

Feb. 20, 1945.

F. L. KLAIBER ET AL

2,369,742

CAN UPENDING MECHANISM

Filed March 3, 1941

6 Sheets-Sheet 1

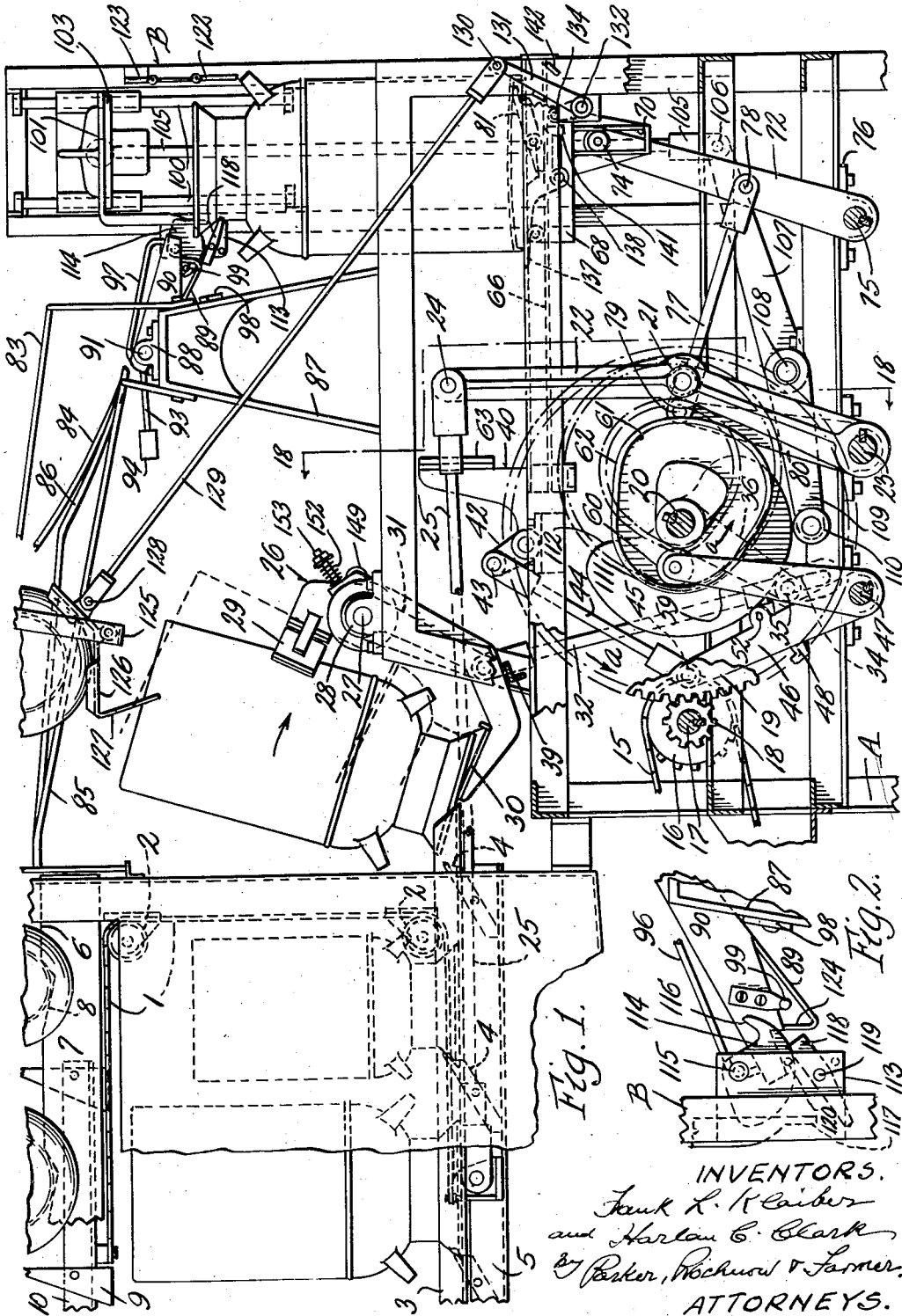


Fig. 1.

Fig. 2.

INVENTORS.
 Frank L. Klaiber
 and Harlan C. Clark
 BY Parker, Richman & Larmer.
 ATTORNEYS.

Feb. 20, 1945.

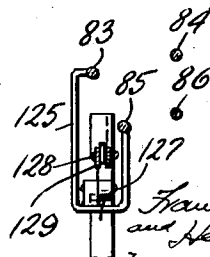
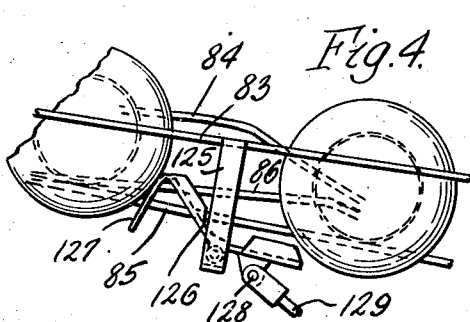
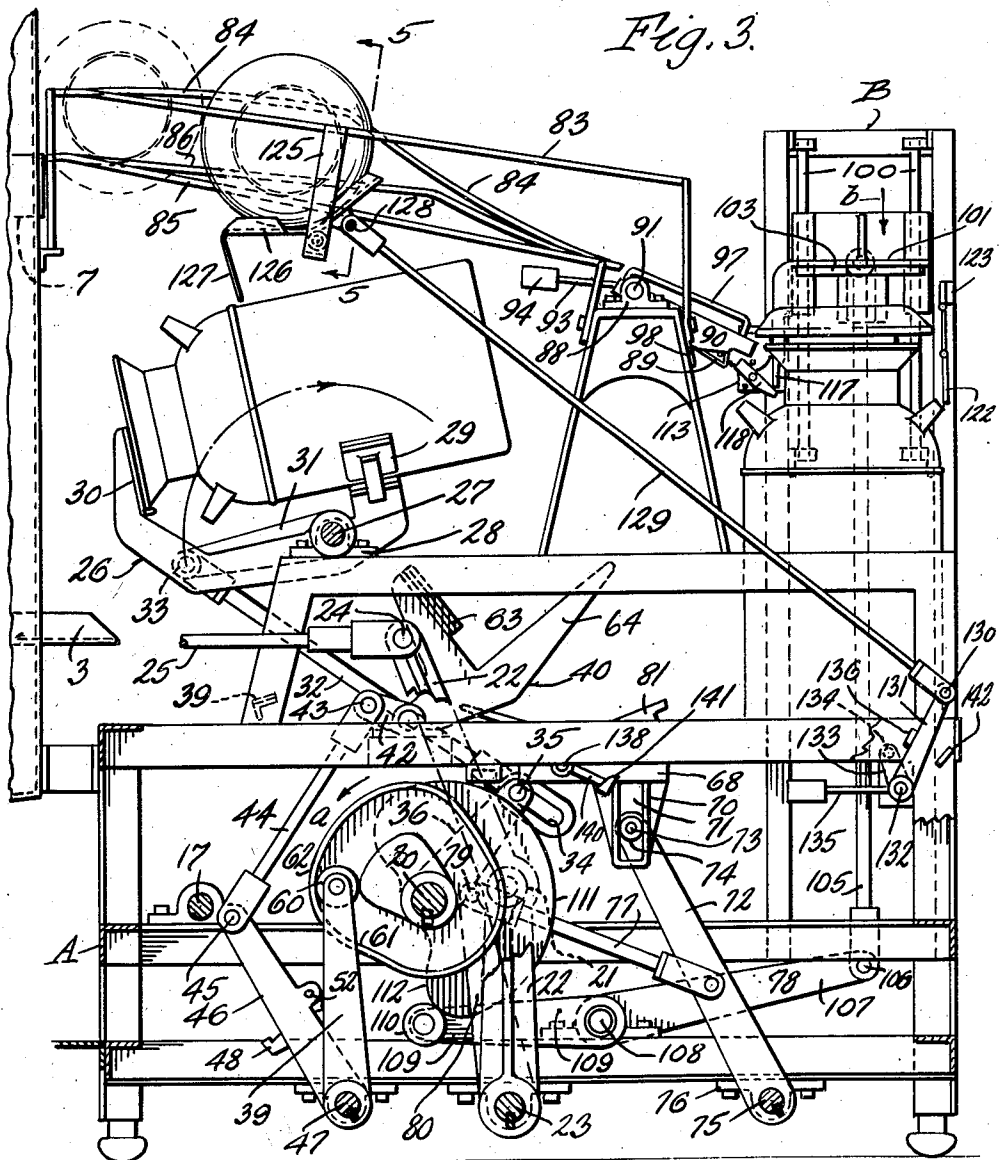
F. L. KLAIBER ET AL

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CAN UPENDING MECHANISM

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6 Sheets-Sheet 2



INVENTORS.
L. Klaiber
Dan C. Clark
Richard T. Farmer.
ATTORNEYS.

Feb. 20, 1945.

