June 7, 1932. H. D. LATHROP 1,861,575

CAN CONVEYING AND DUMPING APPARATUS

Filed April 19, 1930 6 Sheets-Sheet 1

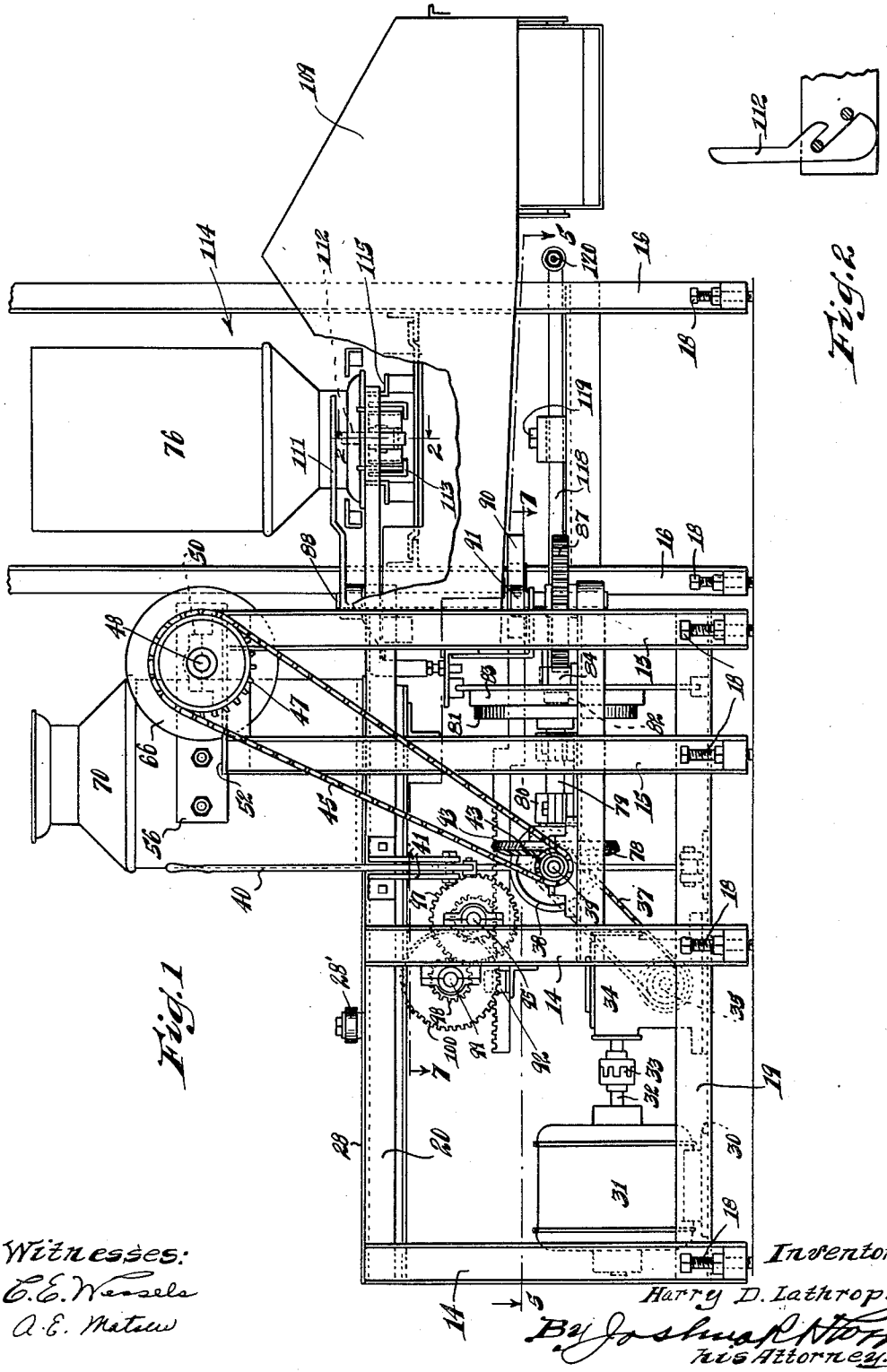


Fig. 1

Fig. 2

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CAN CONVEYING AND DUMPING APPARATUS

