

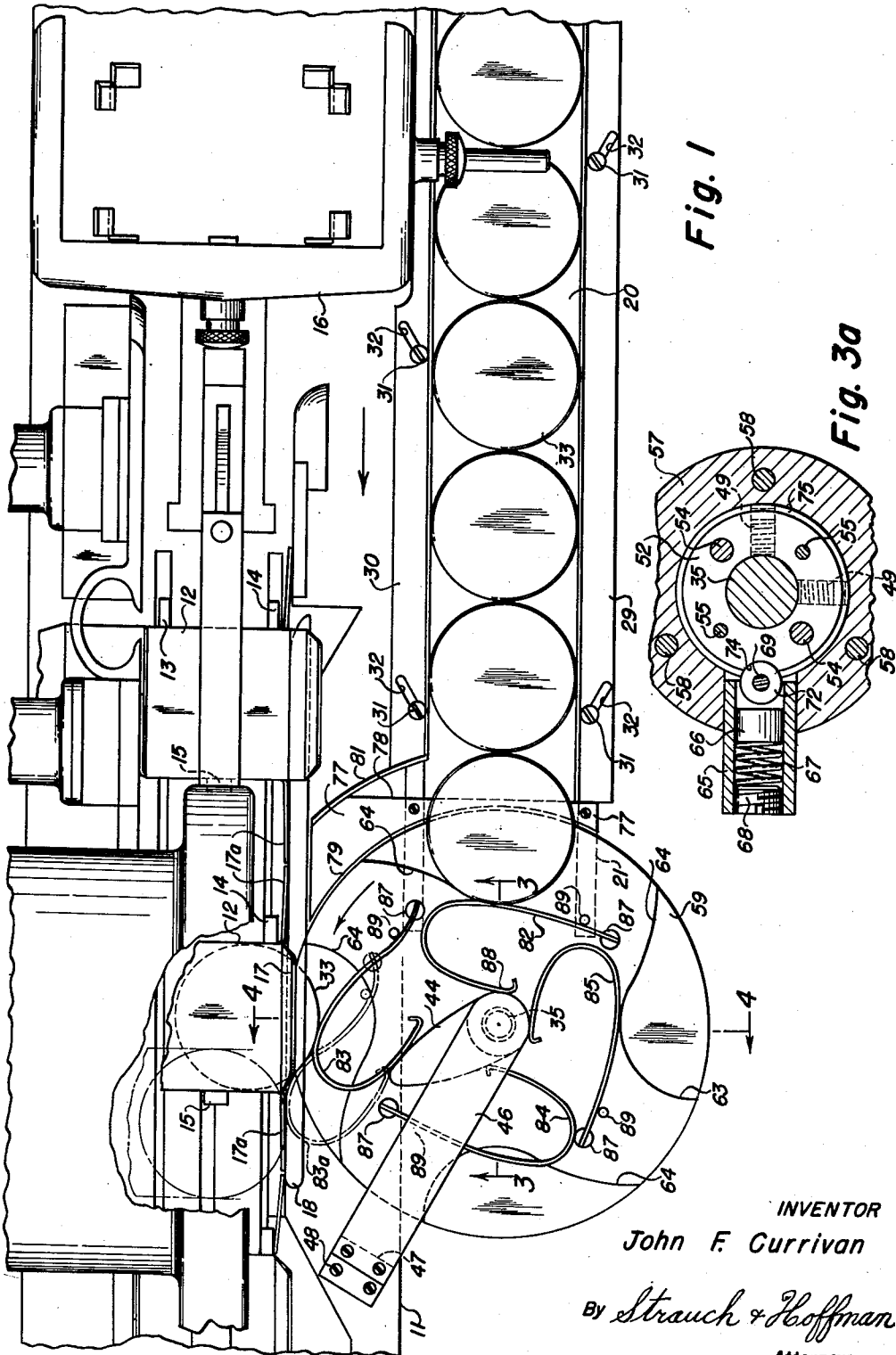
Aug. 10, 1954

J. F. CURRIVAN  
CARTON LOADING DEVICE

2,685,993

Filed March 3, 1949

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