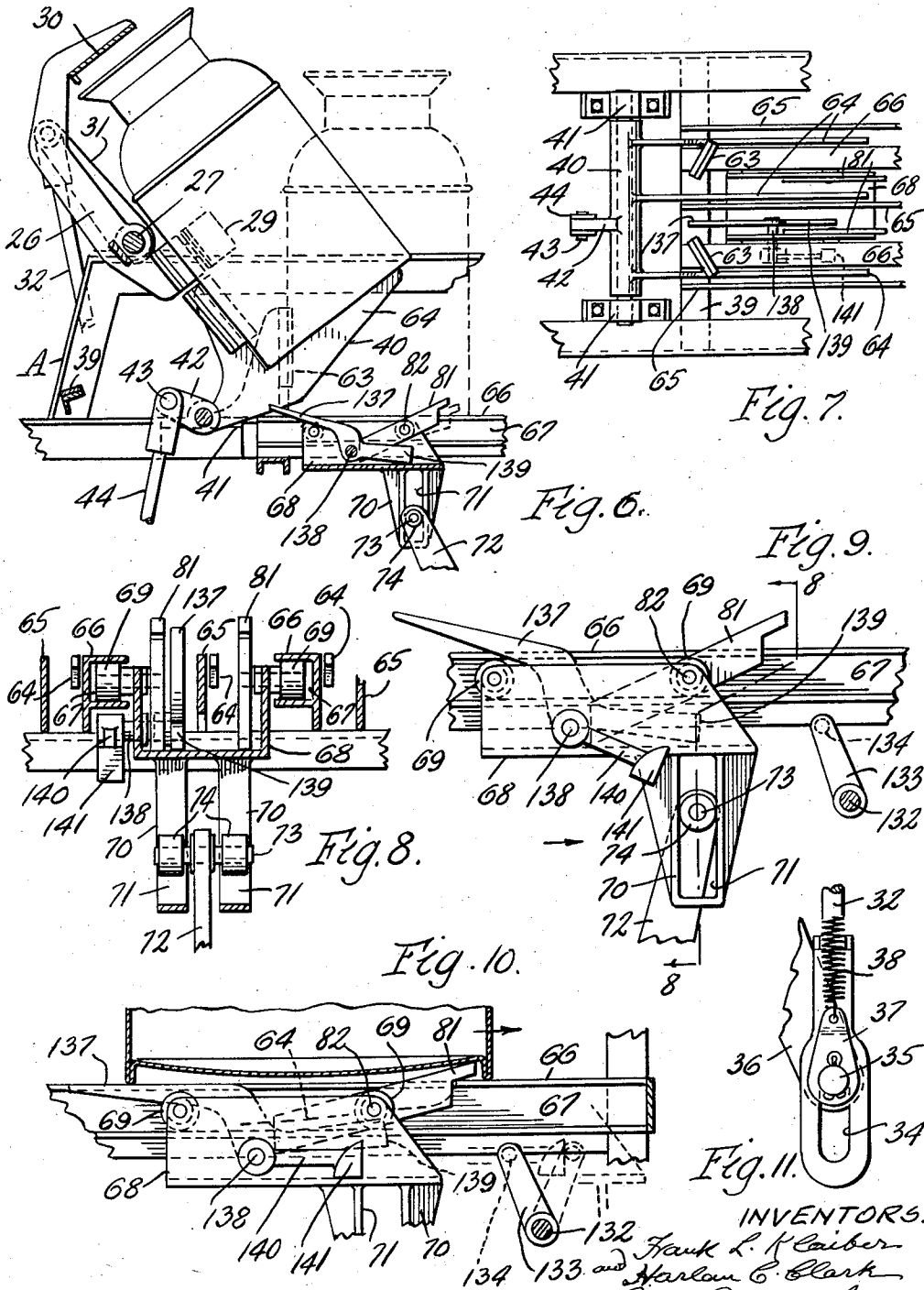
F. L. KLAIBER ET AL

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CAN UPENDING MECHANISM

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6 Sheets-Sheet 3



INVENTORS.
Frank L. Klaiber
and Harlan C. Clark
BY Parker, Prochman & Farmer
ATTORNEYS.

Feb. 20, 1945.

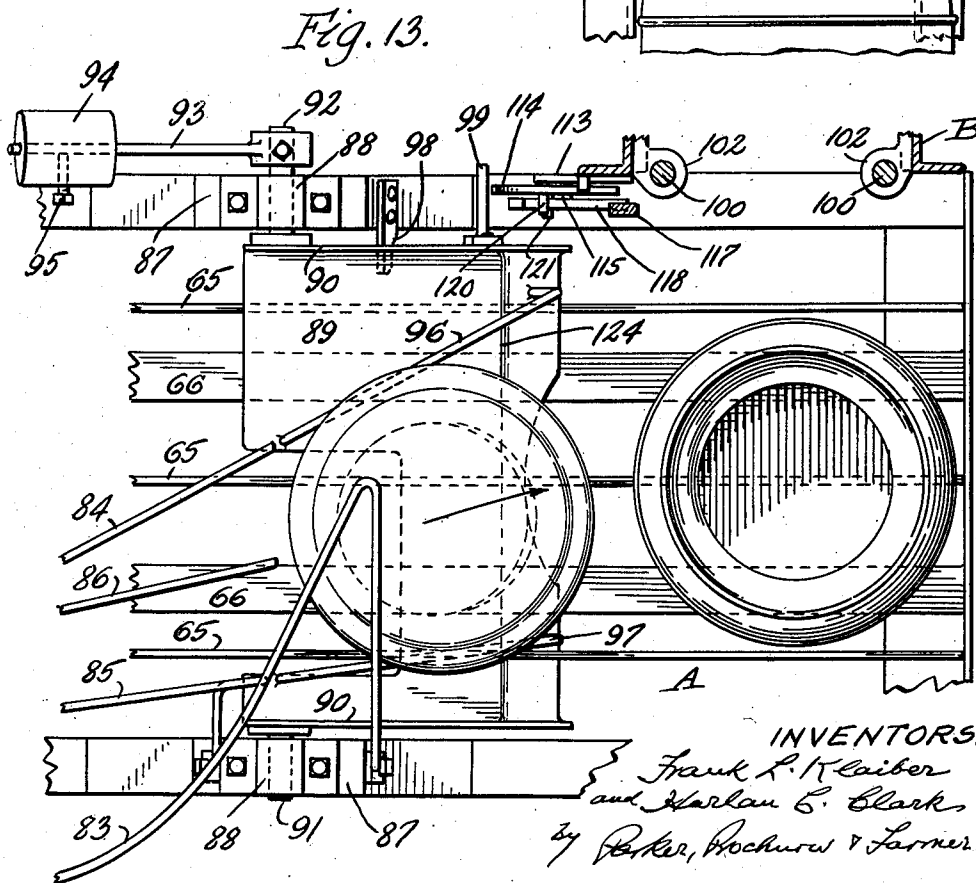
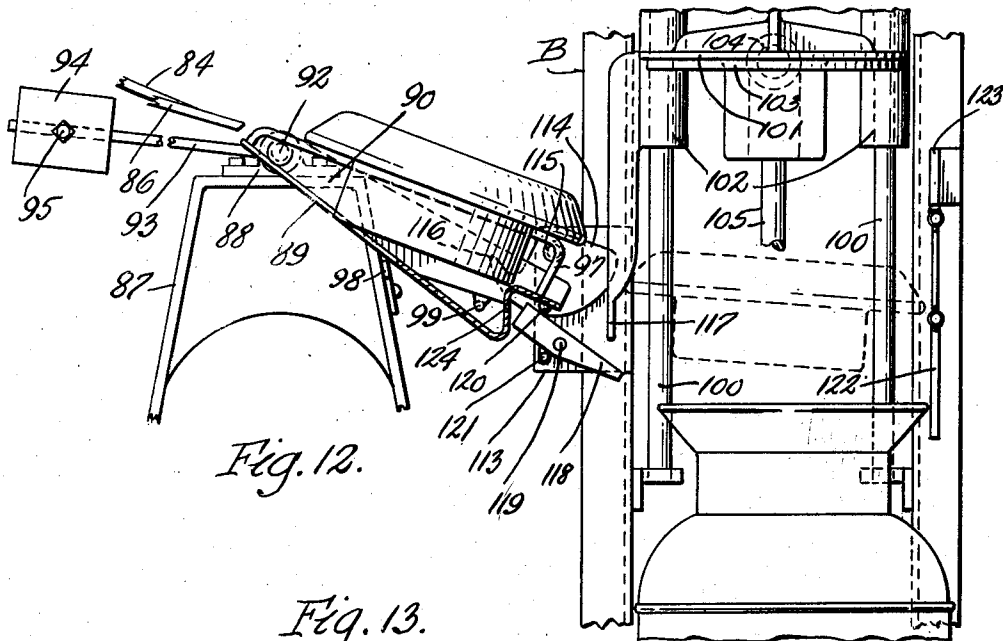
F. L. KLAIBER ET AL

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CAN UPENDING MECHANISM

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6 Sheets-Sheet 4



INVENTORS.
Frank L. Klaiber
and Harlan C. Clark
 BY *Parker, Prochman & Larnier.*
 ATTORNEYS.

Feb. 20, 1945.