Filed April 19, 1930 6 Sheets-Sheet 2

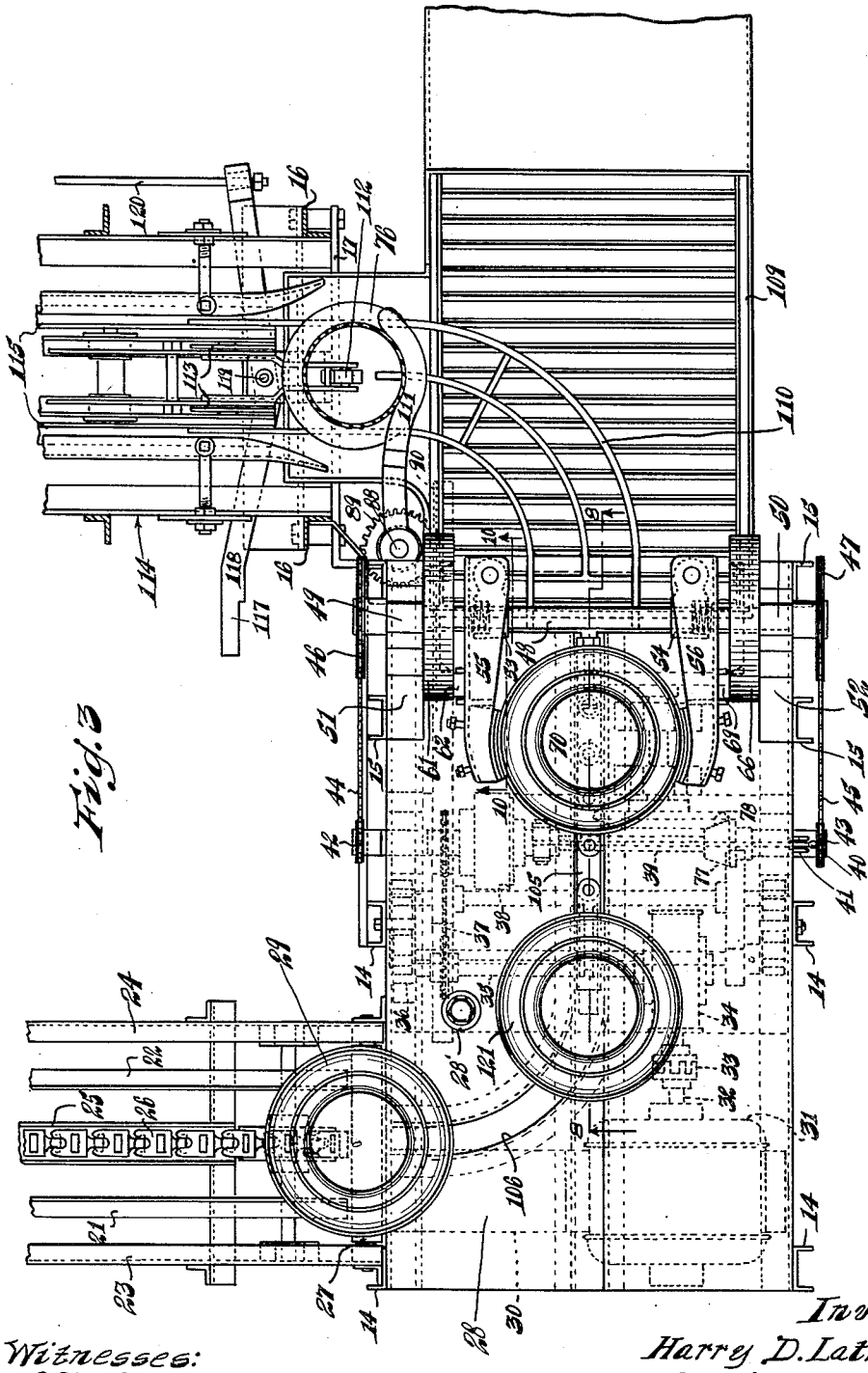


Fig. 3

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CAN CONVEYING AND DUMPING APPARATUS

