June 7, 1938. J. M. McCLATCHIE 2,119,642

RECEPTACLE INVERTING MECHANISM

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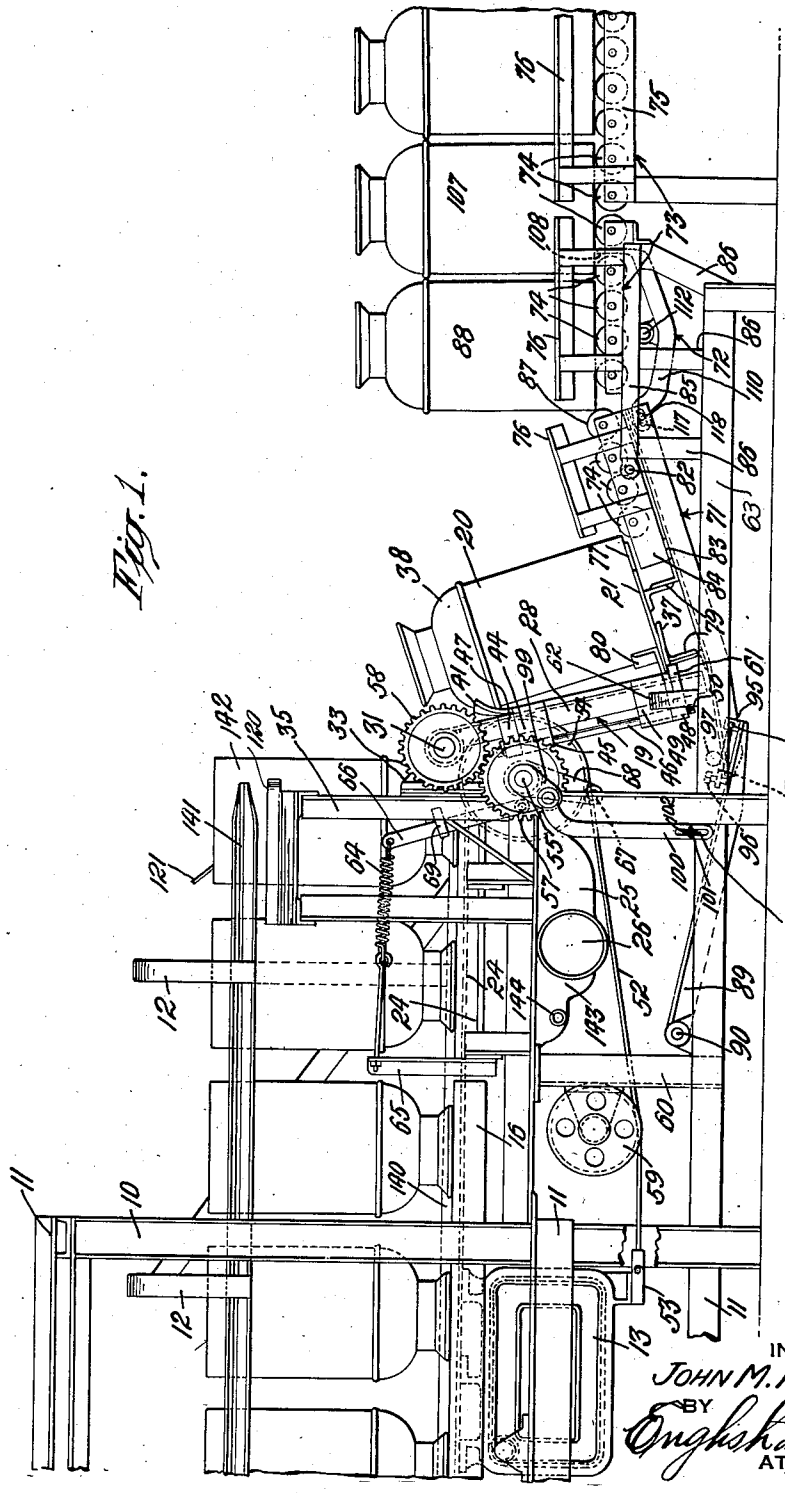


Fig. 1.

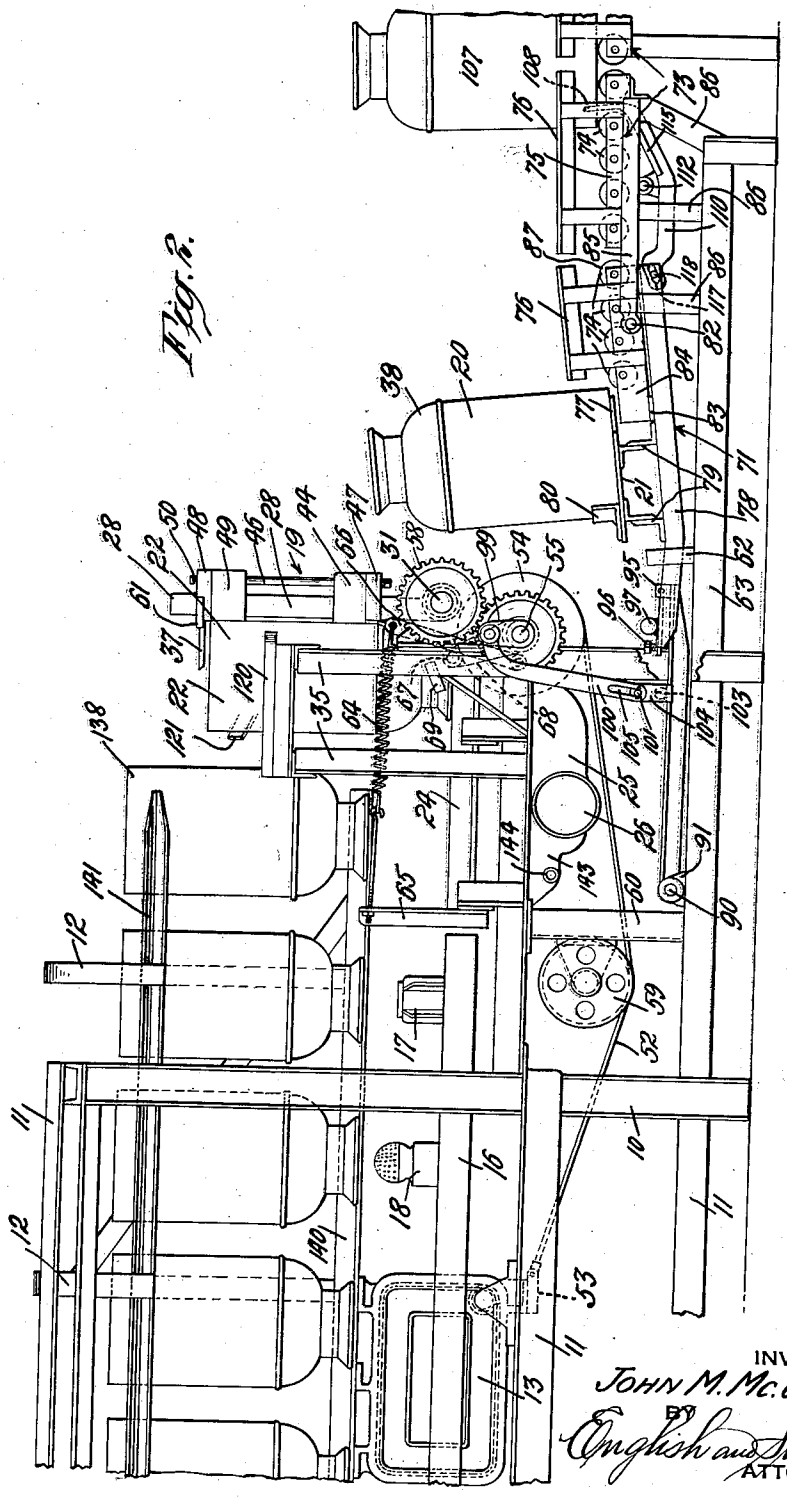
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Fig. 2.