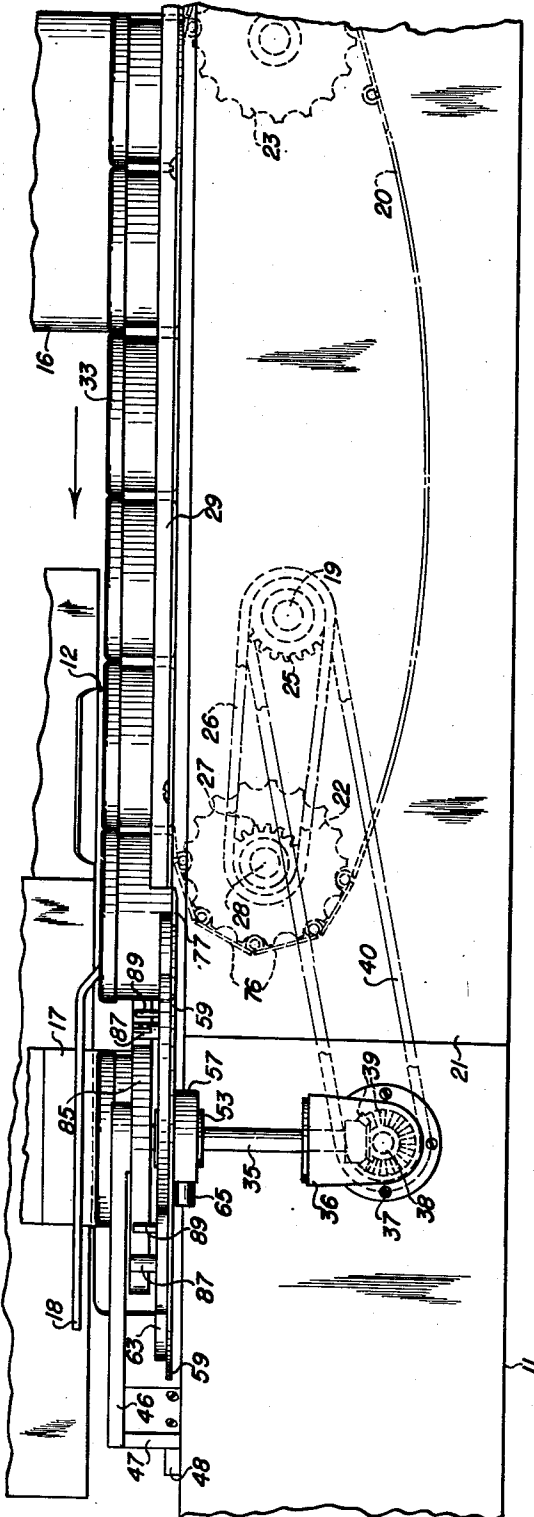


Fig. 2

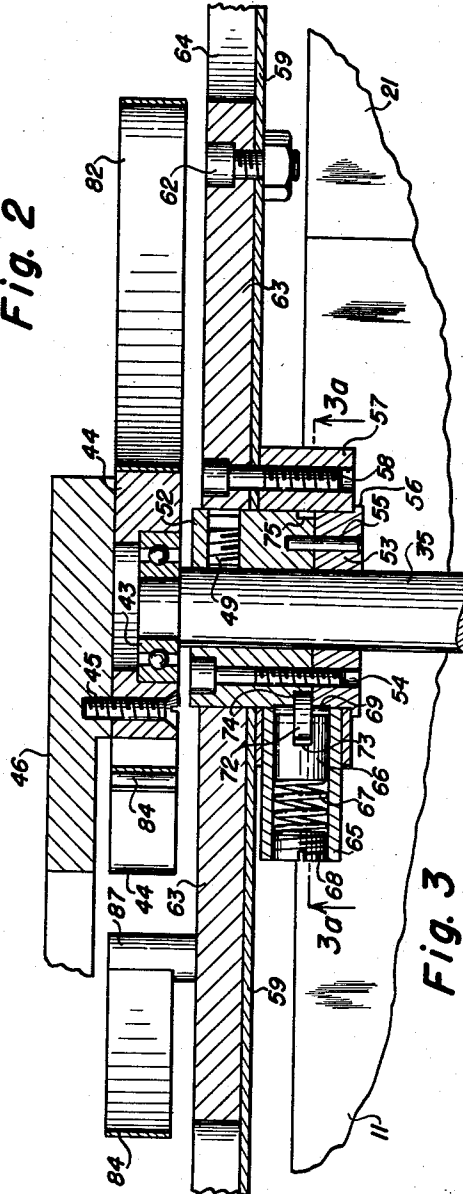


Fig. 3

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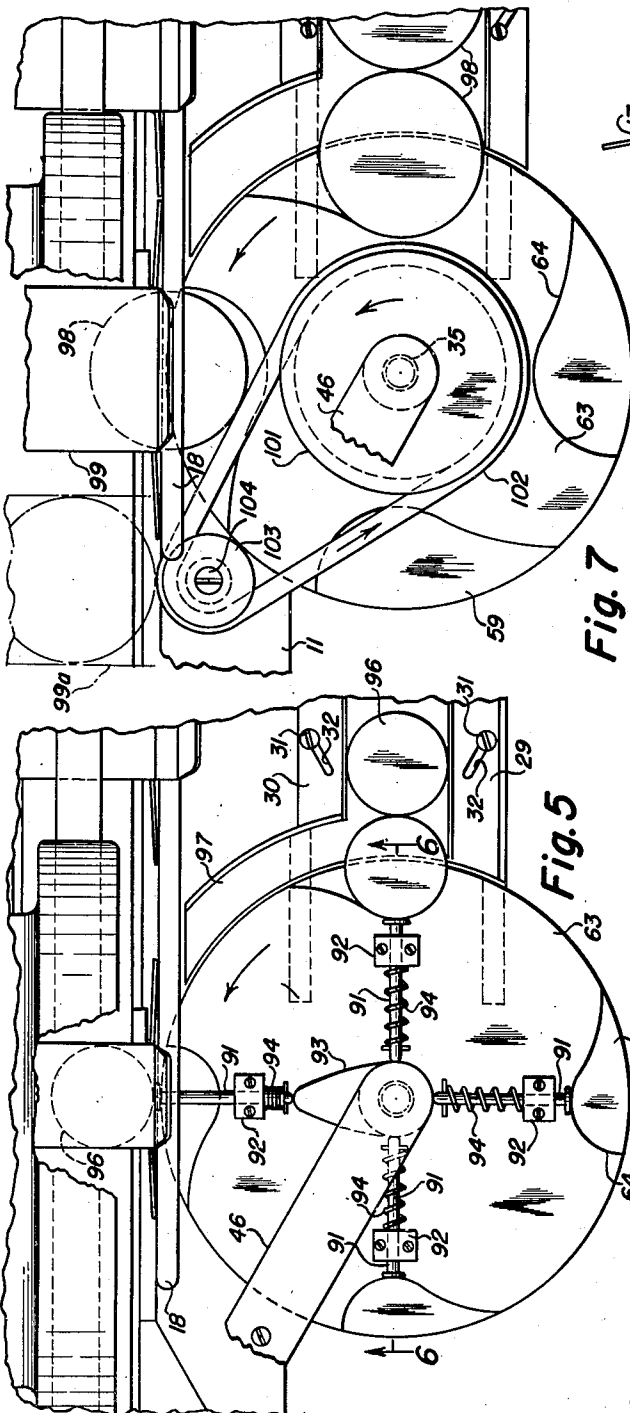


