Dec. 24, 1940. J. H. MOSLEY ET AL 2,226,068

MACHINE FOR FEEDING CANS TO LABELING MACHINES

Filed Oct. 10, 1938 5 Sheets-Sheet 1

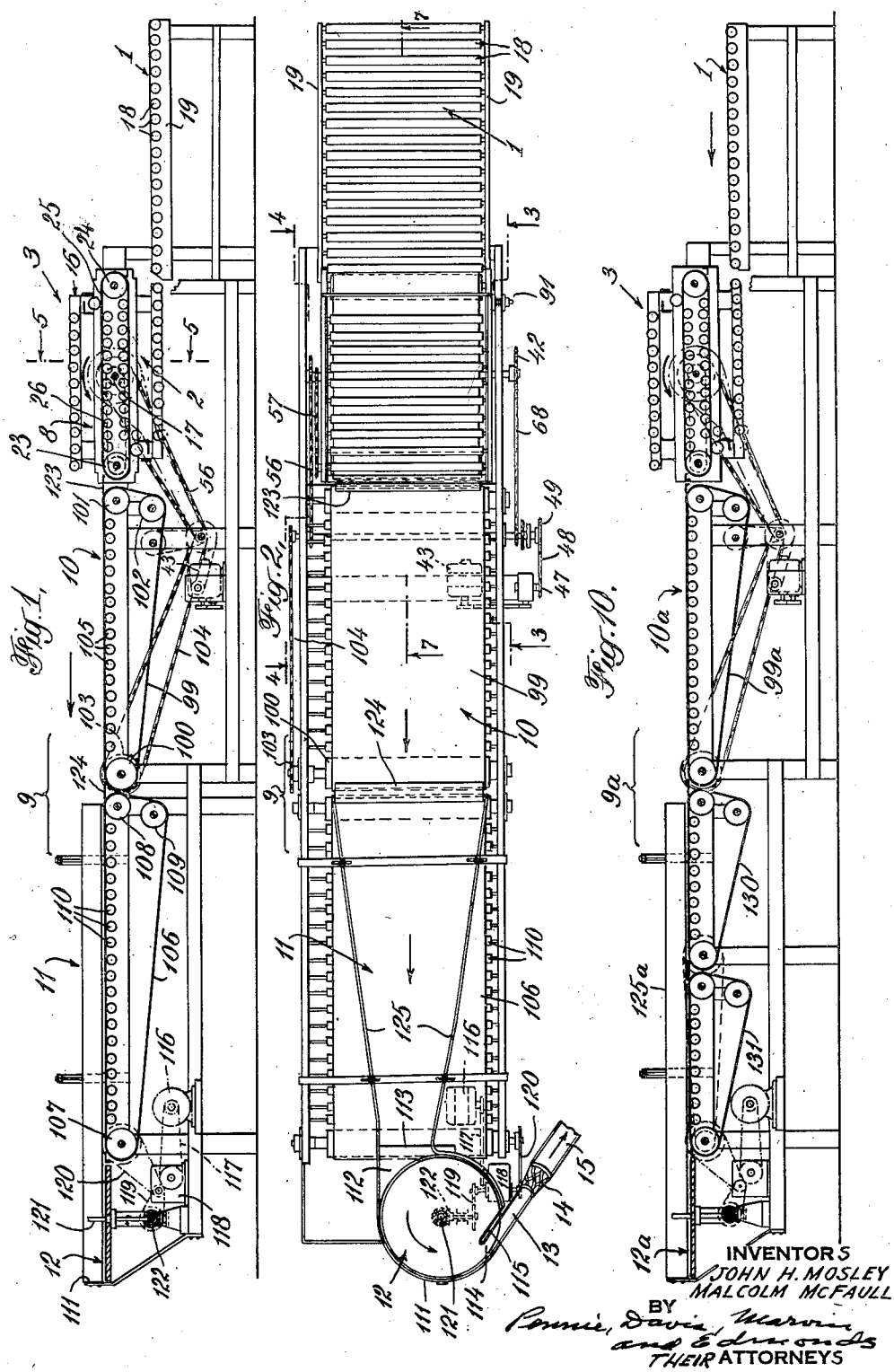


Fig. 1.

Fig. 2.

Fig. 10.

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Filed Oct. 10, 1938 5 Sheets-Sheet 2