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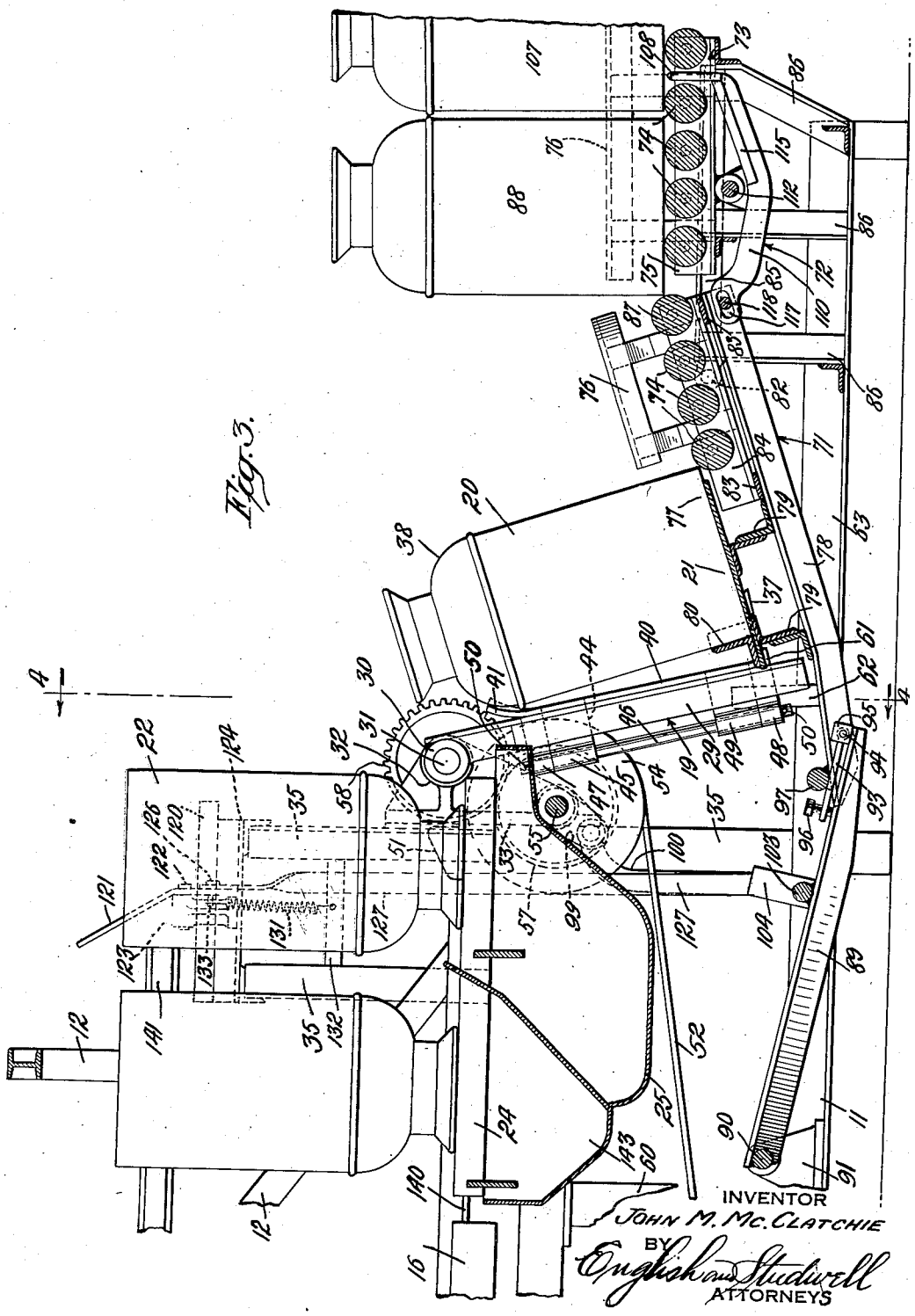


Fig. 3.

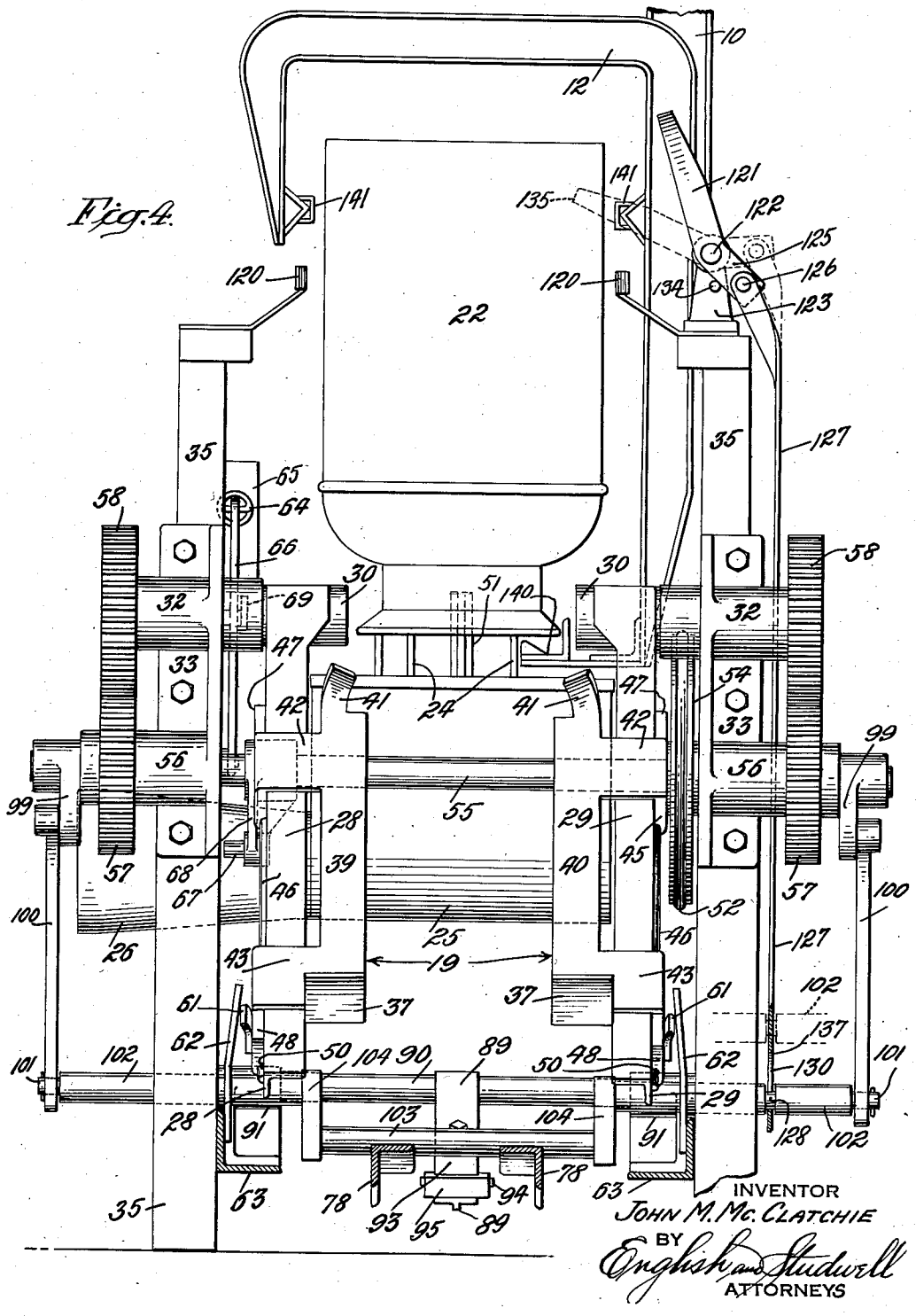
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Fig. 4.



