Aug. 9, 1932. J. R. GRUETTER 1,870,504

BOTTLE HANDLING MECHANISM

Filed Dec. 1, 1931 5 Sheets-Sheet 1

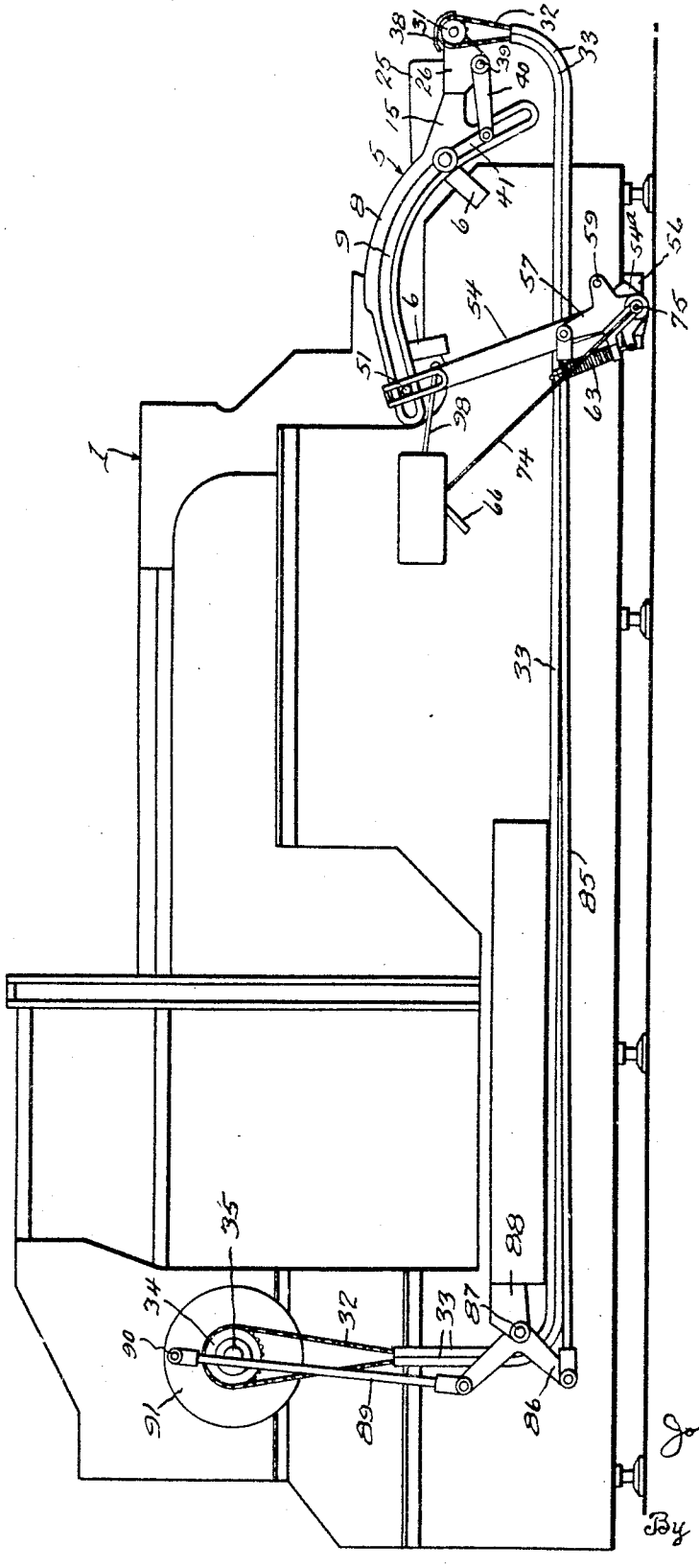


Fig. 1.