Filed April 19, 1930 6 Sheets-Sheet 3

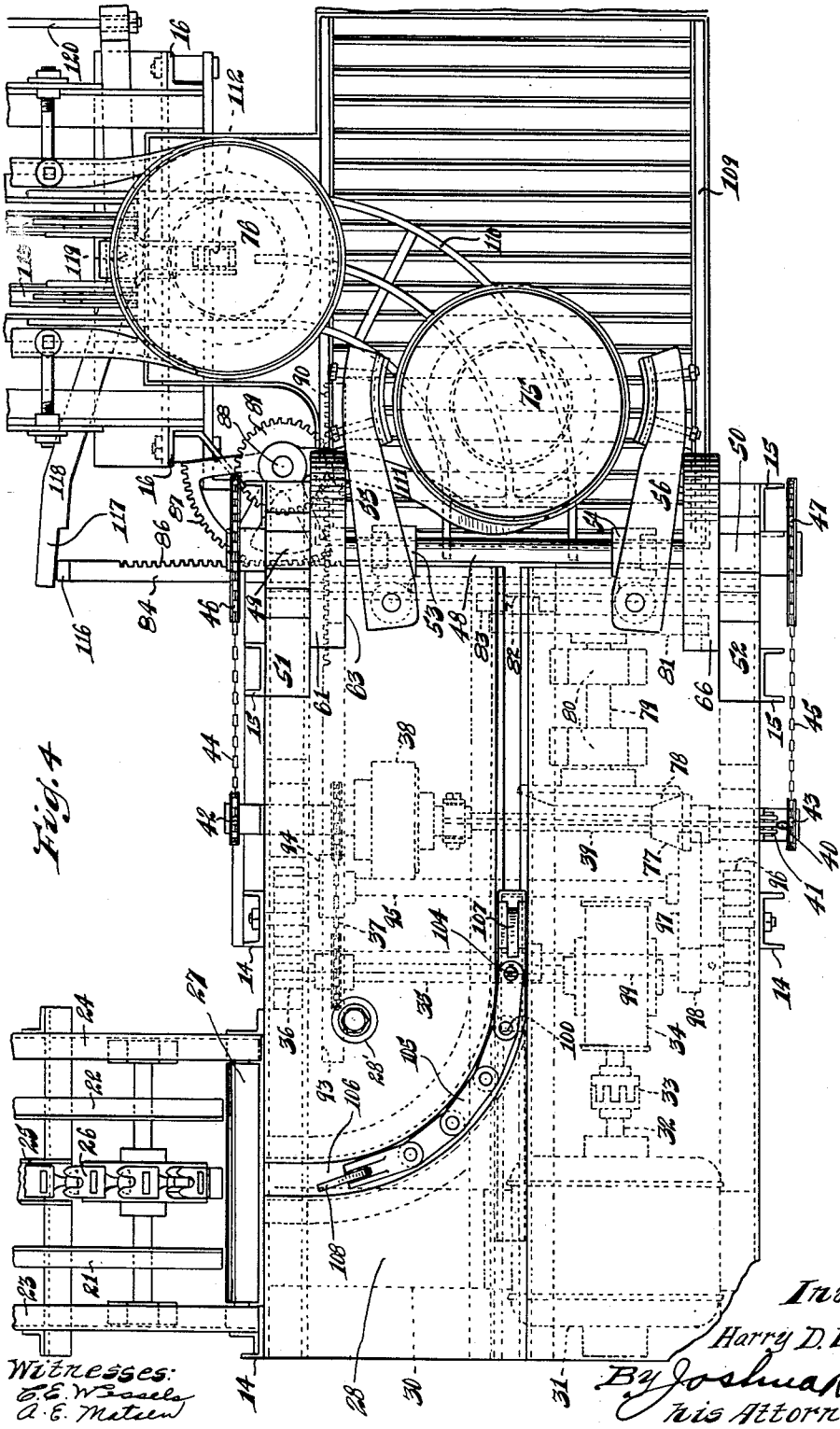


Fig. 4.

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CAN CONVEYING AND DUMPING APPARATUS

Filed April 19, 1930 6 Sheets-Sheet 4

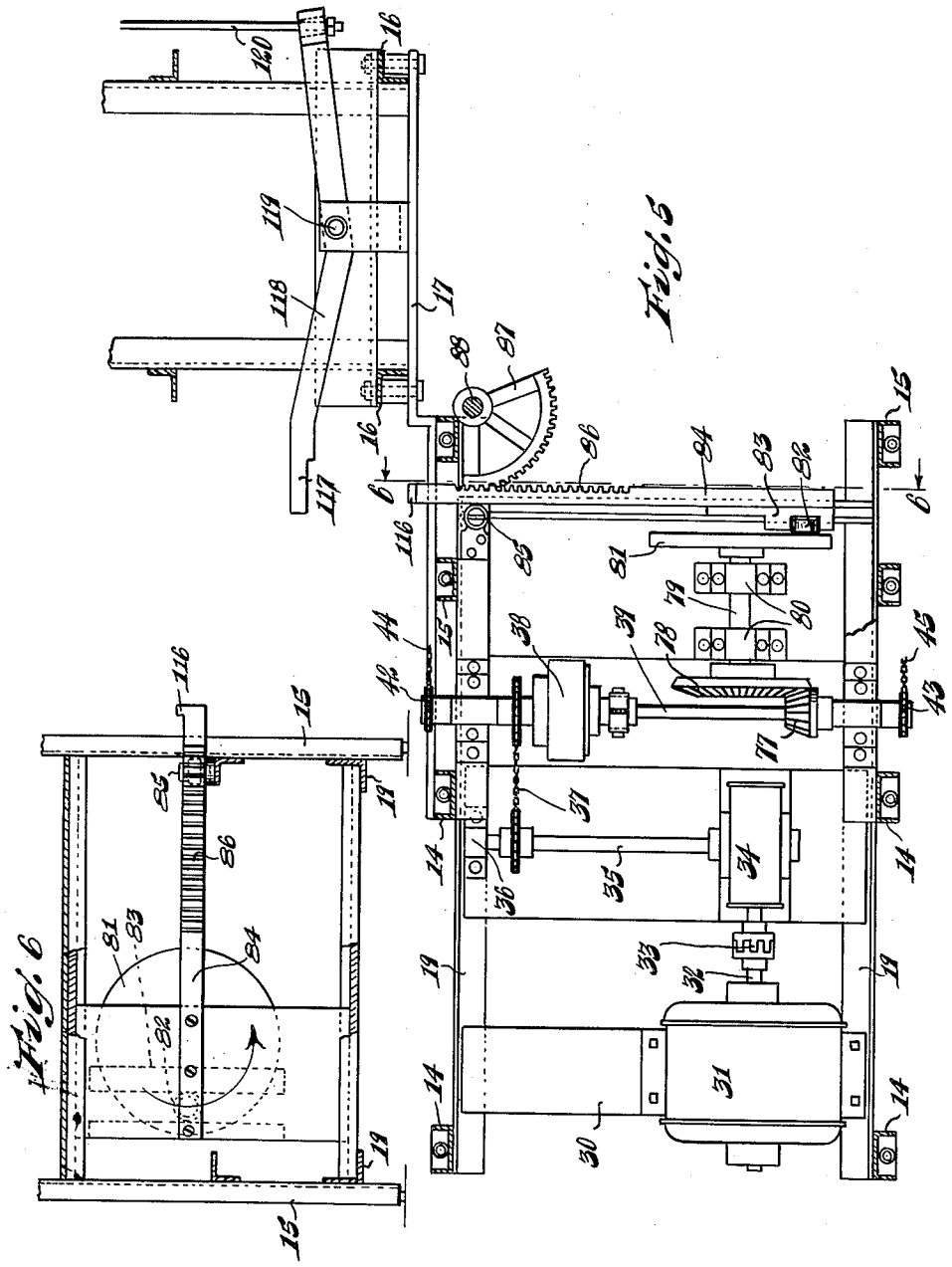


Fig. 5

Fig. 6

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CAN CONVEYING AND DUMPING APPARATUS