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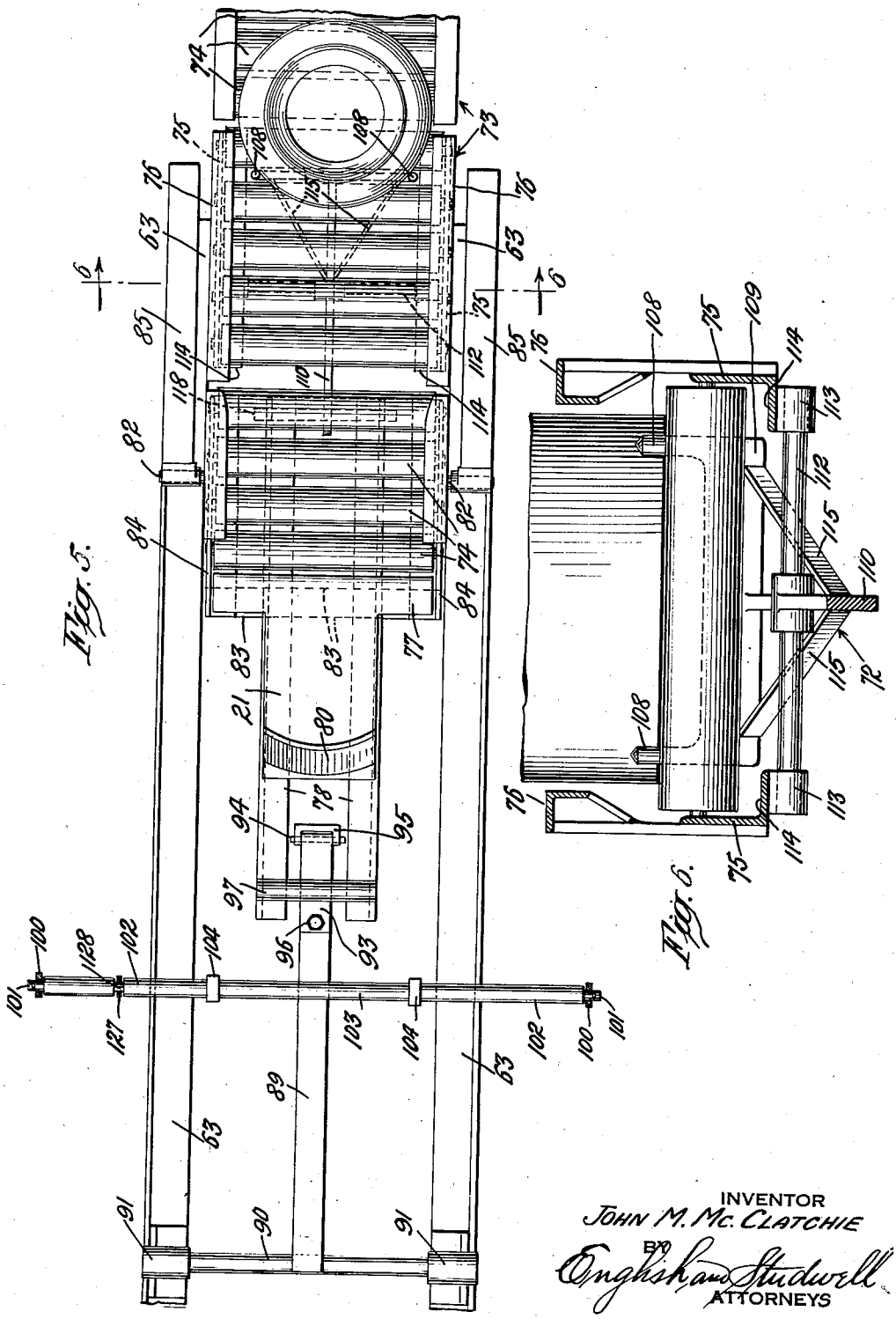


Fig. 5.

Fig. 6.

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Fig. 7.

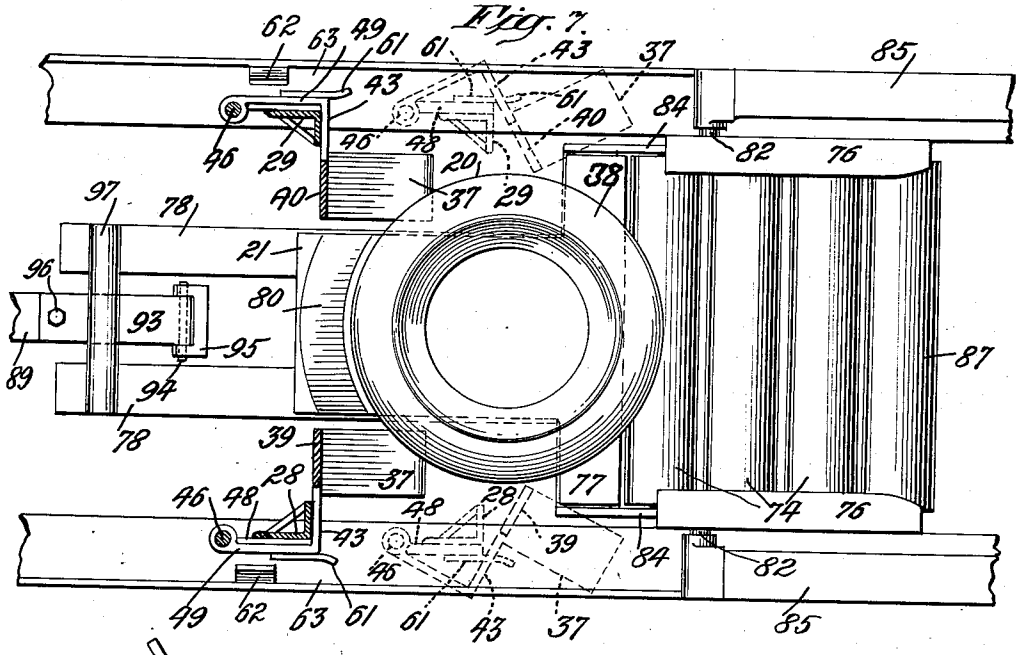


Fig. 8.

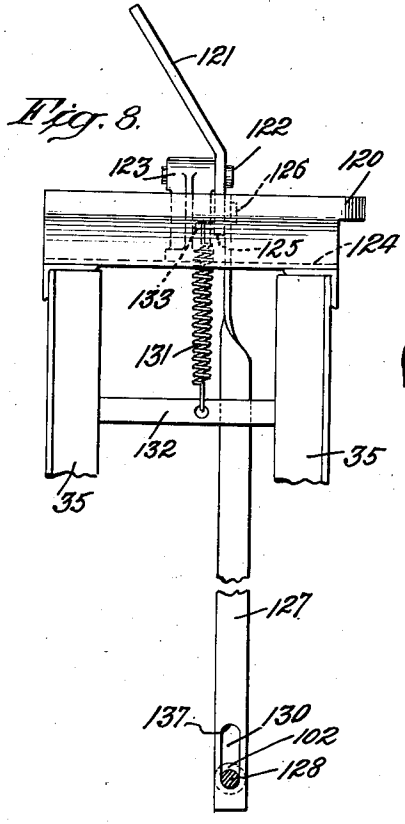
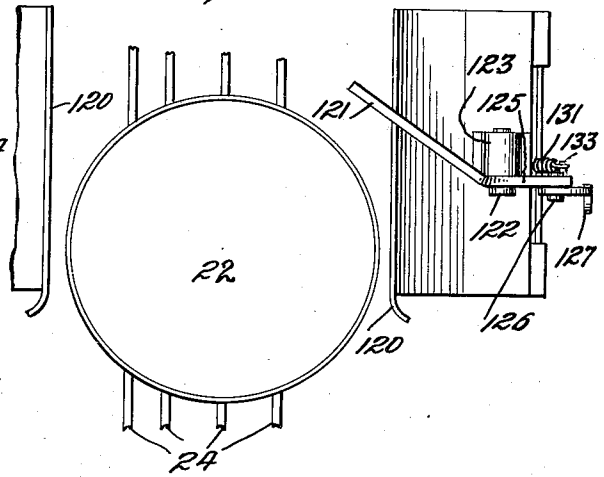


Fig. 9.



