

July 25, 1961

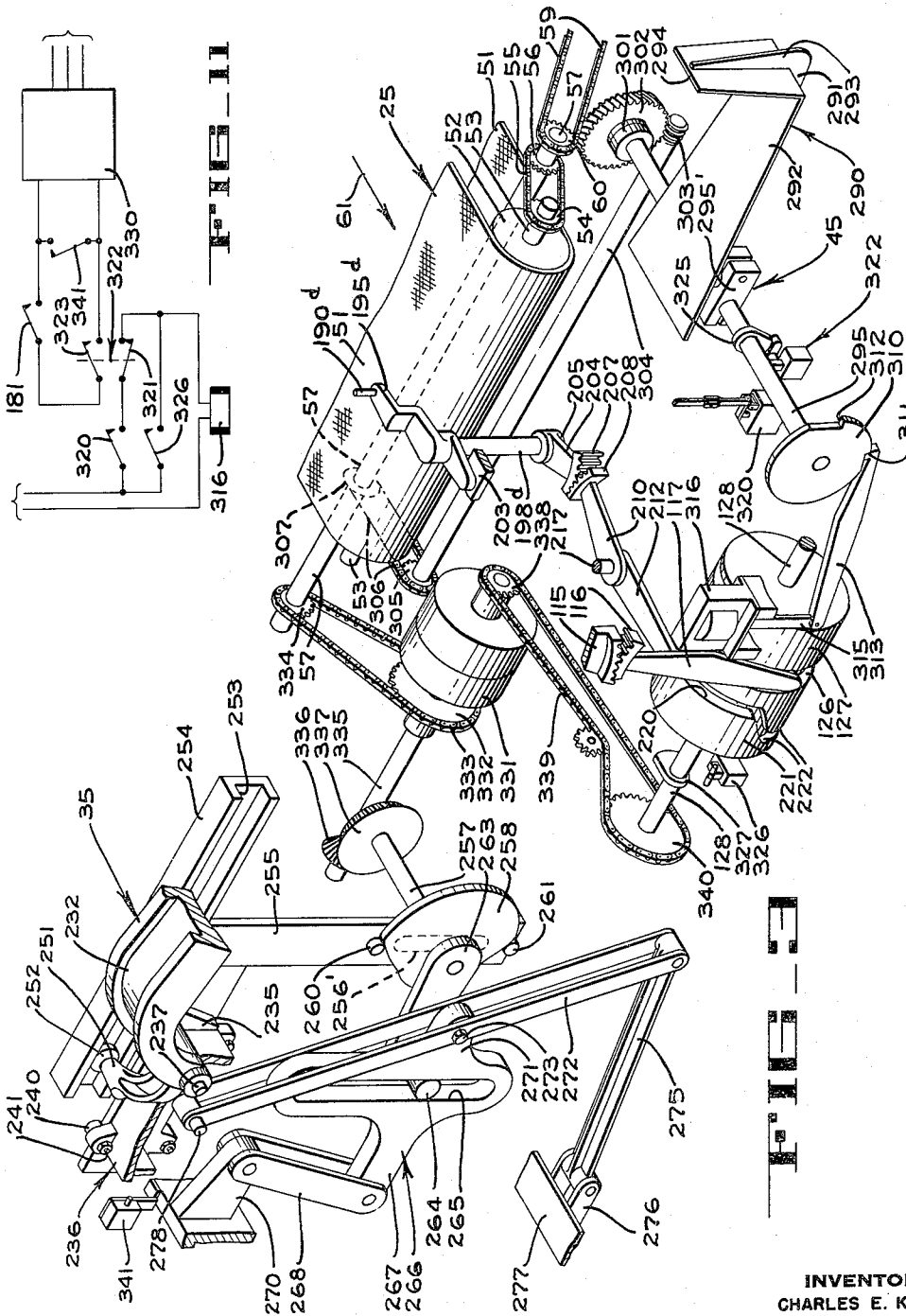
C. E. KERR

2,993,316

CASE PACKING MACHINE

Filed Aug. 20, 1958

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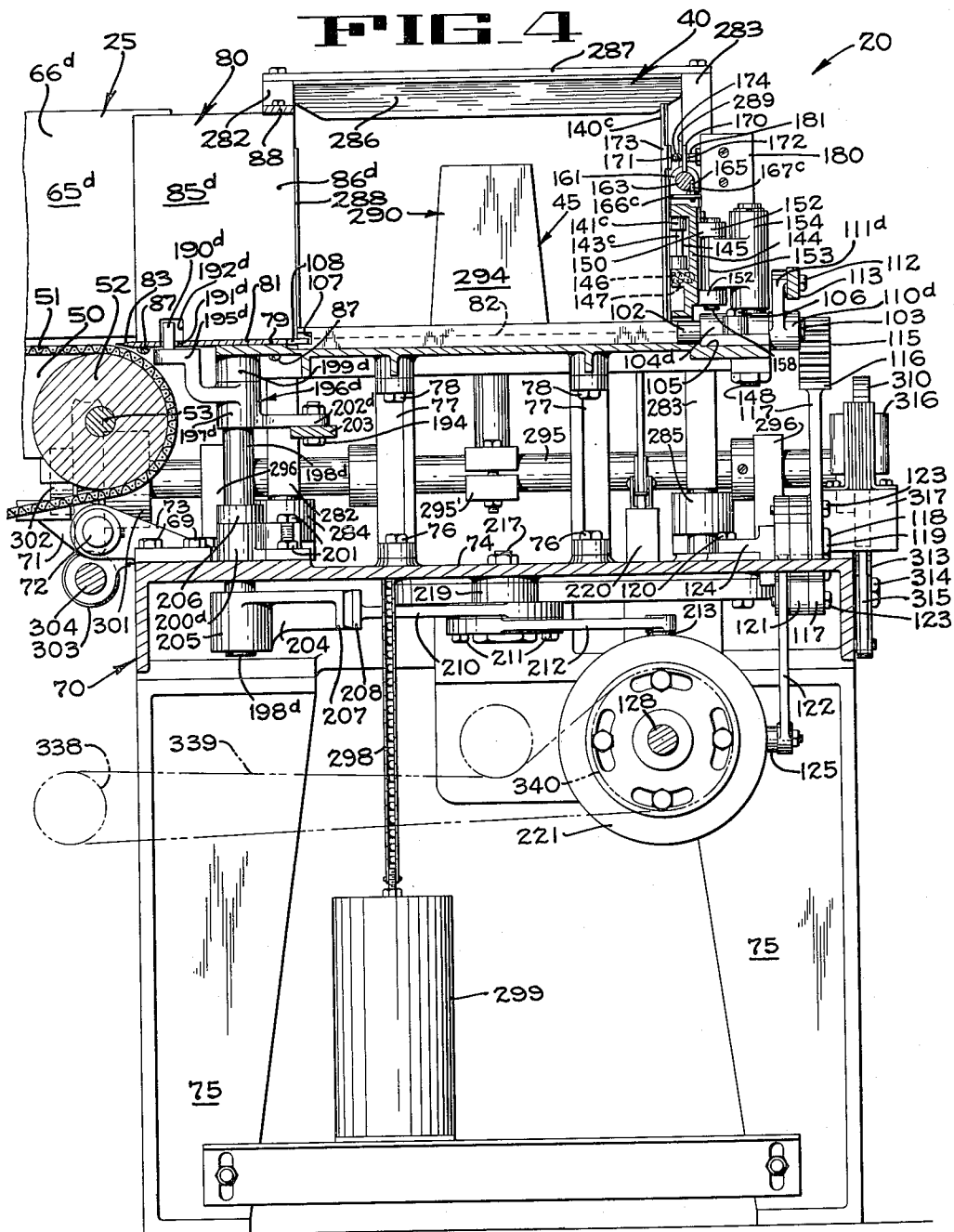
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7 Sheets-Sheet 3