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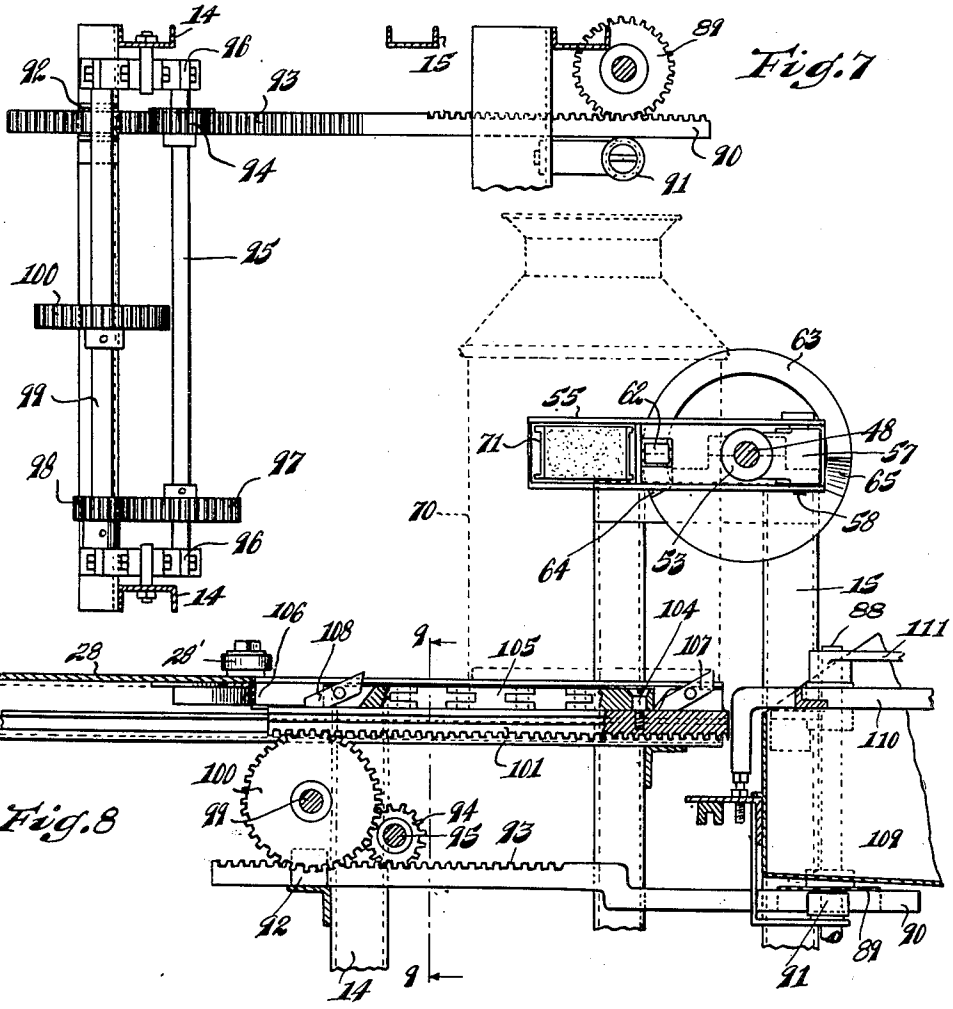


Fig. 7

Fig. 8

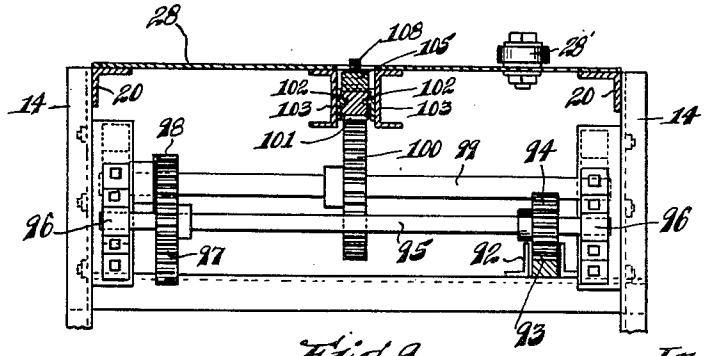


Fig 9

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CAN CONVEYING AND DUMPING APPARATUS