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Fig. 10.

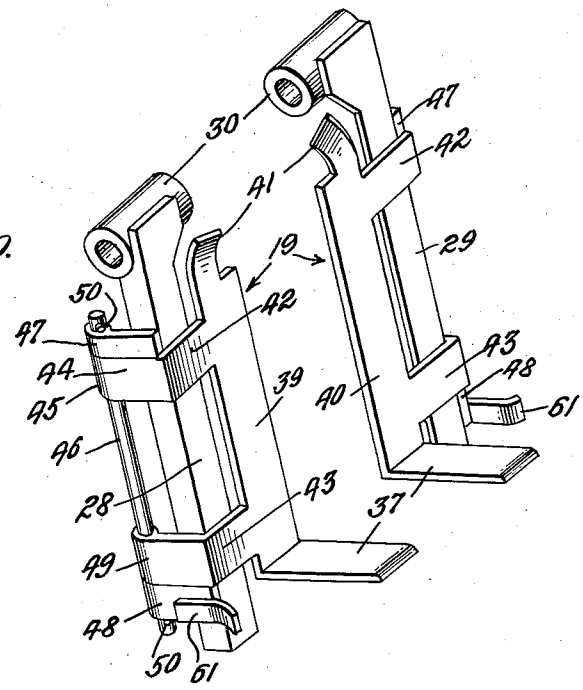
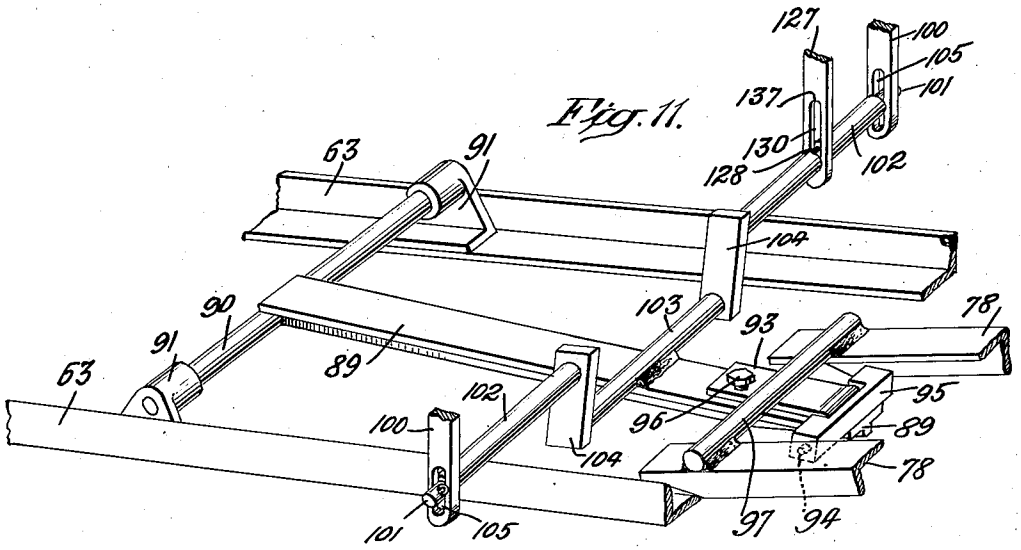


Fig. 11.



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Patented June 7, 1938 2,119,642

UNITED STATES PATENT OFFICE

2,119,642

RECEPTACLE INVERTING MECHANISM

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Application August 8, 1936, Serial No. 94,906

11 Claims. (Cl. 214—1.1)

The present invention relates to an improvement in receptacle inverting mechanisms, and more particularly to an improvement in can inverting or "dumping" mechanisms especially adapted for operation in timed relation with can washing machines of the type disclosed in my Patent No. 2,023,431, dated December 10, 1935.

Automatic receptacle inverting mechanisms are extensively used in the industries to perform the act of dumping or pouring out the liquid contents of the receptacles faster and more efficiently than the act can be done by hand. The mechanisms for inverting or dumping the large milk cans used to transport raw milk from the producer to the receiving and distributing stations are typical examples of such devices, and although the mechanism of the present invention is applicable to the inverting of various kinds of receptacles in order to automatically pour out their contents, the invention will be described with particular reference to the emptying or dumping of the large cans used in transporting fluid milk.

It has been proposed heretofore to provide automatic can inverting or dumping mechanisms for can washers, and there are many such in successful operation on the market today, although many of them are objectionable in one or more particulars, for example, such as spilling or slopping out some of the milk before the can reaches the point at which it is dumped or because some of the milk is spilt onto the outside of a preceding can.

One object of the present invention is to produce a can inverting or dumping mechanism of such construction that no milk will spill or slop over the top of the can before the can is positively inverted or dumped into the milk receiving tank.

A further object of the invention is to produce a can inverting mechanism of such construction that the preceding can which has just been emptied will be removed from the sphere of action of the can being dumped so as to avoid all possibility of milk spilling onto the exterior of the preceding can.

Another object of the invention is to produce a can inverting mechanism especially adapted for connection with and operation from actuating means functioning like the can transporting carriage of the can washing machine disclosed in my said patent, namely, an upward, forward, downward and backward movement. In the can inverting mechanism of the present invention the cans to be emptied travel without vibration down an inclined runway and come to rest on a receiving platform without spilling any milk whatever. Thereupon an oscillatory cradle picks up the filled can and swings it in a vertical plane to turn the can upside down thereby emptying its contents at a higher plane into the milk receiving tank, at the same time depositing the can in upside down position on a support from which the can is removed and carried into the washing machine before the next succeeding can is dumped. By so arranging the can inverting mechanism that the cradle begins its upward swing on the upward stroke of the can transporting carriage of the washing machine the cradle is started in its upward swing slowly and gently without liability of accidentally spilling the contents of the can. And then as the carriage reaches the limit of its upward movement and starts forward the cradle carrying the filled can is accelerated in movement and the contents thereof are swiftly and neatly dumped into the receiving tank without slopping over the sides of the tank. The inverting mechanism is returned to normal position largely under the action of gravity, but in order that there may be no delay in bringing the cradle back to normal position resilient means put under tension from the can transporting carriage is availed of to start the cradle in its downward path.

Another object of the invention is to produce a can inverting mechanism of such compact construction as to take up relatively little floor space, an important desideratum in connection with many can washing machines now in operation in restricted quarters which do not permit of the installation and operation of former kinds of can inverting mechanisms requiring relatively large floor space. In this connection the can inverting cradle is of such construction that when it returns to can receiving position it does not interfere with the passage of the next succeeding filled can onto the receiving platform. For this purpose the can inverting cradle comprises two pivoted parts which are swung outwardly as the cradle descends, being started in their outward swing by contact with the upper rounded part of the can and then when the can supporting plates of the cradle pass by the bottom end of the can swing inwardly into position ready to be brought upwardly under the forward edge of the bottom of the can on the platform.

