Feb. 23, 1932. J. HAUK 1,846,866

BOTTLE UNLOADER

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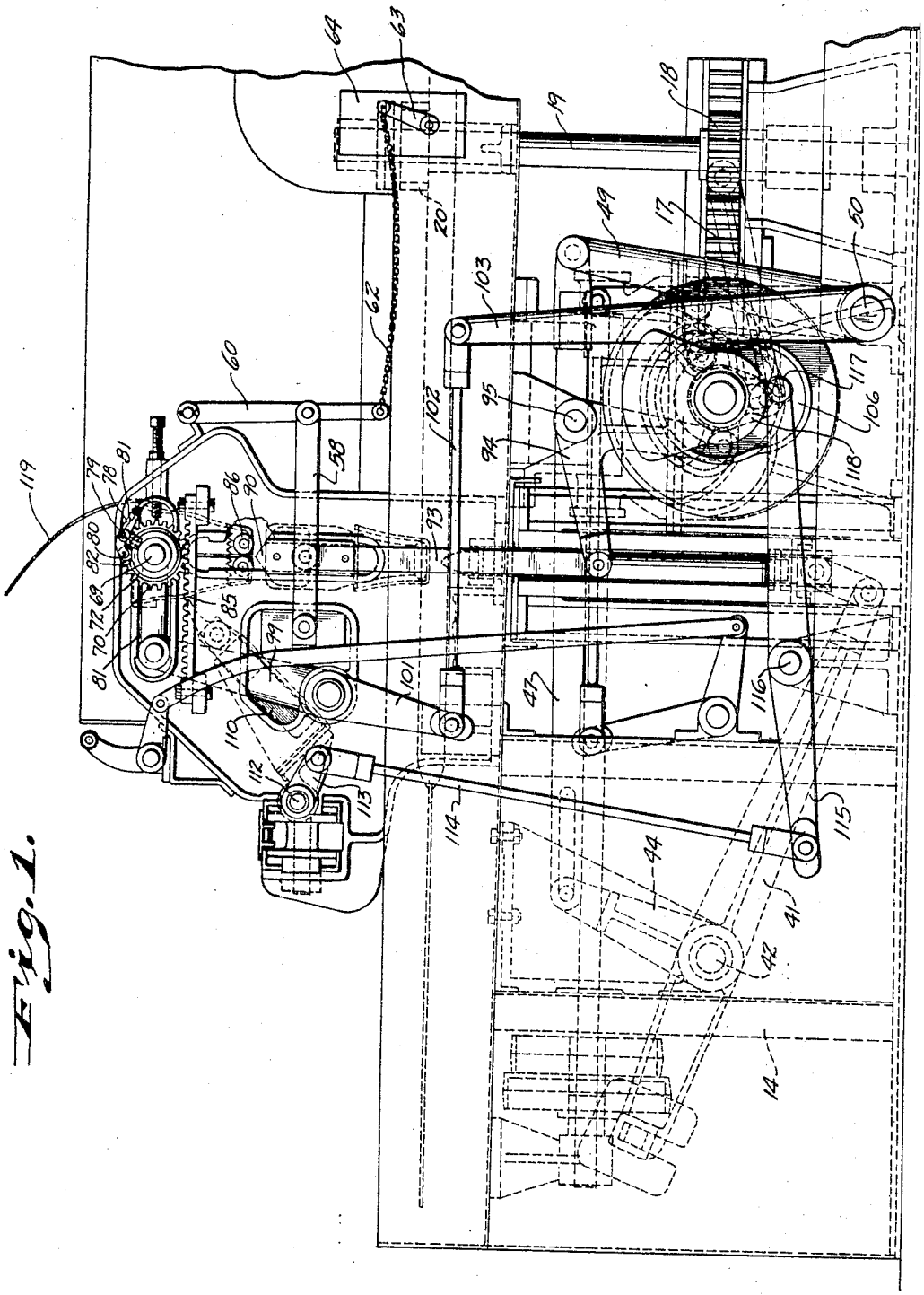


Fig. 1.

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Fig. 2.

