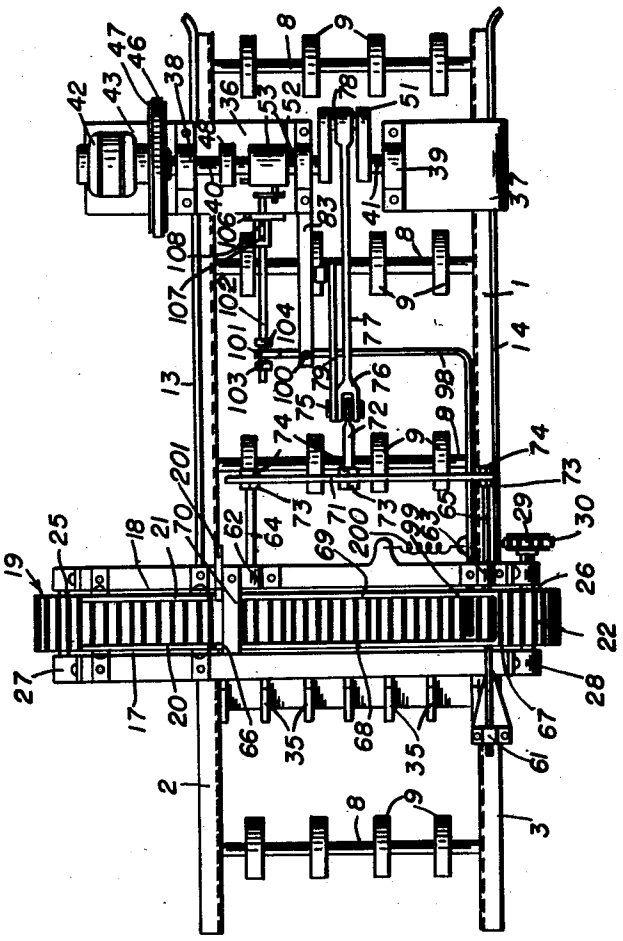
July 7, 1953 E. H. BRITT 2,644,626

AUTOMATIC CRATE LOADING MACHINE

Filed April 16, 1947 4 Sheets-Sheet 1

Fig. 1.



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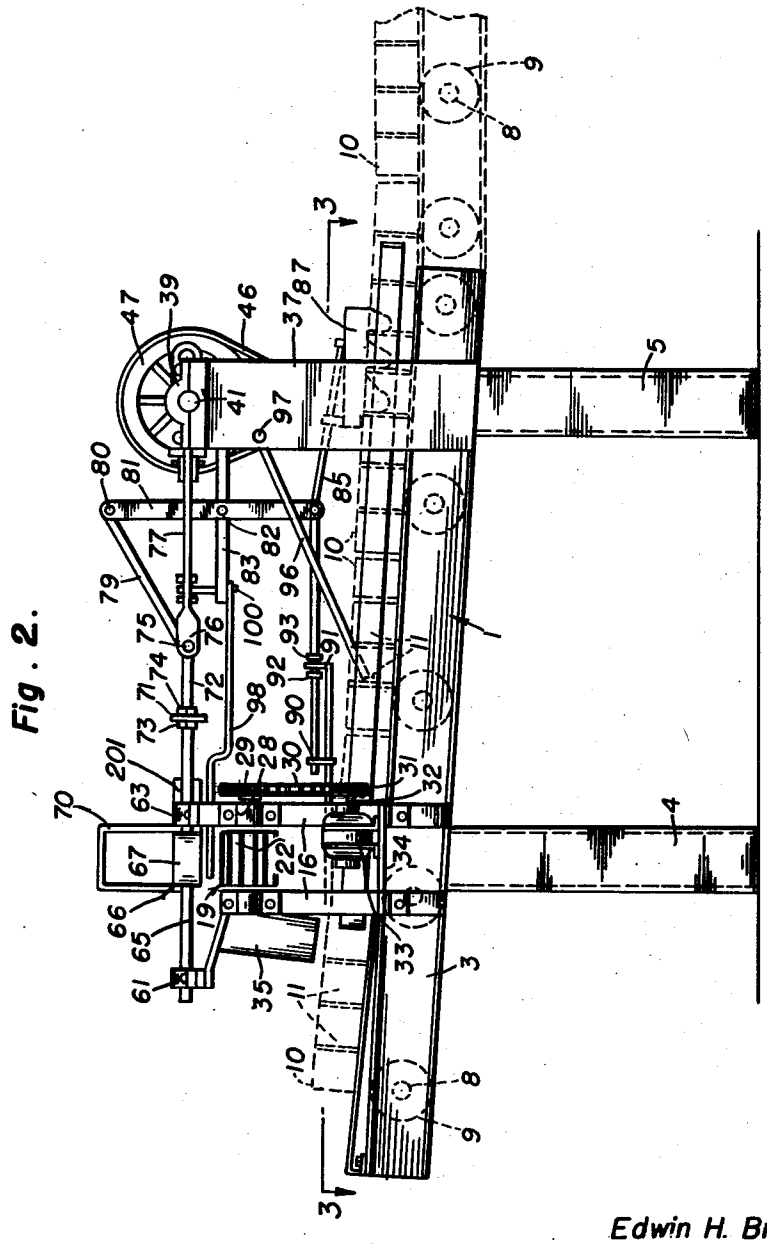
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AUTOMATIC CRATE LOADING MACHINE