Other objects and particular features of the invention will be pointed out as the description proceeds. To these ends the invention consists in the improved receptacle inverting mechanism

hereinafter fully described and particularly pointed out in the appended claims.

In the accompanying drawings illustrating the preferred form of the invention, Fig. 1 is a side elevation of the receiving end of a can washing machine, with the improved can inverting mechanism shown in cooperative relation therewith; Fig. 2 is a view similar to Fig. 1, but showing the oscillatory can inverting cradle in can inverting position; Fig. 3 is an enlarged longitudinal-vertical section of the middle portion of the parts shown in Fig. 1; Fig. 4 is an enlarged transverse section taken on the line 4—4 of Fig. 3; Fig. 5 is a top plan, partly in section, of the can runway, the section being taken on a line above the can receiving platform; Fig. 6 is an enlarged cross section taken on the line 6—6 of Fig. 5; Fig. 7 is a top plan of the can receiving platform and of the adjacent parts of the oscillatory can inverting cradle; Fig. 8 is a detail of the stop for preventing the cans from toppling over during the act of inverting them; Fig. 9 is a plan of the parts shown in Fig. 8, to indicate their relation to an inverted can; Fig. 10 is a perspective view of the can inverting cradle separate from its supporting means; and Fig. 11 is a perspective view of the parts shown in the lower part of Fig. 4.

The improved receptacle inverting mechanism of the present invention is adapted for connection with and operation from any type of machine provided with an element which has an upward, forward, downward and backward movement for the purpose of inverting receptacles in timed relation with the operation of the machine. For the sake of convenience of description, however, the improved receptacle inverting mechanism will be described as especially adapted for inverting or "dumping" large milk cans and is shown in connection with a can washing machine of the character described in my Patent No. 2,023,431, dated December 10, 1935. Only the can receiving end of the can washing machine is shown in the drawings and only enough of the operating parts thereof are described as is necessary to an understanding of the connection between the machine and the elements of the present invention.

As described and illustrated in said patent, the can washing machine includes a stationary frame comprising the uprights 10 and longitudinal bars 11, a can transporting carriage 12 to which is imparted an upward, forward, downward and backward movement by means of a rectangular gear construction, generally indicated at 13, for the purpose of successively depositing the cans in upside down position over the cleansing nozzles, rising from the stationary longitudinally-extending can supporting rails 16. Only the first two nozzles, the centering nozzle 17 and the rinsing nozzle 18, are indicated in the drawings.

The can inverting mechanism comprises a cradle or frame generally indicated at 19, oscillatory in a vertical plane for removing a can 20 resting in substantially upright position on a receiving platform 21, turning it into upside down position, as indicated at 22 in Figs. 2 and 4, and depositing it on longitudinally extending rails 24, which constitute a rearward extension of the rails 16 and are located over the milk receiving tank 25, provided with an opening 26 which leads to the milk weighing devices. Although the can resting on the platform 21 is described as in substantially upright position, it will be noted that it is inclined slightly toward the washing machine so as to facilitate its removal from the platform by the cradle.

The oscillatory can inverting cradle or frame 19 comprises two longitudinally-extending frame members 28 and 29 in the form of angle irons, each of which is secured at its upper end to a hub member 30 fastened to the inner end of a rock shaft 31. The rock shafts 31 are journalled in the upper bosses 32 (Figs. 3 and 4) of the brackets 33 secured to the rear sides of the uprights 35 forming part of the stationary frame of the can inverting mechanism. When the can inverting cradle is in position ready to pick up a can from the platform 21 (which may be termed the lower or can-receiving position of the cradle) the angle irons 28 and 29 are in substantially parallel relation with the longitudinal axis of the can 20 resting on the platform, as shown in Fig. 3, with the can supporting or lifting plates 37 located under the forward edge of the bottom of the can. As shown, the upper end of the can tilts slightly toward the can washing machine.

The can lifting or supporting plates 37 project rearwardly at right angles from the lower ends of the strips 39 and 40 which are respectively associated with the angle irons 28 and 29 and arranged parallelly therewith. As the carriage is swung upwardly from the position shown in Figs. 1 and 3, the front side of the can is adapted to rest against the strips 39 and 40, the upper ends of which are curved, as indicated at 41, to engage with the curved upper part 38 of the can.

The strips 39 and 40 are pivotally mounted so as to swing inwardly toward each other just before they move into can-receiving position and to swing outwardly from each other as they descend after inverting a can. For this purpose each strip 39 and 40 is provided with an outwardly-extending upper lug 42 and an outwardly-extending lower lug 43. Each upper lug 42 is bent forwardly at 44 and terminates in a boss 45 which embraces the upper end of a stud or rod 46 arranged parallelly with the angle irons 28 and 29 and supported therefrom by the upper brackets 47 and lower brackets 48. The lower lugs 43 of the strips 39 and 40 are bent backwardly and terminate in the bosses 49 which embrace the rods 46. The rods 46 are held in position by means of the pins 50 passing transversely through their ends which project beyond the brackets 47 and 48.

The can inverting cradle 19 is swung in the direction to remove the can from the platform 21 and turn it into upside down position by means actuated by the transporting carriage and for this purpose a cable 52 is connected at its forward end to a bracket 53 extending downwardly from the lower rear corner of the rectangular gear 13. The other end of the cable 52 is secured to the rim of a pulley 54 mounted on a transversely-arranged shaft 55 journalled in the lower bosses 56 of the brackets 33. On the outer ends of the shaft 55 are mounted gears 57 which mesh with and drive the gears 58 mounted on the outer ends of the rock shafts 31. The cable 52 passes under the idler pulley 59 mounted on one of the uprights 60 of the frame of the can inverting mechanism.

Assuming the upward stroke of the can transporting carriage to be the first step in its cycle of movements, it will be understood, viewing Fig. 1, that as the gear 13 rises a tension is put on the cable 52 which as the gear 13 continues to rise causes the gears 57 to turn in a clockwise direction and so turn the gears 58 in a counter-clockwise direction, with the result that the can inverting cradle moves into contact with the can

on the platform 21 and gently lifts it therefrom without appreciable vibration and consequently with no spilling or slopping over of the contents of the can. As the gear 13 approaches the limit of its upward movement and then starts forward the speed of rotation of the gears 57 is accelerated and the cradle is swung swiftly but still without vibration to its uppermost position, so that by the time the gear 13 reaches the limit of its forward movement the cradle has been swung into the position shown in Fig. 2, with the can emptied and deposited upon the auxiliary rails 24. The rear end of the tank 25 extends rearwardly a considerable distance beyond the position of the first can 22 resting in upside down position on the auxiliary rails 24, as best indicated in Fig. 3, so that when the cradle approaches a horizontal position and the milk or other liquid begins to pour out of the mouth of the can it will be received in the tank 25 without waste.

The rearwardly curved upper ends 41 of the strips 39 and 40 prevent the can 20 from slipping off the can inverting cradle until the latter is in almost its upright or can depositing position. As the cradle approaches its upright or vertical position, the can slips over the curved ends 41 of the strips 39 and 40 and the forward edge of the mouth of the can first strikes the upper surface of the auxiliary rails 24. To prevent the forward edge of the mouth of the can from sliding along the upper surface of the rails 24, I provide the stop 51 (shown in Figs. 3 and 4), against the rear vertical edge of which the forward inner edge of the mouth of the can strikes as the can is deposited in inverted position on the rails 24, thereby holding the inverted can in the position shown in Figs. 1, 2 and 3 until it is lifted from the rails 24 by the next upward movement of the can transporting carriage.