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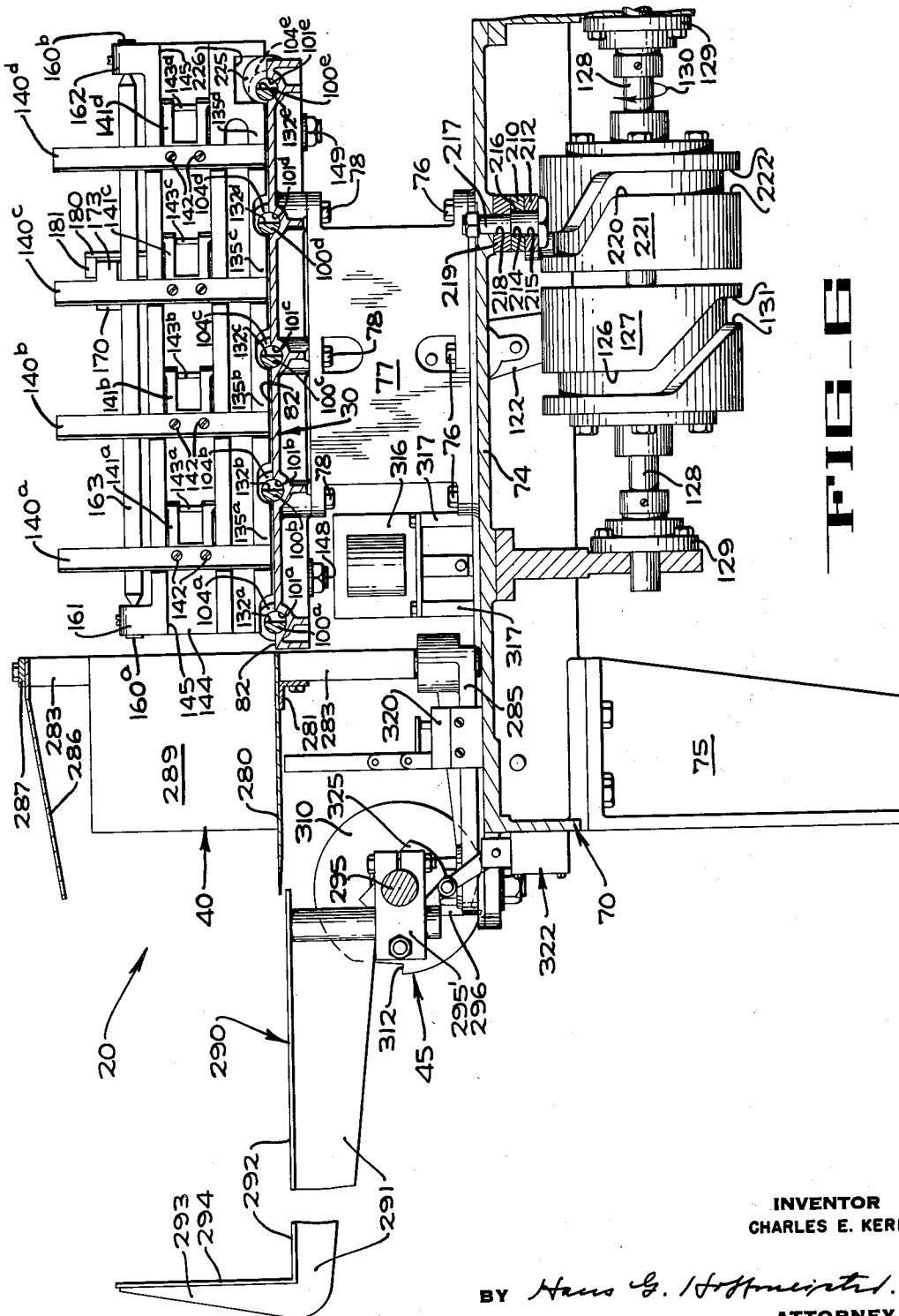
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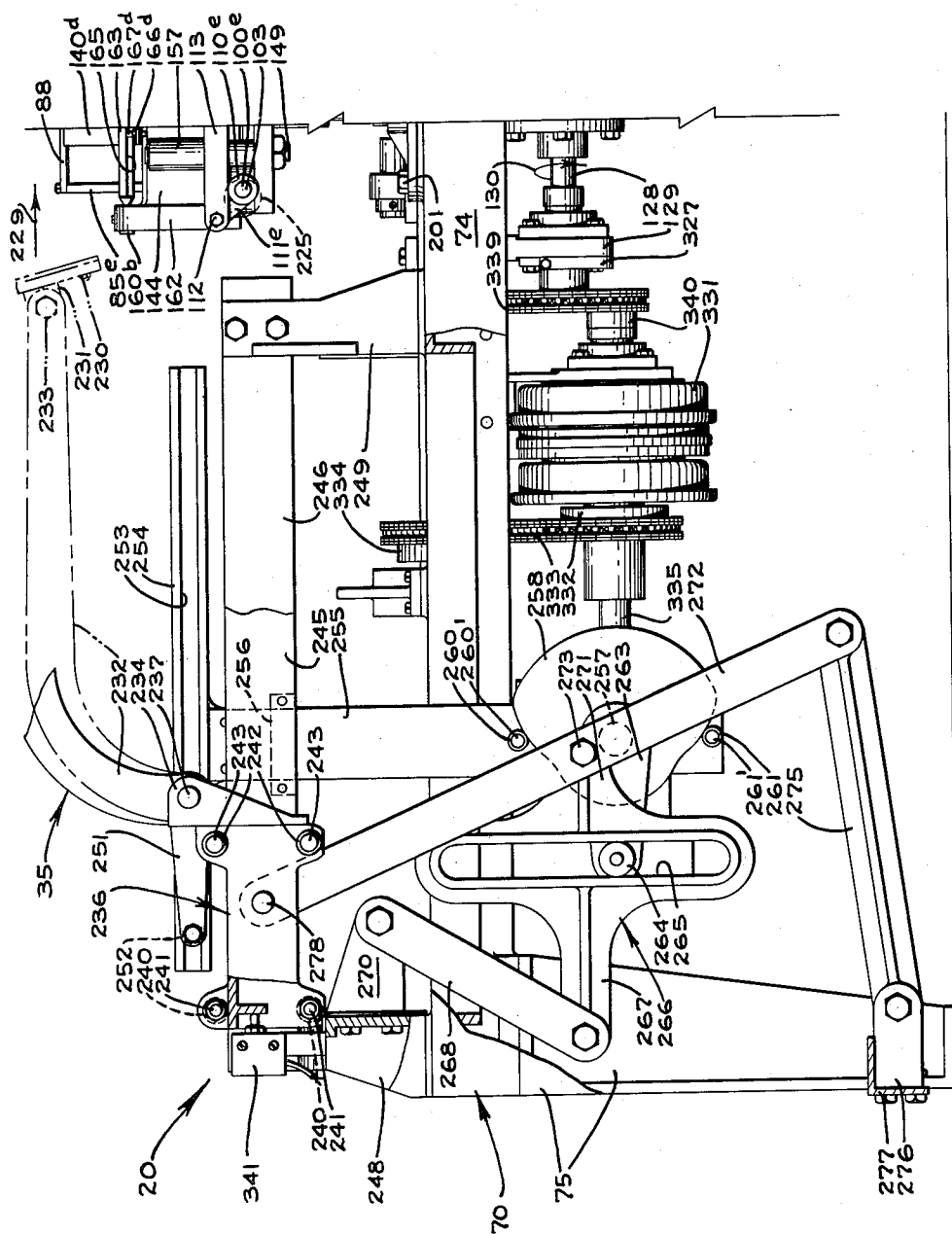
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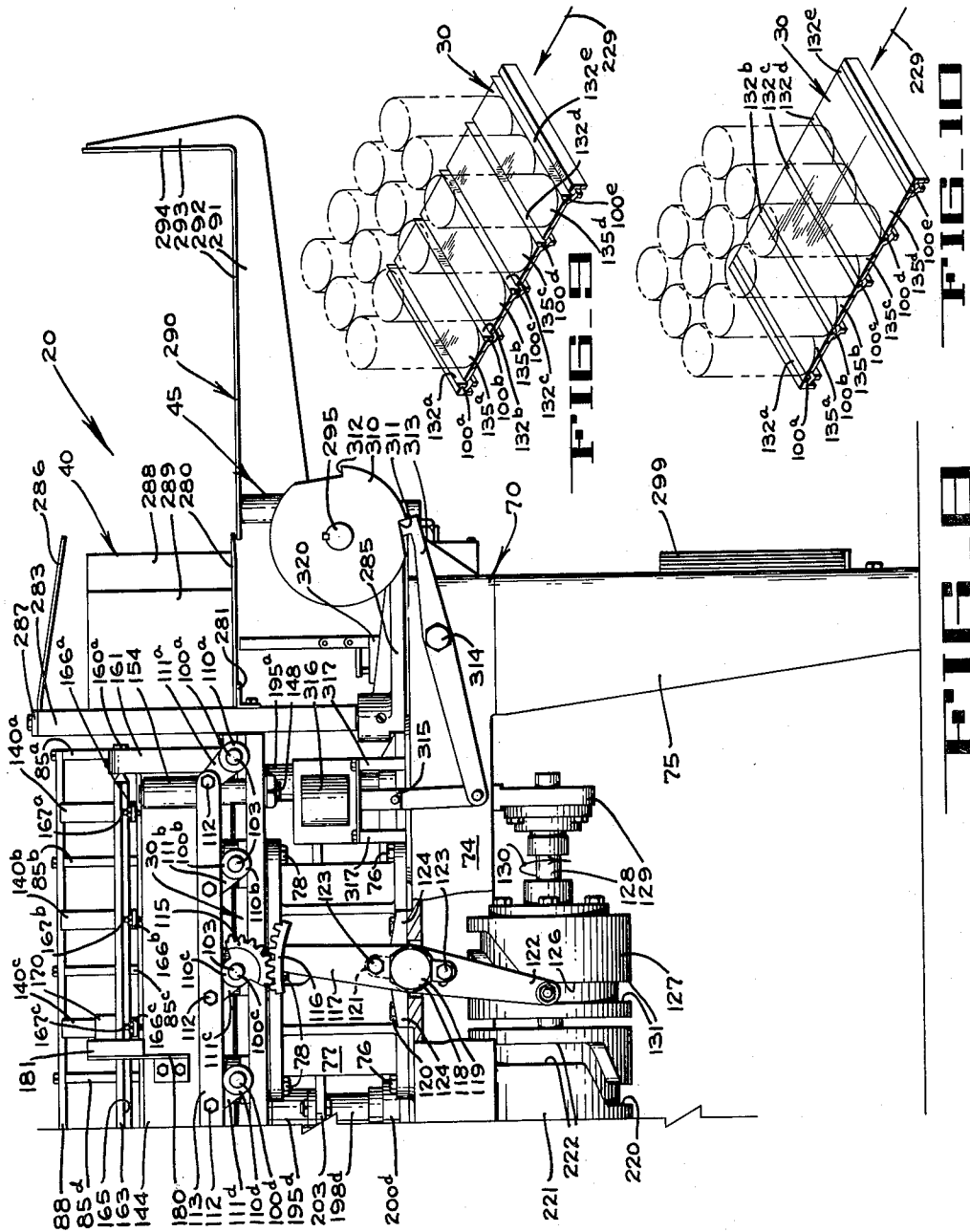
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CASE PACKING MACHINE

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7 Sheets-Sheet 7



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2,993,316

CASE PACKING MACHINE

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8 Claims. (Cl. 53—62)

The present invention appertains to container handling machines, and more particularly to a machine for packing containers into cases, crates, or the like.