Filed April 16, 1947 4 Sheets-Sheet 2

Fig. 2.



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AUTOMATIC CRATE LOADING MACHINE

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Fig. 3.

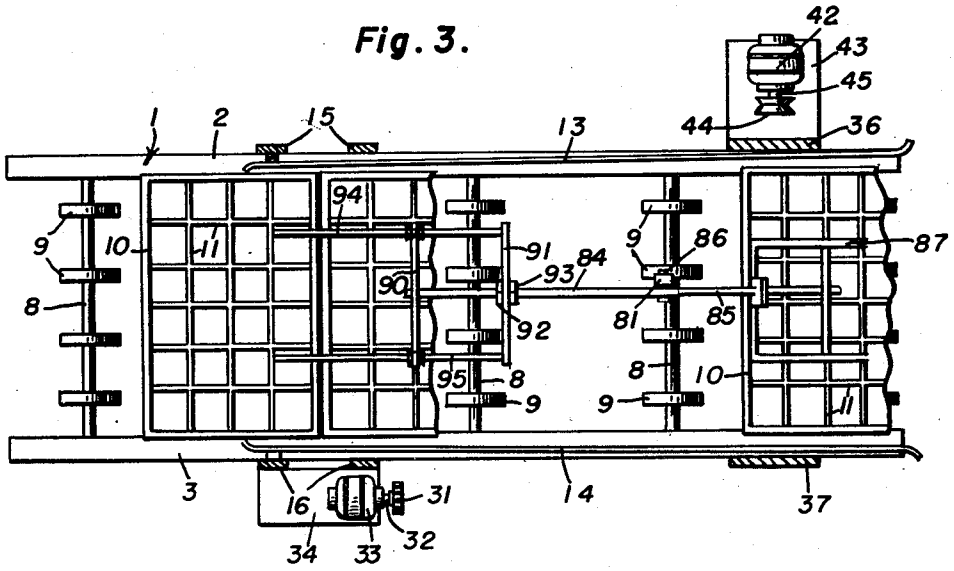
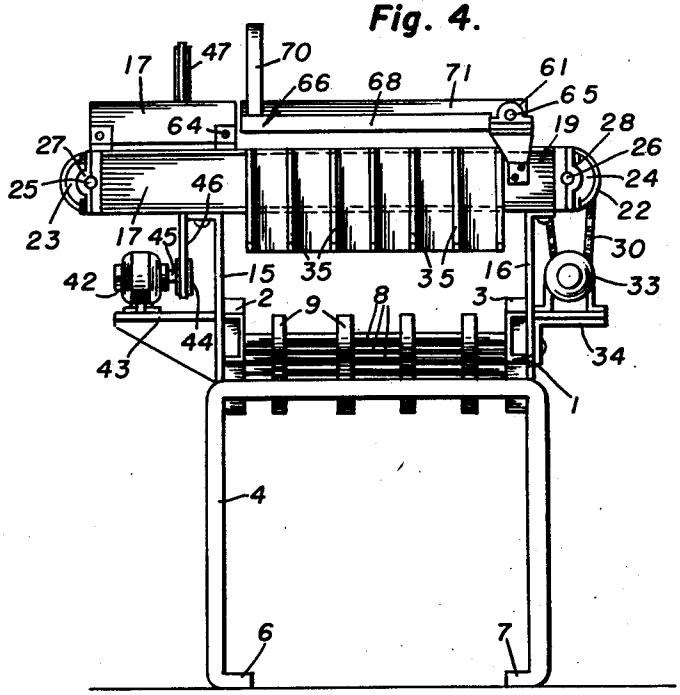


Fig. 4.