When the can inverting cradle has deposited the can in upside down or inverted position on the rails 24, it is returned to can receiving position under the action of gravity, after having received a starting impetus from a spring 64. Before the cradle starts downwardly, another can has been moved onto the platform 21, so that as the cradle approaches a horizontal position the inner edges of the plates 37 strike the sides of the rounded top 38 of the can on the platform and are swung outwardly, as indicated by the dotted lines in Fig. 7. To prevent the plates 37 from swinging outwardly too far stops 61 are mounted on the outer sides of the brackets 48 in position to be engaged by the plates 37. As the plates 37 pass below the lower forward edge of the can, they swing toward each other, but to assure their assuming normal can lifting position the outer sides of the forward extensions of the lower lugs 43 pass between and strike the stops 62 rising from the longitudinal bars 63 of the frame of the can inverting mechanism. The bars 63 constitute a rearward extension of the lower longitudinal bars 11 of the can washing machine.

As stated above, the can inverting cradle is started on its downward swing by means of the contraction spring 64 fastened at its forward end to the bracket 65 and at its rear end to the free end of an arm 66 pivoted on one of the uprights 35. The spring 64 is put under tension by means of a pin 67 projecting outwardly from the free end of an arm 68 fixed on the shaft 55. As the gear 13 nears the end of its forward movement the pin 67 strikes the arm 66 and swings it to the right, viewing Fig. 2, thereby elongating the spring 64, so that when the gear 13 moves downwardly and then begins its rearward movement, thereby permitting the shaft 55 to turn in the opposite direction, the spring 64 acting through the arms 66 and 67 turns the shaft 55 and gears 57 in counter-clockwise direction, and so the gears 58 in clockwise direction, thereby starting the can inverting cradle on its downward swing, which is completed under the action of gravity. To prevent the spring 64 from contracting too much and thereby swinging the arm 66 too far to the left, a stop 69 fixed to one of the uprights 35 limits the leftward swing of the arm 66, as shown in Fig. 1. When the shaft 55 is turned in counter-clockwise direction the pulley 54 winds up the cable 52.

While the can inverting cradle is removing a can from the platform 21 and beginning to swing it upwardly to turn it upside down, the next succeeding can in the row of cans being fed into the machine is not permitted to move onto the platform until the can being removed therefrom is out of the path of travel of the oncoming can. For this purpose the passage of the cans to the platform is controlled by an escapement arrangement effected by making the can runway section 71 on which the platform 21 is located tiltable and providing a pivoted detent member 72 controlled by the movements of the section 71. The detent member 72 is located in the receiving end of the can runway proper, indicated at 73, which comprises the usual transversely arranged rolls 74 fulcrumed at their ends in the side plates 75. The can runway 73 slopes toward the can washing machine to permit the cans to pass onto the platform 21 by gravity when the tiltable section 71 is in the position shown in Fig. 2. To prevent accidental lateral displacement of the cans the usual guide rails 76 are provided.

The tiltable section 71 of the can runway comprises two longitudinally extending bars 78, on which the platform 21 is mounted by means of the angle irons 79. The platform 21, as shown in Fig. 5, is T-shaped in plan with the cross piece 77 at the rear end and an arc-shaped abutment 80 for the cans at its forward end. The platform 21 is made narrow at its forward end in order that the plates 37 of the cradle may swing past it and take their can lifting position under the forward edge of the bottom of the can resting on the platform, as indicated in Fig. 7.

The tiltable section 71 of the can runway is pivotally mounted at its rear end at 82: Supported on the upper sides of the rear ends of the longitudinally-extending angle bars 78 are two laterally-extending plates 83 which support longitudinally-extending angle irons the upright parts 84 of which support the outer ends of the rolls 74 of the runway section 71. Projecting laterally outwardly from each upright plate 84 is a trunnion 82 journalled in the forward end of a longitudinally-extending angle iron 85 supported by the uprights 86.

When a can is in position on the platform 21, the next succeeding can in the line of cans is prevented from passing onto the section 71 of the can runway by tilting section 71 to raise the rear end thereof, whereby the last roll 87 in the section 71 serves as a stop against which the forward edge of the bottom of the next succeeding can 88 abuts and is thereby prevented from further forward travel until the roll 87 is again depressed into the plane of the rolls of the runway section 73. The means for raising and lowering the rear end of the section 71, that is, tilting it on its pivot point 82, comprises a longitudinally-

extending arm 89 fixed at its forward end on the upper surface of the middle portion of a transversely-arranged rock shaft 90 journalled at its outer ends in brackets 91 supported on the angle bars 63. The rear end of the arm 89 is provided with means for regulating the height of the rear end of the tiltable can runway section 71, especially when the latter is in the position shown in Fig. 2 permitting a can to pass onto the rolls of runway section 71. This adjustment means comprises an arm 93 pivoted at its rear end on a pin 94 mounted in a bifurcated boss 95 fixed on the upper surface of the rear end of the arm 89. At its forward end the arm 93 is provided with an adjustment screw 96 which takes against the upper surface of the rear part of the arm 89. The forward ends of the angle bars 78 are provided on their upper surface with a cross rod 97 which bears downwardly against the upper surface of the adjustment arm 93, since the forward ends of the angle bars 78 are not otherwise supported. By turning the adjustment screw 96 in a clockwise direction the rear end of the runway section 71 is lowered and conversely, by turning the screw 96 in a counter-clockwise direction the rear end of the section 71 is slightly raised.

The rear end of the arm 89 is positively raised from the shaft 55 to raise the forward end of the can runway section 71 and thereby depress the rear end thereof to release the can held by the roll 87 by means of the following parts: Each outer end of the shaft 55 is provided with an arm 99 with which is connected the upper end of a link 100. The lower ends of the links 100 are vertically slotted at 105 for a loose connection with the outer reduced ends 101 of the outer sections 102 of a transversely-arranged rod, the middle section 103 of which is supported at a lower plane than the sections 102 by means of the vertically-arranged blocks 104 depending from the inner ends of the sections 102. The under surface of the middle part of the rod section 103 is welded to the upper surface of the arm 89. By reference to Figs. 1 and 3, showing the cradle about to rise, it will be seen that the lower portions of the slots 105 in the lower ends of the links 100 are a considerable distance below the reduced outer ends 101 of the rod sections 102, so that when the shaft 55 is turned in a clockwise direction by reason of the upward and forward travel of the rectangular gear 13 of the can transport, the arms 99 will swing upwardly a portion of their path of travel while the can inverting cradle is swinging the can upwardly, before the links 100 begin to lift the forward end of the bars 78 to depress the rear end of the can runway section 71 to permit the next succeeding can 88 to move onto the section 71. By means of this arrangement it is assured that the cradle removes the can from the platform and swings it to sufficient height before the next succeeding can can collide with it. When on the downward movement of the gear 13 the shaft 55 turns in a counter-clockwise direction and the cradle swings downwardly, the downward travel of the link 100 permits the weight of the rear end of the arm 89 and the forward end of the can runway section 71 to move these parts into the position shown in Figs. 1 and 3, in which position they are held by means of the engagement of the inner ends of the rod sections 102 with the upper edges of the upright portions of the angle bars 63.