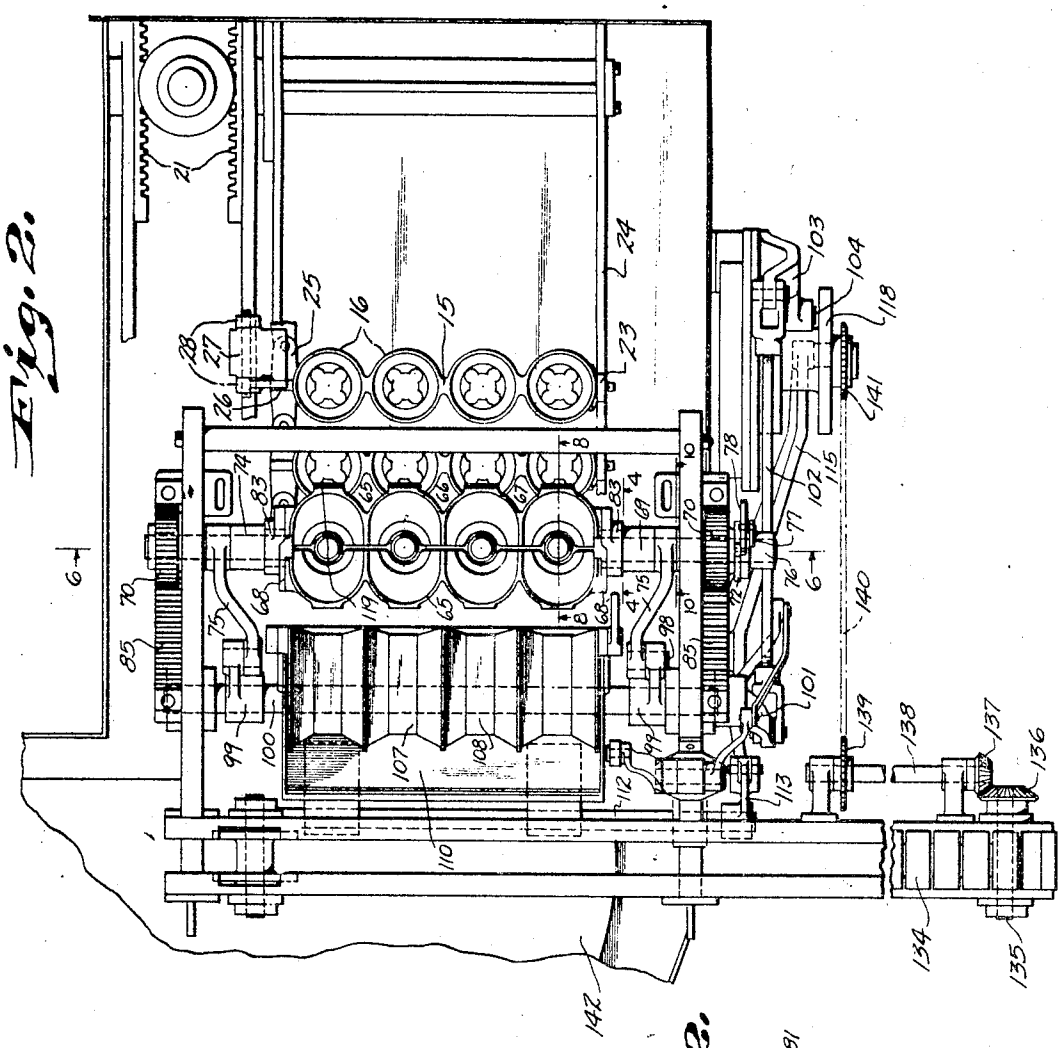


Fig. 5.

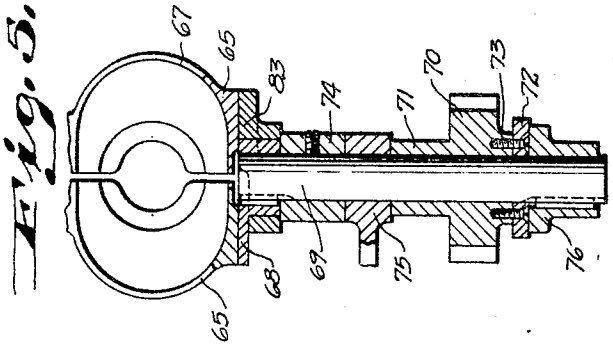
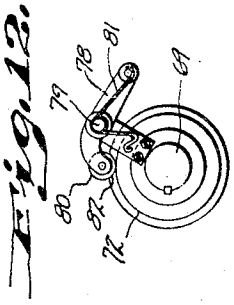


Fig. 12.



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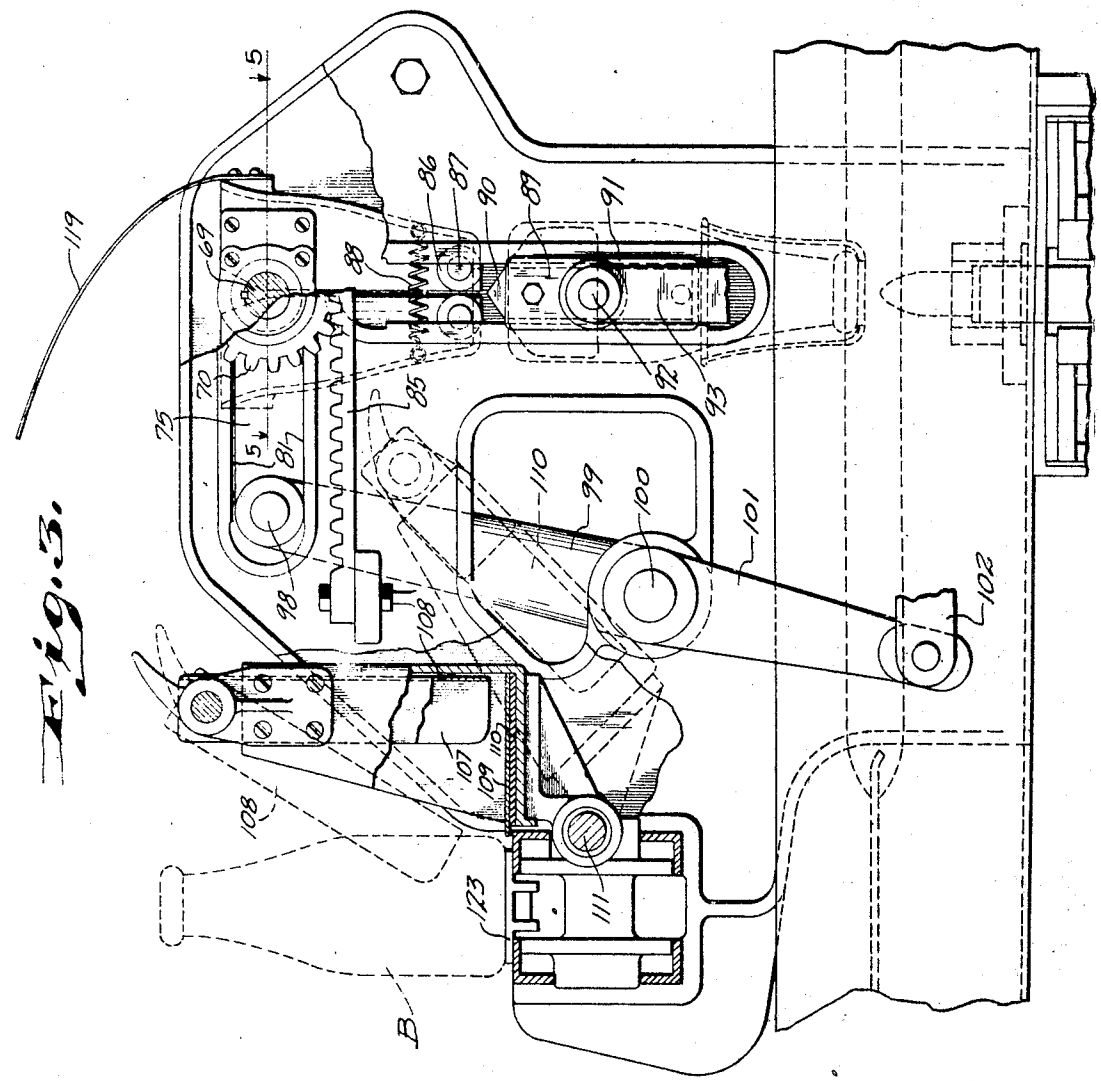