Fig. 7

Fig. 5

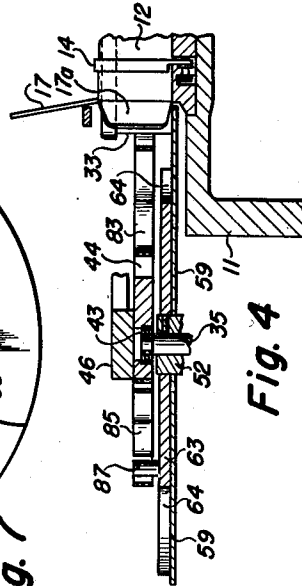


Fig. 4

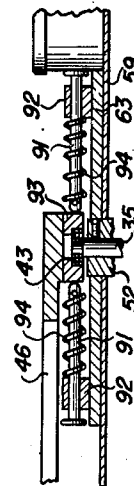


Fig. 6

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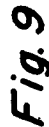
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4 Sheets-Sheet 4



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## UNITED STATES PATENT OFFICE

2,685,993

## CARTON LOADING DEVICE

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Company, a corporation of Delaware

Application March 3, 1949, Serial No. 79,439

25 Claims. (Cl. 226—14)

1

This invention relates to packaging machinery for placing articles into suitable containers such as cartons, and in particular it relates to improvements in devices for transferring the articles from their conveyor to the containers on another conveyor.

One form of cartoning machine to which the invention is applicable is shown and described in the application of A. H. Ross Serial No. 731,395 filed February 27, 1947, for "Cartoning Machine." In general, in machines of the type shown in that application, flattened cartons are fed to a carton conveyor or "transport" upon which they are erected to rectangular shape and then loaded with the article to be packaged, after which the carton flaps are closed. The cartons are carried by the transport with their open ends facing the side thereof so that they can be loaded through the open ends while the transport is moving continuously. The articles to be loaded into the cartons approach the transport on a loading conveyor and are transferred from the loading conveyor to the cartons on the transport. Several types of mechanisms to effect this transfer have been used in the past, one, for example being illustrated in U. S. Patent No. 2,440,866, and it is the applicant's purpose to provide a simplified mechanism for this purpose. Because of its simplified construction the applicant's device is easily adapted to load the articles into the cartons in layers, with the top layer resting upon the layer beneath it, all layers being inserted simultaneously.

When the articles to be loaded into the cartons are of suitable size and shape so that they can be handled by a loading device of the type disclosed herein, the bucket conveyor with its rectilinearly movable buckets, as disclosed in the aforesaid application Serial Number 731,395, or in the applicant's copending application Serial No. 19,625, filed April 7, 1948, now Patent Number 2,642,212, for Tilting Bucket Bottle Loader, may be dispensed with, and the articles may be transferred directly from a simple endless belt type of conveyor directly to the cartons on the transport.

It is accordingly a primary object of the invention to provide a new and improved apparatus for transferring articles from one conveyor and inserting them into cartons or the like carried by another conveyor.

It is another important object of my invention to provide a new and simplified apparatus for loading articles into cartons traveling on a continuously moving conveyor and which is adaptable to load stacks of vertically arranged articles into a carton.

2

Another object is the provision of a novel apparatus having more than one loading station for inserting several articles into a carton to fill it while moving continuously along its path.

Other objects will become apparent as the description proceeds in connection with the accompanying drawings, wherein:

Figure 1 is a top plan view of a cartoning machine showing one embodiment of the loading device.

Figure 2 is a front elevation of the machine in Figure 1.

Figure 3 is an enlarged vertical sectional view of a portion of the machine along the line 3—3 of Figure 1.

Figure 3a is a sectional view of a portion of Figure 3, along the line 3a—3a of Figure 3.

Figure 4 is a vertical sectional view along the line 4—4 of Figure 1.

Figure 5 is a top plan view similar to Figure 1 but showing another embodiment of the loading device.

Figure 6 is a vertical sectional view along the line 6—6 of Figure 5.

Figure 7 is a top plan view of another embodiment of loading device.

Figure 8 is a top plan view of a machine using three of the loading devices, each of which is adapted to load four similar articles into a carton at once, so that a total of twelve articles in two layers of six each are inserted into each carton.

Figure 9 is a front elevation of the machine of Figure 8, with some of the elements omitted.

Referring to Figures 1 and 2, the carton conveyor or transport base is indicated at 11, and it houses three parallel horizontal conveyor chains (not shown) each of which carries a set of fingers that protrude upwardly through the top of the base 11 to erect and move the erected cartons 12 from right to left as viewed in these figures. The outer two of these chains carry sets of fingers 13 and 14 respectively (Fig. 1) while the central chain carries a set of fingers 15, and each carton is thus gripped between a single central finger 15 and a pair of trailing fingers 13 and 14 after it leaves the carton magazine 16 and moves to the left to be erected, filled, and its flaps closed. The details of construction of the transport are not described herein since they are fully disclosed in the aforesaid application Serial No. 731,395, and the instant invention is applicable to loading cartons carried by any other suitable type of conveyor. While passing the article loading station each carton top flap 17 is held in open position by means such as a stationary bar 18. At 19 in Figure 2 is indicated the idle or tail shaft for the

conveyors carrying the fingers 13, 14 and 15, the shaft being driven by the conveyors, and the rotary movement of shaft 19 is utilized in a manner that will be described.

A horizontal conveyor belt 20 is mounted in a suitable base 21 rigidly attached to the side of the transport base. It is trained around a driving sprocket 22 and an idler sprocket 23 with its upper run supported for operation in a horizontal plane and paralleling the movement of the carton transport conveyor. Belt 20 is driven at a speed faster than the transport conveyor by means of a sprocket 25 keyed to tail shaft 19, a chain 26 and a sprocket 27 keyed to the same shaft 28 as sprocket 22. A pair of guides 29 and 30 are adjustably secured to the top of the base 21 by screws 31 passing through slots 32 in the horizontal legs of the guides. These guides retain the jars 33 or other articles upon the conveyor belt 20 as they are moved to the left for loading into the cartons 12 by the device now to be described.