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July 7, 1953 E. H. BRITT 2,644,626

AUTOMATIC CRATE LOADING MACHINE

Filed April 16, 1947 4 Sheets-Sheet 4

Fig. 5.

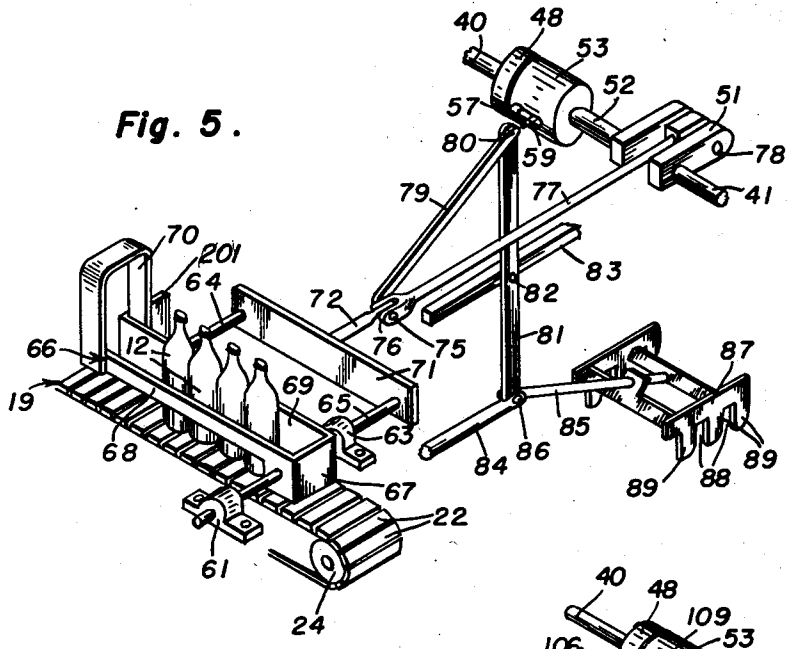


Fig. 6.

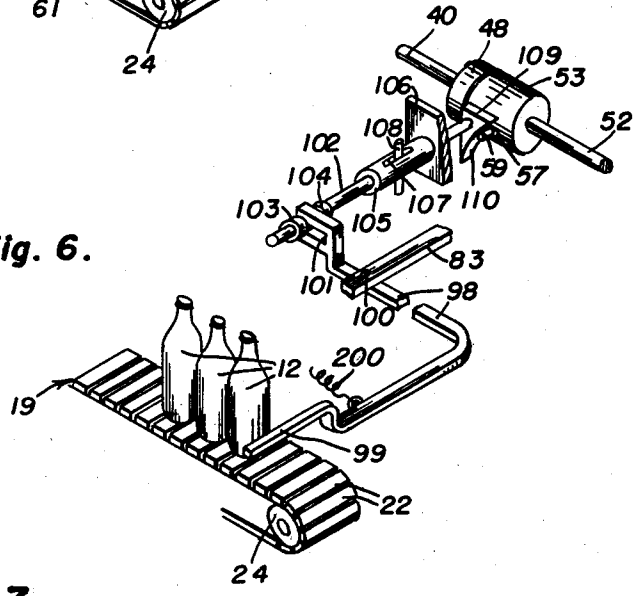
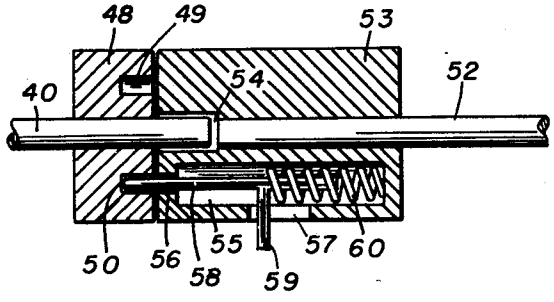


Fig. 7.