An object of the present invention is to provide an improved case packing machine.

Another object of the present invention is to provide a case packing machine particularly adapted to use in packing cases of the end opening type.

Another object of the invention is to provide, in a case packing machine, improved and simplified means for arranging the number of articles that constitute a full case load into the pattern, or arrangement that they are to occupy within the case, and which, therefore, permits them to be propelled as a unit into an open ended case.

Another object is to provide movable guiding means that aid in achieving the desired arrangement of a plurality of articles subsequently to be propelled into a case, and, in cooperative association therewith, apparatus for moving the guiding means after the arrangement has been completed and thereby facilitating the operation of propelling the arranged articles into the case.

Another object is to provide propelling means that propel an assembled case load of articles into a case in a manner causing the articles to move transversely of the direction in which they move while the case load is being assembled, which propelling means, therefore, is particularly adapted for use with the movable guiding means of the invention.

Another object is to provide means automatically operable when a case load of articles has been properly and completely assembled to actuate the means for moving the guiding means and to actuate the load propelling means.

Another object is to provide means for holding an empty case in position to receive a case load of articles, and for moving the loaded case to a position wherein its contents cannot fall out of the case and from which the filled case can easily be removed from the machine.

Another object is to provide an improved lane-forming guide bar arrangement for use with an article collecting platform to cooperate with the platform in such a way as to prevent possible obstruction to the movement of articles on the platform transversely with respect to the guide bars.

Other objects and advantages of the present invention will become apparent from the following description and the drawings in which:

FIG. 1 is a perspective of the case packing machine of the invention.

FIG. 2 is a diagrammatic plan of the machine illustrated in FIG. 1.

FIG. 3 is a diagrammatic isometric view of the power train employed in the case packing machine of the present invention.

FIG. 4 is an enlarged fragmentary section along line 4—4 of FIG. 2.

FIG. 5 is an enlarged fragmentary section along line 5—5 of FIG. 2.

FIG. 6 is an enlarged fragmentary section along line 6—6 of FIG. 2.

FIGS. 7 and 8 are left and right portions, respectively, of an enlarged side elevation of the case packing machine partly broken away and viewed toward the feed end of the machine.

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FIG. 9 is a diagrammatic perspective of a collecting platform for the case packing machine of the present invention with guide bars projecting above the platform.

FIG. 10 is a diagrammatic perspective of the collecting platform with the guide bars even with the upper surface of the platform.

FIG. 11 is a diagrammatic illustration of the control circuit employed in the case packing machine of the present invention.

As shown in FIGS. 1 and 2, the case packing machine 20 of the present invention comprises a multi-lane conveyor 25, which receives upright containers either in a single file or in a promiscuous manner, and discharges the upright containers in a predetermined number of parallel and adjacent files for advancement onto a collecting platform 30. When a tier of the containers is arranged on the collecting platform 30 in the pattern which they are to occupy after having been filled into a case, a pusher mechanism 35 advances the tier of containers from the collecting platform 30 onto a loading chute 40 in a direction that is transverse with respect to the direction of travel of the conveyor 25 and continues to advance the tier of upright containers into an end-opening case that is supported by a case support mechanism 45 at the discharge end of the loading chute 40.

The multi-lane conveyor 25 is similar to the container supply conveyor described in detail in Patent No. 2,710,089, issued on June 27, 1955, to C. E. Kerr et al. for Arrangement for Dividing Container Supply Lines. Briefly, the conveyor 25 comprises a support frame 50 that carries an endless belt 51, which is preferably made of woven wire. At the discharge end of the conveyor 25, the endless belt 51 is trained around a drive roller 52 (FIG. 3) that is fixed to a shaft 53. The shaft 53 has a sprocket 54 fixed thereto and is rotated in a counterclockwise direction, as viewed in FIG. 3, by a chain 55 that is trained around the sprocket 54. The chain 55 is also trained around a sprocket 56 that is keyed to a shaft 57. The shaft 57 is driven by a suitable electric motor 58 (FIG. 1) through a chain 59 (FIG. 3) and a sprocket 60. Thus, the conveyor belt 51 is continuously driven in the direction shown by arrow 61 in FIGS. 1, 2 and 3. Supported above the conveyor belt 51 at the discharge end thereof are a plurality of transversely spaced, parallel guide plate 65a—65e, inclusive (FIGS. 1 and 2), which serve to define lanes 66a—66d, inclusive. The transverse distance across the lanes 66a—66d, inclusive, is equal to the length of a case to be packed, for example, the case A of FIG. 1. In the exemplary embodiment of the present invention, the guide plates 65a—65e, inclusive, divide the containers advancing for discharge from the conveyor 25 into four parallel and adjacent files.

At the discharge end of the conveyor 25, the conveyor frame 50 is attached to a main frame 70 by transversely spaced brackets 71 (only one being shown in FIG. 4). Each bracket includes a bore, not shown, for receiving a stub shaft 72. The stub shafts 72 are individually carried by transversely spaced mounting brackets 73 (only one being shown in FIG. 4) that are secured by bolts 69 to a channel support plate 74 of the main frame 70. The channel plate 74 is supported in an elevated position by legs 75 of the main frame 70. Supported above the channel plate 74 at a height approximately the height of the upper run of the conveyor belt 51 is the previously mentioned collecting platform 30. The collecting platform 30, which is spaced from the discharge end of the conveyor 25, is carried by transversely spaced pedestals 77 (FIGS. 4 and 6) that are secured at the lower portions thereof to the upper surface of the channel plate 74 by screws 76. At the upper portions thereof, the pedestals 77 are secured to the lower surface of the collecting platform 30 by screws 78.

Interposed between the collecting platform 30 and the discharge end of the conveyor 25 is a ramp 80 (FIG. 1), which includes a container support plate 81 (FIGS. 4 and 5). As shown in FIG. 4, one end of the ramp plate 81 is received by a recessed area 79 of the platform 30 and is secured to the platform 30 by suitable means, such as countersunk screws, not shown. In this manner, the upper surface of the plate 81 is in coplanar relation with the upper surface 82 of the platform 30. The other end of the ramp plate 81 extends to the upper run of the conveyor belt 51 and terminates in a beveled edge 83 that is substantially at the same height as the upper run of the conveyor belt 51. Therefore, transfer of the containers from the conveyor 25 to the ramp 80 and from the ramp 80 onto the collecting platform 30 is a smooth, continuous movement. The ramp 80 also includes transversely spaced guide plates 85a-85e, inclusive (FIGS. 1 and 5), which form continuations of the guide plates 65a-65e, respectively, of the conveyor 25 and serve to define lanes 86a-86d, respectively, for advancement of the parallel and adjacent files of containers from the conveyor 25 onto the collecting platform 30. The upright guide plates 85a-86e are secured to the ramp plate 81 by screws 87 (FIG. 4) and the upper portions of the guide plates 85a-85e are maintained in spaced relation by a strap 88 (FIGS. 1 and 5).

The conveyor 25 operates continuously to advance the files of containers through lanes 66a-66d, inclusive, for discharge onto the ramp 80. The containers received by the ramp 80 advance through the lanes 86a-86d, inclusive, in abutting relation with adjacent containers of the same file so that a container contacts the preceding container of a file to impart advancing movement thereto. From the ramp 80, the containers are advanced in parallel and adjacent files onto the collecting platform 30.

According to the present invention, containers advancing on the collecting platform 30 from the ramp 80 are guided in parallel and adjacent files by guide bars 100a-100e, inclusive (FIGS. 6 and 9), each of which has a generally semicylindrical cross-sectional configuration. The guide bars 100a-100e, inclusive, are received by transversely spaced grooves 101a-101e, respectively (FIG. 6), which are formed in the upper surface 82 of the collecting platform 30 and extend in alignment with the guide plates 85a-85e, respectively, of the ramp 80 (FIG. 2). Each groove has a semicircular cross-sectional area of sufficient diameter to enable its associated guide bar to be rotatable therein.