Only one can at a time is permitted to pass from the main or entrance part of the can runway onto the tiltable section 71. When the rear end of the section 71 is depressed to permit the next succeeding can 88 to slide onto the rolls of the section 71 and thence onto the platform 21, the second succeeding can 107 is prevented from moving forward until the rear end of the can runway section 71 is next raised. This action is effected by means of two pins 108 rising from a vertical plate 109 and spaced to be engaged by the lower part of the forward sides of the can, as shown in Figs. 5 and 6. The pins 108 are raised above and lowered below the plane of the upper surfaces of the rolls of the can runway section 73 by means of a lever arm 110 fixed on a transversely arranged rod 112 journalled at its outer ends in the bosses 113 depending from the under surfaces of the horizontal sections 114 of the roll supports 75. The braces 115 arranged in the form of a V assist in supporting the vertical plate 109 from the arm 110. The forward end of the arm 110 is slotted at 117 to receive loosely a pin 118 (Figs. 3 and 5) transversely arranged in the rear ends of the angle bars 78. The above described construction is such that when the rear end of can runway section 71 is depressed to permit can 88 to pass onto the platform 21, it depresses the forward end of the arm 110, thereby raising the pins 108 in front of the can 107, as shown in Fig. 2, thus preventing further forward travel of that can until the pins 108 are lowered, which takes place when the forward end of the arm 110 is lifted with the rising of the rear end of the runway section 71 to place the stop roll 87 in the path of the can 107 which moves forward as soon as the pins 108 are depressed below its lower forward edge.

As the can inverting cradle reaches the limit of its upward swing and deposits the can in upside down position on the rails 24, the can passes between the longitudinally-extending guides 120 supported from the upper ends of the uprights 35 of the frame of the can inverting mechanism. These guides prevent lateral displacement of the can. In order to prevent the upper part of the can from toppling forward when it has been deposited on the rails 24, the arm 121 of a stop lever pivoted at 122 on the standard 123 mounted on a plate 124 supported on the upper ends of the right hand uprights 35 (viewing Fig. 4) is provided. The arm 121 of the stop lever is shown in normal or inoperative position in full lines in Fig. 4. At this time the cradle is in position to engage with and lift a can from the platform 21. In these positions of the stop lever and of the cradle the rod sections 102 are at the limit of their downward movement. Since the rod sections 102 do not start upwardly at the beginning of the upward swing of the cradle but only after the cradle has passed through a considerable portion of its arc of travel, the finger 121 of the stop lever, which is actuated from the right hand rod section 102, will only be brought down into operative position, indicated by the dotted lines in Fig. 4, just before the can is turned into inverted position on the rail 24. The second arm 125 of the stop lever is pivotally connected at 126 with the upper end of a link 127 the lower end of which is loosely connected with a recessed portion 128 of the right hand rod section 102.

The arm 121 of the stop lever must of course be raised out of the path of the forward travel of the can as the can carriage begins its forward movement. Consequently, the stop lever must be actuated other than by the rod section 102

which is controlled in its movements by the rotations of the shaft 55 which is actuated by and under the control of the four cycles of travel of the can carriage. The means adopted for placing the arm 121 of the stop lever in operative position in front of the can which has just been deposited on the rails 24 and then removing it from the path of forward travel of the can consists in slotting the lower end of the link 127 at 130 in which travels the reduced portion 128 of the rod section 102, and providing a contraction spring 131 fixed at its lower end to a bar 132 (Fig. 8) extending between two of the uprights 35 and fixed at its upper end to a pin 133 extending forwardly from the part 125 of the stop lever which acts to hold the stop lever in the position shown in full lines in Fig. 4, with the arm 125 of the lever against the stop pin 134, until the rod sections 102 reach almost the limit of their upward movement, as indicated by the dotted lines 135 in Fig. 4. The reduced portion 128 of the rod section 102 then positively engages with the upper end 137 of the slot 130 and positively swings the stop lever so that the end of the arm 121 is placed in front of the upper part of one side of the can as it is deposited on the rails 24. As the rod sections 102 descend, which is during the downward and rearward travel of the can carriage, the spring 131 acts to turn the stop lever, holding the upper end 137 of the slot 130 against the top of the reduced portion 128 of the rod section 102 so that when the rod 102 has descended only a relatively short distance the stop lever has been swung free of the can and is out of its way before the can starts forward on the next forward stroke of the carriage.

With this construction and timing of operation, if the upper part of the can being deposited in upside down position on the rails 24 should tilt forward, the upper end of the right side of the can (viewing Fig. 4) would strike the finger 121 and the can would be deflected by it against the opposite guide rail 120, and thereby be prevented from falling forward, it being understood that the mouth of the can is prevented from sliding forward on the rails 24 by means of the stop 51. The can would thereafter settle by gravity in upside down position on the rails 24. In this connection it will be observed by reference to Fig. 2 that when the can is being deposited in upside down position on the auxiliary rails 24 the last can 138 in the row of cans supported on the rail 140 of the can transporting carriage is up above and forward of the can which has just been deposited on the rails 24, whereas in Figs. 1 and 4 the can inverting cradle has been swung downwardly into can receiving position and the guide rail 141 of the can transporting carriage has been moved backward into guiding relation with the can 22 which has just been deposited on the rails 24 and is in position to be lifted therefrom by the rail 140 of the transporting carriage. Consequently, all the cans now being in alinement the rail guide 141 of the carriage 12 is apparently, in Fig. 4, in cooperative relation with the finger 121 of the stop lever, whereas in reality when the transporting carriage is in this position the arm 121 is raised as indicated in Fig. 1.

The fact that the can which has just been emptied and left in upside down position over the section 25 of the milk receiving tank is lifted therefrom and then moved forward on the next upward and forward movements of the can carriage makes it impossible for the milk being poured out of the next succeeding can to spill onto the outer surfaces of the preceding can and fall into the section 25 of the milk receiving tank. As described in my said patent, when the can transporting carriage reaches almost the limit of its downward movement it deposits the cans carried thereby on the supporting rails one step in advance of their previous position and then passes rearwardly under the cans in order to pick up the can which has just been placed on the rails and move it and the preceding cans to the next preceding stations. As a result of this action the can which has been dumped and moved forward one step is positioned over a drip tank 143 provided with an opening 144 which leads to waste. This pause of the can over the drip tank 143 affords the drippings in the can, that is, that portion of the milk which adheres to the inner surfaces of the can to drain off, thereby facilitating the cleansing of the inner surfaces of the can by the washing means of the machine.

In order to eliminate as far as possible any retarding friction by the upper surface of the rear end of the platform 21 as the can is passing down the rolls of the forwardly inclined tiltable section 71 of the can runway, the upper surface of the platform 21 is on a slightly lower plane than the upper surfaces of the rolls so that the can is about half its diameter over the rear end of the platform before its lower forward edge tilts downwardly and strikes the platform. The can then slides smoothly down the platform until its lower front edge comes in contact with the abutment 80, which it strikes gently without imparting sufficient vibration to the can to spill out any of its contents, due to the slight inclination of the section 71. The position of the can at this stage is indicated in Fig. 2. To bring the can on the platform within range of the cradle without spilling any milk, the forward end of the platform is depressed, whereby the can is brought into the position shown in Fig. 1, that is, into position to be engaged by the cradle on its next downward movement to swing outwardly the can lifting plates 37 so that they may assume their can lifting position under the forward edge of the bottom of the can.

Having thus described the invention, what I claim as new is:—

1. The combination with a machine of the character described including a carriage having an upward, forward, downward and backward movement, of a receptacle inverting mechanism comprising a platform for supporting a receptacle in substantially upright position but tilted slightly at its upper end toward the machine, a receptacle inverting cradle pivoted above and forward of the platform to swing in a vertical plane, said cradle having two plates adapted to be located under the front edge of the bottom of the receptacle on the platform and being pivotally mounted to swing laterally toward and away from each other, means connected with the carriage and operative upon the upward and forward movements of the carriage to swing the cradle upwardly to turn the receptacle into inverted position, resilient means put under tension from the carriage for starting the cradle into downward swing, said plates being adapted to strike the next receptacle on the platform and be swung outwardly thereby until they pass below the bottom of the receptacle, means against which the plates strike to be swung toward each other under the forward edge of the receptacle, a runway sloping toward the cradle, said runway having a section pivoted at its rear end, an arm pivoted at

its forward end and having a part at its rear end adapted to engage with the forward end of the pivoted runway section for raising and lowering the rear end of the runway section, said arm being connected with the means for swinging the cradle arranged to depress the rear end of the runway section on the upward swing of the cradle and to raise the rear end of the runway section on the downward swing of the cradle, and stop means articulated with the rear end of the runway section arranged to be interposed in the path of the next succeeding receptacle when the rear end of the runway section is depressed and to be moved out of the path of the next succeeding receptacle when the rear end of the runway section is raised.