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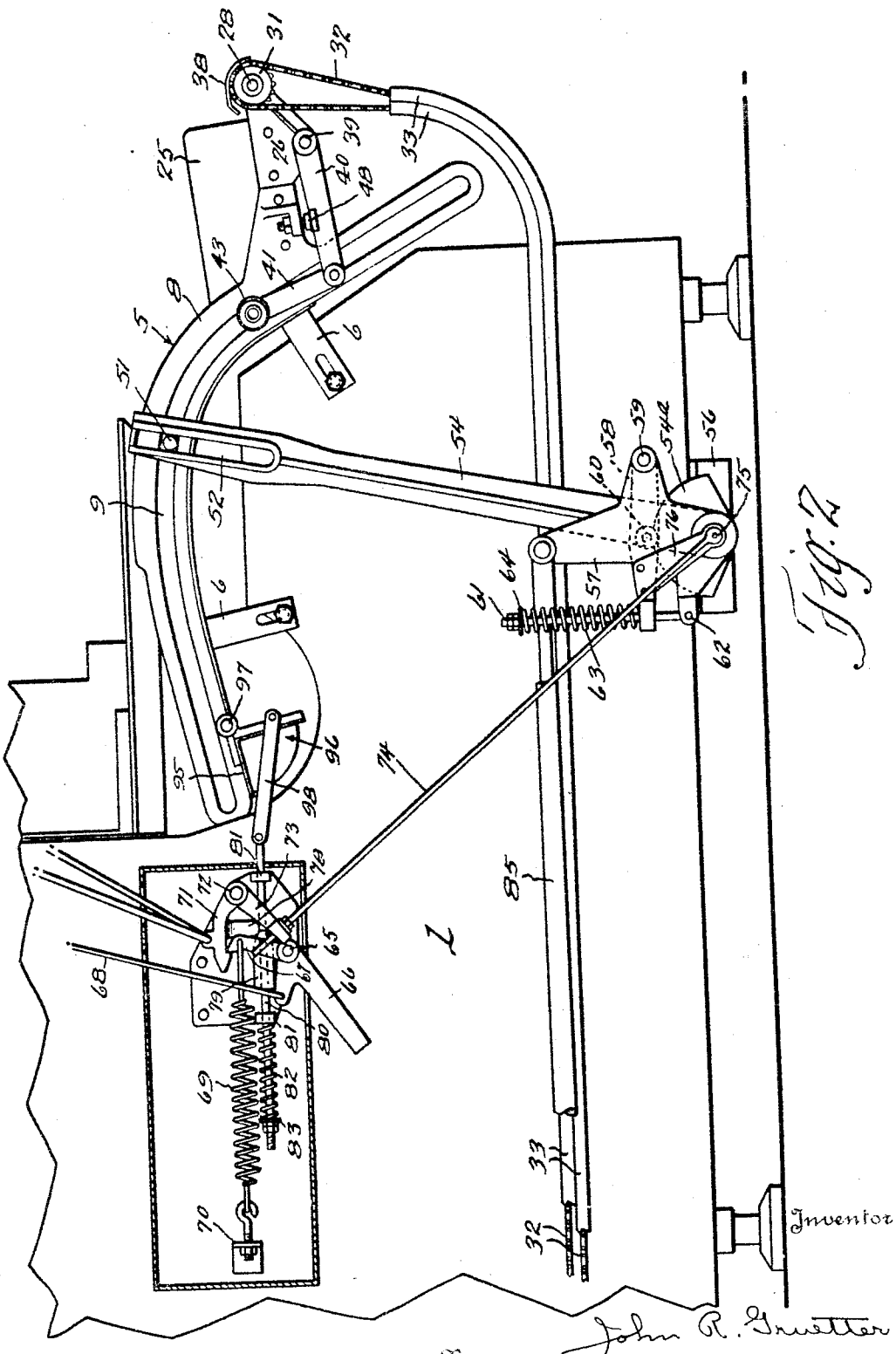