At one end of each guide bar is a cylindrical section 102 (FIG. 4) and contiguous with the cylindrical section is a reduced diameter section 103. The reduced diameter sections 103 of the guide bars 100a-100e are rotatably mounted in bearings 104a-104e, respectively (FIGS. 4 and 6), which are fitted in a recessed area 105 (FIG. 4) formed in the collecting platform 30. The bearings 104a-104e are secured to the collecting platform 30 by screws 106, each bearing being in abutment with the terminal shoulder of the cylindrical section 102 of its associated guide bar. In this manner, the guide bars 100a-100e are restrained from moving axially in one direction within the bearings 104a-104e, respectively. At the opposite end of each guide bar is an axial bore 107 (only one being shown, FIG. 4) of sufficient depth to receive a pin 108, there being one pin for each guide bar. The pins 108 (only one being shown in FIG. 4) are fixed to the ramp plate 81 and are spaced transversely so that a pin is disposed below each of the ramp guide plates 85a-85e, inclusive. The pins 108 serve to retain the guide bars in their respective grooves when rotary movement is imparted to the guide bars.

The reduced diameter portions 103 of the guide bars 100a-100e, inclusive, are secured in fixed relation to hubs 110a-110e, respectively (FIGS. 4, 7 and 8), which are formed as integral parts of the lower portions of lever arms 111a-111e, respectively, and which hubs abut

against the bearings 104a-104e, respectively. Fixed to the upper portions of the lever arms 111a-111e, by screws 112, is a transversely disposed connecting link 113 (FIGS. 4, 7 and 8), whereby movement of the link 113 causes the lever arms 111a-111e, inclusive, to move simultaneously. This action, in turn, imparts in unison a rotary movement to the guide bars 100a-100e through the hubs 110a-110e, respectively.

Formed with the hub 110c of the lever 111c is a spur gear segment 115 (FIG. 8), which meshes with a spur gear segment 116 that is carried by the upper portion of an upper follower arm 117 (FIGS. 4 and 8). Adjacent the lower portion of the arm 117 is a spacer member 121 (FIG. 4) and contiguous with the spacer member 121 is the upper portion of a lower follower arm 122 (FIGS. 4 and 8). The upper follower arm 117, the spacer member 121 and the lower follower arm 122 include axially aligned bores, not shown, for receiving a stub shaft 118 (FIGS. 4 and 8) that has an enlarged end portion 119. The arm 117, spacer member 121 and arm 122 are rigidly interconnected by screws 123 (FIGS. 4 and 8). The shaft 118 has a threaded end portion by which it is secured to a bracket 124 (FIGS. 4 and 8) that is fixed to the plate 74 of the main frame 70 by screws 120. A cam follower roller 125 (FIG. 4) is mounted on the lower portion of the follower arm 122 and follows an endless groove 126 (FIGS. 5 and 8) of a cylindrical cam 127, the cam 127 being fixed to a shaft 128 (FIGS. 3, 6, 7 and 8). Bearings 129 (FIGS. 7 and 8), which are carried by the channel plate 74, journal the shaft 128 for rotation.

The shaft 128 operates intermittently in a manner to be described hereinafter and rotates in the direction shown by an arrow 130 (FIGS. 6, 7 and 8). When the cam follower roller 125 engages the portions of groove walls 131 that are disposed in planes perpendicular to the shaft 128 and adjacent the left hand end of the cam 127 as viewed in FIG. 8, the cam follower arms 117 and 122 are inclined upwardly and toward the right as viewed in FIG. 8, thereby causing the gear segments 115 and 116 to mesh at their extreme left hand portions (FIG. 8). With the gear segments 115 and 116 meshing in this manner, the connecting link 113 is disposed to the left, as viewed in FIGS. 7 and 8, and the guide bars 100a-100e, inclusive, project above the collecting platform 30 (FIGS. 6 and 9) to define lanes 135a-135d, inclusive, for the collecting platform 30 and to guide containers advancing on the collecting platform 30 from the ramp 80, so as to preserve the quadruple file arrangement of the cans previously established by the plates 65a-65e, inclusive. When the cam follower roller 125 engages the portions of the groove walls 131 inclined upwardly and to the right, as viewed in FIG. 8, the follower arms 117 and 122 pivot about the axis of shaft 118 in a counterclockwise direction causing the gear segment 115 to rotate in a clockwise direction, thereby moving the link member 113 toward the right. Moving the link member 113 toward the right (as viewed in FIG. 8) causes the guide bars 100a-100e, inclusive, to rotate 90° in a counterclockwise direction as viewed in FIG. 6. With the guide bars thus rotated 90°, the flat sides 132a-132e of the semicylindrical guide bars 100a-100e, respectively, are even, or flush, with the upper surface 82 of the collecting platform 30 (FIG. 10). Hence, the containers on the collecting platform then can be moved transversely of the lanes 135a-135d, inclusive, without interference from the guide bars 100a-100e. The walls 131 of cam 127 are further arranged to return the follower arms 117 and 122 to the position shown in FIG. 8. This action results in the gear segment 115 rotating in the counterclockwise direction (FIG. 8) to return the link member 113 to the position shown in FIG. 8, which in turn causes the guide bars 100a-100e to rotate 90° in a clockwise direction as viewed in FIG. 6. Thus, for each complete revolution

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of the shaft 128, the guide bars are shifted from a position projecting above the platform 30 (FIG. 9) to a position even with the platform 30 (FIG. 10) and are returned to a position projecting above the platform 30.

Containers from the ramp 80 advance on the collecting platform 30 in lanes 135a-135d, inclusive, which are defined by the guide bars 100a-100e projecting above the platform 30. The containers advance in parallel files with adjacent containers of each file in abutting relation. Disposed in the path of leading containers advancing in lines 135a-135d, inclusive, intermediate adjacent guide bars, are upright article sensing fingers 140a-140d, respectively (FIGS. 1 and 4-6). The article sensing fingers are disposed in transverse alignment and are spaced longitudinally from the discharge end of the ramp 80 so that the distance between the discharge end of the ramp 80 and each of the sensing fingers is equal to the width of a case to be packed, for example case A of FIG. 1. In the exemplary embodiment, this distance is equal to three times the diameter of one of the containers, so that three containers will be in each file collected on the platform 30 between the discharge end of ramp 80 and the associated sensing finger. Thus, the tier pattern of containers formed on the collecting platform 30, in the exemplary embodiment, is four containers in the transverse direction and three containers in the longitudinal direction, as indicated in FIGS. 9 and 10.

The sensing fingers 140a-140d, inclusive, are fixed to transversely extending mounting brackets 141a-141d, respectively (FIGS. 4, 5 and 6), by screws 142 and the mounting brackets 141a-141d are pivotally mounted on vertical pivot pins 143a-143d, respectively. The pivot pins 143a-143d are press fitted into suitable openings in a transversely disposed, upright support plate 144 (FIGS. 4 and 8), which has a slotted area 145 (FIG. 4) to receive the mounting brackets 141a-141d. The flange defining the lower edge of the transversely extending slotted area 145 provides a supporting surface for the brackets 141a-141d, inclusive. With the pivot pins displaced transversely from their associated sensing fingers, the sensing fingers 140a-140d, inclusive, can be moved in a longitudinal direction while their respective brackets experience pivotal movement about the axes of pins 143a-143d, respectively. A compression spring, such as spring 146 (shown in dotted line in FIG. 4), is provided for each article sensing finger to continuously urge its associated sensing finger toward the ramp 80 in the path of a leading container advancing in its associated lane. The spring 146 is received by a bore 147 (shown in dotted line in FIG. 4) in the support plate 144 and is compressed between the support plate 144 and the sensing finger 140c. The compression springs for sensing fingers 140a, 140b and 140d are similar in construction to compression spring 146 and operate in a similar manner.

The support plate 144 is mounted on the collecting platform 30 by transversely spaced brackets 150 and 151 (FIG. 1), each of which includes a pair of vertically spaced ears rigid with the plate 144 and projecting from the back side thereof. Ears 152 of bracket 150 receive therebetween a boss 153 of bracket 154, while ears 155 of bracket 151 receive therebetween a boss 156 of bracket 157. Pivot pin 158 is received by axially aligned bores in the ears 152 and boss 153, and pivot pin 159 is received by axially aligned bores in the ears 155 and boss 156. The brackets 154 and 157 are retained in position on the collecting platform 30 by shafts 148 and 149, respectively (FIGS. 7 and 8), which are displaced from the pivot pins 158 and 159, respectively, in both the transverse and longitudinal directions.

At opposite ends of the plate 144 are upright posts 161 and 162 (FIGS. 6, 7 and 8) having suitable inwardly facing apertures to receive bearings 160a and 160b, respectively, which bearings journal the tapered ends of a transversely disposed shaft 163 (FIGS. 4, 6, 7 and 8)

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for rotation. A shoulder 165 (FIGS. 4, 7 and 8) that is parallel to the axis of the shaft 163 is provided by cutting a notch longitudinally of the shaft in one side thereof. Disposed below the shaft 163 are longitudinally projecting support members 166a-166d (FIGS. 4, 7 and 8) of the sensing fingers 140a-140d, respectively. Carried by the support members 166a-166d are stop pins 167a-167d, respectively, which engage the shoulder 165 of the shaft 163 to prevent clockwise rotation of the shaft 163 as viewed in FIG. 4. The previously mentioned compression springs, such as spring 146 (FIG. 4), urge their associated sensing fingers away from the plate 144 to maintain the stop pins in engagement with the shoulder 165. Secured to the shaft 163 by suitable means, such as welding, is a web 170 (FIGS. 4, 6 and 8) that is disposed in alignment with the sensing finger 140c. The web 170 has an opening therein for receiving a pin 171 (FIG. 4) that is arranged for longitudinal movement within the opening of the web 170. At one end of the pin 171 is a lock nut 172 that prevents the web 170 from slipping off the pin 171. The other end of the pin 171 is threaded into a suitable opening in a laterally projecting portion 173 (FIGS. 4 and 5) of the sensing finger 140c. Interposed between the laterally projecting portion 173 and the web 170 is a compression spring 174 (FIG. 4) that surrounds the pin 171. The compression spring 174 serves to continuously urge the shaft 163 to rotate in a clockwise direction as viewed in FIG. 4.