2. The combination with a machine of the character described including a carriage having an upward, forward, downward and backward movement, of a receptacle-inverting mechanism comprising a platform for supporting a receptacle in substantially upright position but tilted at its top end slightly toward the machine, a receptacle-inverting cradle pivoted above and forward of the platform to swing in a vertical plane to remove a receptacle from the platform and turn it into inverted position, means connected with the carriage for actuating the cradle, and a runway sloping toward the cradle down which the receptacles travel by gravity onto the platform, said runway including a movable part pivoted at its rear end, means controlled from the means for actuating the cradle for raising the rear end of the movable runway section to interpose it in the path of an oncoming receptacle when another receptacle is on the platform and for depressing the rear end of the runway section to permit the receptacle to pass onto the platform when the preceding receptacle thereon has been removed therefrom, and means controlled by the movable runway section for preventing the next succeeding receptacle from passing onto the movable runway section while it is depressed.

3. A receptacle-inverting mechanism adapted for connection with and operation from a machine including a carriage having an upward, forward, downward and backward movement, said receptacle-inverting mechanism comprising a platform tilted toward the machine, a support on a higher plane than the platform and forward thereof, a cradle pivoted above and forward of the platform for removing a receptacle therefrom and depositing it in inverted position on the support, a runway including rolls and sloping toward the cradle so that the receptacles travel by gravity onto the platform, said runway including a movable section pivoted at its rear end, means controlled by the means for actuating the cradle for raising the rear end of the movable runway section to prevent a receptacle from passing onto the platform, and stop means controlled by the movable runway section and operated in timed relation therewith so that as the rear end of the movable runway section is depressed to permit the receptacle held thereby to pass onto the platform the stop means is interposed in the path of the next succeeding receptacle and when the rear end of the movable runway section is raised the stop means are removed from in front of the held receptacle to permit it to travel as far as the raised rear end of the movable runway section.

4. In a machine of the character described, the combination with a can transporting carriage having an upward, forward, downward and backward movement, of a can inverting mechanism comprising, a can runway sloping toward the carriage down which the cans travel by gravity in substantially upright position, said can runway having a tiltable section so that the rear end thereof may be raised to prevent a can from being received thereon and depressed to permit a can to pass thereon, a can receiving platform on the tiltable section, an escapement detent operated from the tiltable section and having means spaced from the rear end of the tiltable section to prevent a can from movement until the tiltable section is in position to receive the next succeeding can, an oscillatory cradle for removing a can from the platform and swinging it upwardly to turn it upside down, means connected with the carriage for swinging the cradle upwardly and resilient means put under tension by the carriage for returning the cradle to normal position, said tiltable section of the can runway and the detent being operated by the cradle swinging means in timed relation with the oscillations thereof.

5. In a machine of the character described, the combination with a can transporting carriage having an upward, forward, downward and backward movement, of a can inverting mechanism comprising, a can receiving platform tilted toward the can transporting carriage, an oscillatory cradle pivoted above and to the front side of the platform, and having two laterally rotatable can supporting plates adapted to be moved under the forward bottom edge of the can on the platform, means actuated from the carriage on its upward and forward movements for rotating the cradle to remove the can from the platform and swing it upwardly into upside down position, and means for returning the cradle into initial position, said can supporting plates on the downward movement of the cradle being arranged to strike and be rotated outwardly by the sides of the next succeeding can on the platform.

6. In a machine of the character described, the combination with a can transporting carriage having an upward, forward, downward and backward movement, of a can inverting mechanism comprising, a can runway tilted toward the can transporting carriage so that the cans travel by gravity toward it, a can receiving platform, an oscillatory cradle arranged to remove a can from the platform and swing it upwardly into upside down position, means connected with the carriage for swinging the cradle into can inverting position, means for returning the cradle to initial position, and means actuated from the carriage for controlling the passage of cans onto the platform.

7. In a machine of the character described, the combination with a can transporting carriage having an upward, forward, downward and backward movement, of a can inverting mechanism comprising, a can receiving platform tilted toward the can transporting carriage, an oscillatory cradle pivoted above and to the front of the platform, said oscillatory cradle including two laterally rotatable can supporting plates adapted to have an initial position below the bottom of the front edge of the can on the platform, means connected with the carriage whereby the latter on its upward and forward movements swings the cradle into upright position to remove the can from the platform and turn it into upside down position, means for returning the cradle to initial position, said can supporting plates on the downward movement of the cradle being adapted to strike the sides of the next can on the platform

and be separated thereby, and means interposed in the path of the plates as the cradle swings to initial position to bring the plates toward each other.

8. In a machine of the character described, the combination with a can transporting carriage having an upward, forward, downward and backward movement, of a can inverting mechanism comprising, a can runway tilted toward the carriage down which the cans travel by gravity in substantially upright position, a receiving platform at the forward end of the can runway, an oscillatory cradle for removing the can from the platform and swinging it upwardly to turn it into upside down position, means connected with the carriage for swinging the cradle upwardly, resilient means for returning the cradle to initial position, said resilient means being placed under tension from the means for swinging the cradle upwardly, said can receiving platform being mounted on a tiltable section of the can runway, means operated from the cradle actuating means for tilting the platform to raise and lower the rear end thereof to permit only one can at a time to reach the platform.

9. The combination with a machine of the character described including a carriage having an upward, forward, downward and backward movement, of a receptacle inverting mechanism comprising a platform tilted slightly toward the machine, a support located above and forward of the platform, a cradle mounted to swing in a vertical plane for removing an upright receptacle from the platform and depositing it in inverted position on the support, means connected with the carriage for swinging the cradle upwardly, means controlled by the carriage for initiating the downward swing of the cradle, said cradle being so mounted as to complete its downward swing by gravity, guide rails for preventing lateral displacement of the receptacle on the support, and stop means controlled by the carriage arranged to be positioned in front of the receptacle being deposited on the support adapted to cooperate with one of the guide rails to prevent the receptacle being deposited on the support from toppling forward.

10. In a machine of the character described, the combination with a can transporting carriage and means for actuating the carriage, of a can inverting mechanism, a can receiving platform, an oscillatory cradle pivoted above the platform and toward the carriage, and having two laterally rotatable can supporting plates adapted to be moved under the can on the platform, means connected with the carriage actuating means for actuating the cradle so as to swing it to turn the can into upside down position, means for receiving the inverted can, and means for returning the cradle into initial position, said can supporting plates on the downward movement of the cradle being arranged to strike and be rotated outwardly by the sides of the next succeeding can on the platform.

11. In a machine of the character described, the combination with a can transporting carriage and means for actuating the carriage, of a can inverting mechanism comprising, a movable can receiving platform tilted toward the can transporting carriage, a tilted can runway in alinement with the can receiving platform when the latter is in normal position so that cans pass by gravity from the runway onto the platform, means connected with the carriage for tilting the platform toward the carriage into position for the removal of the cans therefrom, an oscillatory cradle arranged to lift a can from the platform and swing it upwardly into upside down position, means connected with the carriage for swinging the cradle into can inverting position, means for returning the cradle to initial position, and means actuated from the carriage for controlling the passage of cans onto the platform.

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