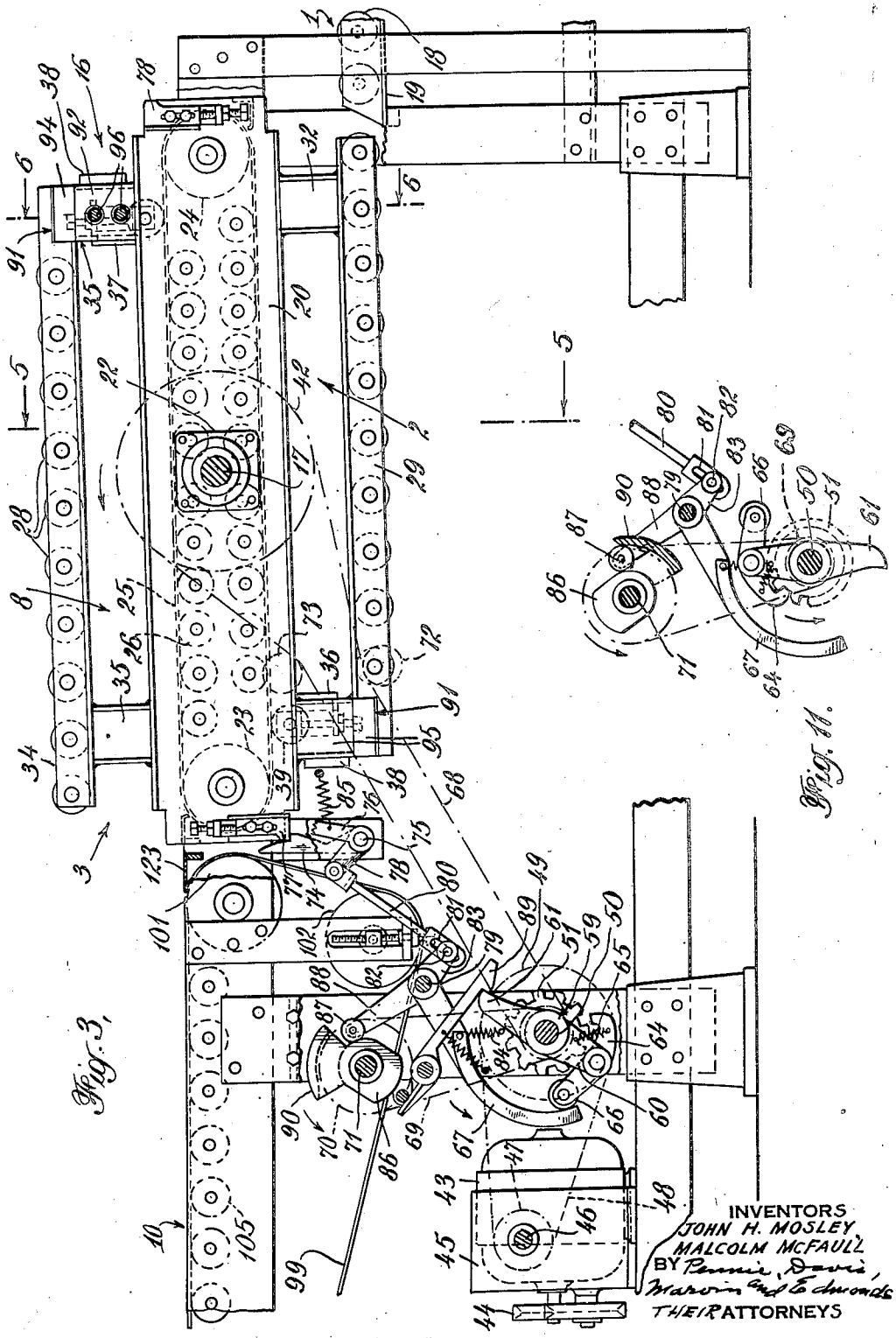


Fig. 3.

Fig. 11.

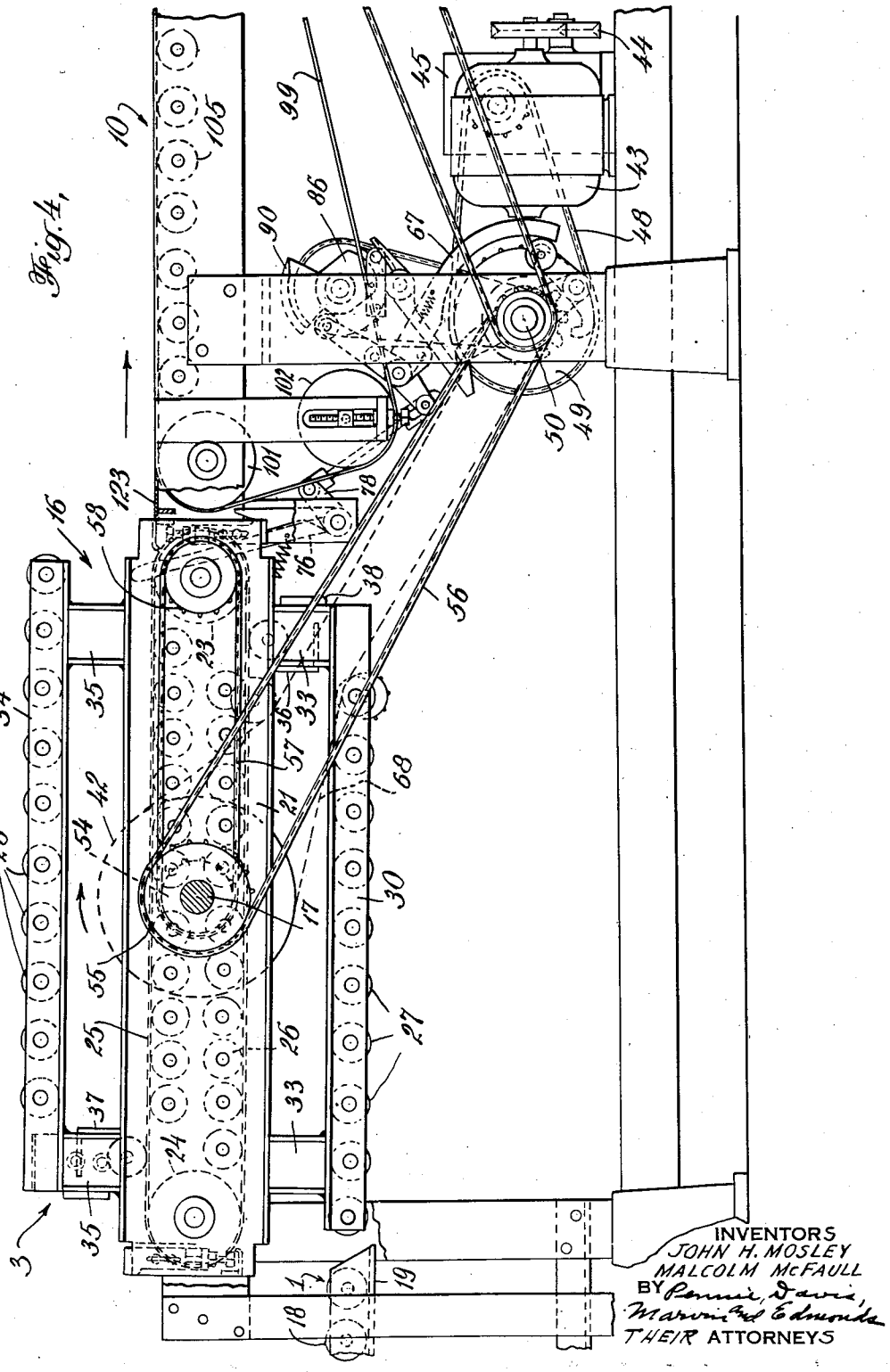
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MACHINE FOR FEEDING CANS TO LABELING MACHINES

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Fig. 4.