When a tier pattern of containers is properly formed on the collecting platform 30, the leading containers in lanes 135a-135d, respectively, will engage the sensing fingers 140a-140d, respectively, causing the sensing fingers 140a-140d to pivot about the pins 143a-143d, respectively, against the urgency of their associated springs, such as the spring 146. As a result thereof, the members 166a-166d will carry the stop pins 167a-167d, respectively, away from the notch 164 and out of engagement with the shoulder 165. Thereupon, the compression spring 174 will cause the web 170 to rotate the shaft 163 in the clockwise direction as viewed in FIG. 4. It is to be observed that the shaft 163 will not rotate in the aforementioned clockwise direction until all of the stop pins 167a-167d, inclusive, are out of engagement with the shoulder 165 of the shaft 163. After the sensing finger 140c is free from engagement with the leading container of lane 135c, the compression spring 146 moves the sensing finger 140c away from the plate 144, thereby causing the locknut 172 on the pin 171 to engage and move web 170 and thus to rotate the shaft 163 in a counterclockwise direction (as viewed in FIG. 4). When this occurs the stop pins 167a-167d will once again engage the shoulder 165 of the shaft 163.

A control switch 181 (FIGS. 4, 5 and 11), which is mounted on the support plate 144 by a bracket 180 in longitudinal alignment with the web 170, is actuated by the web 170 to close the contacts thereof when the shaft 163 is rotated in the previously mentioned clockwise direction and is actuated to open the contacts thereof when disengaged by the web 170. In a manner to be described hereinafter, the switch 181 controls the initiation of the case packing cycle.

For arresting advancement of containers from the conveyor 25 onto the ramp 80 after the packing cycle begins, upright stop pins 190a-190d, inclusive (FIGS. 4 and 5), are provided. The stop pins 190a-190d, inclusive, are received in arcuate slots 191a-191d, respectively (FIG. 5), formed in the container support plate 81 of the ramp 80 at the receiving or feed end portion thereof and project above the ramp plate 81. The arcuate slots 191a-191d, inclusive, extend from the guide plates 85a-85d, respectively (FIG. 5), toward the feed end of the ramp 80 and into the lanes 86a-86d, respectively (FIG. 5), of the ramp 80. Suitable openings 192a-192d, inclusive, are formed in the guide plates 85a-85d, respectively, to

provide clearance for the stop pins 190a-190d, respectively. From the foregoing, it is to be observed that when the pins 190a-190d project into the openings 192a-192d, respectively, of the ramp guides plates 85a-85d, respectively, containers are capable of advancing from the conveyor 25 into lanes 86a-86d of the ramp 80 and when the stop pins 190a-190d are moved in the slots 191a-191d, respectively, into the lanes 86a-86d, respectively, of the ramp 80, advancement of containers from the conveyor 25 onto the ramp 80 is prevented, thereby arresting advancement of containers from the ramp 80 onto the collecting platform 30.

The stop pins 190a-190d, inclusive, are press fitted into suitable openings formed in arms 195a-195d, respectively (FIGS. 4 and 5), of bell cranks 196a-196d, respectively. Hubs 197a-197d of the bell cranks 196a-196d, respectively, are secured to vertical shafts 198a-198d, respectively, which are journaled for rotation in bearings 199a-199d, respectively, and bearings 200a-200d, respectively. The bearings 199a-199d are secured to the ramp plate 81 and the guide plates 85a-85d, respectively, by screws (not shown), while the bearings 200a-200d are secured to the channel plate 74 by screws 201. Arms 202a-202d of the bell cranks 196a-196d, respectively, are secured to a transversely disposed connecting link 203 by bolts 194, whereby movement of the link 203 causes the bell cranks 196a-196d to move simultaneously about pivot axes of the shafts 198a-198d, respectively. This action, in turn, imparts in unison an arcuate movement to the stop pins 190a-190d in slots 191a-191d, respectively.

At the lower extremity of the shaft 198d below the channel plate 74 is secured a horizontally disposed arm 204 by means of a hub 205 (FIGS. 3, 4 and 5). The shaft 198d is longer than the shafts 198a-198c and is retained in position by a set collar 206 that is seated on the bearing 200d. At the free end of the arm 204 is a spur gear segment 207, which meshes with a spur gear segment 208 carried at one end of a horizontally disposed follower arm 210 (FIGS. 3 and 4). Fixed to the other end of the follower arm 210 by screws 211 is a follower arm 212 that carries a cam follower 213 at the free end thereof. The follower arms 210 and 212 include vertically aligned bores 214 and 215, respectively (FIG. 6), that receive a bushing 216, which in turn receives a bolt 217. The bolt 217 is carried by the channel plate 74 and is received by a bore 218 of a spacer member 219 that is interposed between the plate 74 and the follower arm 210. Through the foregoing arrangement, the follower arms 210 and 212 pivot as a unit about the axis of the bolt 217.

The cam follower roller 213, which is mounted on the free end of the follower arm 212, follows an endless groove 220 (FIGS. 5, 7 and 8) of a cylindrical cam 221, the cam 221 being fixed to the previously mentioned intermittently operated shaft 128. Walls 222 of groove 220 are so arranged that rotation of the shaft 128 causes the gear segments 207 and 208 to rotate the shaft 198d, which in turn causes the link 203 to shift the stop pins 190a-190d from the openings 192a-192d, respectively, into container intercepting position (FIG. 5); and before the shaft 128 makes a complete revolution, the link 203 returns the stop pins 190a-190d to openings 192a-192d, respectively, to remove the stop pins from the container intercepting position.

Mounted on the guide bar 100e in fixed relation therewith is an eccentric sleeve 225 (FIGS. 6, 7 and 8) that is received by an opening 226 (FIG. 6) in the support plate 144. The eccentric sleeve 225 is arranged to engage the wall of the opening 226 to move the support plate 144 to the left as viewed in FIG. 6, when the guide bars 100a-100e are rotated in the counterclockwise direction (as viewed in FIG. 6) to position the flat portions 132a-132e, respectively, of the guide bars even with the upper surface of the collecting platform 30. This action

causes the brackets 150 and 151 (FIG. 1) of the support plate 144 to pivot about the shafts 148 and 149, respectively, thereby shifting the support plate 144 away from the ramp 80. Thus, the longitudinal distance between the discharge end of ramp 80 and the sensing fingers 140a-140d is increased at the time the guide bars are even with the collecting platform 30. When the guide bars 100a-100e are rotated in a clockwise direction, as viewed in FIG. 6, to project above the collecting platform 30, the eccentric sleeve 225 rotates with the guide bar 100e and engages the wall of opening 226 to move the support plate 144 to the right, as viewed in FIG. 6. Thereupon, the brackets 150 and 151 of the support plate 144 pivot about the axes of shafts 148 and 149, respectively, to move the support plate 144 in a longitudinal direction toward the ramp 80, whereby the distance between the sensing fingers 140a-140d and the discharge end of the ramp 80 is again made equal to the width of a case to be packed.

After a tier of containers has been assembled on the platform 30, it is propelled transversely of the lanes 135a-135d by the pusher mechanism 35, i.e., in the direction shown by the arrow 229 (FIGS. 2 and 10). As illustrated in FIGS. 1 and 7, the pusher mechanism 35 comprises a pusher plate 230 of sufficient size to engage the entire file of containers in the lane 135d of the collecting platform 30. The pusher plate 230 has projecting therefrom a boss 231 (FIG. 7) which is pivotally mounted on the bifurcated free end of a support arm 232 by a bolt 233. The other end of the support arm 232 is pivotally carried between longitudinally spaced upright ears 234 and 235 (FIGS. 3 and 7) that are secured to a carriage 236. A pivot pin 237 is received by a bore, not shown, in the arm 232 and the horizontally aligned bores in the ears 234 and 235.

The carriage 236 is mounted for reciprocation in a path perpendicular to the lanes 135a-135d by a suitable arrangement of four rollers 240 (one shown in FIG. 3) each of which is rotatable on a pin 241 projecting from one side of the carriage, and a similar, opposed arrangement of four rollers 242 (two shown in FIG. 7) each of which is rotatable on a pin 243 projecting from the opposite side of the carriage. An upper pair of the rollers 240 and an upper pair of the rollers 242 are in rolling engagement with the upper surfaces of two horizontal, parallel tracks 245 and 246, respectively, and a lower pair of each group of the rollers 240, 242 are in rolling engagement with the under surfaces of the tracks 245 and 246, respectively. Suitable pedestals 248 and 249, respectively, are secured to the channel plate 74 of the main frame 70 and support thereon the parallel and longitudinally spaced tracks 245 and 246.

