanges 143 of the stop members 145 (Fig. 10). At this position of the tray receiver, the tray 25 can be inspected to make certain that the fruit is properly distributed in the various pockets of the tray. Normally, the fruit will be properly arranged and will be of the correct number, but, if not, the operator can quickly arrange the fruit properly or add or remove fruit to properly fill the tray.

As previously explained, when the tray receiver is moved to the Fig. 6 inspection position, the spring 105 urges the tray receiver inwardly and a sufficiently slight

inward movement of the tray is permitted to condition the tray receiver to pass by the stop flanges 143 on the stop members 145. Therefore, after the inspection operation is completed, the tray receiver is moved further outwardly to the Fig. 7 position where cooperative stops 208 (Fig. 2) on the tray receiver and the frame side panels 21 limit outward movement of the tray receiver to the position shown in Fig. 7. This outward position is arranged so that the spreader 135 engages the central portion of the inner wall of the front panel of the carton and slightly spreads the carton across the central portion thereof. Also, the stop lugs 163 engage the forward inner corners of the carton and cooperate with the lugs 161 to square up the carton in case it is not square.

Just as the tray receiver 27 reaches the Fig. 7 position, the dog 121 is tripped off the latch element 129, in a manner as previously described, thus releasing the tray support 26. The tray support is immediately rapidly inwardly retracted by the considerably extended strong tension spring 105. Thus, the support for the filled tray is removed permitting it to drop into carton 28.

It is pointed out that the inner ledge portions 207 of the side panels of the tray receiver 27 and the inner tapered wall portions of the front and rear panels are sufficient to support the empty tray 25 but cannot support the filled tray because of the flexibility and structure of the tray. Thus, after the tray is filled it will be supported by the tray support. However, the edges of the tray will remain in engagement with the inner tapered and ledge portions of the panels of the tray receiver. Therefore, the dropping movement of the filled tray is somewhat retarded by the dragging engagement of the edges of the tray with the inner walls of the tray receiver. This retarding movement is most pronounced at the sides of the tray receiver because of the pronounced ledges 207. Thus, the filled tray tends to bow in the center somewhat to the configuration indicated in Fig. 14. Bowing of the tray increases the effective depth of contact between the side edges of the tray and the side walls of the carton, which action resists any tendency the tray might have to tip sideways.

It is pointed out that the dimensions of the tray are such that it also snugly fits within the carton 28. Thus, as the filled tray enters the carton the bowed condition of the filled tray continues because of the spread condition of the central portion of the carton which allows the center of the tray readily to drop, whereas the end portions of the filled tray drag against the inner walls of the carton. Also, the snug fit of the tray 25 relative to the carton walls provides a trapped pocket of air therebeneath which cushions the fall of the tray, the air escaping around the edges of the tray as it drops. This controlled, retarding, dropping movement of the tray accomplishes two important objects; first, it assures that the filled tray will be maintained in a substantially horizontal plane and will not tip toward one end or the other during such dropping movement, and, secondly, such retardation assures that the fruit will not be bruised upon being dropped into the carton. It has been found that with certain types of trays and cartons the spreaders 135 and 137 are not required.

To initiate a second cycle of operation, the drawer or tray receiver 27 is shoved inwardly to the Fig. 3 position and another empty tray is placed in the tray receiver. This tray will be one having its pockets out of register with the pockets of the previous tray so that close packing of fruit is possible.

When the carton 28 is filled with trays, the operator depresses the pedal 189 whereupon the roller conveyors 30 pick up the carton and convey it through the packer to the rear end thereof where it is conveyed away. A second carton is then placed on the platform 29 and this carton filled with filled trays by repeating the operation above described.

It is pointed out that no novelty is attached to the par-

ticular mechanism shown for effecting tilting of the tray receiver and its subsequent return to a coplanar position with the fixed chute portion 22, any other mechanism accomplishing the same result being deemed the equivalent thereof, and the same applies to the particular latch mechanism at 145.

Although the packer of the present invention is particularly suited for packing apples, the packer may also be used to advantage in packing other fruits and also vegetables, and, in fact, articles in general.

Having described the invention in what is considered to be the preferred embodiment thereof, it is desired that it be understood that the invention is not to be limited by the specific details shown unless they constitute critical features of the present invention, all of which will be apparent by reference to the following claims.

We claim:

1. A fruit packing apparatus comprising a fruit supply means having a delivery end, a tray support for releasably supporting an empty tray to be filled with fruit, said tray support being located at a level below that of said supply means and arranged adjacent the delivery end of said supply means, said supply means including measuring means operable to deliver under the influence of gravity a predetermined number of fruit in a group to the tray on said tray support, a carton support beneath the tray support for supporting a carton, and means operable to release a filled tray from said tray support for deposit into said carton under the influence of gravity.