A vertical shaft 35 is journaled at its bottom end for rotation in a gear box housing 36 (Figure 2) which is secured to the side wall of the base 11 as by screws 37. The housing 36 also journals a horizontal shaft 38 that drives shaft 35 through a pair of bevel gears 39. The shaft 38 is driven at the proper speed from the tail shaft 19 by a chain 40 trained over sprockets keyed to the shafts 19 and 38.

At its upper end the shaft 35 is journaled in a ball bearing assembly 43 (see also Figs. 3 and 4) having a press fit in a cam member 44, attached as by screws 45 to the end of a bracket 46. At its other end the bracket 46 is secured to the top of the transport base 11 by means such as the members 47 and 48 and suitable screws.

Secured to the vertical shaft 35 (Fig. 3) by set screws 49 is a two piece hub having an upper part 52 and a lower part 53, secured together as by screws 54 after being correctly aligned with each other as by dowel pins 55. At its bottom, the lower part 53 has a protruding flange 56 forming a support for a sleeve 57 that is mounted on the two piece hub and rotatable with respect thereto. Also mounted on the hub, but secured to the sleeve 57 for rotation therewith by screws 58 is a horizontal circular plate 59 that has affixed to its upper surface by bolts 62 a star wheel, cylinder, or plate 63 having the same diameter as the plate 59 but having equiangularly spaced peripheral recesses or pockets 64. Thus, without the overload clutch means now to be described, the assembly comprising sleeve 57, plate 59 and pocketed cylinder or plate 63 can rotate freely about the two piece hub 52, 53.

Referring to Figures 3 and 3a, a cylindrical tube 65 is fixedly mounted in a radial bore in the sleeve 57. A cylindrical element 66 is slidably mounted in the tube 65 and urged towards the sleeve 57 by a spring 67 retained within the tube 65 by a screw 68. As best seen in Figure 3a the end of the cylindrical element 66 that faces the sleeve 57 is recessed to locate a vertical shaft 69 shorter than the bore of tube 65, and upon which is journaled for free rotation a roller 72 which has a diameter smaller than the bore of tube 65. The cylindrical element 66 has a horizontal diametrical slot 73 to receive the roller 72, the other part of the roller 72 protruding into a recess 74 in the upper part 52 of the hub. This recess 74 is coplanar with a peripheral groove 75 in the same hub part 52, but the recess 74 is deeper than the groove 75 as is apparent in

Figure 3a. The roller 72 is normally seated in the recess 74, being spring pressed therein by the spring 67, and in this manner rotation of the vertical shaft 35 is transmitted to the sleeve 57 and the plates 59 and 63 carried thereby. If however, some overload should occur that will prevent normal rotation of the plates 59 and 63, the roller 72 will be cammed out of the recess 74 and roll in the groove 75, thus allowing shaft 35 to continue its rotation without doing any damage to the articles or cartons or to the machine itself.

The top surface of the rotating circular plate 59 is in the same plane as the top surface of the conveyor belt 20, which in the illustrated example consists of a series of hinged connected platform elements 76 (Fig. 2).

The speed of the conveyor 20 is faster than that of the carton conveyor, and the jars 33 will thus be continuously urged to the left, where they will be intermittently stopped by the edge of the pocketed plate 63. This plate 63 is revolved at a fixed peripheral speed equal to the rectilinear speed of the cartons 12 on the transport. The number of pockets 64 in the plate 63 will depend upon the spacing between adjacent cartons on the transport, and in the illustrated machine the plate has four such pockets, each of which has a radial depth sufficient that when a jar 33 is pushed fully into a pocket by the conveyor 20, more than half of the jar will be resting upon the rotating circular plate 59. Each pocket 64 serves to receive a jar from the conveyor 20 and to move the jar counter-clockwise (as viewed in Figure 1) to a position where it can be pushed into a continuously moving carton. During this period, that part of the jar not resting upon the rotating plate 59 is supported by a dead plate 77 secured to the top of the base 21 and having its top surface coplanar with that of the top surface of rotating plate 59. The right edge 78 of the dead plate lies adjacent the point where the conveyor platform elements 76 start rounding their sprocket 22, and its left edge 79 is curved and lies adjacent the periphery of rotating plate 59. In order to further assure retention of the jars 33 in the pockets 64, a circular guide 81 (Fig. 1) may be affixed either to the dead plate 77, or as an extension on the adjustable guide 30 for the conveyor 20.

In the embodiment illustrated in Figures 1 to 4 the jars are individually ejected from the pockets 64 and inserted into their respective cartons in the following manner. Arranged adjacent each of the pockets 64 is a leaf spring, there being therefore four such springs identified by the reference numbers 82, 83, 84 and 85 in Figure 1. Each spring normally has a configuration similar to the spring 82 in Figure 1, and each outer end is fixed in a post 87 which is preferably non-rotatably secured to the pocketed plate or star wheel 63. Each spring is stressed so that its free end portion 88 presses against the face of the cam 44 which has a profile shown in the plan view of Figure 1. Studs 89 fixed to and projecting upwardly from the pocketed plate 63 adjacent each post 87, bear against the outer surfaces of the springs and serve to stiffen them adjacent the posts 87.

As the pocketed plate 63 is rotated counter-clockwise in Figure 1, the profile of the cam 44 is such that the springs are bent outwardly, and in so doing they eject the jars 33 from the pockets 64 and insert them into the cartons. As shown in Figure 1 one jar 33 has just fully entered the

5

pocket 64 adjacent the spring 82. The preceding pocket is 90 degrees away, in the counter-clockwise direction, and the deflection of the spring 83 by the stationary cam 44 has nearly fully inserted the jar into the carton. As the pocketed plate 63 continues its rotation the spring 83 is further deflected, until it reaches a maximum deflection indicated by the dot-dash position at 83a where the jar has been inserted fully into the carton. After passing this point the shape of the cam permits the spring 83 to return gradually to positions shown by the springs 84 and 85. In the latter position, and until 90 degrees later when the position of spring 82 is reached, the springs do not protrude into the pockets 64. It will be apparent that while the circular peripheral segments of the pocketed plate 63 are presented to the next successive jar 33 on the conveyor 20 the jars on the conveyor are held against movement, and the conveyor 20 slides beneath them. As soon as the next pocket approaches the next jar the jar can enter the pocket gradually, owing to the gradually sloping leading portion of each pocket.