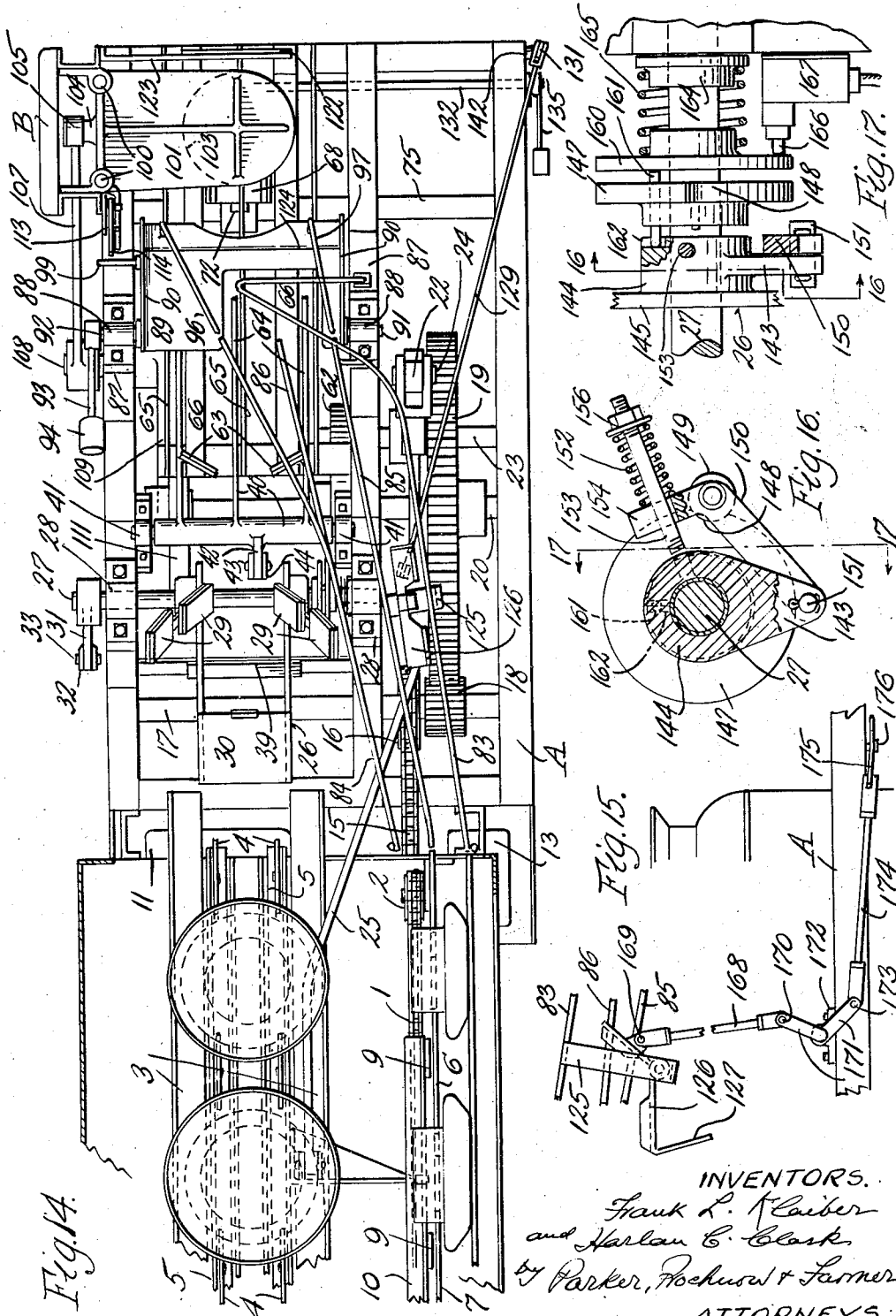
F. L. KLAIBER ET AL

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CAN UPENDING MECHANISM

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6 Sheets-Sheet 5



INVENTORS.
 Frank L. Klaiber
 and Harlan C. Clark
 by Parker, Hochstadt & Lerner.
 ATTORNEYS.

Feb. 20, 1945.

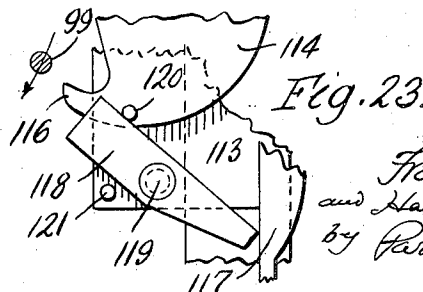
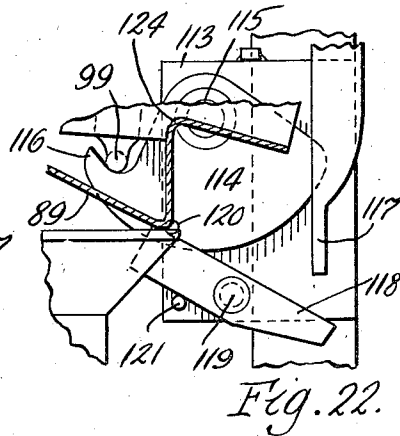
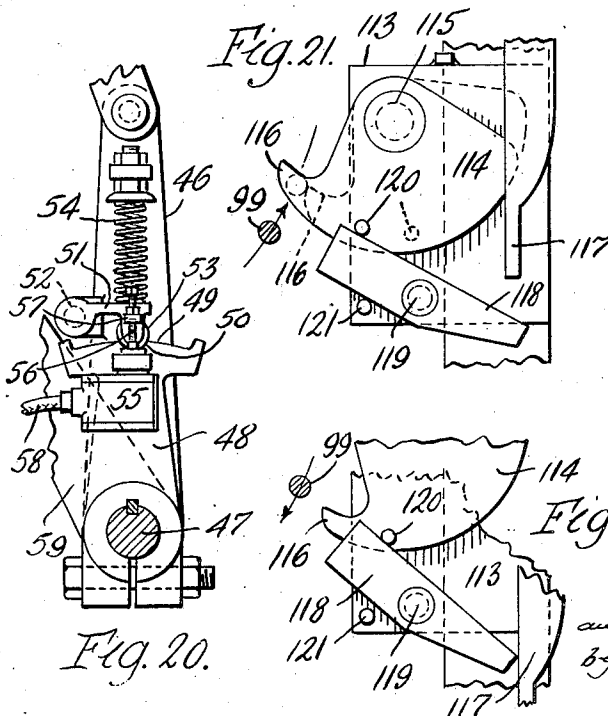
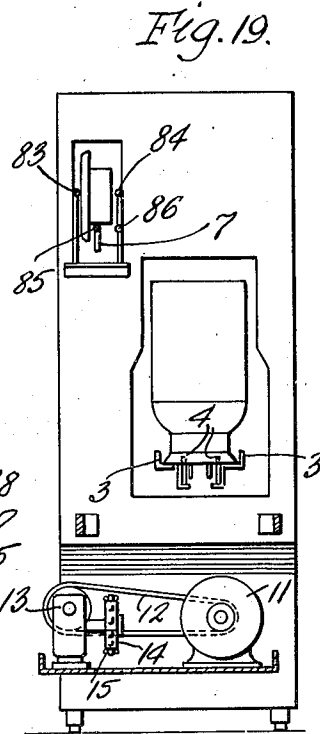
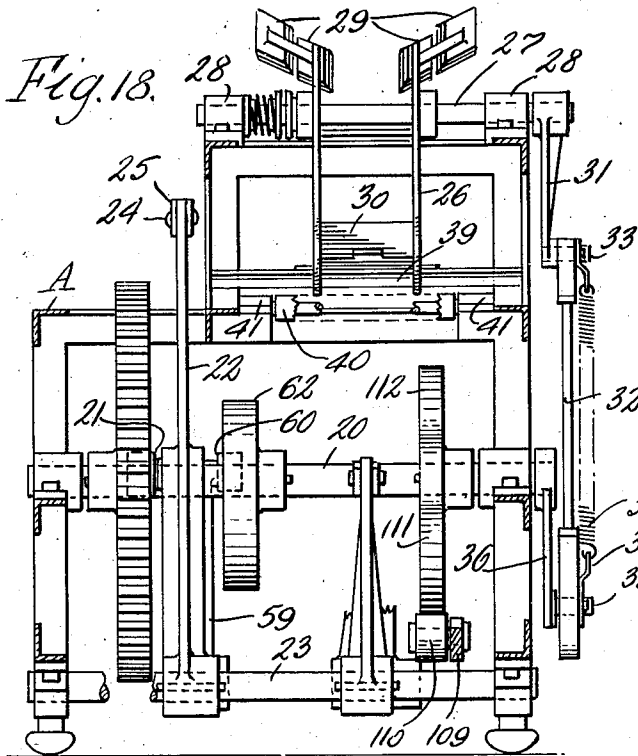
F. L. KLAIBER ET AL

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CAN UPENDING MECHANISM

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6 Sheets-Sheet 6



INVENTORS.

Frank L. Klaiber

and Harlan C. Clark

By Parker, Rochwood & Farmer.

ATTORNEYS.

UNITED STATES PATENT OFFICE

2,369,742

CAN UPENDING MECHANISM

Frank L. Klaiber and Harlan C. Clark, Buffalo,
N. Y., assignors to R. G. Wright Company, Inc.,
Buffalo, N. Y.

Application March 3, 1941, Serial No. 381,480

11 Claims. (Cl. 214-1.1)

This invention relates to machines for washing and drying milk cans and covers therefor, and particularly to the means for upending the washed and dried cans, depositing the proper covers thereon, and pressing the deposited covers firmly on the respective cans.

One object of the invention is to provide improved means for receiving the cleaned cans in inverted positions, and upending them with a minimum of noise and injury to the cans.

Another object of the invention is to provide improved means for depositing the respective covers upon the upended cans in succession with a minimum of noise, and always placing the cover upon the can in proper position to be pressed firmly into closing position on the mouth of the can even though there may be a variation in the height of the can; with which the cover-delivering means will be automatically adjustable for delivering the covers to cans of different heights; with which the deposited covers will be pressed into firm contact with the cans in a simple, quiet and effective manner; with which the delivery of covers to the cans will be prevented unless a can is in a position to receive the cover; with which premature delivery of the covers will be prevented; with which the delivery of more than one cover at a time will be effectively prevented; and with which danger of the discharged covers overshooting the cans will be effectually prevented.