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MACHINE FOR FEEDING CANS TO LABELING MACHINES

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Fig. 5,

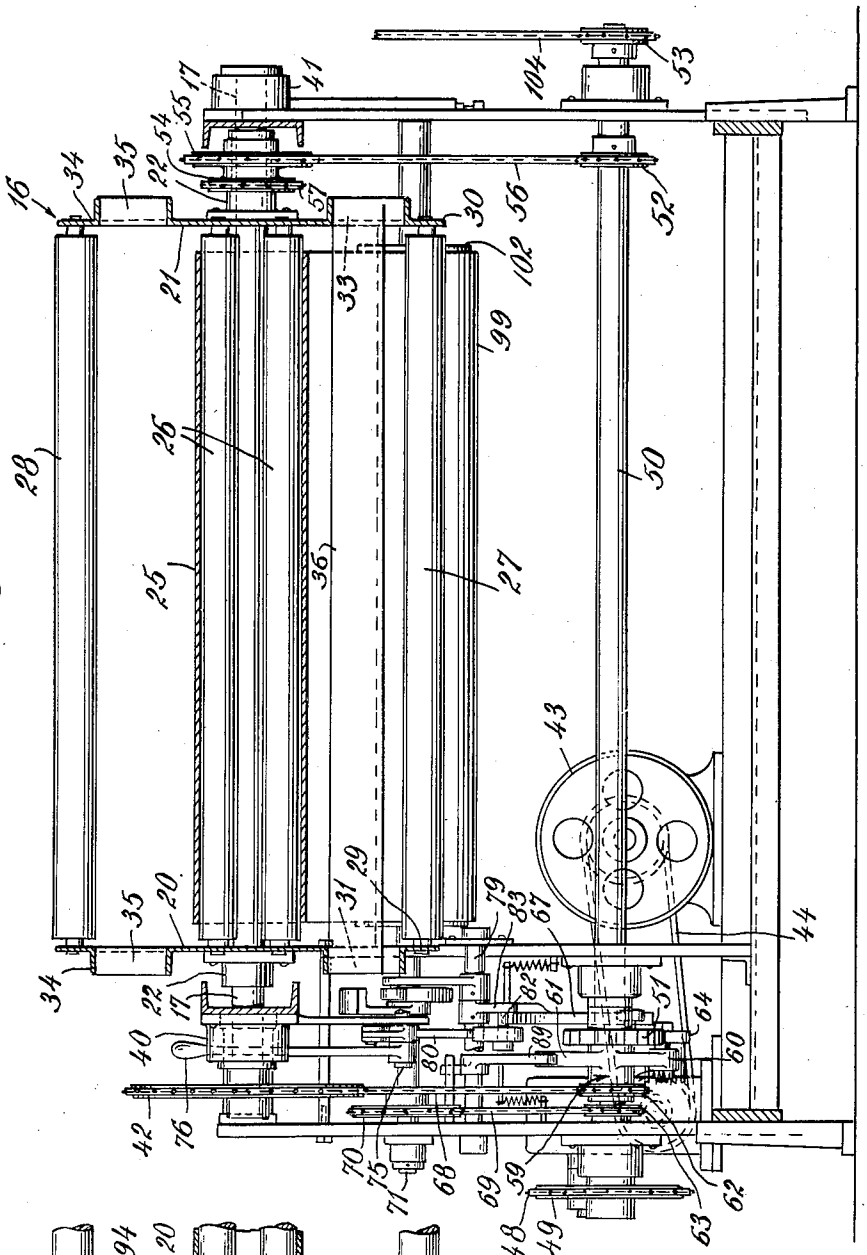
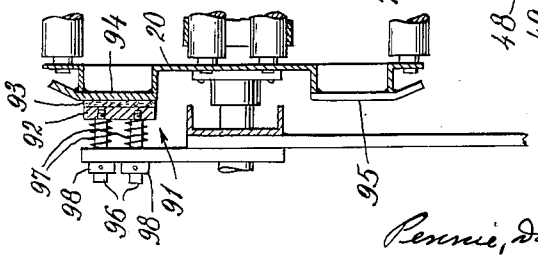


Fig. 6,

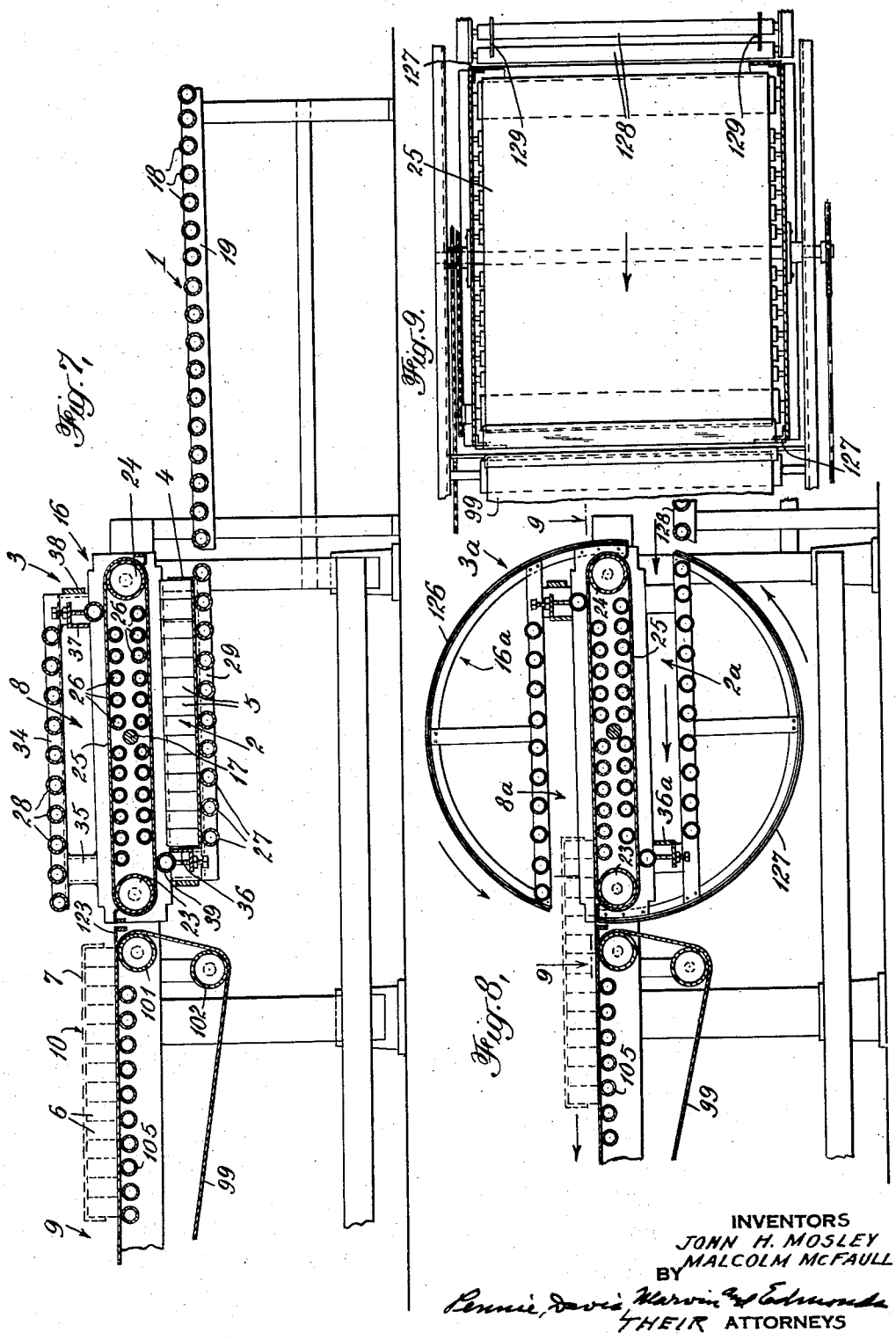


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Patented Dec. 24, 1940 2,226,068