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Patented July 7, 1953 2,644,626

UNITED STATES PATENT OFFICE

2,644,626

AUTOMATIC CRATE LOADING MACHINE

Edwin H. Britt, Raleigh, N. C., assignor, by mesne assignments, to Harris Foundry and Machine Company, Cordele, Ga., a corporation of Georgia

Application April 16, 1947, Serial No. 741,788

6 Claims. (Cl. 226—14)

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This invention relates to improvements in automatic crate loading machines.

An object of the invention is to provide an improved automatic crate or case loading machine which will automatically feed empty bottle crates or cases under a series of bottle guide chutes or slots in a synchronized step-by-step manner while filled beverage bottles are fed along an endless conveyor above said crates or cases for intermittently operating a trigger mechanism for actuating a clutch which will operate a bottle carrier, causing the same to move a number of bottles positioned therein from said conveyor to slide down said bottle guide chute or slots into the crate or case disposed therebelow, after which the bottle carrier will be retracted to its original position and the crate or case will be moved forwardly to permit the filling of the next unfilled row of pockets upon the following operation or cycle of operation of said machine.

Another object of the invention is to provide an improved automatic crate or case-loading machine which will be operated by a suitable electric motor or motors to automatically feed empty bottle cases along a trackway below a transversely disposed endless conveyor which will move filled beverage bottles to a point adjacent a series of bottle guide chutes or slots overlying said cases, said bottles entering a bottle carrier and when filled, the bottles will trip a trigger for operating a clutch for causing the bottle carrier to move the bottles received therein from the endless conveyor to drop down said bottle guide chutes or slots into a case momentarily held motionless therebelow, after which the bottle carrier will be retracted to its original position and a crate or case engaging pawl or pulling member will pull the cases forwardly while a case pushing member will advance the case being filled to the proper position for filling the next rows of pockets or compartments when the next cycle of operation is accomplished, and means being provided for preventing retrograde movement of said cases after being moved or advanced along their supporting trackway while being filled.

A further object of the invention is to provide an improved automatically operated crate or case-loading machine which will positively and efficiently load filled beverage bottles into cases as the same are fed to and through the machine, and said machine being relatively inexpensive to manufacture and produce.

Other objects will appear as the description proceeds.

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In the accompanying drawings which form a part of this application,

Figure 1 is a plan view of the improved automatic bottle crate or case-loading machine;

Figure 2 is a side elevation of the improved automatic bottle crate or case-loading machine;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2;

Figure 4 is an end elevation of the improved automatic crate or case-loading machine;

Figure 5 is a perspective view of one end of the endless conveyor for the beverage bottles showing the bottle carrier and interconnected crate or case-advancing pawl or member with the clutch and crank operating mechanism therefor;

Figure 6 is a perspective view of one end of the endless conveyor for the beverage bottles showing the bottle-actuated trigger and clutch mechanism associated therewith; and

Figure 7 is an enlarged longitudinal sectional view through the clutch mechanism.

Like characters of reference are used throughout the following specification and the accompanying drawings to designate corresponding parts.

In carrying out the invention, there is provided an improved automatic crate or case-loading machine including an upwardly inclined frame generally designated by the reference numeral 1 including the U-shaped side frame rails or tracks 2 and 3, which are supported upon the longitudinally spaced inverted U-shaped legs 4 and 5 also formed of channel members bent inwardly at their lower extremities to form the supporting feet 6 and 7.

A plurality of transversely extending spaced shafts 8 are rotatably mounted between the side frame rails or tracks 2 and 3, and support the transversely spaced rollers 9 upon which the bottle crates or cases 10 will be supported for movement from the lower end of the frame 1 to its upper or discharge end. Partitions 11 will be disposed in the bottle crates or cases 10 to form individual pockets for the bottles 12.

Side guide rails 13 and 14 will be disposed above and at the opposite sides of the side frame rails or tracks 2 and 3, and will be oppositely flared at their ends for facilitating the placing of empty crates or cases in position at the lower or entrance end of the machine.

Upwardly extending spaced supporting members 15 and 16 having outwardly bent upper ends will be secured to the side frame rails or tracks 2 and 3, and will support the side frame

members 17 and 18 of the transversely extending endless conveyor generally designated by the reference numeral 19. Oppositely disposed guide rails 20 and 21 will be disposed above the endless conveyor 19 to prevent the beverage bottles 12 from falling from the sectional conveyor belt 22 which is mounted upon the rollers 23 and 24, which, in turn, are mounted on the cross shafts 25 and 26 in the bearings 27 and 28 disposed at the opposite ends of said endless conveyor 19.