Fig. 3.

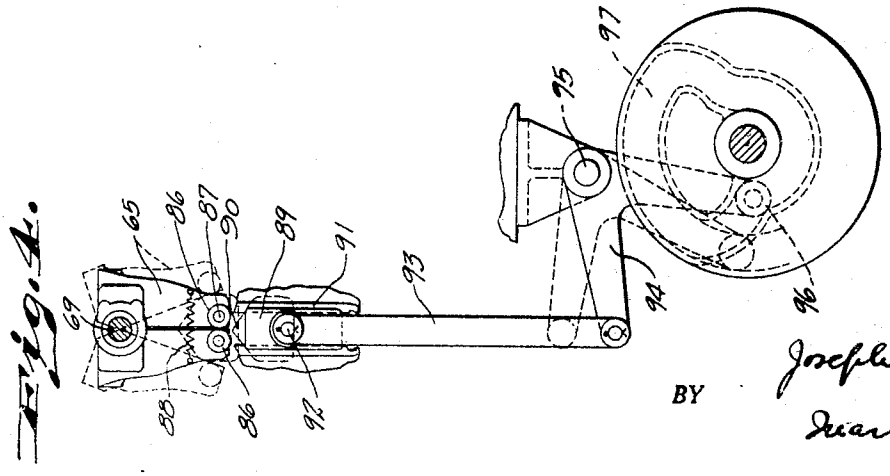


Fig. 4.

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1,846,866

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Fig. 6.

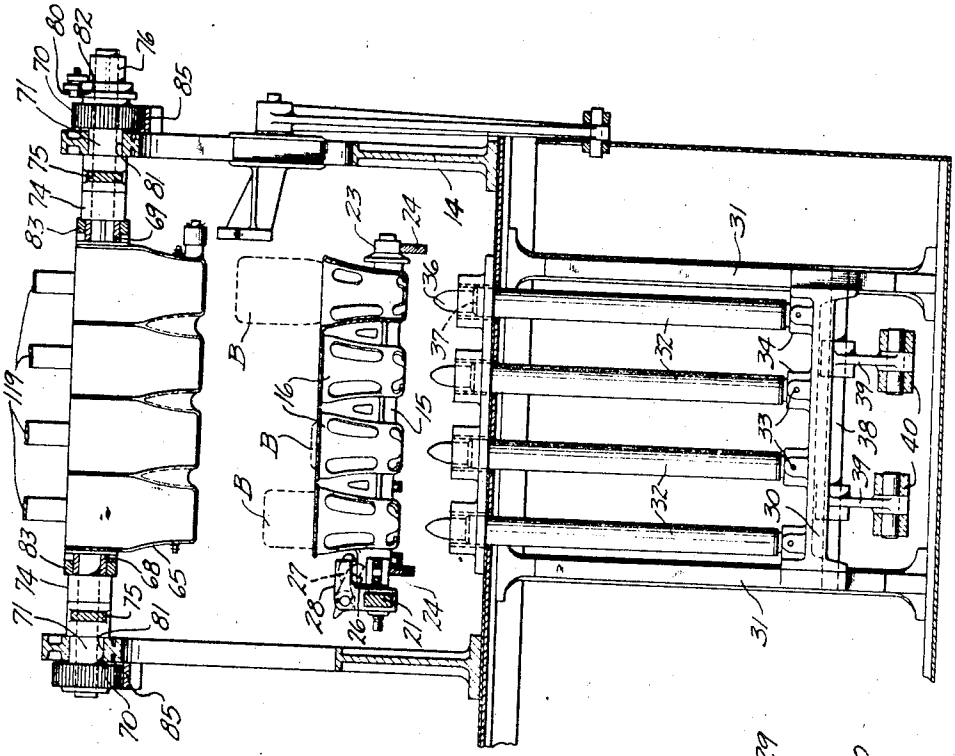
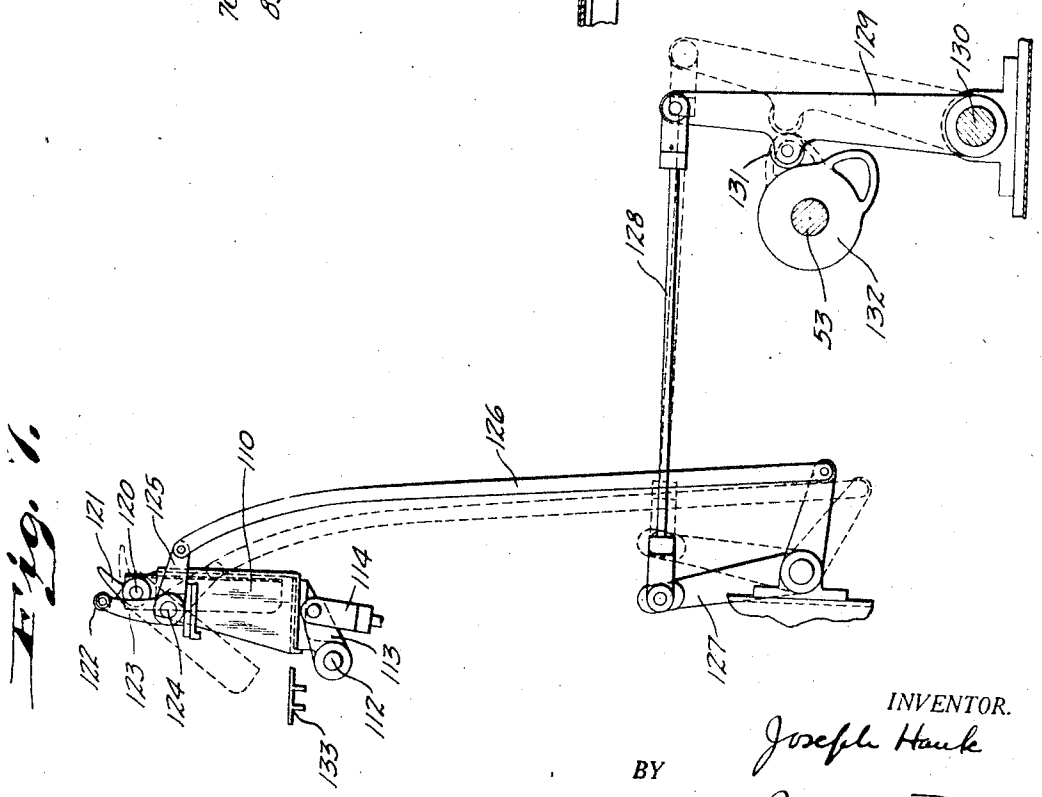