UNITED STATES PATENT OFFICE

2,226,068

MACHINE FOR FEEDING CANS TO LABELING MACHINES

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Application October 10, 1938, Serial No. 234,114

13 Claims. (Cl. 214—1.1)

This invention relates to machines for feeding, handling or transferring cans, and more particularly to machines for feeding cans to labeling machines.

In plants where vegetables, fruit and other food products are packed in cans, the cans, after filling, are usually transferred to a suitable apparatus where the contents are subjected to a cooking operation by submergence in boiling water, or a cooking solution maintained at the desired temperature, or other processing operation. A convenient way of handling the cans for this treatment is to place them upright in trays usually made of metal and circular or rectangular in shape and adapted to hold several hundred cans.

After the treatment operation, draining of the cooking solution and cooling, the cans go to the labeling machine. The problem is to get the cans out of the trays and arranged in a single line for the labeling machine at the rate of speed at which the labeling machine operates, which may be as high as 1,000 cans per minute. The object of the present invention is to provide a machine for accomplishing this, and which preferably will deliver the cans at a sufficient elevation above the floor to enable them to be conveyed to the labeling machine by gravity.

This involves the inverting of these trays for the purpose of removing the cans from them, and because of the fact that the trays hold several hundred cans and have a gross weight of several hundred pounds, the trays are difficult to turn over, and the invention is also directed to the provision of a safe, convenient and semi-automatic apparatus for inverting these trays while loaded with cans, and for facilitating the removal of the trays from the inverted cans.

The invention will be understood from a consideration of the accompanying drawings which illustrate the invention by way of example. In these drawings:

Fig. 1 is a more or less diagrammatic view in side elevation of the apparatus of the invention;

Fig. 2 is a similar view in plan;

Fig. 3 is an enlarged view partially in side elevation and partially in section on broken line 3—3 of Fig. 2 of the inverting mechanism;

Fig. 4 is a view similar to Fig. 3 looking from the opposite side of the machine and taken on broken line 4—4 of Fig. 2.

Fig. 5 is a transverse vertical section taken on line 5—5 of Figs. 1 and 3;

Fig. 6 is a fragmentary view in vertical transverse section taken on line 6—6 of Fig. 3;

Fig. 7 is a vertical longitudinal central section taken on line 7—7 of Fig. 2 showing a tray of cans received within the inverting mechanism and a previous tray of cans which has just been simultaneously discharged therefrom;

Fig. 8 is a view similar to Fig. 7 of a modification;

Fig. 9 is a horizontal section taken on line 9—9 of Fig. 8;

Fig. 10 is a somewhat diagrammatic view similar to Fig. 1 showing a further modification; and

Fig. 11 is a fragmentary vertical section showing the parts of a two-revolution clutch in different positions from those shown in Fig. 3.

Referring now to these drawings, the apparatus is supported upon an elongated framework constructed preferably of steel. The trays of cans are placed one at a time on a receiving table 1 at the right hand end of the machine, as shown in Figs. 1, 2 and 7 and the trays are advanced by hand into a tray-receiving compartment 2 of an inverting mechanism indicated generally by reference numeral 3. A tray 4 filled with upright cans 5 is shown in Fig. 7 in this compartment ready to be inverted. Simultaneously with the entrance of tray 4 into compartment 2, a preceding tray of cans 6, 7 is discharged, or ejected, from a second tray-receiving compartment 8 onto a can-separating and conveying table indicated generally by reference numeral 9, and which comprises a conveying table section 10 and a can-separating and converging section 11. From this section the cans are discharged onto a centrifugal disc 12 from which they are discharged one at a time into a can chute 13 which conveys the cans to the labeling machine. Preferably a can-twisting device 14 is arranged to turn the cans from upright position to horizontal position so that they may roll on their sides by gravity along a trough 15 to the labeling machine.

The rotating framework 16 of the inverting mechanism which contains the two tray-receiving compartments 2 and 8 rotates in the direction shown by the arrows in the several figures, being supported upon a shaft 17. It is to be noted that not only does the inverter simultaneously receive and discharge trays of cans but that it also elevates them from the level of the receiving table 1 to the level of the discharge table 9. The labeling machine is usually on the same floor of the building as the apparatus of the invention, and sometimes it is convenient to place them so that the cans have a considerable distance to travel along the trough 15 before reaching the labeling machine. In order to feed the cans at the speed

desired, it would often require a steeper gradient than could be obtained if the cans were discharged from the can-feeding apparatus at the level of the receiving table 1, for example. Moreover, the can-separating and converging table 9 and the centrifugal disc 12 must necessarily be substantially horizontal. The inverting mechanism 3 hence cooperates with the can-separating and converging table 9 and the centrifugal device 12 in delivering the cans at a sufficient elevation above the floor so that they can be conveyed by gravity to the labeling machine.

Considering the various elements of the can-transferring and feeding machine of our invention, the receiving table 1 is a roller table comprising a series of rollers 18 mounted for free rotation in frame side members 19 which are inclined slightly toward the left so as to assist the operators of the machine in moving the trays into the inverting mechanism 3. It will be understood that in the forms of the invention illustrated in Figs. 1–7, inclusive, and 10, that the trays of cans are deposited on the receiving table 1 by the hoist of an overhead conveyor, or by other suitable means, which conveys the cans from the previous treatment operation.

The inverting mechanism 3 is illustrated in detail in Figs. 3–7, inclusive, and 11. The rotating framework 16 is built up of steel structural material, the principal members of which are two channel members 20 and 21 which extend along each side of the framework. These are mounted upon and secured to shaft 17 by means of two flanged members 22 which are bolted to the outsides of channels 20 and 21, respectively, and keyed to the shaft as shown by dotted lines in Fig. 5.