Filed April 19, 1930 6 Sheets-Sheet 6

Fig. 11

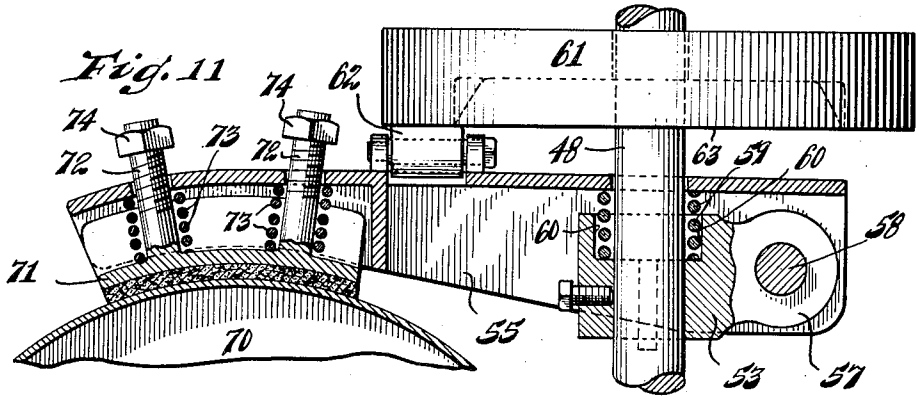


Fig. 10

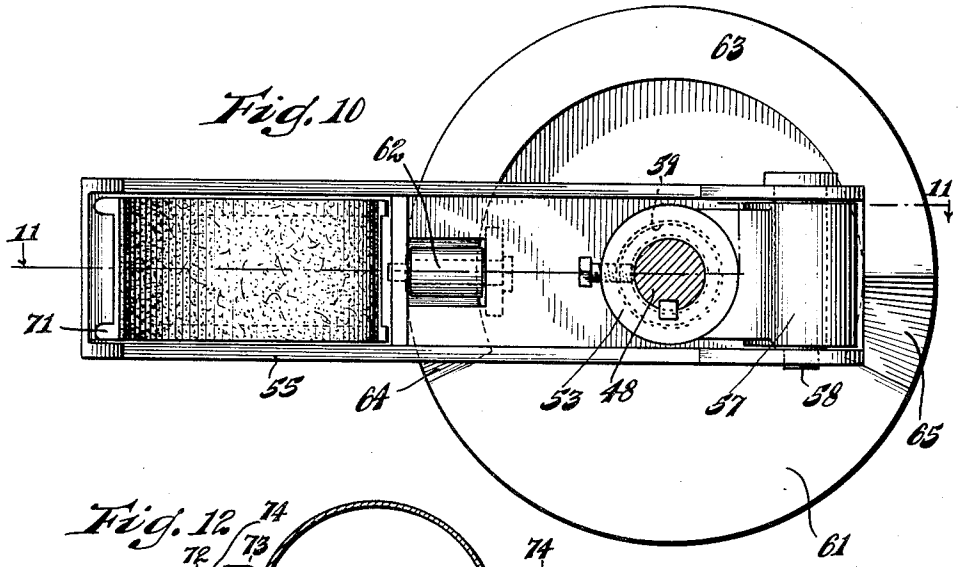
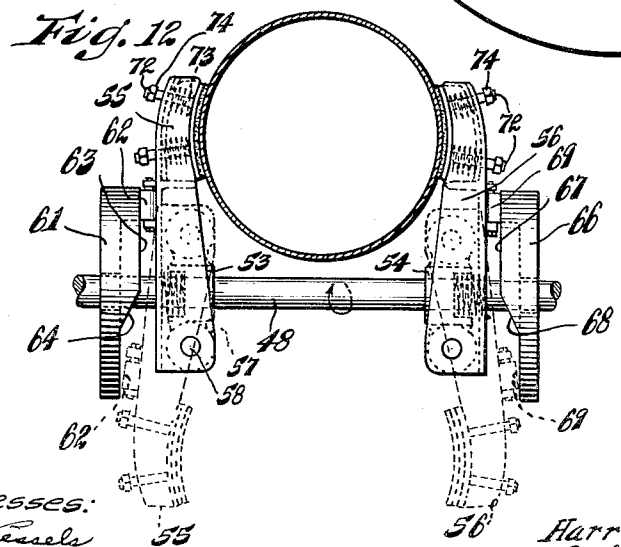


Fig. 12



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Patented June 7, 1932 1,861,575

UNITED STATES PATENT OFFICE

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CAN CONVEYING AND DUMPING APPARATUS

Application filed April 19, 1930. Serial No. 445,812.

This invention relates to can conveying and dumping apparatus, and an object of the invention is the provision of a machine adapted to convey or transport filled milk or cream cans to mechanism adapted to dump the contents thereof, conveying means constructed in timed relation with the dumping mechanism to successively transport filled cans in position to be engaged by the dumping mechanism, dumping mechanism adapted to rigidly engage the can by a gripping action and carry the same through an arcuate path during which travel the contents are dumped into a receiving vat, and feeding mechanism designed to successively convey cans from the dumping mechanism to a can washing machine. The invention also contemplates the provision of means for performing the can handling operations indicated in timed relation and entirely automatically, thus obviating the necessity of any manual handling. In a dairy installation, for example, the filled cans are adapted to be conveyed and handled entirely automatically until the dumping operation is completed, and thereafter the automatic action continues in the removal of the empty inverted can from proximity with the dumping mechanism for passage through the can washing machine. A further object of the invention is the provision of improved can dumping means operatively connected in timed relation with can delivering mechanism and can discharging mechanism.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which:

Fig. 1 is a side elevational view of the can dumping apparatus in operative relation with the receiving end of a can washing machine;

Fig. 2 is a detail view, taken on line 2—2 of Fig. 1, of the initial can engaging pawl on the reciprocating carriage of the washing machine;

Fig. 3 is a plan view of the apparatus, showing the can dumping gripping arms in initial can engaging position;

Fig. 4 is an enlarged view, similar to Fig. 3, showing the relative positions of the parts and the position of the can gripping arms at the point of disengagement with a can;

Fig. 5 is a horizontal sectional view, taken substantially on the line 5—5 of Fig. 1;

Fig. 6 is a view taken on the line 6—6 of Fig. 5;

Fig. 7 is a detail view of the drive mechanism, taken on the line 7—7 of Fig. 1;

Fig. 8 is a vertical sectional view, taken substantially on the line 8—8 of Fig. 3;

Fig. 9 is a view taken on the line 9—9 of Fig. 10;

Fig. 10 is a view taken substantially on the line 10—10 of Fig. 3, illustrating one of the can carriage arms;

Fig. 11 is a sectional view, taken substantially on the line 11—11 of Fig. 10; and

Fig. 12 is a detail sectional view showing the relative positions of a can and gripping arms at the uppermost point of travel, in which position the arms are disposed vertically and the can or receptacle horizontally.

As illustrated in the drawings, the preferred embodiment of the invention comprises a supporting framework having vertical standards 14 which may be of channel iron or similar construction, and standards 15 adapted to extend to a greater height than the standards 14. Standards 16 are part of the framework of the can washing machine, which may be connected to the dumping apparatus by member 17. The can dumping mechanism dissociated from can delivering and discharging conveyors, forms the subject of a separate application Serial No. 445,813, filed concurrently therewith. The respective standards are preferably provided with leveling bolts 18, and the framework also includes suitable longitudinal frame members 19 and 20.