2. In a packer for handling loose articles, a chute for containing loose articles to be packed, said chute having a delivery end and being inclined at an angle to cause loose articles thereon to move thereoff under the influence of gravity when the loose articles are released, a receiving member mounted for horizontal movement from an inward position beneath the delivery end of the chute to an outward position clear of the delivery end of the chute, a gate at the delivery end of the chute, said gate having an operative position where it functions to retain articles on said chute and an inoperative position where it releases articles for movement from said chute, and means for maintaining said gate in said operative position during movement of the receiving member from its outward position to its inward position but for moving said gate to said inoperative position when said receiving member reaches its inward position to release articles for mass movement from the chute onto said receiving member and for maintaining said gate in said inoperative position while said receiving member is moved from its inward position to its outward position to facilitate movement of the desired number of articles from the chute onto said receiving member.

3. In a packer for packing fruit, means for supporting a container to be filled, a tray receiver above said means adapted to receive a tray loaded with fruit, means mounting said tray receiver for reciprocating movement along a predetermined horizontal path between a first position above said container supporting means to a second position out of vertical alignment with said container supporting means, a tray support associated with the tray receiver and adapted to support the loaded tray, and means for rapidly, horizontally moving the support relative to the tray receiver when said receiver is above said container supporting means to permit the loaded tray to drop into the container, said tray receiver having stop means for preventing horizontal movement of the loaded tray with the tray support when said tray support is moved relative to said tray receiver.

4. In a packing machine, fruit supply means operable when actuated to deliver a measured quantity of fruit, a tray support mounted for horizontal movement from a position beneath the delivery end of the supply means to a position clear of said supply means, said tray support adapted to support a tray to be filled with fruit from said supply means, means operatively connecting said

tray support and said supply means engaged by said tray support when said tray support is at a position beneath said supply means for actuating said supply means, means operatively connected to the tray support responsive to movement of the tray support to its position clear of said supply means for causing rapid movement of said tray support back to a position beneath the supply means, means operable to prevent movement of the filled tray with said tray support when said tray support is so retracted whereby said filled tray drops, and means for supporting a carton to be filled with filled trays in a position in register with and beneath the tray support when the tray support is at its position clear of the supply means whereby trays dropped by the tray support fall into a carton on the carton support means.

5. In a packing apparatus, an inclined chute adapted to contain articles to be packed, a tray receiver arranged adjacent the delivery end of the chute and adapted to support a tray to be filled with articles, said chute including a pivoted delivery end portion of a size to contain a number of articles corresponding to the number of articles to fill said tray, said end portion being movable from a loading position in which it forms a continuation of the remainder of said chute to a delivery position in which its delivery end is lowered and its opposite end is elevated, gate means at the delivery end of the pivoted end portion of the chute, and means for tilting the pivoted end portion of the chute from its loading position to its delivery position and for moving said gate means to a releasing position, said opposite end of said end portion blocking the passage of articles from said remainder of the chute onto the delivery end portion during movement of said pivoted delivery end portion from said loading position to said delivery position.

6. In a packing apparatus, a tray receiver adapted to receive a flexible tray to be filled with articles, a tray support associated with the receiver and adapted to support the filled tray, and means for causing relative movement between the tray support and the tray receiver in a manner so that the tray support leaves the filled tray unsupported, said tray receiver including spaced lateral projections extending toward one another and disposed above said tray support for engaging the opposite ends of the flexible tray while said tray is supported by said tray support and serving to retard dropping movement of the tray.

7. A packer for packing loose articles including means for supporting a carton to be filled, with the carton arranged with an open end uppermost, said means including spaced holding elements for engaging the opposite sides of the carton at the base thereof to dispose said carton in a predetermined position, said means including bodily fixed registering means for engaging and holding the upper margin of one side wall of the carton, and depositing means above the support movable from a first position out of register with the carton to a second position in register with said carton in a direction normal to the above-mentioned wall of the carton, said depositing means adapted to carry a tray filled with articles to be packed, said depositing means carrying movable registering means movable into engagement with the wall of the carton opposite from the first-mentioned wall when said depositing means moves from its first position to its second position to assure register of the upper end of said carton with said depositing means.

8. A packer for packing loose articles including a frame, a tray receiver mounted on the frame for horizontal movement from a first position to a second position and adapted to receive a tray to be filled with articles, a tray support associated with the tray receiver and adapted to support the filled tray, latch means operatively connecting the tray support and the tray receiver and operable to cause said tray support to move in unison with said tray receiver when said tray receiver is moved from its first to its second position, means operatively connected to said tray receiver operable to stop said receiver at said

second position against further movement in a direction away from the first position but to permit limited movement of said tray receiver toward said first position, means operatively connected with the tray receiver and last-named means responsive to limited movement of said tray receiver toward said first position to inactivate the next-to-the-last-named means and permit movement of said tray receiver from said second position in a direction away from the first position, means operatively connected to said latch means responsive to movement of said tray receiver away from said second position to release the tray support from the influence of said latch means, and means for rapidly horizontally moving the tray support relative to the tray receiver upon release of the tray support to thus permit the tray to drop from the tray receiver.