A sprocket wheel 29 is secured to the end of the shaft 26 at the inner end of the endless conveyor 19 and is connected by means of the chains 30 with the sprocket wheel 31 mounted upon the shaft 32 of an electric motor 33 which is supported upon the bracket 34 attached to the upwardly extending spaced supporting members 16, for driving the endless conveyor 19.

A series of downwardly angled bottle guide chutes or slots 35 are positioned laterally of the conveyor belt 22, with their upper ends approximately flush with and on the same level as the upper run of the conveyor 22, for guiding the groups of bottles 12 into the pockets formed by the partitions 11 in the cases 10 when disposed immediately below said guide chutes or slots.

Upwardly and inwardly extending supporting frame members 36 and 37 are supported by the side frame rails or tracks 2 and 3, and have the bearings 38 and 39 attached thereto for rotatably supporting the aligned shafts 40 and 41 respectively.

An electric motor 42 is mounted upon the bracket 43 and supports a pulley 44 upon its shaft 45. A belt 46 is disposed over the pulley 44 at its lower end, and has its upper end disposed over the large pulley wheel 47 secured upon the outer end of the shaft 40.

A clutch mechanism is provided and comprises a clutch disk head 48 secured to the inner end of the shaft 40 which extends through the same and slightly beyond, and a pair of oppositely disposed, round bores or sockets 49 and 50 are formed in the inner surface thereof.

The inner end of the shaft 41 is connected to one side of a crank 51 whose other side is connected to the centrally disposed shaft 52, on the opposite end of which the other clutch disk head 53 will be loosely mounted. An axial bore 54 is provided in the outer end of the head 53 for receiving the adjacent end of the shaft 40, while a longitudinally extending offset bore 55 is formed in the head 53, having an opening 56 extending from its outer end to the outer end of said head 53. A slot 57 is formed through the side wall of the head 53 communicating with the bore 55, and the clutch pin 58 is disposed in said bore 55 having one end extending through the opening 56 for being received in either of the bores or sockets 49 or 50 when the heads 48 and 53 are clutched together. A laterally extending slidable stop pin 59 is secured to the clutch pin 58, and extends through the slot 57, while a coil projecting spring 60 will be disposed in said bore 55 about the clutch pin 58 for normally and resiliently projecting the same through the opening 56 in the end of the clutch head 53.

Three bearing brackets 61, 62 and 63 are supported upon the opposite side frame members 17 and 18 of the endless conveyor 19, and support the parallel push rods 64 and 65 to which the bottle carrier, generally designated by the reference numeral 66, is secured. The bottle carrier 66 includes an end 67, parallel spaced opposite side members 68 and 69, and an upwardly extending inverted U-shaped brace member 70. The inner ends of the push rods 64 and 65 are secured to one side of the pusher plate 71, while an arm 72 is connected to the opposite side of said plate 71. Oppositely disposed nuts 73 and 74 are provided on the rods 64 and 65 and on the arm 72 for making adjustment when necessary or desirable. At the free end of the side 69 of the bottle carrier a rearwardly extending gate 201 is provided and is of such length that it extends transversely across the conveyor 22 when the carrier is in advanced position. With the carrier in the advanced position from which bottles are dropped into the chutes, the gate 201 will be in position to block further movement of bottles with the conveyor 22 until the carrier has been returned to the position of Fig. 1 where the conveyor is again unblocked and bottles are allowed to enter between the side members 68 and 69.

The outer end of the arm 72 will be pivotally supported upon a pin 75 extending between the fork 76 on the connecting rod 77, while the opposite end of said rod 77 is pivotally supported upon the pin 78 between the arms of the crank 51.

A rod 79 will be also supported upon one end of the pin 75, and will extend upwardly and rearwardly therefrom to be connected by the pin 80 to the upper end of the rocker shaft or arm 81 pivoted adjacent its central portion upon the pin 82 on the forwardly extending supporting arm 83 attached to the frame member 36.

Forwardly and rearwardly extending rods 84 and 85 are pivoted upon the pin 86 at the bottom or lower end of the rocker arm 81, said rear arm 85 supporting the crate or case pulling pawl member 87 which is formed with the oppositely disposed spaced crate engaging notches 88 and teeth 89 in its lower edges.