At the proximal end of the support arm 232 adjacent the pivot pin 237 is secured a lever arm 251 (FIGS. 3 and 7) that carries a roller 252. The roller 252 follows a horizontal groove 253 formed in a guide rail 254, which is carried by the upper portion of an upright bar 255. A strap 256 (FIG. 7), which is secured to the track 245, guides the bar 255 in reciprocating, vertical movement. At the lower portion of the upright bar 255 is a vertical slot 256' (FIG. 3), through which a horizontal shaft 257 extends. The shaft 257 is intermittently turned in a manner to be described hereinafter. Intermediate the ends of the shaft 257 is fixed a cam 258 (FIGS. 3 and 7), which engages vertically spaced cam rollers 260 and 261 rotatably mounted on pins 260' and 261', respectively, that are secured in fixed relation to the upright bar 255. The cam 258 serves to raise and lower the bar 255 through its engagement with the cam rollers 260 and 261, and to similarly raise and lower the guide rail 254.

To one end of the shaft 257 is rigidly secured a lever 263 which carries a roller 264 at the free end thereof. The roller 264 is received in a vertical slot 265 formed in a yoke 266. An arm 267 of the yoke 266 is supported

for longitudinal movement by a link 268 that is pivotally connected to a bracket 270 rigid with the frame of the machine. Another arm 271 of the yoke 266 is pivotally attached intermediate the ends of a link 272 by a bolt 273. The lower end of the link 272 is pivotally connected to an arm 275 that is pivotally mounted on a bracket 276. As shown in FIG. 7, the bracket 276 is fixed to a horizontal bar 277 that is mounted on an opposed pair of the legs 75. The upper end of the link 272 is pivotally connected to the carriage 236 by a pivot pin 278.

The pusher plate 230 and the support arm 232 are shown in FIG. 7 in a retracted and elevated position. Rotation of the shaft 257 through a half turn causes the arm 263 to move the yoke 266 forward from the position in which it is illustrated in FIGS. 3 and 7, i.e., in the direction shown by the arrow 229 (FIG. 7). By moving the yoke 266 in this manner, the link 272 advances the carriage 236 forward. In addition, rotation of the shaft 257 rotates the cam 258, which raises the bar 255 to elevate the guide rail 254, whereby the arm 251 is elevated while the support arm 232 and the pusher plate 230 are lowered. Thus, rotation of shaft 257 through a half turn lowers the pusher plate 230 to a position enabling it to engage the file of containers in the lane 135d and likewise advances the carriage 236 and moves the pusher plate 230 in a manner causing it to advance the tier of containers on the collecting platform 30 transversely of the lanes 135a-135d. The pusher plate 230 is moved forward until the tier of containers on the collecting plate is advanced through the loading chute 40. After the pusher plate 230 has reached its forwardmost position, and during rotation of the shaft through a succeeding half turn, the reciprocating bar 255 is lowered through the action of the cam 258 to lower the rail 254 and thereby raise the pusher plate 230. As this occurs, the arm 263 moves the yoke 266 which, in turn, retracts the link 272, the carriage 236 and the pusher plate 230. Thus, during each 360° rotation of the shaft 257, the pusher plate 230 is lowered and advanced to its forwardmost position, and subsequently raised and retracted to the position shown in FIG. 7.

The loading chute 40 (FIG. 1) comprises a container support plate 280 (FIGS. 5, 6 and 8) secured to an angle bar 281 and in coplanar relation with and projecting from the upper surface 82 of the collecting platform 30. Longitudinally spaced posts 282 and 283 support the angle bar 281 and are supported by enlarged foot portions 284 and 285, respectively, which are adjustably mounted on the plate 74 of the main frame 70. A top plate 286 is fixed at the upper portions of the posts 282 and 283 by a strap 287 (FIG. 4) and projects outwardly and downwardly therefrom. Longitudinally spaced, upright side plates 288 and 289 are secured to the posts 282 and 283, respectively. The distance between the lowermost portion of the top plate 286 and the container support plate 280 is slightly less than the depth of a case to be packed, while the distance between the side plates 288 and 289 is slightly less than the width of a case to be packed. Thus, the discharge end of the chute 40 is adapted to be received by the open end of a case to be packed and the flaps of the case will fit snugly exteriorly of the walls of the chute 40.

The case support mechanism 45 (FIGS. 5, 6 and 8) is provided to support a case while the case is receiving a tier of containers from the discharge end of the chute 40 and to lower the packed case for removal by an operator. For this purpose, the case support mechanism 45 comprises a case support plate 290 that has an arm 291 with a flat case engaging surface 292 and a thumb 293 with a flat case engaging surface 294 substantially at right angles to the case engaging surface 292. The plate 290 is fixed at one end to a shaft 295 by a clamp 295' (FIG. 6). Bearings 296 (FIG. 1), which are carried by the channel plate 74, journal the shaft 295 for rotation. Se-

cured to the shaft 295 intermediate the ends thereof is a pulley 297 (FIG. 5) that has one end of a chain 298 secured thereto. The chain 298 is trained around a portion of the pulley 297 and carries a weight 299 at the other end thereof. The weight 299 imparts a turning moment to the shaft 295 through the pulley 297, which turning moment urges the shaft 295 to rotate in the clockwise direction as viewed in FIG. 5. With no load on the support plate 290, the plate 290 is raised by the weight 299 until the flat surface 292 of the arm 291 is horizontal. When the flat surface 292 of the arm 291 is horizontal, it projects from the loading chute 40 at a height slightly lower than the height of the container support plate 280 of the loading chute 40. When this occurs, the support plate 290 is adapted to seat thereon a case open at one end, such as case A of FIG. 1, for packing with the closed end of the case abutting against the thumb 293 and with the walls adjacent the open end of the case surrounding the walls of the loading chute 40 at the discharge end thereof.

After a case has been packed with containers, the shaft 295 rotates in the counterclockwise direction as viewed in FIG. 5, under the weight of the packed case and against the urgency of the weight 299. As a consequence thereof, the support plate 290 lowers until the arm 292 assumes an upright position. Although the case support plate 290 is lowered by the weight of a packed case, the movement is made smooth and uniform through the action of a sleeve bearing clutch 301 (FIG. 3), which offers a braking resistance to the lowering movement of the support plate 290. For this purpose, the clutch 301 is mounted on the shaft 295 and is driven by means of a gear 302 that meshes with a worm gear 303. The worm gear 303 is mounted on a shaft 304 for rotation therewith and the shaft 304 is continuously driven by a sprocket 305. Trained around the sprocket 305 is a chain 306 that is also trained around a sprocket 307, the sprocket 307 being fixed to the previously mentioned continuously rotating shaft 57.

For locking the case support plate 290 in either the elevated position or the lowered position, a ratchet disc 310 (FIGS. 3 and 8) is secured to the shaft 295 in fixed relation and includes teeth 311 and 312 that are spaced 90° apart in the periphery of the disc and which face in opposite directions. When the tooth 311 is engaged by a pawl 313 (FIGS. 3 and 8), the case support plate 290 is locked in the elevated position and when the tooth 312 is engaged by the pawl 313, the case support plate 290 is locked in the lowered position. The pawl 313 (FIG. 8) is mounted intermediate its ends for pivotal movement on the channel plate 74 by a pivot pin 314. A plunger arm 315 of a solenoid 316 (FIGS. 3, 8 and 11) is pivotally connected to the end of the pawl 313 opposite the end of the pawl 313 that engages the ratchet 310. The solenoid 316 is mounted on the channel plate 74 by posts 317.

When a case is to be packed with containers, an operator positions the case horizontally in receiving position with the walls adjacent the open end thereof surrounding the walls of the discharge end of the loading chute 40. At this time, the support arm 291 of the loading mechanism 45 is in a lowered, upright position and the pawl 313 is in engagement with the tooth 312 of the ratchet 310. By placing a case to be packed in the container tier receiving position, the lower flap of the case actuates a normally open switch 320 (FIGS. 3, 8 and 11) to close the contacts thereof. The switch 320 is mounted on the channel plate 74 below the loading chute 40. The closing of switch 320 energizes the solenoid 316 through normally closed contacts 321 of a switch 322 (FIG. 11) by a suitable source of electrical energy, not shown, connected in series therewith. Upon energizing the solenoid 316, the pawl 313 is removed from engagement with the tooth 312, and the shaft 295 is rotated in the counterclockwise direction as viewed in FIG. 3, by the weight 299 to elevate the support arm 292 of the support plate

290 to its horizontal position and to rotate the ratchet disc 310. Mounted on the shaft 295 in fixed relation is a cam 325, which is arranged to open for a short time duration the contacts 321 of the switch 322 before the arm 292 of the case support plate 290 reaches the horizontal position, thereby de-energizing the solenoid 316. When the arm 292 of the case support plate 290 reaches the horizontal position, the ratchet disc 310 has rotated far enough for the tooth 311 thereof to be engaged by the pawl 313, thus locking the support plate 290 in its elevated, loading position.