Positioned in proximity with the can dumping mechanism is an incoming conveyor consisting of angle rails 21 and 22, and lateral guides 23 and 24. Between rails 21 and 22 there is mounted a channel member 25

adapted to support an endless chain 26 throughout its upper horizontal run. Chain 26 is positioned to extend a slight distance above channel 25 and rails 21 and 22 in such manner that filled milk cans deposited between guides 23 and 24 will be carried by chain 26 and deposited on roller 27 with a portion resting upon platform 28 in the position of can marked 29 in Fig. 3. Chain 26 is adapted to travel at a uniform speed and may be driven from any suitable source of power. When a can is transported to the position shown by can 29 its movement is arrested until engaged by conveying mechanism operatively associated with the dumping apparatus hereinafter described.

Mounted beneath platform 28 on transverse plate 30 is a motor 31 connected by shaft 32 and flexible coupling 33 to reduction gearing assembly 34, from which extends transverse shaft 35 journaled at 36, having a drive connection through sprocket chain 37 with clutch mechanism 38 operatively associated with an intermediate shaft 39. By this construction and arrangement, while shaft 39 is adapted to continuously rotate in normal operation, operative engagement of shaft 39 with the clutch mechanism is controlled by shipping lever 40 pivotally mounted upon bracket 41 and connected to the clutch mechanism 38. Shaft 39 is adapted to rotate in a clockwise direction from the position shown in Fig. 1, and at the respective extremities thereof carries sprockets 42 and 43, connected by sprocket chains 44 and 45 to respective sprockets 46 and 47 mounted on the extremities of can reversing shaft 48, which is journaled in bearing blocks 49 and 50 mounted upon members 51 and 52, respectively, secured to standards 15 at each side of the machine. Keyed or pinned to shaft 48 are a pair of spaced arm supporting blocks 53 and 54 adapted to carry revolving can gripping arms 55 and 56, respectively, and inasmuch as the construction, arrangement and mounting of arms 55 and 56 are identical except that they are arranged in opposed relation to each other, the description of gripping arm 55 by reference to Figs. 10 and 11 will suffice.

Block 53, as shown in Fig. 11, has a projection 57 upon which arm 55 is pivotally mounted by means of pin 58, but arm 55 is arranged to extend on the opposite side of shaft 48 from projection 57, and therefore the arm is provided with an opening through which shaft 48 extends. A compression spring 59 disposed in a recess 60 of block 53 is adapted to bear against an inner surface of arm 55 to normally force the latter outwardly, or in the direction of a stationary vertically disposed circular cam member 61, against the inner circular surface of which roller 62 on arm 55 is adapted to contact.

As shown in Figs. 10 and 12, the cam member 61 has an upper inwardly extending cam portion 63 adapted to force arm 55 inwardly. An inclined plane portion 64 is engaged by roller 62 on the approach of arm 55 to cam surface 63, and an inclined plane portion 65 disposed diametrically opposite to portion 64, is engaged by roller 62 as arm 55 is carried beyond cam portion 63. Similarly, on the opposite side of the machine, arm 56 operates in conjunction with stationary cam member 66 having an upper cam surface 67 and inclined approach portion 68 engageable by roller 69, with an opposite inclined plane surface corresponding to portion 65 on cam member 61. Thus, it will be seen, as shaft 48 rotates in a clockwise direction from the positions shown in Figs. 1, 8 and 10, arms 55 and 56 are revolved and as they approach a horizontal position from the lower half of the revolution, they are simultaneously forced or contracted toward each other into gripping engagement with the opposite sides of a can 70 which has been conveyed by timed conveying mechanism to the positions shown in Figs. 1 and 3, as hereinafter described.

To afford a certain degree of resiliency in the gripping members and compensate for slight irregularities, each arm 55 and 56 carries a gripping shoe 71, the inner surface of which is curved to conform to the curvature of a milk can, and covered with leather, rubber or equivalent material. Each shoe 71 carries rearwardly extending bolts 72 which extend through openings in the arm and within coiled springs 73 normally adapted to force shoes 71 inwardly, the inward motion being limited by nuts 74.

In order to convey the filled cans from the position of can 29 in Fig. 3 to the position of can 70 for operative engagement by gripping arms 55 and 56, timed reciprocating conveying mechanism is provided, and likewise timed discharging mechanism is supplied to convey cans from the position of can 75 in Fig. 4 to the position of can 76 upon the completion of a dumping operation. Keyed to shaft 39 is a beveled pinion 77 meshing with bevel gear 78 on shaft 79 rotatably mounted in bearings 80. Upon the opposite end of shaft 79 is a disc 81 having mounted near the periphery thereof a crank pin carrying a roller 82 which is adapted to travel in a vertically disposed slot in transversely reciprocating plate 83. Secured to plate 83 is a rack 84 adapted to reciprocate transversely in contact with guide roller 85 and provided with rack teeth 86 arranged to mesh with the teeth on segmental gear 87 affixed to a vertically extending oscillatory shaft 88 journaled in the frame of the machine.