The forwardly extending rod 84 is adjustably attached to the spaced cross members 90 and 91 of the crate-advancing frame, being provided with oppositely disposed nuts 92 and 93 for adjusting the frame for variations in crate or case sizes or for adjusting the push or throw of the crate-engaging arms 94 and 95 which are supported by said cross members 90 and 91 to extend forwardly thereof. The range of movement of the rod 84 is at least as great as the fore and aft dimensions of the pockets in the largest crates to be used with this machine. In many instances it is desirable to load bottles in crates having somewhat smaller dimensions. In such an event, the nuts 92 and 93 may be adjusted along the rod 84 to provide a substantial space therebetween and effecting a lost motion connection between the rod 84 and the cross member 91 of the crate advancing frame. By such an adjustment it will be apparent that the crate engaging arms or pawls 94 and 95 will not be actuated in crate-moving motion through the entire stroke of the rod 84. By this means the effective stroke of the crate engaging pawls may be adjusted to any desired value equal to or less than the stroke of the rod 84.

A safety check rod 96 is pivoted at 97 to the frame member 37, and is adapted to drop by gravity into the cases 10, to engage the partitions 11 after the cases have been advanced to hold the same from any retrograde or backward movement while the bottles are being deposited in the pockets in said crates or cases.

An L-shaped trigger bar 98 is provided with an offset end 99 adapted to overlie the endless con-

veyor belt 22, to be engaged by the bottles 12 when the desired number of bottles have entered the bottle carrier, and is pivoted upon the pin 100 in the forward end of the supporting arm 83. The opposite end of the trigger bar 98 is bent upwardly and provided with the fork 101 which extends about the clutch operating rod 102 between the stops 103 and 104. A stop or limiting sleeve 105 is supported by the frame member 106 secured to the frame member 36, and is oppositely slotted at 107 to receive the cross pin 108 supported by the clutch operating rod 102. The cross pin 108 is effective to prevent rotation of the rod 102 and cam 109 about the axis of the said rod 102, thus insuring proper orientation of the cam 109 at all times. A tension spring 200 is attached to the trigger bar 98 adjacent its front end and to the frame of the machine in the manner shown in Fig. 1. After the trigger has been tripped by bottles 12 on the conveyor 22 and the bottles pushed from the conveyor into the chutes the spring 200 will cause return of the trigger bar 98 to reposition the cam 109 within the path of circumferential movement of the element 59 of the clutch, thus insuring a single revolution of the driven shaft 52.

The clutch operating cam 109 is secured to the end of the clutch operating rod 102 and is provided with an arcuate cam surface 110 adapted to be engaged by the pin 59 in the clutch head or member 53 for disengaging the clutch heretofore described. The mechanism thus described and including the clutch parts 48 and 53 and the rod 102 and cam 109 constitute one modification of what is commonly known as a one-revolution clutch mechanism since momentary withdrawal of the cam permits rotation of the driven part 53 only until the pin 58 is retracted at the completion of a single revolution.

The mode of operation of the improved automatic crate or case-loading machine will now be described. Assuming that the electric motors 33 and 42 are connected with a suitable source of electric current supply (not shown), and that the bottles 12 are being fed to the endless conveyor 19, and crates or cases 10 are being fed to the lower end of the side frame rails or tracks 2 and 3 upon the rollers 9, and the clutch heads or members 48 and 53 are de-clutched. When the desired number of bottles 12, preferably six, enter the bottle carrier, the first bottle to enter will be forced into engagement with the trigger arm 99 disposed over the endless conveyor track 22, causing the same to rotate on its pivot 100. This action will pull the clutch actuating cam 109 away from the pin 59 which held the clutch head 53 de-clutched from the constantly rotating clutch head 48 which is driven directly by the electric motor 42, permitting the crank 51 to make one complete revolution.

In making one rotation, the bottle carrier will be pushed forwardly to slide the bottles 12 from the conveyor belt 22 into the bottle guide chutes or slots 35 where they will drop into the pockets in a crate 10 disposed upon the side frame rails or tracks 2 and 3, at the same time moving the crate pulling pawl or member 87 rearwardly to secure a hold further back upon the crate 10 at the entrance to the rails or tracks 2 and 3. At the same time gate 201 will be moved to block further advance of bottles along conveyor 22 while the carrier is in its advanced position. Simultaneously the crate-engaging and advancing arms 94 and 95 will be retracted ready to

push the crates being loaded to the proper position to fill the next row of pockets, which action will occur as soon as the bottles have been dropped into the crate 10. The bottle carrier will then be retracted, and due to spring 200 the trigger arm will be returned to its normal position and cam 109 will be repositioned to disengage the clutch after one complete revolution, all of these operations taking place during the time the crank 51 is making one complete rotation, thus completing the cycle of operation.