Fig. 1.



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Fig. 8.

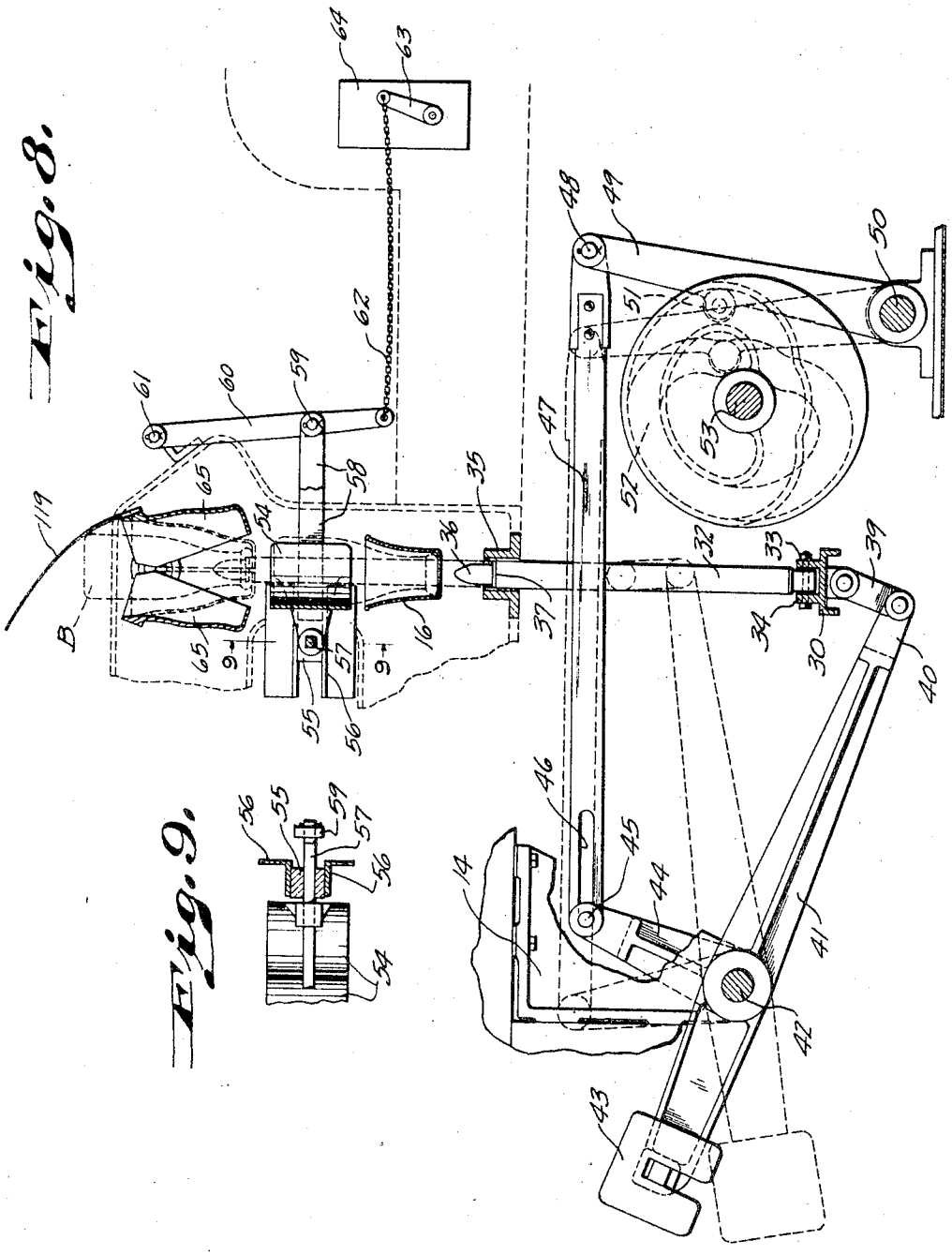


Fig. 9.