Fig. 2

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BOTTLE HANDLING MECHANISM

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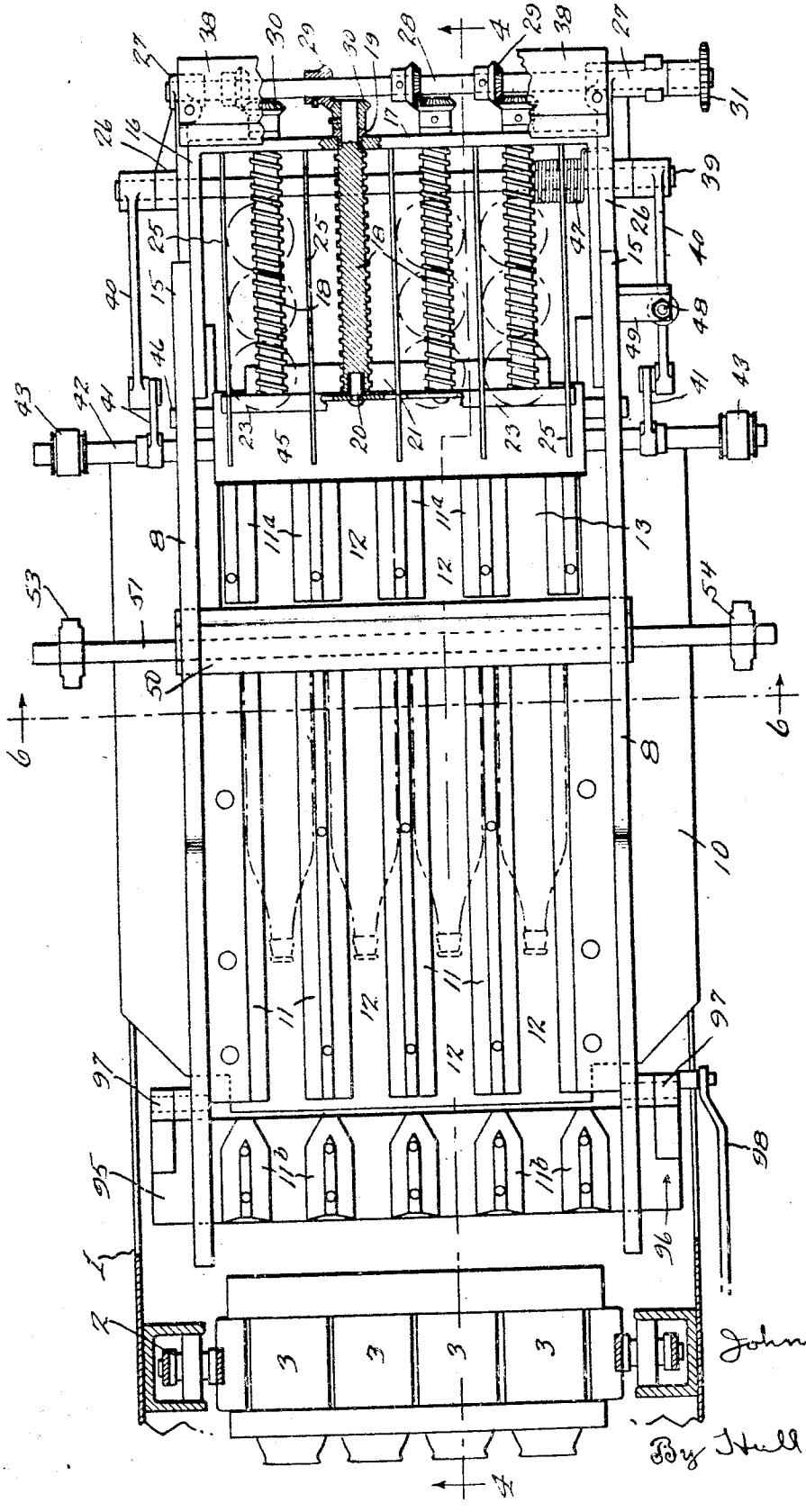