Another object of the invention is to provide an improved upending and cover applying mechanism which will be efficient, quiet and rapid in operation, and compact, simple and inexpensive in construction; in which suitable safety devices may be incorporated to prevent injury to the cans, covers or apparatus in case of jamming of any of the parts, and particularly in the case of misplacement or improper handling of the cans and covers.

Other objects and advantages will be apparent from the following description of some embodiments of the invention, and novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a longitudinal, sectional elevation through the delivery end of a can and cover washer showing the can-upending and cover-applying mechanism connected with the delivery end of the washer, and constructed in accordance with this invention;

Fig. 2 is a fragmentary, side elevation of the delivery end of the cover-delivery mechanism to show certain details thereof;

Fig. 3 is an elevation of the upending and cover-applying mechanism, with the parts in certain positions which they occupy during the upending and cover-applying operation;

Fig. 4 is a side elevation of the cover-releasing mechanism during a release of a cover;

Fig. 5 is a sectional elevation through a part of the same, the section being taken approximately along the line 5-5 of Fig. 3;

Fig. 6 is a sectional elevation of part of the upending mechanism showing a can in the process of being discharged from one cradle to the other;

Fig. 7 is a fragmentary plan view of part of the upending mechanism and illustrating certain details of the second cradle;

Fig. 8 is a transverse, sectional elevation, on a larger scale, through the means for advancing the upright cans after delivery by the second cradle, the section being taken approximately along the line 8-8, Fig. 9;

Fig. 9 is a side elevation of the can-advancing carriage, and particularly illustrating the interponent which is utilized in controlling the release of the covers;

Fig. 10 is a view similar to Fig. 9, but showing the position of the interponent and of the can advancing dogs when a can is in a position to be advanced to receive its cover;

Fig. 11 is a fragmentary elevation showing the connection of a crank to the link which operates the first cradle;

Fig. 12 is a sectional elevation of the hinged end of the cover-delivery track and of the cover-pressing mechanism, and illustrating the manner in which the covers are directed upon the cans, the particular positions shown being those occupied when a cover is delivered upon one of the shorter cans;

Fig. 13 is a plan of the mechanism shown in Fig. 12;

Fig. 14 is a sectional plan of the delivery end of a washer, and of the improved upending mechanism and cover-applying mechanism constructed in accordance with this invention, showing the parts in the same positions as in Fig. 1;

Fig. 15 is a fragmentary, side elevation showing a slight modification of the means for releasing the cover in response to the movement of a can into cover-applying position;

Fig. 16 is a sectional elevation through a part of the upending mechanism, showing one of the safety features with the section taken approximately along the line 16-16 of Fig. 17;

Fig. 17 is a side elevation of the safety device shown in Fig. 16, taken approximately along the line 17-17, Fig. 16;

Fig. 18 is a transverse, sectional elevation through the upending mechanism, the section being taken approximately along the line 18-18 of Fig. 1;

Fig. 19 is an elevation of the delivery end of the washer to which the upending and cover-applying mechanism is attached, and showing the

relative positions of the covers and cans as they pass through the washer;

Fig. 20 is a sectional elevation through a part of the operating mechanism and illustrating a safety feature in connection with the operation of the second cradle;

Fig. 21 is an elevation, on a larger scale, showing the latch mechanism by which the position of the delivery end of the cover-delivery mechanism may be controlled, and showing the same in normal position;

Fig. 22 is a similar figure showing the parts when moved to delivery position under the influence of a tall can; and

Figure 23 is a view of the latch mechanism showing the parts in position to release the hinged delivery end of the cover track.

In the illustrated embodiments of the invention, the can and cover washer may be of any suitable construction, and the details thereof are per se no part of the invention. By way of example, a typical can and cover washer of this type is shown in the United States patent to John P. McKinley, No. 1,845,313, issued February 16, 1932, with the exception that in place of the mechanism therein shown for connecting the cover propelling dog bars with the can advancing dog bars, we have substituted a chain 1 (Fig. 2) at each end of the machine, the upper ends of the chains being connected to the cover advancing dog bar and the lower ends being connected to the can advancing dog bars. Intermediate of the ends, each chain is guided over idlers 2. While only one of such chains is shown, it will be understood that a similar chain is similarly disposed and connected at the other end of the machine, with the exception that at the other end of the machine, the chain ends extend toward the delivery end of the machine. In Fig. 2, only the delivery end of such machine is shown.

In a washer of this type, the cans are conducted, while in inverted positions, through the washer on a track 3 (Fig. 1), by pivoted dogs 4 which are hinged or pivoted to dog bars 5 that are mounted for endwise reciprocation beneath the track 3. Similarly, the covers roll on their sides along the upper edge 6 of a cover track 7 which, as shown in Fig. 19, is disposed at a level above the path of travel of the cans and if desired, slightly at one side thereof. The upper edge of the cover track 6 is provided with notches 8 (Fig. 1) into which the covers roll and which position the covers in the successive treating stations in which they are washed and treated. The notches 8 are shallow so that the covers may be propelled out of the notches and along the cover track 7 by pivoted pawls 9 which are hinged to a reciprocating cover dog bar 10. Each chain 1 is connected at its upper end to the cover dog bar 10, and at its lower end to the can advancing dog bar 5, so that when the can dog bar is advancing a can toward the delivery or discharge end of the washer, the dog bar 10 will be retracted through the chain 1 at the entrance end of the machine. Similarly, when the dog bars 5 are retracted, they will act through the chain 1 at the delivery end of the machine to pull the cover advancing dog bar to the right and advance the covers from one station to another and towards the cover delivery end of the machine. These are features of prior machines and are not part of this invention, but a brief description thereof has been necessary to understand the application thereto of the improved can upending and cover applying means.

The actuating power for the dog bars 5 and 10 is supplied in any suitable manner, such as heretofore, in which the prime mover is an electric motor 11 (Fig. 19) which through a belt 12 drives a speed reduction mechanism 13, and the latter through a sprocket 14 and a chain 15 drives a sprocket wheel 16 (Fig. 1) on a power shaft 17 which is mounted in an auxiliary frame A at the delivery end of the washer which also mounts the upending and cover applying mechanism. The shaft 17 carries a pinion 18 which meshes with and drives a larger gear 19 fixed on a shaft 20 that also is rotatably supported in the auxiliary frame A. On one face of the gear 19 is a cam having a suitable cam groove shown by dotted lines in Fig. 1, in which operates a roller or cam follower 21 (Fig. 18) which is carried on a lever or arm 22. Arm 22 is fixed on a shaft 23 also rotatably mounted on the frame A, and at its free end, is pivotally connected by a pin 24 to one end of a link 25, the latter being pivotally connected at its other end to the dog bars 5 of the can washer. Thus, the dog bars 5 are reciprocated through repeated cycles, each of which cycles is determined by the character and shape of the groove in the cam on the gear 19.

The cans, when discharged from the washer are in inverted positions, and disposed at the discharge end of the washer to receive the inverted cans is a primary cradle 26 which is fixed on a shaft 27 that is rotatably mounted in bearings 28 on frame A. The cradle 26 is provided with arms 29 between which the sides of the inverted cans fall when discharged from the washer, and the bottom of the cradle 26 is provided with a foot 30 which is disposed to receive and support the open end of any inverted can which falls between the arms 29. The cradle 26 is disposed in the position shown in Fig. 1 when an inverted can is discharged into it from the washer and it will be noted that any can so received is disposed in a somewhat inclined position, with the open lower end of the can resting on the foot 30 and the side of the can between and supported by the arms 29.

This cradle 26 is rocked from the receiving position shown in Fig. 1, through the intermediate position shown in Fig. 3 into the discharge position shown in Fig. 6 by suitable mechanism. For this purpose, the cradle shaft 27 has fixed thereon an arm 31 (Fig. 18) and a link 32 is pivotally connected at one end by pin 33 to the free end of arm 31. The other end of the link 32 is provided with a slot 34 which extends in a direction endwise thereof. A pin 35 carried on a crank arm 36, runs in the slot 34 of link 32. A plate 37 is rotatably secured over the free end of the pin 35, and a helical tension spring 38 is connected at one end of the plate 37 and at its other end to a similar plate on the pin 33, with the spring 38 under tension so that it normally tends to hold the pin 35 at the inner end of the slot 34 but yields, for a purpose which will be later explained, to allow movement of the pin 35 toward the outer end of slot 34. The arm 36 is fixed on the shaft 20 (Fig. 18) which continuously rotates, so that the arm 36 acts as a crank arm and the link 32 as a connecting rod to oscillate the arm 31 and by it the primary cradle 26.

The cradle 26 is limited in its movement in one direction by a stop 39 (Fig. 1) to the position shown in full lines in Fig. 1, where it receives the inverted cans from the washer. It will be noted from Fig. 1 that when the cradle 26 hits the stop 39, the pin 35 is at the upper end of the slot 34

and the arm 36 is rotating in the direction of the arrow *a* in Fig. 1. Since the cradle 26 is held against further movement in the same direction, the pin 35 will move along the slot 34 and tension the spring 38, the length of the slot 34 being sufficient to enable the arm 36 to pass through dead center and then pin 35 moves in the opposite direction along the slot 34 until it again meets the inner end of the slot, whereupon the link 32 will again be moved endwise to rock the cradle 26 from the position shown in Fig. 1 through the position shown in Fig. 3, into the discharge position shown in Fig. 6. This idle movement of the crank arm 36 past dead center while the cradle is held stopped by the stop 39, gives a time dwell or interval in which the cradle remains stationary in can receiving position, during which a can may be discharged from the washer into the cradle, and then the cradle is rocked into the position in Fig. 6, which is also an inclined position, so that the can, which has been partially upended during the rocking of the cradle 26, will slide from the cradle in a direction away from the foot 30 and into a secondary cradle 40 as shown in Fig. 6.