The described construction thus eliminates the relatively expensive reciprocating bucket type of article loading conveyor disclosed in the aforesaid applications Serial Numbers 731,395 and 19,625. Where such types of conveyors and loading devices are not required because of special considerations, such as article size and configuration, the loading device shown herein provides a greatly simplified construction. Where the jars or other articles to be loaded are of smaller diameter than those shown in Figure 1 a different plate 63 may be substituted, having smaller pockets, and the guides 29 and 30 for the conveyor 20 may be moved closer together.

Figures 5 and 6 illustrate another embodiment similar to that of Figures 1 to 4 except that four reciprocating plungers 91, one for each pocket 64, are slidably mounted upon the pocketed plate 63 for radial reciprocating movement by means of guides 92 secured to the top of the plate 63. Each plunger is resiliently retained against the cam 93 by a compression spring 94, and the cam is so located and of such profile that a jar 95 is fully transferred into the carton at the conclusion of a 90 degree movement from the position where it fully entered a pocket 64, as shown in Figure 5. In the illustration of this embodiment the jars 95 are smaller than the jars 33 of the first embodiment, consequently the pockets 64 are smaller, the guides 29 and 30 are closer together, and the dead plate 97 is smaller than the dead plate 77. The rotating assembly is driven in the same manner as that of Figures 1 and 2 etc.

Figure 7 illustrates still another embodiment, similar in all respects to those of Figures 1 to 6, except that a different system is used for transferring the jars 98 from the pockets 64 to the cartons 99. No cam is carried by the bracket 46. A pulley 101 for a V belt is keyed to the vertical shaft 35 above the pocketed plate or star wheel 63 and below the bracket 46, and its diameter is such that the V belt 102 does not protrude into the pockets 64 while it is seated in the pulley groove. An idler pulley 103 for the belt 102 is suitably journaled for rotation upon a stud 104 fastened to the top of the transport base 11 at a point such that the belt 102 will just be touching a fully inserted jar when a carton 99 has reached the position shown in dot dash lines at 99a in Figure 7, and the jar is in the same trans-

6

verse vertical plane as the axis of pulley 103. Thus as the belt passes counter-clockwise about the pulley 101 and then travels towards idler pulley 103 it pushes the jars successively out of the pockets 64 and into the cartons. As will be understood, the stud 104 may be adjustably mounted upon the transport base 11 so that it may be shifted for cartons of different length. When jars smaller than those shown in Figure 7 are being handled, a pocketed plate, having smaller pockets 64 is substituted for the one shown. The same size pulley 101 may be used, since the only difference in operation will be that it will not contact the jars to remove them until the pocketed wheel has turned a little further.

Figures 8 and 9 show how a device constructed in accordance with my invention is adapted to load a larger number of articles into a row of cartons 106 as they are traveling without interruption from right to left. While in the illustrated machine twelve identical articles are shown being loaded into each carton it will be apparent that a larger or smaller number may be loaded in a similar manner. As shown in the plan view of Figure 8 there are three vertical shafts 107, 108 and 109 arranged along the conveyor that moves the cartons 106 from right to left. By way of example only, a conveyor similar to that of Figures 1 and 2 is represented, with pairs of trailing fingers 111 and 112 and central leading fingers 113 grasping the cartons to drive them along their path. The central vertical shaft 108 is driven at the proper speed from the carton conveyor in the same manner as described in connection with Figures 1 and 2, and shafts 107 and 109 are driven from shaft 108 by means of chains 114 and 115 (Figure 9) and suitable sprockets keyed to the shafts. Since the structures associated with or carried by each of the shafts 107, 108 and 109 are identical, only that connected with shaft 109 will be described in detail.

Referring to Figure 9, the shaft 109 has keyed to it two axially spaced identical circular plates 117 and 118 corresponding to the plates 59 of the other embodiments. Also keyed to shaft 109 and arranged in spaced relationship above plate 117 but below plate 118 are a pair of identical pocketed plates 119 and 120. Another pair of pocketed plates 122 and 123 identical to plates 119 and 122 are keyed to the shaft 109 in spaced relationship and above the upper circular plate 118. In the illustrated embodiment the articles being loaded into the cartons 106 are cans 124 having the conventional beads on their top and bottom edges, and the spacing of each pair of pocketed plates is preferably such that they lie in planes slightly spaced from the planes of the beads on the cans.

Each of the pocketed plates has four equiangularly spaced pairs of peripheral notches or pockets 126 and 127, each pair of notches being adapted to receive a pair of the cans 124, as seen in Figure 8. Each set of peripheral pockets 126, 127 in a pocketed plate is in vertical alignment with the corresponding pockets in the other three pocketed plates, so the result is that as shown in Figure 8 four cans are inserted into the carton 106 at one time, two of the cans resting upon two lower cans after they have been inserted into the carton. The circular plate 118 is relatively thin and spaced only slightly above the tops of the lower layer of cans, so that as the cans are transferred from the plates 117 and 118 to the cartons, the upper cans will drop only a short distance

7

before they become supported by the lower cans.

The cans are fed to the rotating circular plates from conveyors 128 and 129 arranged at different levels and with their upper surfaces coplanar with the upper surfaces of the rotating circular plates 117 and 118. The conveyors 128 and 129 have guide rails 131 and 132 respectively on one side, and similar guide rails 133 and 134 on the other side to keep the cans 124 on the conveyors. Preferably the rails comprise spaced upper and lower elements, as best seen in Figure 9, where the rails 133 and 134 are shown in section. As shown in Figure 8 the guide rails 133 and 134 are continued around rotating elements carried by shaft 109, to form guides which keep the cans on the rotating circular plates and within the pockets of the pocketed plates. The guide rails terminate in portions 136 adjacent the ends of the cartons 106 and paralleling their direction of motion, and may serve the dual function of engaging the side flaps 137 of the cartons to hold them open, as well as imparting a final push to the cans in the carton if they should still protrude slightly from the carton after having been transferred thereto by the means now to be described.