Fig. 3

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BOTTLE HANDLING MECHANISM

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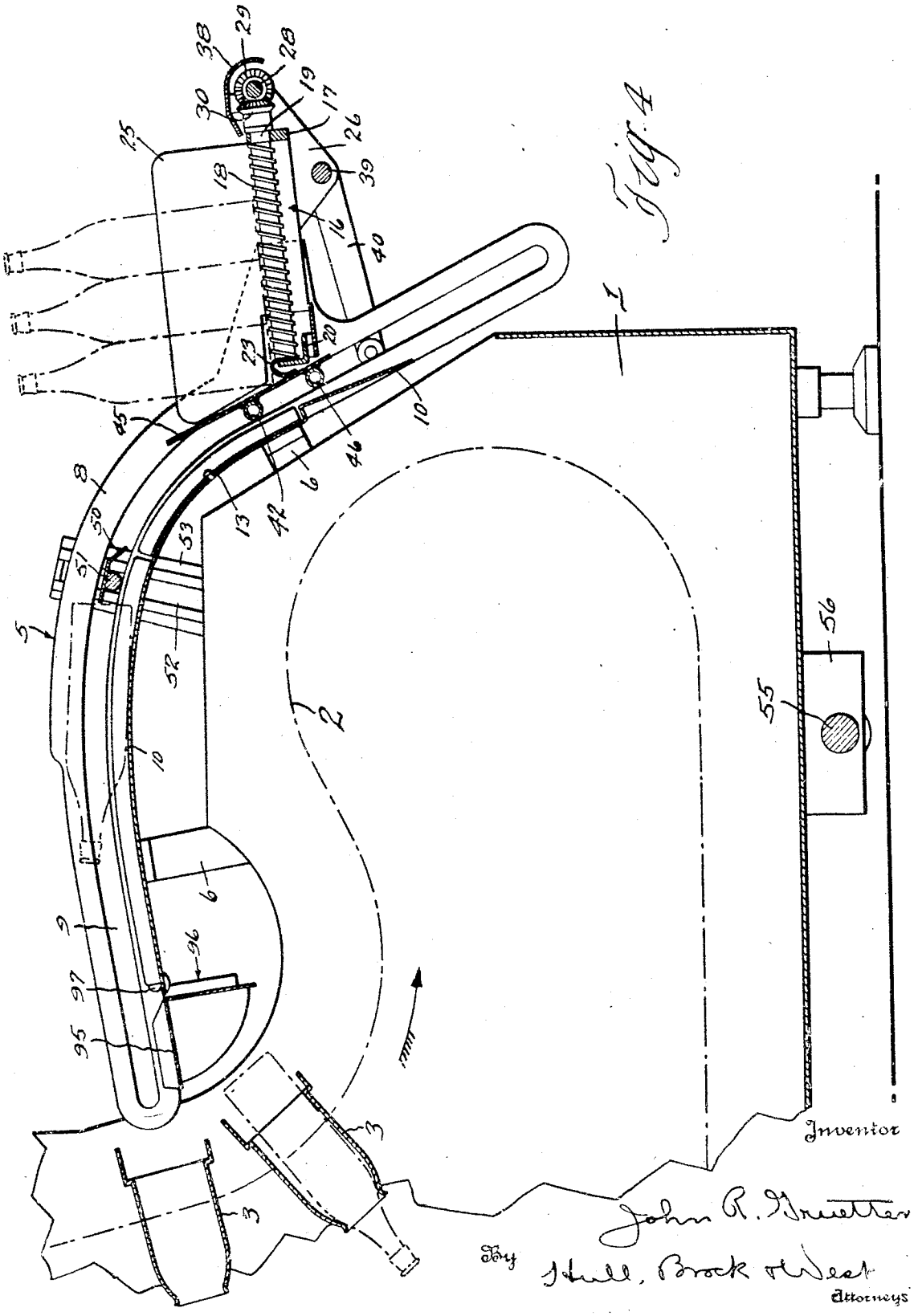