The cradle 40 is suitably supported in bearings 41 (Figs. 7 and 14) and has an arm 42 (Figs. 6, 7 and 14) extending therefrom and pivotally connected by pin 43 to one end of a link 44, the other end of which is pivotally connected by pin 45 (Fig. 3) to an operating arm 46. The arm 46 is loosely mounted on a shaft 47, and fixed on the shaft 47 is an arm 48 (Figs. 3 and 20) which extends alongside of the arm 46 and at its free end has an arcuate edge 49 whose center of curvature is the axis of oscillation of the shaft 47. The edge 49 is provided with a notch 50 (Fig. 20) approximately midway on its ends. An arm 51 is pivotally mounted at 52 on the arm 46, and its free end rotatably supports a roller 53 which rides on the arcuate edge 49 and enters the notch 50 therein. A compression spring 54 urges the arm 51 in a direction to hold the roller 53 in notch 50 and thus provide a yieldable drive between the arms 46 and 48, but when excessive resistance is encountered such as when the secondary cradle is jammed, the roller 53 will be forced out of the notch 50 and will ride along the arcuate edge which has a length such that the roller 53 will not leave it, within the limits of oscillation of the shaft 47.

Mounted on the arm 48 is a very sensitive electric switch 55, the operating button of which is normally held in closed position by a stem 56 which is adjustably threaded through an ear 57 on the pivoted arm 51, so that when the roller 53 is in the notch 50, which is the normal operating position, the stem 56 will be in engagement with the operating button of the switch 55 and will hold it depressed or in closed circuit position. When the roller 53 leaves the notch 50 during an abnormal operating condition, the stem 56 will be carried out of engagement with the operating button of switch 55 and the switch which is urged into closed condition will then automatically close. An electric cable 58 connects the switch 55 to suitable mechanism for stopping the operation of the machine automatically. An arm 59 (Fig. 3) is fixed on the shaft 47 and at its free end it carries a roller or cam follower 60 which runs in a groove 61 provided in a side of a cam 62 which is fixed on the main cam shaft 20, as also shown in Fig. 18. Since the cam 62 is fixed on the shaft 20, it will rotate continuously at the same rate as and in timed relation to the arm 36

which operates the cradle 26, and the groove 61 is so designed that the cradle 40 is rocked into a position to receive the partially upended can sliding from the cradle 26, and then to tip it into the fully upright position shown by dash lines in Fig. 6.

The cradle 40 is provided with arms 63 (Figs. 3 and 14) between which the side of the partially upended can is received, and is also provided with spaced parallel bars 64 (Figs. 3 and 14) which serve as a foot to receive and support the bottom of the partially upended can that is resting between arms 63. As the cradle 40 rocks from the receiving position shown in Fig. 3 clockwise in Fig. 6, the can resting therein will be tilted from the full line position in Fig. 6 into the dash line position in that figure. As the cradle 40 moves into the dash line position in which it supports the can fully upright, the arms 64 which form the foot thereof move downwardly alongside of rails 65 which are disposed in parallel spaced relation to one another and supported upon the frame A to form a track or platform upon which the upended cans are deposited, and along which the upright cans may be moved to receive the covers. The upright cans deposited upon the platform formed by the bars 65 are forcibly advanced into cover-receiving positions, as shown by the position of the upright can in Fig. 1, by any suitable advancing means which is operated in timed relation to the cradles.

In this particular example, guide bars 66 (Fig. 8) are disposed alongside of the platform bars 65 and have channel grooves 67 opening toward one another. A carriage 68 is disposed beneath the bars 65 and has upstanding side flanges which rise to a position in alignment with the open faces of the grooves 67, and these upstanding flanges of the carriage rotatably support rollers 69 which run in the grooves 67 and provide a rolling support for the carriage 68. The carriage 68 is provided with depending parallel arms 70 which have vertically extending slots 71 therein. An arm 72 (Figs. 1, 8 and 9) extends between the depending arms 70 of the carriage and carries a pin 73 which extends from both sides thereof into the slots 71 and mounts rollers 74 which ride in the grooves 71 endwise thereof. When the arm 72 is rocked, the rollers 74 provide a sliding drive between it and the carriage 68 and thus will reciprocate the carriage along the platform formed by the bars 65.

The arm 72 is fixed on a shaft 75 which is rotatably mounted in bearings 76 provided on the frame A. A link 77 is pivotally connected at one end by a pin 78 to the arm 72 (Fig. 1), and at its other end by a pin 79 to an arm 80 which is also fixed on the shaft 23 that carries the arm 22 that operates the can-advancing dog bars 5 of the washer, so that whenever a can is advanced through the washer, the carriage 68 will also move to the right in Fig. 1. The carriage 68 (Figs. 8 and 9) supports a pair of dogs 81 by the pins 82. The dogs 81 are similar to the dogs 4 and are counterweighted to normally rise into the positions shown in Fig. 9, at which time the lower ends of the dogs 81 rest upon the bottom of the carriage 68. As shown in Figs. 6 and 10, these dogs 81 are yieldingly urged upwardly into positions to engage along the inner edge of the depending flange forming the bottom of an upright can, when the carriage 68 is at its limit of movement to the left in Fig. 1, and then when the carriage 68 moves to the right in Fig. 1, the dogs 81 will advance along the platform formed

by the bars 65, any can they engage from the position of the can shown by dash lines in Fig. 6 to the full line position shown in Fig. 1, which latter position may be designated as almost to the cover-receiving position. The full cover-receiving position is shown in Fig. 3.

The covers, when discharged on their sides from the washer, are rollingly received by a cover track formed of a plurality of rods 83, 84, 85, and 86 (Figs. 3 to 5). The covers rolling from the washer are rollingly received on the rod 85, with the covers supported upright by the rods 83 and 84 shown in Fig. 19. The track formed by these rods is inclined downwardly so that the covers roll down the same by gravity, and these rods are directed laterally into positions over the path of travel of the cans and serve to discharge the covers upon the cans when the cans are in the cover-receiving position shown in Figs. 1 and 3. As the cans roll down the track toward the up-ended cans, they are tipped over into proper upright positions to descend upon the cans with the top uppermost, and for this purpose, the rod 83 is curved and brought over rods 85 and 86 as shown in Fig. 14.

Where only one size of can is to be run through the washer, the rods 83 to 86 are terminated at the proper level to discharge the properly positioned covers upon the tops of the cans, but where different size cans are to be run through the washer, provision has been made for automatically adjusting the delivery end of the cover track to cans of different heights, so that the covers will fall upon such cans in positions to descend thereon approximately horizontally. This adjustment for different size cans is illustrated in the drawings, and for this purpose, the rods 83 to 86 at their lower ends are secured to a supporting frame 87 (Fig. 1) and this frame also oscillatably mounts in bearings 88 a hinged track end that forms a continuation of the cover track. This hinged end of the track includes a plate 89 (Figs. 13 and 14), which has upstanding flanges 90 at its opposite sides. The flanges 90 carry pins or stub shafts 91 and 92 which are rotatably received in the bearings 88 on the frame 87, and the shaft 92 carries an arm 93 which mounts a weight 94. The weight 94 is slidable along the arm 93 but may be secured in any desired position therealong by a set screw 95 in the weight which engages the arm 93. The weight 94 thus tends to counter-balance to some extent the weight of the plate 89.

Wire guides 96 and 97 (Fig. 13) are secured on the plate 89 so as to extend above the same a substantial distance and form approximate but separate continuations of the rods 84 and 85 respectively. As the cover slides down the track toward the plate 89, it is supported upon the rods 84 and 85 and confined thereagainst by the rod 83 which extends above the covers. When the cover passes over the hinged end of the cover track it is supported by the rod 96 and 97. A stop 98 (Fig. 13) is carried by the frame 87 so as to extend beneath the plate 89 and limit its downward swinging movement, when it is released, to a position in which it is suitable for discharging the covers upon one of the shorter or smaller cans. This position is shown in Fig. 12. The plate 89 is also provided with a pin 99 (Figs. 2 and 13) which extends from one side thereof, and by this pin 99 the plate 89 is latched in elevated position in which it discharges the covers upon the taller cans in a manner which will be explained presently.

The frame A is provided at one side thereof with an upright frame B (Figs. 1, 12, 13 and 14) which is alongside the position of the cans after advancement into what has been designated as cover-receiving position. This frame B mounts a pair of guide rods 100 which extend vertically, and a cover presser arm 101 is slidably supported on the rods 100 by suitable bosses 102 through which the rods 100 pass. The arm 101 extends laterally from the upright frame B into a position above a can in cover-receiving position (Fig. 14) and on its underface carries a disk 103 of suitable material such as wood which will not scratch the can cover and which, when contacting the same, will be relatively quiet. The arm 101 carries a pin 104 (Fig. 14) which is pivotally connected to one end of a link 105 (Fig. 1), the other end of that link being pivotally connected by pin 106 (Figs. 1 and 3) to a lever 107 which is fixed on a shaft 108 that is rockably supported in the frame A. Also fixed on the shaft 108 is an arm 109 which, at its end, rotatably supports a roller 110 that rides upon the periphery of a cam 111 which is also fixed upon the shaft 20 to rotate therewith.