Mounted between and near the opposite ends of the two channel members 20 and 21 are two belt rolls 23 and 24 and between them is stretched a wide belt 25. The sides, or reaches, of this belt each form one of the walls of the two tray-and-can-receiving compartments 2 and 8, and this belt, as the framework 16 rotates from the receiving to the discharge position, receives and supports the cans in inverted position and discharges them from framework 16, and for this reason is positively driven as will be described later on.

Both sides of belt 25 are supported by a series of suitably spaced rollers 26 which are journalled between the channel members 20 and 21.

The outer walls of the two tray-receiving compartments 2 and 8 are formed by a series of rollers 27 and 28, respectively. Rollers 27 are mounted for free rotation between two angle bars 29 and 30 which form part of the framework 16 and are fixed in parallel, spaced relation with the lower flanges of channel members 20 and 21. Angle bar 29 is held in position by two short channel sections 31 and 32 (see Fig. 3). The ends of these channel sections are firmly welded to the lower flange of channel member 20 and to the horizontal flange of angle bar 29. The opposite angle bar 30 is similarly mounted upon the lower flange of channel member 21 by means of two short angle sections 33.

The upper series of rollers 28 is similarly mounted between a pair of angle bars 34 which are secured in like manner to the upper flanges of channel members 20 and 21 by short channel sections 35. In order to brace the two side frames of framework 16 laterally and at the same time form stops for the trays as they enter the tray compartments, two heavy angle bars 36 and 37 are arranged to extend crosswise of the frame and are welded at their ends to the short angle sections 31—33 and 35. These cross angle members 37 also support substantially the entire weight of the tray of cans which is being inverted during the time the framework 16 is in a more or less vertical position. Additional cross members for strengthening purposes are provided in bars 38 which are also welded to the short channel sections 31—33 and 35.

An adjustable take-up roll 39 is mounted between channel members 20 and 21 for the purpose of taking up the stretch of belt 25.

The shaft 17 which supports framework 16 is carried in journals 40 and 41 appropriately mounted in the machine frame (see Fig. 5), one end of this shaft extending outside of journal 40 and having a sprocket 42 mounted upon it by means of which the frame 16 is rotated whenever it is desired to invert a tray of cans within it.

It will be understood that in inverting a tray of cans framework 16 is rotated through an angle of 180°, or in other words, one-half of a complete revolution. During this time the tray of cans which is received within whichever of compartments 2 or 8 happens to be in the lower position, is gradually turned upside down, and during this movement the tops of the cans come to rest upon the surface of belt 25, the tray resting upside down on the inverted cans. In order to cause belt 25 to eject, or discharge, the cans from the framework 16, provision must be made for driving the belt. The mechanism for driving this belt 25 and for imparting and controlling the rotation of framework 16 will now be described.

Power is supplied for this work by means of a motor 43 which is belt connected by means of the belt 44 and suitable pulleys to a speed-reducing gearing 45. On the slow speed or output shaft 46 of this gear box there is a sprocket 47 which, through a chain 48 and another sprocket 49, drives a main operating shaft 50 which extends crosswise of the machine from one side to the other. Shaft 50 rotates continuously so long as power is supplied to motor 43. Fixed to this shaft and also rotating continuously there is a star wheel 51 forming part of a two-revolution clutch and also sprockets 52 and 53.

Because of the rotation of frame 16 it is necessary to drive belt 25 by means rotating concentrically with the axis of supporting shaft 17. This is accomplished by means of two sprockets 54 and 55 which are secured to a common hub that rotates freely on shaft 17 (Fig. 5). This sprocket assembly is driven by means of a chain 56 passing over sprocket 52 on shaft 50 and sprocket 55. A chain 57 from sprocket 54 to a sprocket 58 on the shaft of roll 23 which supports one end of belt 25 serves to drive this belt.

The description of the driving mechanism for turning framework 16 starts with the clutch member 59 forming with star wheel 51 the principal parts of the two-revolution clutch previously mentioned. Member 59 is loosely mounted on main shaft 50 alongside of the star wheel 51 which is keyed to the shaft and rotates continuously. Member 59 has two arms 60 and 61 and a hub carrying sprockets 62 and 63. Arm 60 has a dog 64 pivoted thereto which is adapted to engage the teeth of star wheel 50 to cause clutch member 59 to rotate with it. This dog is biased towards such engagement by means of a helical spring 65 and is normally held out of engagement by a roller on the tail portion 66 of the dog engaging an arcuate lever 67 which will be more fully described presently. Sprocket 62 on the hub of clutch member 59 is, by means of a chain 68, connected with sprocket 42 on supporting shaft 17 of the frame-

work 16. The relative sizes of these sprockets is such that for each two revolutions of clutch member 59 the framework 16 is rotated through one-half a revolution, or 180°. Hence two revolutions of the clutch member are required to produce each tray inverting operation. The other sprocket 63 on the hub of clutch member 59 is connected by means of a chain 69 to a sprocket 70 which drives a clutch control shaft 71, this shaft being arranged to make one complete revolution for each two revolutions of clutch member 59. Chain 68 is provided with two idler sprockets 72 and 73 both of which are adjustable to keep the chain taut and also to adjust the angular position of framework 16 with respect to the clutch member 59.

In order to stop the framework 16 in horizontal position after the completion of an inverting movement, a movable stop or latch lever 74 is provided on the side of the machine adjacent the two-revolution clutch 51, 59. This latch lever is fixed to, and projects upwardly from, a short shaft 75 to the outer end of which an operating handle lever 76 (Figs. 5 and 3) is attached. Adjustable stops 77 and 78 are provided at each end of framework 16, as shown in Fig. 3, in proper position to engage stop lever 74, and by appropriate adjustment of these stops the framework 16 will always come to rest accurately in position.

Also fixed to shaft 75, on which the stop lever 74 is mounted, is a short arm 78 which controls the two-revolution clutch 51, 59. This is accomplished by rocking the arcuate lever 67 previously referred to so as to cause it to release the tail 66 of dog 64 and allow the dog to engage the teeth of the star wheel 51 or driving member of the two-revolution clutch. For this purpose arcuate lever 67 is mounted upon a rock shaft 79, and arm 78 is arranged to rock this shaft 79 by means of a link 80 having a slot and pin connection 81, 82 with an arm 83 which is pinned to shaft 79.