Keyed upon shaft 88, at a point slightly above segmental gear 87, is a spur gear 89 adapted to mesh with rack teeth on one vertical surface of longitudinally reciprocating rack 90 guidable by roller 91 and bearing 92, as clearly shown in detail in Fig. 7. The

opposite portion of rack 90 is provided on its upper horizontal surface with rack teeth 93 meshing with pinion 94 affixed to shaft 95, journaled in bearings 96. Keyed on shaft 95 is gear 97 adapted to mesh with gear 98 on shaft 99, journaled parallel to shaft 95 and having secured thereto intermediate its length a drive gear 100. Gear 100 is mounted to mesh with rack teeth on the lower horizontal face of reciprocating rack 101 provided with lateral rabbet grooves for engagement by rabbet tongues 102 mounted on the inner surfaces of channel members 103, as shown in Fig. 9. Secured to the upper surface of rack 101 by screw 104 is the advance link of chain 105 which is adapted to travel in a curved channel trackway 106, as shown in Fig. 4. Mounted upon the advance end of chain 105 is a gravity pawl 107, and mounted adjacent the rear end is a similar pawl 108. These pawls are loosely pivoted to the respective chain links so as to engage the advanced inner surface of a depending flange at the bottom of a can, as shown in Fig. 8, and to be rocked on their pivots by cans on the platform 28 when chain 105 is moved rearwardly, or toward the left from the position shown in Fig. 4. A guide roller 28′ extends above the surface of platform 28 to maintain cans in alignment with channel 106.

While a can is being lifted and carried through an arc of 180 degrees by the can gripping arms 55 and 56, the contents are dumped into a receiving vat or container 109 disposed below horizontally curved track rails 110, upon which a can is deposited in inverted position after a dumping operation. Keyed adjacent the upper extremity of shaft 88 is a curved bar 111 adapted to intermittently oscillate between the positions shown in Figs. 3 and 4, and by reason of the curved portion which engages the neck of the can to shift a can from the position shown by can 75 to the position shown by can 76, in which latter position the neck of the can incloses gravity pawl 112 pivotally mounted upon reciprocating carriage 113 of a can washing machine 114. Inasmuch as rails 110 are aligned with track rails 115 of the washing machine, the can is then propelled through the latter by the reciprocating motion of the can carriage 113 provided with a plurality of can advancing pawls. At the completion of each dumping operation, when the parts are in the position shown in Fig. 4, the extremity 116 of rack 84 is adapted to contact with arm 117 of lever 118 pivotally mounted upon the frame of the washing machine at 119 and having the opposite end connected to a cable 120. Cable 120 is in turn connected to tripping mechanism (not shown) adjacent the discharge end of the washing machine, and when cable 120 is pulled by the engagement explained, the actuation of the tripping mechanism causes operation of the can washing machine through one cycle, in which the can carriage is advanced and again returned to the original position shown in Fig. 3. As shown in Fig. 3, can 121 is at an intermediate position upon the delivery platform 28.

In amplification of a description of the operation of the machine, which will in large part be understood from the foregoing structural description and functional arrangement, the filled cans are deposited at the unloading point upon rails 22 and carried forward by endless chain 26 until the advanced can is in the position of can 29, as shown in Fig. 3, with the forward base edge resting upon platform 28. It will be understood that if feasible to employ an inclined runway, gravity rollers may be utilized for conveying the filled cans to this point. On a half revolution of arms 55 and 56 from the position shown in Fig. 4, by reason of the gearing and rack timing connection, chain 105 is moved forwardly from the position shown in Fig. 4 to the position shown in Fig. 3 whereby pawl 108 completes the shifting of can 29 to the position of can 121, and pawl 107 completes the shifting of can 121 to the position of can 70. Simultaneously, by the timed operative connection described, curved bar 111 is oscillated from the position shown in Fig. 4 to the position shown in Fig. 3, shifting a can from position 75 to position 76. During the next one-half revolution of arms 55 and 56 through the upper half of their circular travel, a can in the position of can 70 of Fig. 3 is rigidly gripped through the cam action described, the contents thereof dumped into vat 109 and the can deposited in inverted position on rails 110. Simultaneous with this action, bar 111 is oscillated to the position shown in Fig. 4 and chain 105 likewise moved from the position shown in Fig. 3 to the position shown in Fig. 4. Also, at the conclusion of this last mentioned operation, the can washing machine is actuated for one operative cycle by reason of the contacting engagement of extremity 116 on rack 84 with lever 118 whereby a can in the position of can 76 in Fig. 4 is conveyed one step into the washing machine and pawl 112 is moved rearwardly to the position shown in Fig. 3 for engagement with the next following can.

It will thus be seen that the entire handling and manipulation of a succession of filled cans is rendered entirely automatic, resulting in a great saving in labor and operating cost, and efficiency in operation. In addition, an extremely important factor from a sanitary standpoint in modern dairy operation is that contact of the cans or contents by workmen is eliminated.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of

variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. Apparatus of the class described comprising, in combination, can engaging and dumping means, and a flexible reciprocating delivery carriage working in an arcuate guideway and operatively connected for actuation and control by the actuating and controlling means of said dumping means and adapted to successively convey filled cans in relatively timed sequence into position for engagement by said dumping means.

2. Apparatus of the class described comprising, in combination, can engaging and dumping means, a flexible reciprocating delivery carriage working in an arcuate guideway and operatively connected for actuation and control by the actuating and controlling means of said dumping means and adapted to successively convey filled cans in relatively timed sequence into position for engagement by said dumping means, and an oscillatory member likewise operatively connected for actuation and control by the actuating and controlling means of said dumping means and adapted to convey empty cans from said dumping means at the conclusion of dumping operations.

3. Apparatus of the class described comprising, in combination, can engaging and dumping means, means operatively connected in timed relation with said dumping means to successively convey cans into position for engagement by said dumping means, and an oscillatory member operatively connected in timed relation with said dumping means and adapted to convey empty cans from said dumping means at the conclusion of dumping operations, the can receiving and discharging supports of said dumping means being in substantially the same horizontal plane.