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Fig. 10.

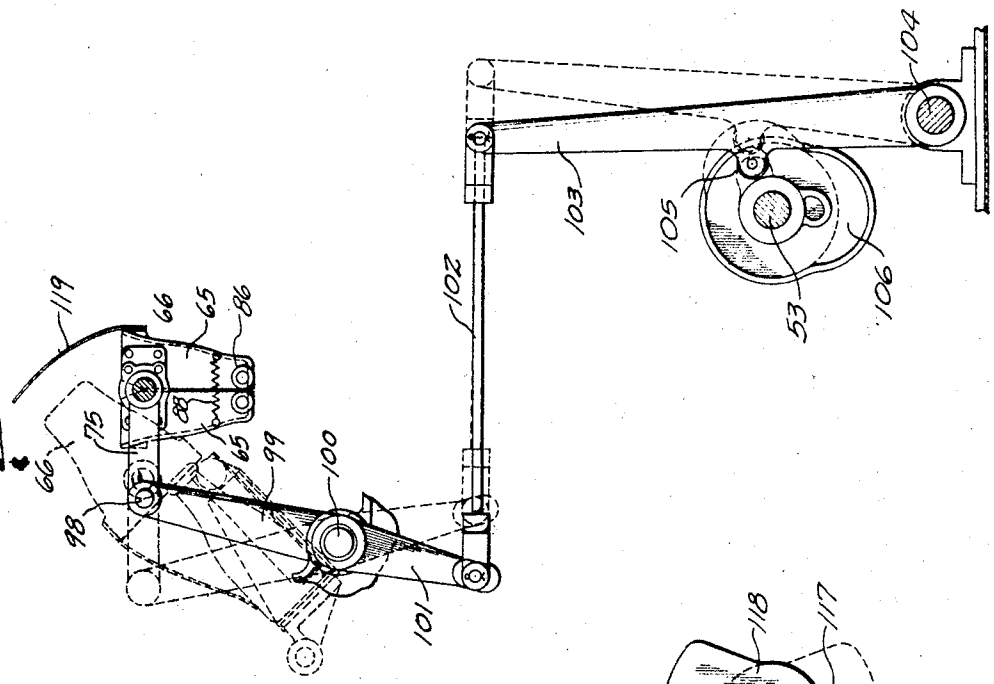
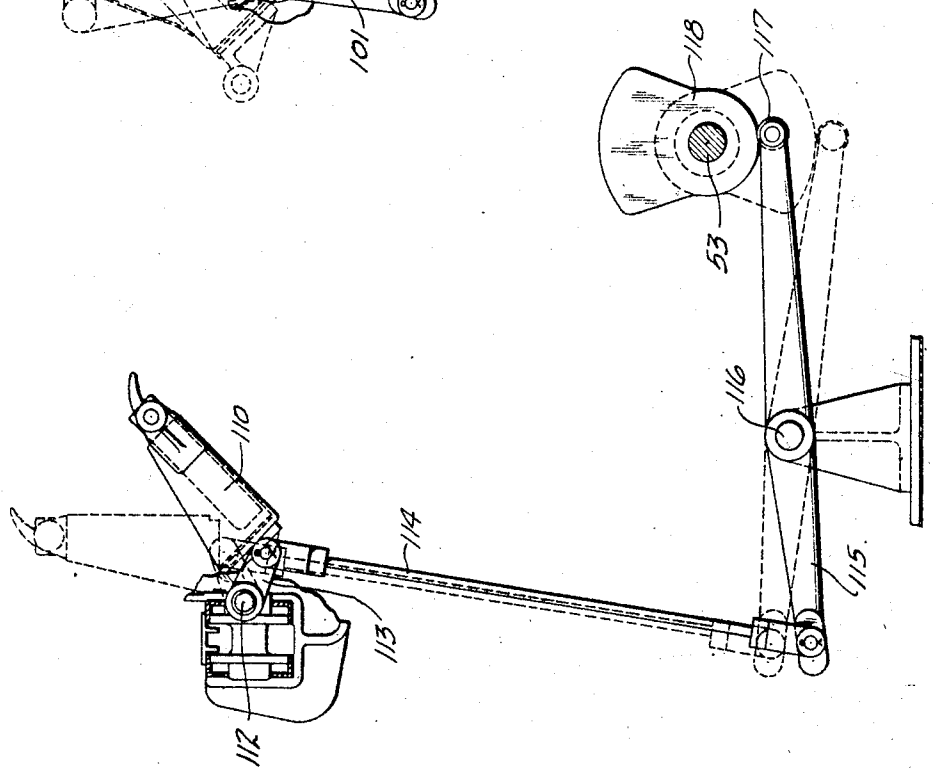


Fig. 11.



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UNITED STATES PATENT OFFICE

JOSEPH HAUK, OF SHOREWOOD, WISCONSIN, ASSIGNOR TO PHILIP C. READ, OF MILWAUKEE, WISCONSIN

BOTTLE UNLOADER

Application filed July 14, 1930. Serial No. 467,705.

The invention relates to bottle washing machines and more particularly to an automatic unloader for such machines.

The main object of the invention is to provide a bottle unloader apparatus wherein the bottles carried in pockets of an intermittently moving conveyor are lifted out of these pockets while in an inverted position and are then subjected to the action of novel turning mechanism hereinafter described and turned to upright position and deposited upon a delivery conveyor. More particularly the invention includes novel means for raising the bottles out of the conveyor pockets by mechanism which during the raising operation is free to be stopped in case the condition of a bottle or bottles taken from the conveyor should interfere with its free raising movement but which is positively operated on its return movement. It also includes a novel reversing mechanism wherein the bottles raised from the conveyor are introduced into a series of two part oscillatory holders which are automatically opened up to receive the inverted bottles as they are removed from the pockets of the conveyor and are thereafter turned to deposit the bottles into an oscillatory two part cradle which acts to deposit the bottles in upright position upon a delivery conveyor.