9. An article packing apparatus comprising a frame, a chute supported by said frame, tray receiver means beneath the chute for supporting an empty tray to be filled, said tray receiver means being supported by said frame for horizontal movement beneath the discharge end of the chute to permit the tray to be filled with articles from the chute, and means for supporting a container at a level below that of said tray receiver means in a position for receiving a filled tray from said tray receiver means and means for conveying said container away from said position in a generally horizontal direction to provide for placement of a subsequent container on said supporting means.

10. An article packing apparatus comprising article supply means, a tray receiver for releasably supporting an empty tray to be filled, means mounting the tray receiver for reciprocating movement beneath the supply means, means effective to discharge articles from the supply means onto the tray as the tray moves therebeneath in one direction, means for holding said tray receiver stationary after said tray has been filled to allow inspection of the filled tray, and means for releasing a tray from said tray receiver, the last named means being actuated by manual operation so that after a tray is inspected it may be released from said tray receiver so that said tray receiver is in condition to receive a subsequent empty tray.

11. A fruit packer comprising a chute, a drawer for supporting an empty tray to be filled from the chute, means mounting the drawer for reciprocating movement beneath the discharge end of the chute, means for releasing fruit from the chute onto the empty tray as the tray is moved beneath the chute, said drawer having a movable bottom adapted to support a filled tray, means for moving said bottom relative to the remainder of the tray to a nonsupporting position to drop the tray, means for supporting a carton beneath the drawer in a position to receive the dropped tray, and means for conveying the carton away from the last-mentioned position.

12. A fruit packing apparatus comprising a tray support for supporting a tray, means mounting said tray support for reciprocating movement along a predetermined path, means for supporting a carton or like container adjacent said path in position to receive a tray from said tray support, means permitting movement of a tray with said tray support in one direction of movement of said tray support but preventing movement of said tray with said tray support in the opposite direction to provide for release of the tray from said tray support for deposit into said carton.

13. A fruit packing apparatus comprising means for supporting a carton or like container which is adapted to be loaded with trays filled with fruit, a filled tray support, means mounting said tray support for movement from a first position out of vertical alignment with said carton to a second position above said carton, means providing for movement of a filled tray with said tray support during movement of said support from said first position to said second position but preventing move-

ment of said filled tray with said tray support during movement of said tray support from said second position back to said first position to effect release of said filled tray from said tray support for deposit into said carton, and means for preventing said filled tray from being released until after said filled tray has been stopped momentarily after leaving said first position to thus permit inspection of the fruit in said filled tray.

14. A fruit packing machine comprising a tray filler having a fruit supporting surface of an area to support a sufficient number of fruit in a single layer group to fill a tray, said tray filler having a discharge edge, means for supporting a tray under said tray filler, means mounting said tray supporting means and said tray filler for reciprocating movement of one relative to the other so that said tray is progressively uncovered by said tray filler adjacent said discharge edge of said tray filler during each cycle of movement between said tray supporting means and said tray filler, means for effecting transfer of fruit as a group from said tray filler to said tray over said discharge edge as said tray is uncovered, and means for supplying a group of fruit to said tray filler during each such cycle of movement.

15. A fruit packing machine comprising a tray filler having an inclined rectangular fruit supporting surface of an area to support in a single layer group a number of fruit substantially corresponding to that necessary to fill a rectangular tray, said tray filler having a lower discharge edge and a gate adjacent said edge for releasably retaining said group of fruit on said surface, means for supporting a tray under said tray filler, means mounting said tray supporting means and said tray filler for reciprocating movement of one relative to the other so that said tray is progressively uncovered by said tray filler adjacent said discharge edge of said tray filler during each cycle of movement between said tray supporting means and said tray filler, means for moving said gate to an inoperative position to permit said group of fruit progressively to roll off said tray filler to empty the same onto said tray as said tray is uncovered thus to distribute said fruit over said tray to fill the same, means for preventing fruit being supplied to said tray filler at the time fruit is being discharged from said tray filler, and means for supplying a group of fruit to said tray filler during each such cycle of movement.