Between the pairs of pocketed plates 119, 129 and 122, 123, flanged pulleys 138 and 139 are keyed to the vertical shaft 109. These pulleys are wide and may serve as spacers for the pocketed plates above and below them. Flat belts 141 and 142 are trained around these pulleys and also around suitable idler pulleys 143 journaled upon a fixed vertical post or shaft 144. The shaft 144 is so located that the belts 141 and 142, in passing around the idler pulleys, are tangent to the path of the open ends of the cartons 106. Each belt 141 and 142 operates to transfer the cans 124 from the pockets 126 and 127 into the cartons, in the same manner as the V belt in Figure 7. Wide flat belts are preferably used in the embodiment of Figures 8 and 9 because of the relative height of the cans 124 as compared to their diameter.

As mentioned before, the details of construction of the mechanism associated with shafts 108 and 107 are the same as those associated with shaft 109, and any number of such shafts may be used in a gang arrangement, depending upon the number of cans or articles that are to be loaded into a carton. Any number of stacks of cans can be inserted into a carton, since any desired number of circular and pocketed plate combinations may be arranged upon a vertical shaft. Either the spring pressed plungers of Figure 5 or the curved leaf springs of Figure 1 may be used in the multiple loader of Figures 8 and 9 in place of the belts. It should be pointed out however, in connection with the belts of Figures 7 to 9 that in addition to inserting the articles into the cartons they can also serve to assure that the leading side flaps (the left hand side flaps in the drawings) are moved to and held in open position as the cartons move from right to left. The tendency of the side and top flaps is to spring toward a position coplanar with the sides or top to which they are attached, because of the natural resiliency at their hinged joints. While the top flap can be held out of the way by a stationary member such as member 18 of Figures 1 and 2, no such bar can be used to hold the side flaps open because the bar would obstruct the carton opening at the loading station. Normally there is no trouble with the trailing side flap because since its hinge is ahead of the flap, that flap will be pushed back as it encounters any stationary object such as the portions 136 of the guide rails

8

133 etc. in Figure 8. Since the other or leading side flap is hinged at its rear edge there is an opportunity for this flap to be folded back and over the end of the carton when engaging a stationary object such as the aforesaid portions 136, particularly if the free end of the flap should be caught under the free end of such an object. Viewing the rightmost carton of Figure 8 however, it will be apparent that if its leading side flap springs toward closed position it will engage the belt 142, which is moving along with the carton although at a slightly slower speed. It does not have any free end for the flap to get caught under and it will push the flap back to fully open position and guide it over the next succeeding guide end portion 136.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In a machine for loading articles into cartons or the like; a first conveyor having means for conveying cartons past a loading device; means for driving said first conveyor at a constant speed; a second conveyor operable to carry articles to a loading device; means for driving said second conveyor at a constant speed greater than that of said first conveyor, a loading device operable to remove articles from said second conveyor and insert them into the cartons on said first conveyor, comprising a cylindrical rotor having peripheral pockets for receiving articles to remove them from said second conveyor, said rotor being so disposed relative to the path of carton movement that the periphery of said rotor is substantially tangent to the path of movement of the adjacent end of the carton; means for driving said rotor so that its peripheral speed is substantially the same as the speed of said first conveyor; and means movable in timed relation with the rotation of said rotor and disposed in the path of said pockets operable to cooperate with said pockets to insert the articles into the cartons as they pass said loading device so that articles are received by the loading device from said feeding means and transferred through a curvilinear path into the open ends of the cartons.

2. In a machine for loading articles into cartons or the like; a loading device; a first conveyor having means for conveying cartons past said loading device; means for driving said first conveyor at a constant speed; a second conveyor operable to carry articles to said loading device; said loading device being operable to remove articles from said second conveyor and insert them into the cartons on said first conveyor, and comprising a rotor having peripheral pockets to remove articles from said second conveyor, said rotor being so disposed relative to the path of carton movement that the periphery of said rotor is substantially tangent to the path of movement of the adjacent end of the cartons; means for driving said rotor so that the speed of its pockets is substantially the same as the speed of said first conveyor; means movable in timed relation with the rotation of said rotor and disposed in the

path of said pockets operable to cooperate with said pockets to insert the articles into the cartons as they pass said loading device so that articles are received by the loading device from said feeding means and transferred through a curvilinear path into the open ends of the cartons; and rotary means cooperating with said rotor to support the articles within said pockets during their transfer from said second conveyor to the cartons.

3. In the machine described in claim 2, said rotor comprising a cylindrical element with a vertical axis and lying in the plane of the articles on said second conveyor, the peripheral surface of said element having spaced pockets to receive articles from said second conveyor, and the portions of said peripheral surface between said pockets being operable to block the movement of the articles on said second conveyor.

4. In the machine described in claim 2, said last mentioned means comprising an element having a top surface substantially coplanar with the top surface of said second conveyor and with the bottoms of the cartons carried by said first conveyor.

5. In the machine described in claim 2, said last mentioned means comprising a disc fastened to said rotor for rotation therewith, and having its top surface substantially coplanar with the top surface of said second conveyor and with the bottoms of the cartons carried by said first conveyor.

6. In a machine for loading articles into cartons or the like, a carton loading device, a conveyor having means for moving erected cartons past said loading device, means for driving said conveyor at a constant speed, said loading device comprising a generally cylindrical rotor having a peripheral pocket for receiving articles and so disposed relative to said conveyor that its periphery is substantially tangent to the path of movement of the adjacent carton ends, means for feeding articles against the periphery of said cylindrical rotor, whereby the cylindrical portion of the periphery of said rotor prevents movement of the article from said feeding means, and said feeding means forces the leading article into the empty peripheral pocket of said rotor when it becomes aligned with said feeding means during the rotation of said rotor, drive means for rotating said rotor about an axis so that its peripheral speed is substantially the same as the speed of said conveyor, and means movable in timed relation with the rotation of said rotor and disposed in the path of said pocket operable to co-operate with said pocket to gradually transfer an article from the pocket into a carton as it passes said loading device, so that articles are received by the loading device from said feeding means and transferred through a curvilinear path into the open ends of the cartons.