The invention further consists in the several features hereinafter described and more particularly defined by claims at the conclusion hereof.

In the drawings, Fig. 1 is a side elevation view of a bottle unloading apparatus embodying the invention;

Fig. 2 is a plan view thereof, parts being broken away;

Fig. 3 is an enlarged elevation view of the main parts of the unloader, parts being broken away and parts being shown in section;

Fig. 4 is a detail sectional view taken generally along the section line 4—4 of Fig. 2 showing the holder opening mechanism;

Fig. 5 is a detail section view taken on the line 5—5 of Fig. 3;

Fig. 6 is a detail sectional view taken on the line 6—6 of Fig. 2;

Fig. 7 is a detail side elevation view of parts shown in Fig. 3 with their operating mechanism;

Fig. 8 is a detail sectional view taken generally on the line 8—8 of Fig. 2;

Fig. 9 is a detail sectional view taken on the line 9—9 of Fig. 8;

Fig. 10 is a detail vertical sectional view taken generally along the line 10—10 of Fig. 2;

Fig. 11 is a side elevation similar to Fig. 7 showing one of its actuating mechanisms;

Fig. 12 is an enlarged view of the clutch for the oscillatory bottle holder.

Referring to Figs. 1, 3 and 6, the numeral 14 designates the main frame of the machine having an endless conveyor including spaced transversely disposed members 15 provided with a plurality of bottle holding pockets 16 wherein the bottles B, for example, quart or pint and half pint milk bottles, are mounted in inverted position and carried through the washing machine by the step by step or intermittent progressive movement of the conveyor. Feed mechanisms for moving the conveyor in this manner are old and well known and I will therefore only point out that in the present instance a rack 17 reciprocated from a suitable power source engages a gear 18 on an upright shaft 19 and that this shaft carries a gear 20 meshing with racks 21 associated with the conveyor for intermittently moving the same, the conveyor including rollers 23 mounted to ride on one of the horizontally disposed tracks 24 and a chain 25 mounted to ride on the other track 24.

The chain 25 includes sections formed as part of transverse members 15 and provided with lugs 26 adapted to be releasably engaged by dogs 27 pivotally mounted on one of the reciprocating rack bars 21 whereby these dogs successively engage said lugs to feed the conveyor forwardly on the forward movement of said rack and are free to move back to engage behind the lug of the next bottle holding section on the backward movement of said rack bar 21 to thus impart an intermittent forward feed to the conveyor, the dogs 27 being arranged at suitably spaced intervals on the rack bar on bracket lugs 28 se-

cured thereto, one of said dogs being shown in Figs. 2 and 6.

After the bottles are washed they are moved by the conveyor to bring their mouths over the mechanism for lifting them up out of the pockets of the conveyor which is shown more particularly in Figs. 1, 6 and 8. Referring to Fig. 6, this mechanism includes a frame or bar 30 slidably mounted and guided on uprights 31 and having a plurality of plungers 32 secured thereto in spaced relation by bolts 33 passing through said plungers and the sockets 34 in which they are loosely mounted so that said plungers will readily adjust themselves for loose sliding movement through the tubular guides 35 so that the conical ends 36 of the plungers will readily aline themselves with the axes of the bottle openings and enter the same until their shoulders 37 engage the mouths of the bottles. The frame 30 carries a shaft 38 operatively connected by spaced links 39 to the ends 40 of levers 41. Each of these levers is mounted on a shaft 42 pivoted in the frame of the machine and carries a weight 43, (Fig. 8). These weights are sufficient to act through the levers 41 to move the frame 30 and plungers 32 upwardly and thereby lift the bottles out of the pockets of the conveyor at the proper time in the cycle of operations but should anything happen whereby the bottles were stopped in their upward movement the upward feeding of the plungers 32 would also be stopped.

The shaft 42 has a lever arm 44 mounted thereon provided with a pin 45 working in the slot 46 of an actuating link 47 whose opposite end is connected by a pin 48 with the free end of a lever 49 pivoted at 50 and carrying a roller 51 working in a grooved cam 52. With this construction the lost motion connection provided by the pin 45 and slot 46 permits the free upward movement of the plungers 32 under the action of the weights 43 while the cam 52 is moving the lever 49 to bring the link 47 from the full to dotted line position shown in Fig. 8 to move the plungers 32 with the bottles up into a position for engagement by the bottle holders hereafter described but on the return movement of the plungers the lost motion is taken up by the movement of the link 47 toward the right and the plungers through the connections above described are positively moved downwardly through the direct power drive of the machine which rotates the shaft 53 on which the cam 52 is mounted. Thus if for any reason the bottles are not moved upwardly the full distance by the plungers the weights 43 and the lost motion connection above described permit arresting of the upward movement of the plungers 32 without danger of breakage of the bottles and at the same time the positive return feed of the plungers assures their prompt withdrawal from the bottles.

If cracked or otherwise defective bottles on reaching the discharge position of the conveyor should offer an obstruction preventing the upward lifting of this bottle from the conveyor and the withdrawal of the plungers 32 after this operation, I have provided means for automatically stopping the drive of the machine which is shown more particularly in Fig. 8 in connection with one of the units. For this purpose a frame including bottle troughs 54 is carried by blocks 55 slidably mounted on guides 56 on a portion of the machine frame with a square shaft 57 associated with said frame and blocks and connected by links 58 and a shaft 59 with a lever 60 pivoted at its upper end 61 and connected at its lower end by a chain 62 to the operating arm 63 of a suitable motor cut out switch 64 in the circuit supplying current to the electric motor for operating the machine including the conveyor and the other unloading apparatus.