When the handle 76 is moved to start an inverting movement of framework 16, latch lever 74 is first released from whichever of stops 77 or 78 happens to be in engagement with it. Continued motion of the handle brings the top of slot 81 into contact with pin 82 and rocks shaft 83, thereby swinging arcuate lever 67 to the left, as shown in Fig. 3 and releasing the dog 64 and causing engagement of the clutch. Inasmuch as the clutch member 59 always stops with the roller of the tail 66 of the dog in contact with the extreme end of arcuate lever 67, this roller passes from beneath the arcuate lever as soon as rotation of clutch member 59 commences. The release of handle 76 by the operator therefore causes arcuate lever 67 and the handle to return to their original positions. The lever is moved under the action of a biasing spring 84 and the handle by a biasing spring 85. Pin 82 on arms 83 returns to approximately the center of slot 81.

The engagement of the clutch 51, 59 causes the framework 16 to commence an inverting movement, rotating in the counterclockwise direction, as shown by the arrow in Fig. 3. In order to cause clutch member 59 to make two revolutions, thereby completing the inverting movement of the framework 16, provision is made for automatically preventing the release of the clutch on the first revolution of clutch member 59, and causing its release on the second revolution.

In order to do this, arcuate lever 67 is moved to the left (see Fig. 11) out of the path of the roller on tail 66 of the dog before this roller is carried around on the first revolution of clutch member 59 far enough for it to come into engagement with the upper end of arcuate lever 67. This movement of arcuate lever 67 is effected by means of a cam 86 on control shaft 71 which engages a roller 87 on an arm 88 which is pinned to rock shaft 79. The length of slot 81 permits this rocking of shaft 79 to take place without shifting stop 74 out of its position. The contour of cam 86 is such as to cause arcuate lever 67 to return to its normal position under the action of spring 84 as soon as the first revolution of clutch member 59 is completed, thereby placing arcuate lever 67 in position to stop the rotation of clutch member 59 on its next revolution.

On account of the momentum of the rotating framework 16 and its heavy load of cans, it is essential to release dog 64 from star wheel clutch member 51 prior to the completion of the inverting movement, and let framework 16 coast to completion of this movement, at which point it will be stopped by the latch lever 74. This accounts for the length of arcuate member 67, which is made long enough to engage the tail 66 and throw out the dog 64 after the completion of about ¾ of the second revolution of clutch member 59 (see Fig. 11). Then as the framework 16 coasts into position against stop 74, the tail 66 will move along the arcuate surface of lever 67 into the position shown in Fig. 3. Rebounding of the framework 16 from stop 74 is prevented by means of a latch 89 which falls behind the outer end of arm 61 on clutch member 59 substantially simultaneously with the engagement of latch lever 74.

It would be disastrous if a second inverting movement should be commenced before the discharge of the cans was completed, and to prevent this a guard cam 90 (Figs. 11 and 3) is provided on control shaft 71 in the same vertical plane as cam 86 and so positioned as to engage the outer side of roller 87 on arm 88 and thus prevent the accidental release of the latch lever 74 and actuation of clutch 51, 59 by handle 76 (Fig. 5) during approximately the last half revolution of clutch member 59, or during the last approximately 45° of movement of the framework 16. This guard cam 90, however, releases roller 87 at about the same time that the framework 16 comes into engagement with latch lever 74 at the end of the inverting movement.

In order to absorb the momentum of the frame 16 and its load of cans during the coasting period, and prevent damage to the latch 74, a brake mechanism 91, illustrated in Fig. 6, is provided. A metal brake block 92 faced with appropriate friction material 93 is yieldably mounted in position to be engaged by either one of two shoes 94 or 95 which are carried by the framework 16. This brake block 92 is provided with two parallel supporting rods 96 which pass loosely through holes in a part of the machine frame and are provided with helical springs 97 for urging the blocks 92 into engagement with the brake shoes 94 and collars 98 for limiting the movement of the block under the action of these springs.

The can conveying and separating table 9 (Figs. 1 and 2) onto which the cans are discharged from the inverting mechanism 3 comprises a conveying table section 10 and a can-separating and converging section 11. Both of these sections include wide endless belts of the same width as the belt 25 of the inverting mechanism and arranged horizontally at substantially the same level as the upper side of belt 25, that is to say, the side of this belt which supports the cans after they have been inverted. The conveying belt for conveying section 10 is indicated by reference numeral 99 and passes

around a driving roll 100 at the left hand end, as viewed in Figs. 1 and 2, and a roll 101 at the right hand end adjacent the inverting mechanism. A take-up roll 102 adjustably mounted, as indicated in Fig. 4, for taking up the slack is provided. Belt 99 is driven through roll 100 on whose shaft there is a sprocket 103 shown in Fig. 1 which is driven by a chain 104 passing over sprocket 53 on main operating shaft 50 as best shown in Fig. 5. The upper side or reach of belt 99 on which the cans rest is supported by a series of rollers 105 which are journalled on the side frame members of the apparatus.

The can-separating section of table 9, which is indicated generally by reference numeral 11 comprises an endless belt 106 which is supported at its ends between two rollers 107 and 108 journalled in the machine frame, and which maintain the upper side of the belt in line with belt 99. An adjustable take-up roll 109 is also provided for this belt, and the upper side of the belt is supported in the same manner as belt 99, namely, by means of a series of rollers 110.

The centrifugal device at the left-hand end of can-separating section 11 comprises a rotatable horizontal disc 12 having a stationary circular guard 111 substantially surrounding it, but provided with an entrance 112 through which the cans are received over a scuff plate 113 from the belt 106. Guard 111 is also provided with an exit 114 which is just wide enough to receive one can at a time. At this exit a deflecting plate 115 is provided for deflecting the cans which have been thrown to the periphery of rotating disc 12 into the exit 114 and the chute 13.

A separate motor 116 is provided for driving belt 106, of the can-separating section 11, and the centrifugal disc 12. The drive is by means of a belt 117 to a reducing gear box 118 and by means of chains 119 and 120. These chains are driven from sprockets on the slow speed shaft of the reducing gear box 118. Chain 119 drives the vertical shaft 121 of centrifugal disc 12 through suitable beveled gearing 122. Chain 120 drives belt 106 through roll 107 by means of a sprocket mounted upon one end of the shaft on which this roll is carried.