4. Apparatus of the class described comprising, in combination, can engaging and dumping means, means operatively connected in timed relation with said dumping means to successively convey cans into position for engagement by said dumping means, means operatively connected in timed relation with said dumping means to successively convey cans from said dumping means at the conclusion of dumping operations, and means for successively conveying cans into operative engagement with a can washing machine, the respective cans being delivered to and discharged from said dumping means in substantially the same horizontal plane.

5. Apparatus of the class described comprising, in combination, can engaging and dumping means, a reciprocating delivery carriage operatively connected in timed relation to the actuating means and operating in the same plane with the receiving portion of said dumping means and adapted to successively convey filled cans into position for engagement by said dumping means, an oscillatory member operatively connected in timed relation with said dumping means and adapted to convey empty cans from the discharge portion of said dumping means at the conclusion of dumping operations, and means for successively conveying cans into operative engagement with a can washing machine in the same plane of the discharge portion of said dumping means.

6. Apparatus of the class described comprising, in combination, a can receiving platform, a can discharge platform, said platforms being in substantially the same horizontal plane, can engaging means revolvably mounted between said receiving platform and said discharge platform and adapted to successively engage and transport filled cans through an arcuate path about a horizontal axis whereby to invert the cans and dump the contents thereof, and an oscillatory member operatively connected in timed relation with said can engaging means and adapted to successively engage the inverted cans and move them in an arcuate path on said discharge platform following dumping operations.

7. Apparatus of the class described comprising, in combination, a can receiving platform, a can discharge platform, can engaging means revolvably mounted between said receiving platform and said discharge platform and adapted to successively engage and transport filled cans through an arcuate path about a horizontal axis whereby to invert the cans on said discharge platform and dump the contents thereof, an oscillatory member operatively connected to the actuating means of said can engaging means and operating in timed relation to said can engaging means whereby to successively discharge cans from said discharge platform following dumping operations, said means successively conveying cans into operative engagement with a can washing machine, and means controlled by the actuation of said can engaging means to control the operation of the can washing machine.

8. Apparatus of the class described comprising, in combination, a can receiving platform, a can discharge platform, said platforms being in substantially the same horizontal plane, can engaging means revolvably mounted between said receiving platform and said discharge platform and adapted to successively engage and transport filled cans through an arcuate path about a horizontal

axis whereby to invert the cans on said discharge platform and dump the contents thereof, a reciprocating carriage slidably mounted in an arcuate guideway on said receiving platform and operatively connected to the actuating means of said can engaging means, and a plurality of pawl members pivotally mounted upon said carriage and adapted to successively advance cans positively into position for engagement by said engaging means in timed relation thereto.

9. Apparatus of the class described comprising, in combination, a can receiving platform, a can discharge platform, said platforms being in substantially the same horizontal plane, can engaging means revolvably mounted between said receiving platform and said discharge platform and adapted to successively engage and transport filled cans through an arcuate path about a horizontal axis whereby to invert the cans and dump the contents thereof, a reciprocating carriage slidably mounted in an arcuate guideway on said receiving platform and operatively connected to the actuating means of said can engaging means, a plurality of pawl members pivotally mounted upon said carriage and adapted to successively advance cans positively into position for engagement by said engaging means, and an oscillatory bar mounted adjacent said discharge platform and being operatively connected to said can engaging means and having an engaging portion for guiding and conveying empty cans from said discharge platform in an arcuate path.

10. Apparatus of the class described comprising, in combination, a can receiving platform, a can discharge platform, said platforms being in substantially the same horizontal plane, can engaging means revolvably mounted between said receiving platform and said discharge platform and having horizontally movable clamping arms to successively engage and transport filled cans through an arcuate path about a horizontal axis whereby to invert the cans and dump the contents thereof, a reciprocating carriage slidably mounted in an arcuate guideway on said receiving platform and operatively connected to the actuating means of said can engaging means, a plurality of pawl members pivotally mounted upon said carriage and adapted to successively advance cans into position for engagement by said engaging means, and means for successively conveying cans from said engaging and dumping means into operative engagement with a can washing machine placed in receiving relation to said discharge platform, the operation of the washing machine being controlled by the actuation of said conveying means through an operable connection with the actuating means of said can engaging and dumping means.

11. Apparatus of the class described comprising, in combination, a can receiving platform, a can discharge platform, can engaging means revolvably mounted between said receiving platform and said discharge platform and adapted to successively engage and transport filled cans through an arcuate path about a horizontal axis whereby to invert the cans and dump the contents thereof, a reciprocating carriage slidably mounted in a guideway on said receiving platform and operatively connected in timed relation with said engaging means, a plurality of pawl members pivotally mounted upon said carriage and adapted to successively advance cans into position for engagement by said engaging means, an oscillatory bar mounted adjacent said discharge platform and adapted to operate in timed relation with said engaging means for successively conveying empty cans from said discharge platform, and a washing machine located with its receiving portion in operative receiving relation to said discharge platform, the actuating means for said washing machine and conveyors being connected to and under the control of the actuating means for said can engaging and dumping means.

12. Apparatus of the class described comprising, in combination, an incoming can conveyor, a can washing machine, dumping means in connected relation to the delivery end of said conveyor and the receiving end of said washing machine, said dumping means comprising a device revolvable about a horizontal axis and having opposed horizontally movable grasping members between which the cans are engaged, means for positively moving the respective filled cans successively from said incoming can conveyor to a relative position for engagement by said grasping members, means for successively conveying the dumped cans from said dumping means to said washing machine, and means under common control for rotating the grasping arms of said dumping means and simultaneously actuating the means for delivering the filled cans to said grasping arms and also the means for transferring the dumped cans to said washing machine, the actuation of said washing machine being controlled by the actuation of said dumping means.

In testimony whereof I have signed my name to this specification.

HARRY D. LATHROP.