Each bottle is raised up out of its pocket 16 to the dotted line elevated position shown in Fig. 8 where it is carried into one of the spaces then formed between cooperative half sections 65 of the oscillatory bottle holder 66. Each half section 65 of the holder is divided into a plurality of bottle holding sections 67 as shown in Fig. 2 and the mounting of these sections at each end is best shown in Fig. 5 wherein one end mounting is shown in detail including a hub member 68 secured to one of the sections 65 and keyed to a shaft 69 which has a gear 70 loosely mounted thereon and having a roller hub portion 71 and a locking disk 72 secured thereto by screws 73. This shaft also has a spacing sleeve 74 secured thereto and one end of a link 75 is pivotally mounted thereon between the hub of the gear and said sleeve while a disk 76 has its hub portion keyed to the shaft and as shown in Fig. 1 has an arm 77 secured thereto on which a locking lever 78 is pivotally mounted at 79 and carries a roller 80 urged by a spring 81 acting on said lever against the disk 72 to engage in a notch 82 therein so as to couple the gear 70 at one end of the holder with the shaft 69 at this end of the holder, it being noted from Fig. 2 that this coupling is not used at the other end of the holder. The other section 65 of the holder has a hub member 83 mounted at each end and these hubs are journalled on the hub members 68. As shown in Figs. 1 and 2, the roller hub portion 71 of each gear is mounted to work in a guide and track slot 84 formed in the frame members of the machine and the gears 70 mesh with the racks 85 secured to these frame members. The gear and rack connections above described are not absolutely essential but they are used to secure a definite

and positive action for the oscillating or turning movement of the holder.

Referring now to Figs. 1, 3, 4 and 6, each half section 65 of the oscillatory holder has a roller 86 mounted on a pin extension 87 at one end thereof and these sections are normally held in closed bottle holding position by springs 88 secured to these sections at each end thereof and as the bottles are carried up out of the conveyor means are provided to act on the rollers 86 to separate these sections. A separate member 89 having a pointed or wedge end 90 to engage between the rollers is mounted to move vertically in ways 91 in the frame and has a shaft extension 92 operatively connected by a link 93 with one of the arms of a bell crank lever 94 pivoted at 95 and having a roller 96 on its outer arm working in a grooved cam 97 mounted on the shaft 53 which cam through the connections above described operates to move the wedge 90 in advance of the plungers 32 to open and hold the sections 65 of the bottle holder open as shown in Figs. 4 and 8, until the plungers have carried the bottles into the sections of the holder which then close up on the inverted bottles and are then turned by mechanism hereinafter described during the rotary and longitudinal movement of the holder along the guides 81 by means acting on the links 75.

As shown in Figs. 2 and 10 each link 75 is pivotally connected by a pin 98 to a crank arm 99 on a shaft 100 journalled in the frame of the machine and carrying a crank arm 101 operatively connected by a link 102 with the free end of a lever 103 pivoted at 104 and carrying a roller 105 engaging in a grooved cam 106 on the shaft 53 the action of this cam being to actuate the links 75 so as to move the holder from the full to the dotted line position shown in Fig. 10, it being noted that as the shafts 69 are free to pivot on the links, that the same may be revolved to tip the holder over due to the traction of the rollers 71 on the guides 81 accentuated by the movement of the gears 70 along the racks 85. As the holder moves to the dotted line position shown in Fig. 10, the bottles are free to slide bottom down through the guide troughs 107 formed in an oscillatory member 108 onto the plate 109 of a cradle or carrier 110 which is then in the dotted line position shown in Figs. 1, 3 and in full lines in Fig. 11 ready to receive them. The plate 109 of metal rests on a rubber cushion pad 111 and the carrier together with the member 108 is oscillated as a unit by the cam controlled mechanism shown in Fig. 11.

The carrier 110 is mounted on a shaft 112 pivoted in the frame of the machine and has a crank arm 113 mounted thereon connected by a link 114 with one arm of a lever 115 pivoted at 116 and carrying a roller 117 at its other end engaging a cam 118 on the shaft 53 which acts to move the carrier from bottle receiving to bottle discharging position as shown in Fig. 11.

In order to prevent any possibility of the bottles jumping out of the guide troughs 107 as they enter the same from the pockets of the holder 66 each of the pockets of the holder has a spring arm guard 119 connected thereto as shown in Figs. 2 and 3.

As the carrier 110 moves to its upright position means are provided for oscillating the member 108 from the full to the dotted line position shown in Fig. 3 and also in its two positions in Fig. 7. From Fig. 7 it will be noted that the upper end of the carrier 110 has pivot shafts 120 pivotally mounted thereon and secured to the upper ends of the member 108 and one of these shafts 120 carries a cam lug 121 which as the carrier 110 moves to discharge position is adapted to be engaged by a roller 122 on a crank arm 123 mounted on a shaft 124 pivoted on the frame of the machine and carrying a crank arm 125 operatively connected by a link 126 with an arm of a pivoted bell crank lever 127 whose other arm is connected by a link 128 with the upper end of a lever 129 pivoted at 130 and carrying a roller 131 engageable with a cam 132 on the shaft 53.

With the above construction when the carrier 110 reaches the upright position for discharge the lug 121 and arm 123 are in the full line position shown in Fig. 7 but immediately thereafter the arm 123 swings to the right causing the roller 122 to engage the lug 121 and thereby swing the member 108 toward the left and thus move the upright bottles off the plate 109 and onto the endless conveyor 123 as shown in dotted lines in Fig. 3.