The cans, as they leave belt 25 of the inverting mechanism 3, pass over a scuff plate 123 onto belt 99, and as they leave this belt they pass over another scuff plate 124 onto belt 106. While on belt 106 the cans are brought together, or converged, by means of guide rails 125 which slope from the outer sides of belt 106 toward the center of this belt and join with the ends of the circular guard 111 for the centrifugal disc 12 at the front edge of scuff plate 113 and the mouth 112.

Two operators are required to operate this apparatus. One of them stands on either side of the machine. A tray of cans is shoved into the receiving compartment 2 from the receiving table 1 and then the operator on the front side of the machine moves handle lever 76 to the left, as viewed in Fig. 3 or to the right, as viewed in Fig. 4, thereby causing the inverting mechanism to make half a revolution and invert this tray of cans. The operators then push a second tray of cans along table 1 into receiving compartment 8 which is now on the bottom. While this is being done, the first tray of cans is being ejected from compartment 2, which is now on top, over scuff plate 123, and onto belt 99 of conveying table section 10. As soon as these cans are clear of the inverter, the two operators standing on opposite sides of the machine lift off the inverted tray 7 shown in dotted lines in Fig. 7 and place it upon a suitable conveyor (not shown) to return to the prior treatment operation. The operator then again moves handle lever 76, thus inverting the second tray of cans.

The drive mechanisms for the belts 99 and 106 of the can conveying and separating table 9 are so arranged that belt 99 operates at substantially the same linear speed as ejecting belt 25 of the inverting mechanism 3 operates during the ejection of the cans. Belt 106 of the can-separating section of table 9, however, operates at a higher linear speed than belt 99. Hence as the cans move onto belt 106 over scuff plate 124 they are given an increase in speed and thereby separated from one another a sufficient amount to permit the cans to be shifted together laterally by the converging guides 125 so that they can be delivered to the rotating disc 12 which is necessarily smaller in diameter than the width of belt 106.

It is desirable to reduce to as low a point as possible the amount of slippage between the bottoms of the cans being inverted while they are in contact with discharge belt 25. To accomplish this the driving mechanism for this belt, previously described in connection with Fig. 4, is arranged to move belt 25 continuously at a speed corresponding to the speed of rotation of the inverter; that is to say, the angular velocity of the belt rolls 23 and 24 is substantially the same as the angular velocity of shaft 17 during an inverting movement. The direction of the circuit of the belt around the belt rolls also corresponds to the direction of rotation of the inverter. Hence, during the rotation of the inverter the belt is substantially motionless with respect to the cans in contact with it. However, at the instant the rotation of the inverter is interrupted by latch lever 74, belt 25 commences to carry the cans forward over scuff plate 123 and out of the inverter. This arrangement not only saves wear on belt 25, but also makes for speed in the ejection of the cans.

Referring now to Figs. 8 and 9 of the accompanying drawings, there is here shown a modification of our apparatus which provides for automatic feed of the filled trays of cans into the inverter as well as the automatic discharge of the inverted cans therefrom. The rotary framework 16*a* is constructed exactly like framework 16 previously described except that it is provided with two pairs of semi-circular rails 126 and 127, one pair opposite tray-receiving compartment 2_a and the other opposite tray-receiving compartment 8_a. The trays are fed successively one against another along any suitable conveying device such, for example, as a roller table 128, which is inclined sufficiently to cause the trays to be fed along the same by gravity toward the inverting mechanism 3_a, and which is provided with side rails 129 to direct the trays into the receiving compartments of the inverter.

The trays are of uniform dimensions so that when a tray of cans has been received within one of the compartments, 2_a, for example, with its forward end against stop 36_a, its rear end will be flush with the surfaces of rails 126 and 127. Hence when the rotation of the inverting mechanism commences, rails 127, for example, will come into engagement with the foremost tray of the line of oncoming trays of cans and hold it back until tray-receiving compartment 8_a comes into alinement with the receiving table 128.

The further modification of our apparatus shown in Fig. 10 is intended for an extremely high speed of operation. When the cans are pushed

over scuff plate 124 from the slower speed belt 99 onto the higher speed belt 106 of the apparatus previously described, the cans are jerked forward by belt 106 to accelerate them to the higher speed, but there is necessarily some slippage between the bottoms of the cans and the belt. As the speed of operation is increased, it is necessary to increase the difference in speed between belts 104 and 106 to such a point that this slippage interferes with the proper separation of the cans. In Fig. 10 the increase in the speed of the cans for delivery to the centrifugal device is made in two steps.

Instead of employing a single belt 106 for the can-separating section of the conveying and separating table 9_a, two belts 130 and 131 are employed, and the converging guide rails 125_a extend over both of these belts. Belt 130 is driven at a somewhat higher speed than belt 99_a, and belt 131 at a higher speed than belt 130 so that the cans delivered to the centrifugal disc 12_a are moving at a velocity which is high enough for them to be accelerated by disc 12_a at the higher speed of operation of this disc which is necessary for the higher rate of the can delivery.

By the apparatus of our invention we have provided for the rapid handling of cans from cooking, or other treatment operation, to a can-labeling machine so that the output of a high speed labeling machine is not reduced by the inability of the can handling apparatus heretofore available for rearranging and delivering the cans to the labeler. This, moreover, is accomplished without damage to the cans by denting, scarring, or otherwise. Also the apparatus is safe for the operators to use and is of such construction that it cannot be readily abused.

It will be understood that the drawings and above description constitute merely an exemplifying disclosure of our invention and that changes can be made in the construction of the apparatus without departing from the spirit and scope of the invention as set forth in the appended claims.

We claim:

1. In an apparatus for inverting loaded trays, a rotatable framework, means for supporting the same for rotation about a horizontal axis, said framework having two parallel tray compartments and an endless conveyor the opposite sides of which serve each as one of the walls of said compartments, said conveyor supporting the tray load and tray after inverting, means for rotating the framework, and means for driving said conveyor to eject the inverted tray load and tray.

2. In an apparatus for inverting loaded trays, a rotatable framework, means for supporting the same for rotation about a horizontal axis, two tray compartments each open at one end only and arranged in opposite directions and in parallel relation on opposite sides of the axis of rotation, when the framework is in stationary horizontal position the compartment above the axis being in receiving position and the compartment below the axis in discharge position, an endless conveyor having one side forming the ceiling of the compartment in the receiving position and having its other side forming the floor for the compartment in the discharge position, means for rotating the framework, and means for driving said conveyor to eject trays from the upper compartment.