Considering that the direction of rotation of the cam 111 is counterclockwise or in the direction of the arrow *a* in Fig. 3, the roller 110 in Fig. 3 is starting to ride down the portion of the cam surface 112 which leads toward the shaft 20, and the weight of the arm 101 and its bosses 102 and link 105 is sufficient to cause the roller 110 to follow the surface 112 which causes a descent of the presser arm 101 in the direction of the arrow *b* in Fig. 3. As this arm 101 descends, its disk 103 thereon will engage the cover that has just been deposited upon an upright can, and by its weight will press the cover downwardly and firmly into the mouth of the can. In Fig. 3, the presser arm 101 has not yet engaged the cover, but has just started to move downwardly for that purpose.

If the presser arm and parts connected thereto are not sufficient to exert the desired pressing action on the cover, the weight of those parts may be increased until the arm will give the desired pressure on the cover. By determining the slope of the cam surface 112 the rate of the descent of the presser arm 101 may be regulated so as to avoid blows by the presser arm but yet allow the pressure arm to exert its weight on the cover and thus force the cover firmly on the can.

The frame B is provided with a plate 113 (Figs. 2, 12 and 13) which extends toward the hinged end of the cover track. A latch 114 (Figs. 21 to 23 also) is hinged by pin 115 on this plate 113. The latch 114 is provided with a nose 116 (Fig. 22) and the latch is so weighted that it urges the nose 116 into the path of travel of the pin 99, which is carried by the hinged end of the cover track, as shown in Fig. 21. When the hinged end of the cover track is engaged and swung upwardly by the passage of one of the taller cans therebeneath, the pin 99, in moving upwardly in the direction of the arrow in Fig. 21, will engage with the nose 116 of the latch 114 and cam it from the full line position into the dash line position, and then as it clears the nose, the latch will swing by gravity back into the position shown by the full lines in Fig. 21. When the plate 89 on the hinged end of the track is released, the pin 99 will be held upwardly by the nose 116, as shown in Fig. 22, in a position to discharge the covers upon a taller can, as shown in Fig. 1. The shorter cans in passing into the cover-receiving position as moved by the carriage 68, pass freely beneath the plate 89 with-

out elevating the latter, but the taller cans engage the plate 89 and cam it upwardly, as just explained, and it is important to release the hinged end of the track or plate 89 immediately after it has delivered a cover to a can so that it may again descend into its lower position, ready to deliver a cover to a shorter can, it being understood however, that if the next can is also a relatively tall can, it will again elevate the plate 89 and latch it as just described.

To release the plate 89, after it has delivered its cover, one of the bosses 102, which slidably supports the presser arm 101, is provided with a cam 117 (Figs. 3 and 12), which moves vertically with the presser arm and during its descent engages one end of a lever 118 which is pivoted at 119 to the plate 113. The lever 118 is disposed to engage against a pin 120 (Fig. 21) which is carried on the latch 114 and rock the latter. The lever 118 is normally over-balanced so as to be urged into contact with a stop pin 121 on the plate 113. When the cam 117 descends and rocks the lever 118, it will be in a direction to cam the pin 120 and latch 114 into unlatched position, as shown in Fig. 23, and thus release the pin 99 on the plate 89, whereupon the pin 99 descends in the direction of the arrow in Fig. 23 until the plate 89 or hinged end of the cover track engages the stop 98 (Fig. 12). When the presser arm 101 is elevated again, the cam 117 releases the lever 118 and the weight of the latch 114 again carries it into the normal position shown in Fig. 21.

It is desirable to impart to the covers sufficient velocity to insure their travel fully into positions directly over the mouths of the cans, and inasmuch as the friction on the covers will vary to some extent, depending upon the type of covers and the angular position of the hinged end of the track from which they are delivered, the slope of the track is sufficient to give the covers ample velocity under all conditions, and then overshooting of the cover is prevented by supporting a baffle 122 (Figs. 12 and 14) from a bracket arm 123 that extends forwardly from the upright frame B in the path of the discharged covers. The baffle 122 is preferably formed of plates hingedly suspended from one another and from the arm 123, as shown in Fig. 12, and as the covers are delivered into positions above the cans, they strike the baffle 123 and are stopped thereby in positions to fall in proper positions upon the cans. By having material velocity to the covers as they move into positions above the cans and then stopping them by the baffle 122, the covers are more likely to descend in a normal manner upon the open mouths of the cans, instead of merely sliding into the tops of the cans at a low rate and assuming decidedly angular and different positions on the tops of the cans.

The baffle 122 depends sufficient to stop the covers for the short cans as well as for the tall cans, and yet when any can moves out of the cover-receiving position with the cover thereon, the baffle 122 will swing and allow passage of the can and the applied cover. When the hinged end of the cover track is lowermost for the shorter cans, the inclination of the cover is greater, and hence, there is a tendency for the covers to drop into the can mouths at an angle instead of more squarely thereon. To remedy this, an upward fold 124 (Fig. 12) is placed in the plate 89, near its discharge edge, which upfold extends just high enough to be engaged slightly by the depending flange of the upright cover as the cover is about to be discharged, and this gives the forward edge of

any cover sufficient upward movement or impulse to cause it to assume an approximately horizontal position when striking the baffle, as shown by the dash lines in Fig. 12, and thus settle properly upon a can, and particularly the shorter cans.

In order to avoid the danger of two covers going down the cover track and being deposited upon the same can, in case the cans and covers are not started properly through the machine, we provide a gate in the cover track for temporarily holding the covers and then releasing them exactly at the proper time for them to reach a can in cover-receiving position. For this purpose, a frame member 125 (Figs. 1, 3, 4 and 5) is connected between the rods 83 and 85 as shown particularly in Figs. 4 and 5, and a gate member 126 with angularly disposed arms is hinged to the bottom portion of this frame 125 as at 127. The arms of the member 126 make an obtuse angle between them as shown in Figs. 3 and 4, and when the member 126 is swung into the position shown in Fig. 1, one arm of the member is in the path of the head or flange of the cover as also shown in Fig. 3, which stops the cover from rolling down the track. At that time, the other arm of the gate member is below the path of travel of the flange or head of the cover.

When the gate member is rocked into the position shown in Fig. 4, the arm which has been holding the head flange of the cover, moves downwardly to release the flange as shown in Fig. 4, and the other arm of the gate member which is nearer the can washer engages with the rear of the head flange of the cover just released and starts it with a definite movement down the track so that there will be no uncertain delay in getting the released cover in motion once a can is in position to receive it. When the arm of the gate member which moves upwardly to start the cover reaches its upper position, it positions a tail 127 thereof in a position to stop any other cover which is attempting to roll down the runway and prevent it also from passing the gate member and reaching the can. This is shown in Fig. 4. When the gate member 126 returns to the position shown in Fig. 3, the cover previously held back by the tail 127 will be released and will roll down the track until stopped by the then upstanding arm of the gate member.

To rock the gate member, it is pivotally connected by a pin 128 (Fig. 3) to one end of a link 129, the other end of that link being pivotally connected by a pin 130 to one end of an arm 131. The arm 131 is fixed on a shaft 132 which is rotatably mounted in the frame A, and the shaft 132 carries adjacent the path of travel of the carriage 68 an upstanding arm 133 having at its free end a laterally extending pin 134. A weighted arm 135 is also connected to the shaft 132 so as to urge the shaft and arms 131 and 134 yieldingly into the positions shown in Fig. 3, in which the gate member is in the cover-obstructing position shown in Fig. 3. A stop lug 136 on the frame A, limits the movement of the arm 131 under the action of weighted arm 135. On the carriage 68 a lever 137 is mounted on a pivot 138 (Fig. 9). A weighted tail 139 on lever 137 urges lever 137 into the position shown in Fig. 9 in which an end of the lever rises above the track bars 65 on which the cans may rest, but which will be depressed to the level of the upper edges of the track bars 65 when a can rests on the track bars 65 in a position to be advanced by the dogs 81. Also fixed to the lever 137 for

rocking movement therewith, is an arm 140 having a laterally extending abutment 141.

When the lever 137 is in its raised position shown in Fig. 9, the arm 140 will be downwardly inclined and the abutment 141, when moving with the carriage 68, will travel below the pin 134 so as to clear the same. When the lever 137 is depressed by a can resting thereon, the arm 140 is elevated and places the abutment 141 thereof at a level such that when carriage 68 moves in a can-advancing direction, this abutment 141 will strike the pin 134 and rock it in a direction to cause the rocking of the gate member 126 and the release of a cover just about as the can-advancing carriage reaches its limit of movement to the right in Fig. 3. Overtravel of the arm 131 by inertia of the connected parts will be prevented by a stop 142 in the path of movement of the arm 131 (Fig. 3). Thus, the release of covers by the gate member 126 will be effected only when a can is moving into cover-receiving position and only one cover can be released for each can advanced into cover-receiving position.

It is desirable to also provide a safety device for the operating means for the primary cradle in case a can becomes jammed or improperly placed therein, and this safety mechanism for this cradle is shown more particularly in Figs. 16 and 17. Such a safety device is important where the jamming of a can is such as to prevent oscillation of the cradle, because as explained hereinbefore, this cradle is driven directly from the main shaft 20 which is continuously rotating. Referring now particularly to Figs. 16 and 17, the safety device there illustrated employs an arm or crank 143 fixed to a hub 144 on a supporting arm 145 of the cradle 26. Keyed on the shaft 27 adjacent to but in spaced relation to the end face of that hub 144, is a disk or circular plate 147 in the periphery of which is formed an arcuate notch or depression 148.