The endless conveyor 123 includes a plurality of plates 134 mounted on a chain which is driven from a sprocket (not shown) on a shaft 135 carrying a bevel gear 136 meshing with a bevel gear 137 on a shaft 138 carrying a sprocket 139 connected by chain 140 with a sprocket 141 on the shaft 53 whereby the bottles are carried forwardly away from the machine, a table 142 being provided adjacent the conveyor to remove bottles directly therefrom if desired.

The operation in brief is as follows: as the conveyor with a row of bottles in the pockets 16 thereof comes to the unloading position and remains in this position for a certain predetermined interval, the plungers 32 are raised up and engaging the mouths of the bottles carry them up to the open pockets of the holder 66 which then closes on the descent of the wedge 90 as the plungers 32 are positively moved back to their initial position. As soon as the plungers 32 are released from the bottles in the then closed holder, the holder is then turned as a unit to discharge the bottles bottom end down on the carrier 110 then in an inclined position to receive them

and the oscillatory holder 66 is then moved back to initial position ready for the next load from the conveyor. After the bottles are delivered to the carrier 110 the same is swung toward the left to carry the bottles to an upright position adjacent the conveyor 123 and as the carrier reaches this position the member 108 is swung toward the left to push the bottles from their lower end portions onto the conveyor 123 by which they are carried away from the machine as the carrier returns to bottle receiving position thus completing one cycle of operations of the apparatus which is repeated as each holding section of the conveyor is presented thereto.

I desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except insofar as such limitations are included in the claims.

What I claim as my invention is:

1. In a bottle unloading apparatus, the combination of a conveyor having bottle holding pockets arranged in rows and carrying the bottles in inverted position, means for lifting the bottles out of pockets, reversing mechanism for receiving the bottles lifted out of the pockets and turning them toward upright position, an oscillatory carrier for receiving the bottles and moving them to upright position, and means for discharging the bottles from said carrier.

2. In a bottle unloading apparatus, the combination with a conveyor having bottle holding pockets arranged in rows and carrying the bottles in inverted position, of reciprocatory plungers engageable with the bottles to lift the same out of said pockets, means for moving said plungers upwardly, means for positively moving said plungers downwardly, reversing mechanism for reversing the bottles lifted out of the pockets by said plungers and turning them to a discharge position, and means for receiving the bottles discharged from said reversing mechanism.

3. In a bottle unloading apparatus the comibnation with a conveyor having bottle holding pockets arranged in rows and carrying the bottles in inverted position, of reciprocatory plungers engageable with the bottles to lift the same out of said pockets, means for moving said plungers including a part exerting a predetermined lifting force on said plungers and mechanism for positively retracting said plungers, reversing mechanism for receiving the bottles lifted out of the pockets by said plungers and turning them to a discharge position, and means for receiving the bottles discharged from said reversing mechanism.

4. In a bottle unloading apparatus, the combination with a conveyor having bottle holding pockets arranged in rows and carrying the bottles in inverted position, of reciprocatory plungers engageable with the bottles to lift the same out of said pockets, means for moving said plungers including a lever provided with a weight for moving the plungers upwardly and mechanism having a lost motion connection with said lever for positively retracting said plungers, reversing mechanism for receiving the bottles lifted out of the pockets by said plungers and turning them to a discharge position, and means for receiving the bottles discharged from said reversing mechanism.

5. In a bottle unloading apparatus, the combination with a conveyor having bottle holding pockets arranged in rows and carrying the bottles in inverted position, of reciprocatory plungers engageable with the bottles to lift the same out of said pockets, means for operating said plungers, an oscillatory holder including sections movable to open position to receive the bottles from said plungers, means for moving said sections to receive the bottles, means for moving said sections to bottle holding position, means for oscillating said holder to turn and discharge the bottles therefrom, a carrier for receiving the bottles discharged from said holder, means for moving said carrier to bring the bottles to upright position, and means for discharging the bottles from said carrier.

6. In a bottle unloading apparatus, the combination with a conveyor having bottle holding pockets arranged in rows and carrying the bottles in inverted position, of reciprocatory plungers engageable with the bottles to lift the same out of said pockets, means for operating said plungers, an oscillatory holder including pivoted sections movable to open position to receive the bottles from said plungers, means for moving said sections to receive the bottles, means for moving said sections to bottle holding position, means for oscillating said holder to turn and discharge the bottles therefrom, an oscillatory carrier for receiving the bottles discharged from said holder, a support, and means movable with and relative to said carriers for discharging the bottles from said carrier in upright position on said support.

7. In a bottle unloading apparatus, the combination with a conveyor having bottle holding pockets arranged in rows and carrying the bottles in inverted position, of reciprocatory plungers engageable with the bottles to lift the same out of said pockets, means for operating said plungers, and oscillatory holder including a pair of members having complementary bottle receiving recesses provided with openings through which said plungers work, spring means for moving said sections to bottle holding position, means acting upon the lower portions of said sections to spread them apart to receive the bottles from the plungers, means for moving the holder as a unit to turn the same and discharge the bottles therefrom, a support, and means for receiving the bottles dis-

charged from said holder and depositing them in an upright position on said support.

8. In a bottle unloading apparatus, the combination with a conveyor having bottle holding pockets arranged in rows and carrying the bottles in inverted position, of reciprocatory plungers engageable with the bottles to lift the same out of said pockets, means for operating said plungers, an oscillatory holder including a pair of members having complementary bottle receiving recesses provided with openings through which the plungers work and with lugs, spring means for moving said sections to bottle holding portion, reciprocating wedge means engageable with said lugs for moving said holders to bottle receiving position, means for moving the holder as a unit to turn the same and discharge the bottles therefrom, a support, and means for receiving the bottles discharged from said holder and depositing them in upright position in said support.

In testimony whereof, I affix my signature.

JOSEPH HAUK.