16. A fruit packing machine comprising a tray filler having an inclined rectangular fruit supporting surface, said tray filler having a lower discharge edge and a gate adjacent said edge for releasably retaining said group of fruit on said surface, means for supporting a tray under said tray filler, said fruit supporting surface having a length and breadth approximately that of the tray so as to be capable of supporting in contiguous fashion and in a single layer group a number of fruit substantially sufficient to fill the tray, means mounting said tray supporting means and said tray filler relative to the other in a horizontal direction so that said tray is progressively uncovered by said tray filler for reciprocating movement of one adjacent said discharge edge of said tray filler during each cycle of movement between said tray supporting means and said tray filler, means for moving said gate to an inoperative position to permit said group of fruit progressively to roll off said tray filler to empty the same onto said tray as said tray is uncovered thus to distribute said fruit over said tray to fill the same, means for preventing fruit being supplied to said tray filler at the time fruit is being discharged from said tray filler, and means for supplying a group of fruit to said tray filler during each such cycle of movement, said supply means comprising a chute adjacent said tray filler, said chute having an inclined fruit supporting surface upon which fruit may rest in single layer fashion and from which fruit may roll onto said tray filler.

17. The method of filling a tray with loose articles

13

to a single layer depth, comprising holding a number of such articles substantially corresponding to that necessary to fill said tray on an article supporting surface in contiguous relation in a single layer isolated group, arranging said surface and tray in superimposed adjacent relation with said tray horizontal and with said surface uppermost and inclined at an angle sufficient to cause said number of articles when released to roll under the influence of gravity off such surface but insufficient to cause said articles to tumble one over the other, horizontally moving said surface and said tray relative to each other to uncover said tray, causing such movement to take place in a direction such that the lower edge of said surface traverses the area of said tray, during such movement entirely releasing said articles for free mass movement off said tray under the influence of gravity to spread said number of articles in uniform fashion over said tray, and preventing the supply of articles to said surface during such movement.

18. An apparatus for filling trays with fruit, comprising a tray filler having a generally inclined imperforate flat fruit supporting surface, the inclination of said surface being sufficient to cause fruit thereon to roll off when released but insufficient to cause fruit to tumble one over the other, means for supporting an empty tray beneath said tray filler, said fruit supporting surface having a length and breadth approximating that of the tray so as to be capable of supporting in contiguous fashion and in a single layer group a number of fruit approximating that necessary to fill the tray, means mounting the said tray supporting means and said tray filler for reciprocating movement of one relative to the other in a predetermined horizontal direction to provide for uncovering of said tray during each cycle of movement between said tray supporting means and said tray filler, means for releasably holding fruit on said tray filler, and means for effecting release of the fruit on said tray filler as a group for transfer to said tray during each such cycle of movement.

19. The method of loading a normally flat flexible tray filled with loose articles into a carton or similar container which has a closed bottom and a depth of at least several times the effective thickness of the filled tray, comprising the steps of arranging said carton with an open end uppermost and said closed bottom lowermost, supporting said flexible tray by the bottom portions thereof, bringing said flexible tray filled with loose articles into a horizontal position above and close to said open end of said carton, arranging said filled tray in register with the open end of said carton and removing the support from said tray to free said tray for falling movement, causing said tray to flex downwardly in a direction lengthwise thereof to cause the tray to assume a bowed condition while falling so that sidewise tipping movement of the tray within said carton is resisted because of the greater depth of contact of said bowed tray with the side walls of said carton, than would be the case were the tray unbowed, said tray having length and breadth dimensions substantially the

14

same as the interior length and breadth dimensions of said carton so that a body of air is trapped between said tray and the closed bottom of said carton during falling movement of said tray to retard such movement and cause said filled tray to be deposited without abrupt shock in a horizontal position within said carton.

20. The method of group loading loose articles to a single layer depth onto a tray means, comprising holding a number of such articles substantially corresponding to that necessary to fill said tray means on an article supporting surface in single layer fashion and in adjacent relation and so as to occupy an area of substantially the same size and shape as the article supporting area of said tray means, arranging said surface and tray means in superimposed adjacent relation with said tray means horizontal, horizontally moving said surface and said tray means relative to one another to uncover said tray means, causing such movement to take place in a direction such that the lower edge of said surface traverses the area of said tray means, including said surface at an angle sufficient to cause said number of articles when released to move under the influence of gravity off such surface but insufficient to cause said articles to tumble one over the other, entirely releasing said articles for free mass gravitational movement off said surface onto said tray means during such movement to spread said number of articles in uniform fashion over said tray means, and preventing the supply of articles to said surface during such movement.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,797,540

July 2, 1957

Earl W. Carlsen et al.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 7, line 37, for "operaion" read -- operation --; column 8, line 68, after "with" insert -- filled --; column 12, line 56, beginning with "relative" strike out all to and including "filler" in line 58, and insert the same after "one" in line 59, same column; column 14, line 20, for "including" read -- inclining --.

Signed and sealed this 17th day of September 1957.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

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Commissioner of Patents