A roller 149 (Fig. 16) is carried by an arm 150 pivoted at 151 to the free end of arm 145, and is yieldingly urged into the notch or recess 148 by a relatively strong compression coil spring 152 surrounding a bolt or rod 153, which passes through a slot or bifurcation in the free end 154 of the arm 150 and at its inner end is screwed into the hub 144. The rod 153 extends radially with reference to the axis of the shaft 27, and the spring 152 is confined between the bifurcated part 154 and a washer and nut or other adjustable confining means 156 at the extremity of the rod 153. A second circular disk or member 160 is loosely arranged on the shaft 27 adjacent to and in spaced, but face to face, relation with a face of the disk 147. A pin 161 is loosely arranged in an aperture in disk 147 so as to extend parallel to the shaft 27, and one end of this pin normally engages in the bottom of a V-shaped notch 162 formed in an end face of the hub 144 of the cradle 26. The other end of the pin 161 bears against the face of the disk 160. Disposed between the other face of the disk 160 and a collar 164 arranged on the shaft 127, is a compression spring 165. This spring urges the disk 160 against the adjacent end of the pin 161 and the other end of this pin in turn into notch 162. Abutting against that face of disk 160 which is engaged by the spring 165, is the operating stem or button 166 of a sensitive switch 167 which is normally in closed circuit condition. When button 166 is depressed, it opens a circuit there-through.

In normal operation, the pressure of the spring 152 maintains the roller 149 in the notch 148 of the disk 147 which is keyed to the shaft 27. Thus, an effective driving connection is maintained between the shaft and its cradle 26 for operating that cradle under normal conditions. Should, however, an obstruction of any kind occur which would retard or prevent proper oscillation of the cradle 26, the movement of the cradle oscillating means will force the roller 149 out of the notch 148 of the disk 147 against the action of spring 152, whereupon the roller 149 will ride upon the periphery of the disk and permit the shaft 27 to continue its oscillation as long as the jamming of the cradle continues. Upon correcting the trouble, the cradle 26 must be manually rotated into operating position again bringing the roller 149 into alignment with the notch 148 of the disk 147, whereupon the roller under the influence of the spring 152 will re-enter the notch and resume its driving connection between the disk and the cradle with the parts in proper relation to one another.

When the roller 149 is forced out of the notch 148, the resulting rotation between the disk 147 and the adjacent hub 144 of cradle 26 will cause the pin 161 to be forced out of V-shaped notch 162, so that this end of the pin will ride upon the end face of said hub. A resulting endwise movement of the pin will cause the opposite end of the pin 161 to effect a movement of the disk 160 lengthwise of the shaft 27 in a direction away from the disk 147 and against the action of the spring 165, thereby depressing the stem or button 166 of the switch in a manner to open the circuit through the switch. The switch 167 (Fig. 17) and the sensitive switch 55 of Fig. 20 are both connected to suitable mechanism for stopping the operation of the washer at the source of power in a manner which is well understood in the art.

In the modification of the invention shown in Fig. 15, the gate member 126 is rocked by a link 168 which is pivotally connected at one end by pin 169 to the gate member and at its other end by pin 170 to the crank 171 which is rockably mounted in a bearing 172 of the frame A. The crank 171 is also pivotally connected by a pin 173 to one end of a link 174, the other end of such link being pivotally connected to a lever 175 which is pivoted at 176 to the frame A. The free end of lever 175 extends into the path of travel of the upright cans during their advancement into cover-receiving position, so that the cans themselves moving into cover-receiving position furnish the motive power for rocking the gate member 126 to release a cover. A suitable spring (not shown) returns the gate member 126 to cover restricting position.

The operation of the device is believed to be clear from the foregoing description, but it will be briefly summarized. The cans and covers are passed through the usual washer in the usual manner in inverted positions, and the cans as they are discharged are received, while still inverted, in the primary cradle 26, a can being shown in Fig. 1 as in the process of being received in the cradle 26, and the position of the can when fully received in the cradle being shown by the dash lines in Fig. 1. The cradle 26 is then rocked to carry its foot 30 upwardly through the position shown in Fig. 3 and into the position shown in Fig. 6 which is its other limited position at which time the can is delivered from the cradle 26 into the secondary cradle

40 which has in the meantime been rocked into the position shown in Fig. 6 for this purpose. Then, the cradle 40 is rocked to carry the can fully into upright position as shown by the dash lines in Fig. 6, and during this time the cradle 26 is returned to receive a new can from the washer.

After the can is deposited upright on the platform formed by the bars 65, the carriage 68 is moved to the right in Figs. 1 and 6 and dogs 81 shift the upright can into the cover-receiving position in Fig. 1. When the upended can was deposited in upright position on the platform formed by the bars 65, it depressed the lever 137 as shown in Fig. 10, which shifted the abutment 141 into the effective position shown in Fig. 10. Then, when the carriage 68 moves to advance the can, the abutment 141 will engage the pin 134 on arm 133 and rock it in a direction to rock the gate member and release a cover. The released cover then rolls down the track and is turned over into a horizontal position and deposited upon the can. If the can which is so advanced into cover-receiving position is a short can, it passes under the hinged end of the track or plate 89 without elevating the latter and the cover is deposited upon the shorter can without being obligated to fall through too great a distance. Any over-shooting is stopped by the suspended baffle 122.

If, however, any can moving into cover-receiving position is a relatively tall can, its top will engage beneath the plate 89 and lift it so as to carry its pin 99 upwardly, thereby camming aside the nose 116 of latch 114 as shown by Figs. 21 to 23, whereupon the latch 114 will return to the position shown in Fig. 22 and latch the plate 89 in elevated position suitable for delivering the cover upon the taller can. Thereafter, the presser arm 101 will descend and press the cover into firm engagement with the can and since the presser arm descends entirely by gravity, it automatically accommodates itself to cans of different heights, by being stopped earlier in its descent by the taller cans. As it descends, however, the cam 117 carried thereby rocks the lever 118 and the latter rocks the latch 114 into the position shown in Fig. 23, so as to release the pin 99. The plate 89 or hinged end of the cover track so released then descends into its lowermost position.

If there is any jamming which would interfere with the normal rotation of the parts for upending the cans, the safety devices which have been provided will stop the machine and will allow sufficient slippage until the stopping occurs which will prevent damage to the cans being handled. The means for upending the cans, advancing them into cover-receiving positions, and depositing the covers thereon are operated in timed relation to one another, but if there is no can in position to receive a cover at any time no cover would be released even though one might be on the cover track and held by the gate member 126.

It will be understood that various changes in the details and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

We claim:

1. In a machine for washing milk cans and their covers in which the cans are conveyed along a selected horizontal path while in inverted posi-

tions, and discharged, while still inverted, at regularly periodic intervals in a horizontal direction at the end of said path, into an upending mechanism, that improvement which comprises

5 an L shaped cradle mounted for oscillation about a horizontal axis back and forth from one position in which the open side of the L receives the inverted cans and the cans rest upon the base of the L and lean against the side of the L, to another position in which the base of the L has been carried upwardly until the can is upended and gravity causes the can to slide along the arm of the L and leave that cradle, a second L shaped cradle disposed to receive therein while in an inclined position any upended can sliding from the first cradle, and tiltable on a fixed axis to set the upended can upright, a track for slidably supporting upended cans and disposed to form an approximate continuation of the bottom of the second cradle when it supports a can upright thereon, means for causing movement of an upended can from said second cradle and along said track, and means for tilting said second cradle back and forth, oscillating said first cradle back and forth and operating said movement causing means in timed relation to one another, to receive inverted cans in succession in said first cradle, upend each one individually and in succession in said first cradle until it slides therefrom, receive it upended in said second cradle, set it upright, and advance it along said track.

2. In a machine for upending milk cans in which the cans are discharged, while inverted, in a horizontal direction that improvement for upending the cans which comprises a cradle mounted for oscillation about a horizontal axis back and forth between two positions, in one of which it receives a discharged, inverted can at the end of said path and supports it in one inclined position, and in another of which positions the can is upended and is free while in another inclined position, to slide downwardly from the cradle by gravity, a second cradle disposed in a position to receive and support the upended but still inclined can received from the first cradle in said still inclined position and tiltable about a fixed axis from that receiving position into a position in which the can is approximately upright, a track having portions overrunning horizontally with the portion of the second cradle on which the bottoms of the cans rest as they are brought into upright positions and which receives and slidably supports the upended cans as they are brought upright, means engageable with the upright cans resting on said track for moving them away from said second cradle, and means for oscillating said first cradle and tilting said second cradle and operating said can feeding means in timed relation to one another, to receive inverted cans in the first cradle, upend them until they slide downwardly in an inclined path into said second cradle, and by the latter set them upright to clear the first cradle and advance them along said track in succession.

3. In a machine for washing milk cans in which the cans are conveyed along a selected horizontal path while in inverted positions, and discharged, while still inverted, in a horizontal direction at the end of said path, into an upending mechanism, that improvement in the upending mechanism which comprises a cradle mounted for oscillation about a horizontal axis back and forth between two positions, in one of which it receives a discharged, inverted can at the end

of said path and supports it in an inclined position, and in another of which positions the can is upended and also inclined free to slide downwardly from the cradle by gravity, a second cradle disposed to receive and support the upended can received from the first cradle in an inclined position and tiltable about a fixed axis into a position in which the can is upright, a track disposed to form a continuation of the portion of the second cradle on which the bottoms of the cans rest as they are brought into upright positions and which receives and slidably supports the upended cans as they are brought upright, means engageable with the upright cans resting on said track for moving them away from said second cradle, and means for oscillating said first cradle and tilting said second cradle and operating said can feeding means in timed relation to one another, to receive inverted cans in the first cradle, upend them until they slide downwardly in an inclined path into said second cradle, and by the latter set them upright and advance them along said track in succession.