The bottles 12 will again advance into the bottle carrier since gate 201 will have been again retracted and the same procedure will be repeated as long as bottles and crates are fed to the machine, and the machine is kept running.

From the foregoing description, it will be apparent that there has been devised and provided a highly efficient form of automatic crate-loading machine which is relatively inexpensive to manufacture and produce.

While the preferred embodiment of the instant invention has been illustrated and described, it will be understood that it is not intended to limit the scope of the invention thereto, as many minor changes in detail of construction may be resorted to without departure from the spirit of the invention.

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

1. In a crate loading machine, a conveyor for moving articles to a loading station, crate advancing means to move empty crates to said loading station in position to receive articles from said conveyor, reciprocable means movable transversely across said conveyor at said loading station to move articles from said conveyor to a crate, an oscillatable lever pivoted intermediate its ends, one end of said lever overlying said conveyor at said loading station to be engaged and moved by an article thereon, driving means for said reciprocable means, said driving means including a normally disengaged one-revolution clutch mechanism, the other end of said lever being connected to said clutch whereby actuation of said lever by an article on said conveyor will effect a single cycle of operation of said reciprocable means.

2. In a crate loading machine, means for effecting transfer of articles from a source of supply to a crate, driving means therefor, said driving means including a one-revolution clutch comprising; a rotatable driving member, an eccentrically positioned axially extending opening in an end face of said member, a rotatable driven member axially aligned with said driving member, an eccentrically located axially movable pin on said driven member, said pin being movable into position to enter said opening, spring means urging said pin toward said driving member, a radial projection on said pin, and cam means radially movable into the circumferential path of movement of said projection whereby to move said pin away from said driving member to disconnect said driven member from said driving member.

3. In a crate loading machine, means for supplying articles to a loading station and for placing said articles in a crate, means for moving empty crates along a fixed path to predetermined positions at said loading station, said crate moving means comprising; an oscillatable lever, one end of said lever being swingable in the direction of movement of said crates, a pair of links piv-

oted to the said one end of said lever and extending in opposite directions therefrom along said path, said links being of such length that their ends overlie different crates, and crate engaging means carried by each link adjacent its free end.

4. In a crate loading machine, a conveyor for moving articles to a loading station, reciprocable means movable transversely across said conveyor at said loading station to move articles from said conveyor to a crate, an oscillatable lever pivoted intermediate its ends, one end of said lever overlying said conveyor at said loading station to be engaged and moved by an article thereon, driving means for said reciprocable means, said driving means including a one-revolution clutch mechanism having an element normally in position to keep said clutch disengaged, the other end of said lever being connected to said element whereby actuation of said lever by an article on said conveyor will effect withdrawal of said element to initiate a single cycle of operation of said reciprocable means.

5. In a crate loading machine, means for advancing articles along a fixed path to a loading station, reciprocable means movable transversely of said path at said loading station to move articles therefrom to a crate, cyclically operable driving means for said reciprocable means, a pivoted lever having an end portion extending across said path to be engaged and moved by an article, a uni-cyclic control element for said driving means, said lever being connected to said control element whereby actuation of said lever by an article will cause said driving means to drive said reciprocable means through a single cycle of reciprocation.

6. In a crate loading machine, a conveyor for frictionally engaging and moving articles to a

loading station, reciprocable means movable transversely across said conveyor at said loading station to move articles from said conveyor to a crate, an oscillatable lever pivoted intermediate its ends, one end of said lever overlying said conveyor at said loading station to be engaged and moved by an article thereon, driving means for said reciprocable means, a uni-cyclic control element operated by said oscillable lever and operably connected between said driving means and said reciprocable means, said driving means being arranged to drive said reciprocable means through a single cycle of reciprocation, said lever being connected to said control element and arranged to control operation of said driving means to initiate a cycle of operation thereof, said lever being yieldably resistant to actuation by articles on said conveyor until a predetermined number of abutting articles are stopped by said lever whereby the frictional engagement between said conveyor and said predetermined number of articles will be sufficient to cause actuation of said lever and initiate a cycle of operation of said reciprocable means.

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