3. In an apparatus for inverting loaded trays, a rotatable framework, means for supporting the same for rotation about a horizontal axis, said framework having two parallel tray compartments, an endless conveyor between them the opposite sides of which serve each as one of the walls of said compartments, said conveyor serving to support the tray load and tray after inverting, means for rotating the framework, and means for continuously driving the conveyor in the same direction as the rotation of the framework and at such a speed when the framework is stationary that when the framework is rotating the conveyor remains substantially stationary with respect to the framework.

4. In an apparatus for inverting loaded trays, a rotatable framework for receiving a loaded tray, means for supporting the same for rotation about a horizontal axis, and means for rotating the framework to invert the loaded tray comprising a continuously rotating shaft, and means for operatively connecting said shaft and said framework to rotate the same including a limited-revolution clutch adapted to be thrown out of engagement after sufficient rotation of said continuously rotating shaft to rotate the framework for an inverting operation, manually operated means for engaging said clutch, and mechanically actuated means for disengaging the clutch after said predetermined rotation, and means for preventing re-engagement of the clutch during the final portion of the inverting movement of the frame but permitting re-engagement at the end of the inverting movement.

5. In an apparatus for inverting loaded trays, a rotatable framework for receiving a loaded tray, means for supporting the same for rotation about a horizontal axis, and means for rotating the framework to invert the loaded tray comprising a continuously rotating shaft, and means for operatively connecting said shaft and said framework to rotate the same including a limited-revolution clutch adapted to be thrown out of engagement after sufficient rotation of said continuously rotating shaft to rotate the framework for an inverting operation, a releasable stop mechanism for stopping the framework at the end of each inverting operation, manually operated means for successively releasing the stop mechanism and engaging said clutch, and mechanically actuated means for disengaging said clutch after said predetermined rotation.

6. In an apparatus for inverting loaded trays, a rotatable framework for receiving a loaded tray, means for supporting the same for rotation about a horizontal axis, and means for rotating the framework to invert the loaded tray comprising a continuously rotating shaft, and means for operatively connecting said shaft and said framework to rotate the same including a limited-revolution clutch adapted to be thrown out of engagement after sufficient rotation of said continuously rotating shaft to rotate the framework for an inverting operation, a releasable stop mechanism for stopping the framework at the end of each inverting operation, manually operated means for successively releasing the stop mechanism and engaging said clutch, mechanically actuated means for disengaging said clutch after said predetermined rotation, and means for permitting said stop mechanism to return to its normal position upon release of said manually operated means.

7. In an apparatus for inverting loaded trays, a rotatable framework for receiving a loaded tray, means for supporting the same for rotation about a horizontal axis, and means for rotating the framework to invert the loaded tray comprising a continuously rotating shaft, and means for operatively connecting said shaft and said framework to rotate the same including a limited-revolution clutch adapted to be thrown out of engage-

ment after sufficient rotation of said continuously rotating shaft to rotate the framework for an inverting operation, releasable stop mechanism for arresting the movement of the framework at the end of the inverting operation, mechanically operated means for releasing said stop and engaging said clutch the release of which permits the stop to return to its normal position, mechanically operated means for disengaging the clutch prior to the completion of the inverting operation, and brake mechanism for retarding the motion of the framework after the clutch is disengaged and before the stop mechanism is re-engaged by said framework.

8. In an apparatus for inverting loaded trays, a rotatable framework for receiving a loaded tray, means for supporting the same for rotation about a horizontal axis, and means for rotating the framework to invert the loaded tray comprising a continuously rotating shaft, and means for operatively connecting said shaft and said framework to rotate the same including a limited-revolution clutch adapted to be thrown out of engagement after sufficient rotation of said continuously rotating shaft to rotate the framework for an inverting operation, said clutch including a star wheel on the continuously rotating shaft and a clutch member along-side of said wheel having a dog pivoted thereto and biased for engagement with the teeth thereof, an arcuate arm pivoted to swing in and out of the path of rotation of the tail of said dog, and means for actuating said pivoted arm to engage and disengage the clutch, the length of said arcuate arm permitting the framework to coast for a predetermined angular distance after disengagement of the clutch without causing the clutch to be re-engaged.

9. In an apparatus for inverting loaded trays, a rotatable framework for receiving a loaded tray, a horizontal shaft for supporting the framework, means for rotating the framework to invert the loaded tray comprising a continuously rotating shaft, a limited revolution clutch having driving and driven members, the driving member thereof being secured to said shaft and said driven member operatively connected to the shaft of the rotatable framework by means of a chain passing over sprockets on said respective shafts, a clutch control member, stop mechanism for stopping the framework at the end of the inverting operation, and a pair of take-up devices one engaging each side of said chain for adjusting the angular position of the driven member of said clutch with respect to the angular position of the framework to cause said driven member to come to rest at the desired position with respect to said clutch control member.

10. In an apparatus for inverting loaded trays, a framework, means for supporting the same for rotation about a horizontal axis, said framework having two parallel tray compartments and an endless conveyor the opposite sides of which extend operatively into said compartments, said conveyor, after an inverting operation, being in operative relation to the tray load to move the same, means for rotating the framework, and means for driving said conveyor to eject the inverted tray load and tray.

11. In an apparatus for inverting loaded trays, a framework, means for supporting the same for rotation about a horizontal axis, said framework having two parallel tray compartments and an endless conveyor the opposite sides of which extend operatively into said compartments, said conveyor, after an inverting operation, being in operative relation to the tray load to move the same, means for rotating the framework, and means for driving said conveyor to eject the inverted tray load and tray, said conveyor, before an inverting operation permitting the entry of a tray into one of said compartments independently of the motion of the conveyor.

12. In an apparatus for inverting loaded trays, a rotatable framework, means for supporting the same for rotation about a horizontal axis said framework having two parallel tray compartments, an endless conveyor between them, the opposite sides of which extend operatively into said compartments, means for rotating the framework, and means for continuously driving the conveyor in the same direction as the rotation of the framework and at such a speed when the framework is stationary that when the framework is rotating the conveyor remains substantially stationary with respect to the framework.

13. In an apparatus for inverting articles, a rotatable framework having an article-receiving compartment, means for supporting the framework for rotation about a horizontal axis, means for rotating the framework, a conveyor carried by and rotatable with the framework and operating continuously in a direction to eject articles from the compartment, the articles being received in the compartment out of engagement with the conveyor and being placed in engagement therewith during the rotation of the framework, and means for stopping the rotation of the framework upon completion of the inversion of the articles therein to permit said conveyor to eject the inverted articles.

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