After the case is packed with a tier of containers and is ready for lowering, a switch 326 (FIGS. 3 and 11) is actuated by a cam 327 to close the contacts thereof. The cam 327 (FIGS. 3 and 7) is fixed to the shaft 128 and closes for a short time duration the contacts of the switch 326, which are connected in parallel with the contacts of switch 320 and the contacts 321 of switch 322. The closing of the contacts of the switch 326 (FIG. 11) energizes the solenoid 316 to remove the pawl 313 from engagement with the tooth 311 of the ratchet 310. Thereupon, the case support plate 290 is lowered by the weight of the packed case. The lowering of the case support plate 290 rotates the shaft 295 in a clockwise direction as viewed in FIG. 3. When the arm 292 of the case support plate 290 reaches the upright position, the contacts of switch 326 have opened and the ratchet disc 310 has rotated far enough for the tooth 312 of the ratchet disc 310 to be engaged by the pawl 313 and thus lock the support plate 290 in the lowered position so that the filled case can easily be removed therefrom.

The switch 322, which is mounted on the channel plate 74 (FIGS. 1 and 6), also includes normally open contacts 323 (FIG. 11). When the switch 322 is actuated by the cam 325 to open the contacts 321 thereof, contacts 323 of the switch 322 are closed. The contacts 323 of switch 322 are connected in series with the contacts of the previously mentioned control switch 181 (FIG. 11). As heretofore described, the contacts of the switch 181 are closed when a desired tier pattern of containers is completed on the collecting platform 30 and the leading containers in the lanes 135a-135d engage the sensing fingers 140a-140d, respectively. The contacts 323 of switch 322 and the contacts of switch 181 are connected in series with a conventional clutch-brake control circuit 330 (FIG. 11) which controls the operation of a clutch-brake 331 (FIGS. 3 and 7) in a manner that will presently be explained. The clutch-brake control circuit 330 has a suitable source of electrical energy, not shown, connected thereto. Connected in parallel with the serially connected contacts 323 of switch 322 and the contacts of switch 181 are the contacts of switch 341 (FIGS. 3 and 11), which is mounted on the pedestal 248 in the path of the carriage 236. When the carriage 236 is in its retracted, or rearmost position, the contacts of switch 341 are open, and when the carriage 236 moves away from its retracted position, it disengages the switch 341 to close the contacts of switch 341.

The clutch-brake 331 is supported by the channel plate 74 and the input end thereof is driven by a sprocket 332 that has a chain 333 trained therearound. The chain 333 is trained around a sprocket 334 that is secured to the continuously driven shaft 57 for rotation therewith. The output of the clutch-brake 331 drives intermittently a shaft 335. At one end of the shaft 335 is a bevel gear 336 that meshes with a gear 337. The gear 337 is keyed to the shaft 257 that operates the pusher mechanism 35. At the other end of the shaft 335 is keyed a sprocket 338 that has a chain 339 trained therearound. The chain 339 is trained around a sprocket 340, which is secured to the shaft 128. As previously described, the shaft 128 controls the positioning of the guide bars 100a-100d, the stop pins 190a-190d and the support plate 144 which supports the sensing fingers 140a-140d.

Thus, closing of contacts 323 of the switch 322 for a short time duration and closing of contacts of the switch

181 (FIG. 11) in response to completion of a desired tier of containers on the platform 30 energizes the control circuit 330 to engage the clutch and to disengage the brake of the clutch-brake (FIG. 3) to rotate the shafts 257 and 128. Thereupon, the carriage 236 moves forward, and, in doing so, it disengages the switch 341, thereby closing the contacts of switch 341 to maintain the control circuit 330 energized. When the carriage 236 is retracted to its rearmost position, the carriage 236 actuates the switch 341 to open the contacts thereof, thereby de-energizing the control circuit 330. In so doing, the clutch of the clutch-brake 331 is disengaged and the brake of the clutch-brake 331 is engaged.

In the operation of the case packing machine 20, an open end case (such as case A of FIG. 1) is placed in horizontal alignment with the discharge end of the loading chute 40 so that the walls of the case adjacent the open end thereof surround the walls of the discharge end of the chute 40. Thereupon, the lower flap of the case to be packed engages the switch 320 (FIGS. 3, 8 and 11) to close the contacts thereof to complete an operating circuit for the solenoid 316. Upon energizing the solenoid 316, the plunger 315 is retracted to pivot the pawl 313 about the pivot pin 314, thereby removing the pawl 313 from engagement with the tooth 312 of the ratchet 310. As a consequence thereof, the weight 299 causes the shaft 295 to rotate in the counterclockwise direction as viewed in FIG. 8, thus raising the case support plate 290. When the arm 291 of the case support plate 290 reaches its horizontal position, the tooth 311 is aligned for engagement with the pawl 313. Such rotation of the shaft 295 rotates the cam 325 (FIG. 3) causing the contacts 321 of the switch 322 to open. The opening of the contacts 321 de-energizes the solenoid 316 and the pawl 313 engages the tooth 311 to lock the case support plate 290 in the elevated, tier receiving position. When the contacts 321 of switch 322 are opened, contacts 323 of switch 322 are closed to prepare an operating circuit for the clutch-brake control circuit 330.

As above explained, the conveyor 25 operates continuously to advance upright containers in parallel and adjacent files onto the collecting platform 30. Until a complete case load, or charge, of the containers has been assembled on the platform 30, the guide bars 100a-100e, inclusive, are projecting above the upper surface 82 of the collecting platform 30 and serve to define the lanes 135a-135d for guiding the advancing containers within the parallel and adjacent files. In addition, the stop pins 190a-190d are in openings 192a-192d, respectively, removed from their article intercepting position, and the support plate 144 is disposed so that the distance between the sensing fingers 140a-140d and the discharge end of the ramp 80 is equal to the width of a case to be packed.

When a tier pattern of containers corresponding to a full case load is collected on the platform 30, the leading containers in the lanes 135a-135d, engage and move the sensing fingers 140a-140d, respectively. The sensing fingers 140a-140d are thus pivoted about the pivot pins 143a-143d, respectively, (FIG. 5) against the urgency of their associated compression springs, such as spring 146 for the sensing finger 140c, thereby moving the stop pins 167a-167d out of engagement with the shoulder 165 of the shaft 163. As a consequence thereof, the shaft 163 rotates in a clockwise direction as viewed in FIG. 4, under the urgency of the spring 174. The web 170, which is fixed to the shaft 163, actuates the control switch 181 to complete an energizing circuit for the clutch-brake control circuit 330 for engaging the clutch and disengaging the brake of the clutch-brake 331. This action results in the rotation of the shafts 257 and 128.

The rotation of the shaft 128 rotates the cylindrical cam 221 (FIGS. 3 and 8), and the cam follower roller 213 pivots the cam follower arms 210 and 212 about the axis of the bolt 217. Thereupon, the gear segment 208 actuates the gear segment 207 to rotate the shaft 198d, which in turn imparts a movement to the link 203 to

shift the stop members 190a-190d in unison from the openings 191a-191d, respectively, into the path of containers advancing from the discharge end of the conveyor 25 on to the ramp 80. Thus, advancement of containers onto the collecting platform 30 in addition to those assembled in readiness to be propelled from the platform 30 is arrested. Simultaneously, the cylindrical cam 127 (FIGS. 3 and 8) rotates with the shaft 128 causing the cam follower roller 125 to pivot the cam follower arms 117 and 122 about the axis of shaft 118. This action causes the gear segment 116 to rotate the gear segment 115 to impart a movement to the lever arm 111c (FIG. 8). The lever arm 111c actuates the link 113 (FIGS. 4 and 8) to rotate the guide bars 100a-100e, inclusive, in unison 90° in the counterclockwise direction as viewed in FIG. 6, thereby causing the flat sides 132a-132e, respectively, of the guide bars 100a-100e, respectively, to be positioned even with the upper surface 82 of the collecting platform 30 so as to bridge the grooves 101a-101e. Hence the guide bars 100a-100e are automatically removed from the paths of containers to be moved transversely from the collecting platform 30. In addition, the rotation of the guide bar 100e in the aforementioned counterclockwise direction causes the eccentric sleeve 225 to engage a wall of the opening 226 of the support plate 144 to pivot the brackets 150 and 151 about the axes of the shafts 148 and 149 to shift the support plate 144 in a longitudinal direction away from the ramp 80. In this manner, the sensing fingers 140a-140d are withdrawn from the leading containers, so increasing the distance between the discharge end of the ramp 80 and the sensing fingers 140a-140d that clearance is provided for the pusher plate 230 of the pusher mechanism 35.

The rotation of the shaft 257 rotates the cam 258, which engages the cam rollers 260 and 261, to cause the upright bar 255 to raise the rail 254. When the rail 254 is elevated, the roller 252 of the lever arm 251 is likewise raised. By raising the roller 252, the pusher support arm 232 is lowered so that the pusher plate 230 is positioned for engagement with the file of containers in the lane 135d of the collecting platform 30. Further, the rotation of the shaft 257 rotates the arm 263 causing the yoke 266 to be moved in a forward direction. This action, in turn, actuates the link 272 which causes the carriage 236 to move in the direction shown by the arrow 229. Thereupon, the support arm 232 and the pusher plate 230 are moved in a forward direction to advance the accumulated tier of containers through the chute 40 into the case supported by the case support mechanism 45. As the carriage 236 is moved forwardly, the contacts of the switch 341 are closed to maintain the clutch-brake control circuit 330 energized throughout a full cycle of the apparatus.