7. In the machine described in claim 6, said means operable to transfer the articles into the cartons comprising reciprocating devices mounted adjacent each rotor pocket and shiftable from first positions adjacent said pockets to second positions where they protrude beyond the pockets to a point adjacent the path of the ends of the cartons on said first conveyor; and stationary means connected with said reciprocating devices and operative to reciprocate them in response to the movement of said rotor.

8. In the machine described in claim 6, said means operable to transfer the articles into the cartons comprising plungers mounted for recip-

rocating radial movement with respect to each rotor pocket and shiftable from first positions adjacent said pockets to second positions where they protrude beyond the pockets to a point adjacent the path of the ends of the cartons on said first conveyor; means connected with said plungers and operative to move them to said second positions, and means operative to return them to said first positions.

9. In the machine described in claim 6 said means operable to transfer the articles into the cartons comprising leaf springs each fixed at one end to said rotor adjacent a rotor pocket; and a stationary means in the path of the end portions of said springs operable to deflect said springs from first positions adjacent said pockets to second positions where they protrude beyond the pockets to a point adjacent the path of the ends of the cartons on said first conveyor.

10. In a machine for loading articles into cartons or the like; a loading device comprising a rotor rotatable about a vertical axis; a first horizontal conveyor having means for carrying cartons past said rotor with their open ends following a path substantially tangent to the periphery of said rotor; a second conveyor having its top surface substantially coplanar with the top surface of said first conveyor and operable to convey articles to said rotor, said rotor having a series of peripheral pockets to receive articles from said second conveyor; a third conveyor in a plane above that of said second conveyor and operable to convey articles to said rotor, said rotor having an upper series of peripheral pockets in vertical alignment with said first series of pockets; means independently supporting the articles in each series of pockets with the articles in the upper of each pair of vertically aligned pockets spaced above the articles in the lower vertically aligned pockets; and means cooperating with said rotor and operable to simultaneously transfer the articles from a pair of vertically aligned pockets to a carton on said first conveyor, whereby the upper articles will rest upon the lower articles as they are removed from said supporting means.

11. In a machine for loading articles into cartons or the like; a loading device comprising a rotor rotatable about a vertical axis; a first horizontal conveyor having means for carrying cartons past said rotor with their open ends following a path substantially tangent to the periphery of said rotor; a second conveyor having its top surface substantially coplanar with the top surfaces of said first conveyor and operable to convey articles to said rotor, said rotor having a first series of peripheral pockets to receive articles from said second conveyor; a third conveyor in a plane above that of said second conveyor and operable to convey articles to said rotor, said rotor having an upper series of peripheral pockets in vertical alignment with said first series of pockets; means for independently supporting the articles in each series of pockets with the articles in the upper each pair of vertically aligned pockets spaced above the articles in the lower vertically aligned pockets; and means in the paths of the pockets as they approach said first conveyor and operable to simultaneously transfer the articles from a pair of vertically aligned pockets to a carton on said first conveyor, whereby the upper articles will rest upon the lower articles as they are removed from said supporting means.

12. In the machine described in claim 10, a

second loading device similar to said first mentioned loading device and located substantially tangent to the path of the open ends of the cartons after they have passed said first mentioned loading device; a fourth conveyor having its top surface substantially coplanar with the top surfaces of said first and second conveyors and operable to feed articles to the lower series of pockets of said second loading device; and a fifth conveyor having its top surface substantially coplanar with the top surfaces of said third conveyor and operable to feed articles to the upper series of pockets of said loading device.

13. In a machine of the class described, a first horizontal conveyor, a second conveyor having its top surface substantially coplanar with the top surface of said first conveyor; and means for transferring articles from said second conveyor to said first conveyor comprising a rotatable disc having its top surface substantially coplanar with the top surfaces of said conveyors and its peripheral surface tangent to said first conveyor, said second conveyor terminating adjacent said disc and extending at a horizontal angle therefrom; means for driving said disc and said first conveyor at a rate such that the peripheral speed of the disc is equal to the speed of said first conveyor; means for driving said second conveyor at a speed greater than that of said first conveyor; a second disc above and connected to said rotatable disc for rotation therewith and having substantially the same diameter, said second disc having a series of equiangularly spaced peripheral pockets of such size as to receive articles from said second conveyor; and means movable in timed relation with the rotation of said discs and disposed in the path of articles in said pockets operable to cooperate with said pockets to gradually transfer such an article from each of the pockets on to said first conveyor so that articles are received by said transfer means from said second conveyor and transferred through a curvilinear path on to said first conveyor.

14. The machine described in claim 13 wherein said last mentioned means comprises reciprocating elements mounted upon said discs adjacent each pocket and each shiftable from a withdrawn to a second position protruding beyond its respective pocket to a point adjacent said first conveyor, and wherein said reciprocating elements are actuated by means cooperating with said reciprocating elements to shift them successively to said second position as their respective pockets approach said first conveyor.

15. In the machine described in claim 13 an overload release clutch in the drive between said first conveyor and said discs and operable to discontinue the operation of said discs in response to jamming of an article during the transfer operation.

16. In a machine of the class described, a first horizontal conveyor, a second conveyor having its top surface substantially coplanar with the top surface of said first conveyor; and means for transferring articles from said second conveyor to said first conveyor comprising a rotatable disc having its top surface substantially coplanar with the top surface of said conveyors and its peripheral surface tangent to said first conveyor, said second conveyor terminating adjacent said disc and extending at a horizontal angle therefrom; means for driving said disc and said first conveyor at a rate such that the peripheral speed of the disc is equal to the linear speed of said first conveyor; means for driving said second conveyor at

a linear speed greater than that of said first conveyor; a second disc above and connected to said rotatable disc for rotation therewith and having substantially the same diameter, said second disc having a series of spaced peripheral pockets of such size as to receive articles from said second conveyor; a driving pulley mounted upon said discs for rotation therewith in a plane above that of said rotatable disc, said pulley having a radius less than the distance from the roots of said pockets to the axis of said discs, a driven pulley substantially tangent to said first conveyor, and a belt passing over said pulleys, said belt acting to gradually guide the articles from the pockets into the carton as they pass said loading device.