4. In a machine for washing milk cans in which the cans are conveyed along a selected horizontal path while in inverted positions, and discharged while still inverted, in a horizontal direction at the end of said path, into an upending mechanism, that improvement in said mechanism which comprises a cradle mounted for oscillation about a horizontal axis back and forth between two positions, in one of which it receives a discharged, inverted can at the end of said path and supports it in an inclined position, and in another of which positions the can is upended and is free to slide downwardly from the cradle by gravity, a second cradle disposed to receive and support the upended can received from the first cradle in an inclined position and tiltable about a fixed axis into a position in which the can is upright, the portion of said second cradle against which the bottom of the upended can abuts being formed of a plurality of bars spaced apart, a track formed of members extending above the upper faces of and alongside of said bars when the bars are horizontal so that when an upended can in said second cradle is shifted into upright position, the can will automatically engage with and be supported by said track, and means engageable with cans resting on said track for feeding the same along said track.

5. In a machine for washing milk cans in which the clean cans are discharged while in inverted positions in a horizontal direction, that improvement for upending the cans, which comprises, a cradle oscillatable back and forth about a horizontal axis between two positions, in one of which the cradle receives an inverted can as it is discharged, the cradle having a foot which is lowermost in said one position to engage the open mouth of the can and prevent it from sliding downwardly in said cradle, said oscillation being in a direction to carry said foot upwardly as the can moves toward upended position, said cradle being free of any obstruction to movement of a can therein in a direction away from said foot, a second cradle tiltable back and forth about a fixed axis between two positions, in one of which it receives a can from the first cradle and supports it at its sides and bottom, and in another of which it supports a can in upright position, a platform adjacent the second cradle when in its second position for receiving upright cans from said second cradle, means for advancing cans along said platform, and means for operating said

cradles and can advancing means in timed relation to one another, in which a discharged can is received in the first cradle rocked thereby in a direction to carry the open mouth of the can upwardly and discharge it into the second cradle, and by the latter be fully upended to clear the first cradle and delivered to said platform, and then advanced along the platform.

6. In a machine for washing milk cans in which the clean cans are discharged while in inverted positions in a horizontal direction, that improvement for upending the cans, which comprises, a pair of cradles disposed adjacent one another and tiltable back and forth about fixed horizontal axes, and each of which is formed to receive and alone support a can, one of said cradles being operable to receive an inverted, discharged can and tilt it part way into upright position, stop and deliver it to said second cradle, and then return backwardly to can receiving position, and said second cradle being operable to fully support the can received from the first cradle and continue the movement of said can into fully upright position to clear the first cradle when the latter returns to can-receiving position, a platform for receiving from the second cradle the fully upended cans, means for advancing the cans along said platform, and means for operating said cradles and advancing means in timed relation to one another to receive said inverted cans in the first cradle, partially upend them and deliver them to the second cradle and fully upend them in the second cradle, and then advance them along said platform in succession.

7. In a machine for washing milk cans in which the cans are conveyed along a selected horizontal path while in inverted positions, and discharged while still inverted, in a horizontal direction at the end of said path, into an upending mechanism, that improvement in said mechanism which comprises a cradle mounted for oscillation about a horizontal axis back and forth between two positions, in one of which it receives a discharged, inverted can at the end of said path and supports it in an inclined position, and in another of which positions the can is upended and is free to slide downwardly from the cradle by gravity, said cradle having a long portion extending in one direction from its axis of oscillation and at its end in that direction terminating in a laterally extending foot to receive and support the lower open end of an inverted can as discharged, the cradle also having a relatively short portion extending in the other direction from said axis for a materially lesser extent than in said one direction, a second cradle disposed to receive and support the upended can received from the first cradle in an inclined position and tiltable about a fixed axis into a position in which the can is upright, said second cradle being L-shaped with the arm of the L upstanding and inclined when in can receiving position for receiving the side of a can sliding from the first cradle, the portion of said second cradle against which the bottom of the upended can abuts being formed of a plurality of bars spaced apart, a track formed of members extending above the upper faces of and alongside of said bars when the bars are horizontal so that when an upended can in said second cradle is shifted into upright position, the can will automatically engage with and be supported by said track, and means engageable with cans resting on said track for feeding the same along said track.

8. In a machine for washing milk cans in which

the cans are conveyed along a selected horizontal path while in inverted positions, and discharged while still inverted, in a horizontal direction at the end of said path, into an upending mechanism, that improvement in said mechanism which comprises a cradle, means mounting said cradle for oscillation about a horizontal axis back and forth between a can-receiving position and a can-upended position, and having a shaft, a coupling member mounted on said shaft and having a recess in its surface, an arm member also mounted on said shaft, a roller mounted on said arm member for movement against said surface and engageable in said recess when aligned therewith to effect a yieldable driving connection between said members, spring means urging said roller against said surface and into said recess, and determining by its pressure the driving torque between said members necessary to disengage said roller from said recess, means for transmitting oscillatory, back and forth movement to one of said members, the other of said members being coupled to said shaft, means for receiving upended cans from said cradle, and means for conveying away the received cans.

9. In a machine for washing milk cans in which the cans are conveyed along a selected horizontal path while in inverted positions, and discharged while still inverted, in a horizontal direction at the end of said path, into an upending mechanism, that improvement in said mechanism which comprises a cradle, means mounting said cradle for oscillation about a horizontal axis back and forth between a can-receiving position and a can-upended position, and having a shaft, a coupling member mounted on said shaft and having a recess in its surface, an arm member also mounted on said shaft, a roller mounted on said arm member for movement against said surface and engageable in said recess when aligned therewith to effect a yieldable driving connection between said members, spring means urging said roller against said surface and into said recess, and determining by its pressure the driving torque between said members necessary to disengage said roller from said recess, means for transmitting oscillatory, back and forth movement to one of said members, the other of said members being coupled to said shaft, the angular distance between said two cradle positions being less than a full revolution, a second cradle disposed to receive and support the upended can received from the first cradle in an inclined position and tiltable about a fixed axis into a position in which the can is upright, the portion of said second cradle against which the bottom of the upended can abuts being formed of a plurality of bars spaced apart, a track formed of members extending above the upper faces of and alongside of said bars when the bars are horizontal so that when an upended can in said second cradle is shifted into upright position, the can will automatically engage with and be supported by said track, and means engageable with cans resting on said track for feeding the same along said track.

10. In a machine for washing milk cans and their covers in which the cans are conveyed along a selected horizontal path while in inverted positions, and discharged, while still inverted, at regularly periodic intervals in a horizontal direction at the end of said path, into an upending mechanism, that improvement which comprises an L shaped cradle mounted for oscillation alter-

nately in opposite directions about a horizontal axis between can-receiving position, in which the base of the L is lowermost and the open side faces said end of the path, to receive inverted cans and support them in an inclined position resting upon the base of the L and leaning against the upstanding arm of the L, and a can-discharging position in which the base of the L is uppermost and the side of the L inclined sufficiently to discharge the largely upended can downwardly by gravity along the side of the L with the can base foremost, the base of the L being further than the top of the L from said axis, a second L shaped rigid cradle also pivoted to oscillate on a fixed pivot alternately in opposite directions between an inclined can-receiving position in which the L is generally upright but tipped backwardly somewhat and will receive an upended can sliding from the first cradle when the base of the L of that cradle is uppermost, and a fully upright position, in which the can supported thereby is upright and clears the top end of the L of the first cradle while the latter moves back to can-receiving position, a platform aligned with the base end of the L of the second cradle when the L thereof is fully upright, means for moving upright cans from said second cradle and along said platform, and means for oscillating said cradles and operating said moving means in co-ordinated movement relatively to one another, to cause an inverted can to be received, upended, transferred from cradle to cradle, and deposited on said platform by successive operations.

11. In a machine for washing milk cans and their covers in which the cans are conveyed along a selected horizontal path while in inverted positions, and discharged, while still inverted, at regularly periodic intervals in a direction at the end of said path, into an upending mechanism, that improvement which comprises an L shaped cradle mounted for oscillation alternately in opposite directions about a horizontal axis between can-receiving position in which the base of the L is lowermost and the open side faces said end of the path, to receive inverted cans and support them in an inclined position resting upon the base of the L, and leaning against the upstanding arm of the L, and a can-discharging position in which the base of the L is uppermost and the side of the L inclined sufficiently to discharge the largely upended can downwardly by gravity along the side of the L with the can base foremost, the base of the L being further than the top of the L from said axis, a second L shaped rigid cradle also pivoted to oscillate on a fixed pivot alternately in opposite directions between an inclined can-receiving position in which the L is generally upright but tipped backwardly somewhat and will receive an upended can sliding from the first cradle when the base of the L of that cradle is uppermost, and a fully upright position, the intersection between the side and base of the L of said second cradle being disposed a substantial distance from and in such relation to the axis of oscillation of that cradle, that when that cradle moves from can-receiving, inclined position to fully upright position, any can supported thereon will be carried horizontally away from the axis of the first cradle, sufficiently to clear the end of that cradle opposite from the base as said first cradle returns to its can-receiving position.

FRANK L. KLAIBER.
HARLAN C. CLARK.