When the shaft 128 completes a full revolution, the guide bars 100a-100e are rotated 90° in the clockwise direction as viewed in FIG. 6, to project above the collecting platform 30 and thereby define the lanes 135a-135d and the stop pins 190a-190d are removed from the article intercepting position to the openings 192a-192d. In addition, the support plate 144 is returned to its initial position so that the distance between the discharge end of the ramp 80 and the sensing fingers 140a-140d is equal to the width of the packing case.

As the sensing fingers 140a-140d are withdrawn from the leading containers in lanes 135a-135d, sensing fingers 140a-140d move away from the support bar 144 under the urgency of their associated compression spring, such as spring 146. When this occurs, the shaft 163 is turned counterclockwise (FIG. 4) under the urgency of spring 146 until the stop pins 167a-167d again engage the shoulder 165 of the shaft 163. The web 170 rotates with the shaft 163 to actuate the switch 181 in a manner opening the contacts thereof. However, the control circuit 330 for the clutch-brake 331 is not broken at

this time, because the switch 341, which is shunted thereacross, remains closed.

The shaft 257 makes one complete revolution each time the shaft 128 completes one revolution. During the last half of the rotation of the shaft 257 for each cycle, the pusher plate 230 is raised and then retracted to its rearmost position. When the pusher plate 230 reaches its rearmost position, the carriage 236 actuates the switch 341 to de-energize the control circuit 330, thereby disengaging the clutch and engaging the brake of the clutch-brake 331 and thus causing both shafts 128 and 257 and the various mechanisms driven thereby to become idle in position wherein they are in readiness for commencement of another operating cycle of the case loader 20. Upon nearing completion of a full revolution of the shaft 128, the switch 326 is actuated by the cam 327 for a short time duration to close the contacts thereof, thereby energizing the solenoid 316. This removes the pawl 313 from engagement with the tooth 311 of the ratchet 310. Consequently, the case support arm 290 lowers under the weight of a packed case, the shaft 295 rotates in the clockwise direction as viewed in FIG. 3, and, when the arm 291 reaches a vertical position, the tooth 312 of the ratchet 310 is engaged by the pawl 313 to lock the case support plate 290 in its lowered position. An operator removes the packed case from the case support mechanism 45, whereupon the above described operation can be repeated to pack the succeeding end-opening case.

It will be understood that modifications and variations of the embodiments of the invention disclosed herein may be resorted to without departing from the spirit of the invention and the scope of the appended claims.

Having thus described my invention, that which is claimed as new and for which protection by Letters Patent is desired is:

1. A machine for packing articles into a case comprising a collecting platform for receiving articles advancing along a path, said collecting platform having a plurality of parallel grooves formed in the upper surface thereof and extending in the general direction of said path, a generally semicylindrical guide bar for each of said grooves, means rotatably mounting said guide bars in their associated grooves for movement from a position projecting above said collecting platform to a position even with the upper surface of said collecting platform, said guide bars when projecting above said collecting platform being arranged to guide the articles received by said collecting platform into parallel lanes, means for advancing the articles on said collecting platform transversely of said lanes, a case loading chute disposed in the path of the articles advancing transversely of said lanes, and means connected to said guide bars for rotating said guide bars from the position projecting above said collecting platform to the position even with the upper surface of said collecting platform to remove said guide bars from the path of articles advancing toward said loading chute.

2. A machine for packing articles into a case comprising a conveyor for advancing files of articles along a path, a collecting platform positioned to receive the files of articles advanced by said conveyor, guide members mounted on said collecting platform for movement from a position projecting above said collecting platform to a retracted position, said guide members when projecting above said collecting platform being adapted to guide the files of articles received by said collecting platform into lanes to form a tier of articles, a pusher mechanism adjacent said collecting platform for advancing the tier of articles transversely of said lanes, a case loading chute disposed in the path of the tier of articles advancing transversely of said lanes, a sensing finger disposed in each lane of said collecting platform and engageable by the leading article of the file of articles in its associated lane, means mounting said sensing fingers for movement in a direction away from the leading articles in engage-

ment therewith, and means responsive to engagement between the leading article of each file of articles and its associated sensing finger for operating said pusher mechanism to advance the tier of articles toward said case loading chute and for withdrawing said guide members from the position projecting above said collecting platform to the retracted position to remove said guide members from the path of the tier of articles advancing toward said loading chute and for shifting said sensing finger mounting means in a direction away from the leading articles of the files of articles to provide clearance for movement of said pusher mechanism.

3. A machine for packing articles into a case comprising a conveyor for advancing files of articles along a path, a collecting platform positioned to receive the files of articles advancing by said conveyor, guide members mounted on said collecting platform for movement from a position projecting above said collecting platform to a retracted position, said guide members when projecting above said collecting platform being adapted to guide the files of articles received by said collecting platform into lanes to form a tier of articles, a pusher mechanism adjacent said collecting platform for advancing the tier of articles transversely of said lanes, a case loading chute disposed in the path of the tier of articles advancing transversely of said lanes, an article sensing finger disposed in each lane of said collecting platform and engageable by the leading article in its associated lane, means mounting said sensing fingers for movement in a direction away from the leading articles in engagement therewith, and means responsive to engagement of said leading articles with their associated sensing fingers for withdrawing said guide members from the position projecting above said collecting platform to the retracted position, for removing said guide members from the path of the tier of articles advancing toward said loading chute, and for shifting said sensing finger mounting means away from the leading articles of the files of articles to provide clearance for movement of said pusher mechanism.

4. A machine for packing articles into a case comprising a conveyor for advancing files of articles along a path, a collecting platform positioned to receive the files of articles advanced by said conveyor, guide members mounted on said collecting platform for movement from a position projecting above said collecting platform to a retracted position, said guide members when projecting above said collecting platform being adapted to guide the files of articles received by said collecting platform into lanes to form a tier of articles, a pusher mechanism adjacent said collecting platform for advancing the tier of articles transversely of said lanes, a case supporting mechanism for supporting a case adjacent said collecting platform in position to receive the articles advancing transversely of said lanes, an article sensing finger disposed in each lane of said collecting platform and engageable by the leading article of the file of articles in its associated lane, and means responsive to concurrent engagement of said leading articles with their associated sensing fingers and arrival of a case in position to receive the tier of articles from said collecting platform for withdrawing said guide members from the position projecting above said collecting platform to the retracted position to remove said guide members from the path of the tier of articles advancing toward said case and for operating said pusher mechanism.

5. An article handling machine having in combination, a collecting platform having an upper surface for receiving articles advancing along a predetermined path, said collecting platform having therein a plurality of openings extending in the general direction of said path, a generally semicylindrical guide bar in each opening and rotatable therein from a position projecting above said collecting platform to a position even with the upper surface of said collecting platform, said guide bars when projecting above said collecting platform being arranged to guide the articles received by said collecting platform

in adjacent lanes, means for advancing the articles on said collecting platform transversely of said lanes, and means connected to said guide bars for rotating said guide bars from the position projecting above said collecting platform to the position even with the upper surface of said collecting platform to remove said guide bars from the path of articles advancing transversely of said lanes.

6. A machine for packing articles into a case comprising a collecting platform for receiving articles advancing along a path, said collecting platform having a plurality of semicylindrical grooves formed in the upper surface thereof and extending in the general direction of said path, a generally semicylindrical guide bar in each of said grooves and rotatable therein from a position projecting above said collecting platform to a position even with the upper surface of said collecting platform, the diameter of each of said guide bars being substantially equal to the diameter of the associated groove, said guide bars when projecting above said collecting platform being arranged to guide the articles received by said collecting platform into adjacent lanes, means for advancing the articles on said collecting platform transversely of said lanes, and means connected to said guide bars for rotating said guide bar from the position projecting above said collecting platform to the position even with the upper surface of said collecting platform to remove said guide bars from the path of articles advancing transversely of said lanes.

7. A machine for packing articles into a case comprising a collecting platform having a planar surface for receiving articles advancing along a path, means for advancing the articles on said surface transversely of said path, guide bars mounted on said collecting platform for movement between a projected and a retracted position relative to the platform, said guide bars being arranged when in said projected position to guide into lanes and temporarily retain in the lanes articles moving along said path on the surface of said collecting platform and when in said retracted position being in planar alignment with said surface wherein said guide bars cooperate with said surface to provide said collecting platform with a substantially uninterrupted article supporting surface, a case loading chute in the path of the articles advancing transversely of said lanes, and means connected to said guide bars for moving said guide bars from the projected to the retracted position prior to advancing articles on said collecting platform transversely of said path.

8. An article handling machine having in combination, an article collecting platform having an upper surface for receiving articles advancing along a path and provided with an opening therein for each of a plurality of article guide bars, said openings extending longitudinally of said path, a guide bar in each opening, said guide bars being movable in said openings between a position projecting above the upper surface of said collecting platform to guide articles moving thereon into lanes and a position bridging said openings to close said openings and thereby cooperate with said collecting platform in defining a continuous upper surface on which the articles can be moved transversely of said lanes, and means for advancing articles on said collecting platform transversely of said lanes when said guide bars are in a position bridging said openings.

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