17. In a machine for loading articles into cartons or the like; a carton loading device, comprising a cylindrical rotor having spaced peripheral pockets for receiving articles, drive means for rotating said rotor with a constant peripheral speed about an axis, a first conveyor having means for moving erected cartons having open ends along a path substantially tangential to the periphery of said rotor; means for driving said first conveyor past said loading device at a constant speed substantially the same as the peripheral speed of said rotor, a second conveyor operable to feed articles in succession along a path against the periphery of said rotor, means for driving said second conveyor at a constant speed greater than that of said first conveyor, whereby the cylindrical portion of the periphery of the rotor prevents movement of the articles from said second conveyor and said second conveyor urges the leading article into the first empty peripheral pocket of the rotor to come adjacent the end of said second conveyor during the rotor's rotation, and means in the path of said pockets operable to co-operate with said pockets to gradually transfer the articles from the pockets into the cartons as they pass said loading device, so that articles are received by the loading device from said second conveyor and transferred through a curvilinear path into the open end of the cartons.

18. In a machine the loading articles into cartons or the like, a plurality of carton loading devices each adapted to transfer at least one article into each passing carton, each of said loading devices comprising a cylindrical rotor having spaced peripheral pockets for receiving articles, drive means for rotating said rotors at a constant peripheral speed about axes normal to the path of carton movement relative thereto, a conveyor having means for moving erected cartons, each having an open end, along a path substantially tangential to the periphery of said rotors, means for driving said conveyor past said loading devices at a constant speed substantially the same as the peripheral speed of said rotors, means for feeding articles against the periphery of each of said rotors, and means in the path of said pockets operable to co-operate with said pockets to transfer the articles from the pockets into the cartons as they pass said loading devices whereby articles are urged against the periphery of said rotors and into the pockets as they become aligned with the feeding means, and are transferred by said loading devices through a curvilinear path into the open ends of the cartons.

19. The cartoning machine defined in claim 18 wherein the rotors of said loading devices are coaxially aligned and are each operable to trans-

fer at least one article into each passing carton simultaneously.

20. The cartoning machine defined in claim 13 wherein the rotors of said loading devices are mounted for rotation about spaced parallel axes equi-distantly disposed from the path of movement of the carton open ends and are each operable to transfer at least one article into each passing carton successively.

21. In a cartoning machine, the combination of a rotor having a plurality of spaced can receiving pockets, and a driven belt in the path of movement of said pockets and coacting therewith for successively ejecting the cans from said pockets after predetermined movement of said cans with said rotor.

22. In the machine defined in claim 21, said belt being driven with said rotor.

23. In a machine for loading articles into cartons or the like; a loading device; a first conveyor having means for conveying cartons past said loading device; means for driving said first conveyor at a constant speed; a second conveyor operable to carry articles to said loading device; said loading device being operable to remove articles from said second conveyor and insert them into the cartons on said first conveyor, and comprising a rotor having peripheral pockets to remove articles from said second conveyor; means for driving said rotor so that the speed of its pockets is substantially the same as the speed of said first conveyor; means in the path of said pockets operable to cooperate with said pockets to insert the articles into the cartons as they pass said loading device; and rotary means for cooperating with said rotor to support the articles within said pockets during their transfer from said second conveyor to the cartons, said means operable to insert the articles into the cartons comprising a driving pulley fixed to said rotor adjacent the plane of said pockets, an idler pulley mounted adjacent the path of the ends of the cartons on said first conveyor, and a belt mounted on said pulleys, said belt in its travel from said driving to said idler pulley lying in the path of articles carried by the pockets in said rotor.

24. In a machine for loading articles into cartons or the like; a loading device; a first conveyor having means for conveying cartons past said loading device; means for driving said first conveyor at a constant speed; a second conveyor operable to carry articles to said loading device; said loading device being operable to remove articles from said second conveyor and insert them into cartons on said first conveyor, and comprising a rotor having peripheral pockets to remove articles from said second conveyor; means for driving said rotor so that the speed of its pockets is substantially the same as the speed of said first conveyor; means in the path of said pockets operable to cooperate with said pockets to insert the articles into the cartons as they pass said loading device; and rotary means cooperat-

ing with said rotor to support the articles within said pockets during their transfer from said second conveyor to the cartons, said means operable to insert the articles into the cartons comprising a driving pulley fixed to said rotor adjacent the plane of said pockets, an idler pulley mounted adjacent the path of the ends of the cartons on said first conveyor at a point on said path beyond the perpendicular between said rotor and said first conveyor, and a belt mounted on said pulleys, said belt in its travel from said driving to said idler pulley lying in the path of articles carried by the pockets in said rotor.

25. In an article handling machine, a linear conveyor mounted for movement through a loading station; a rotor at said loading station continuously driven at the same speed as that of said conveyor having at least one peripheral pocket, the leading edge of said pocket in the direction of rotation of said rotor being so constructed as to gradually admit an article fed against the periphery of said rotor into such pocket, said rotor being operative to move such article into said station, means for feeding a succession of articles against the periphery of said rotor, means on the periphery of said rotor intermediate the leading and trailing edge of each such pocket for arresting movement of said succession of articles during the periods between transfer of said articles to the rotor pocket, and means movable in timed relation with the rotation of said rotor and disposed in the path of said pocket operable to cooperate with said pocket to gradually transfer an article from the pocket to said conveyor at said loading station so that articles are received by said rotor from said feeding means and transferred through a curvilinear path onto said conveyor.

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