Fig. 4

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BOTTLE HANDLING MECHANISM

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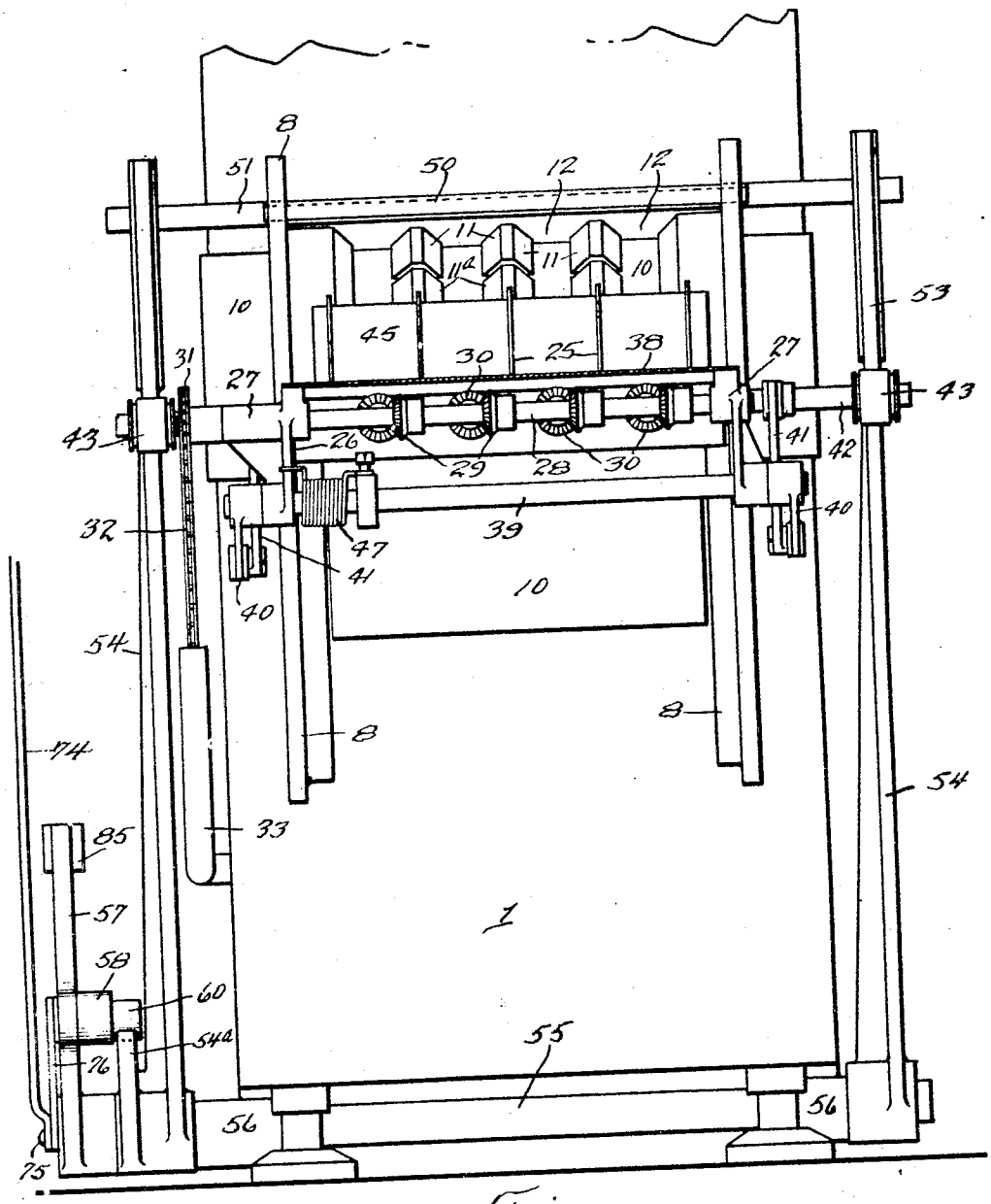


Fig. 5

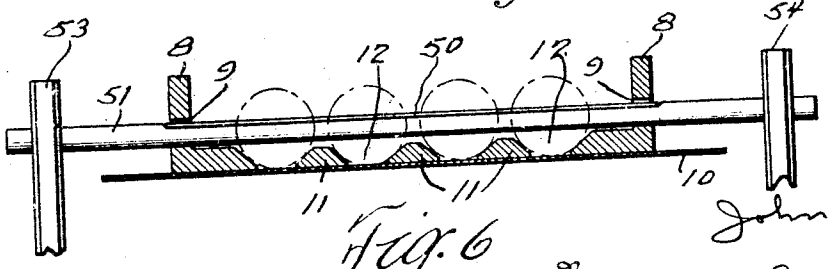


Fig. 6

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UNITED STATES PATENT OFFICE

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BOTTLE HANDLING MECHANISM

Application filed December 1, 1931. Serial No. 578,297.

This invention relates to bottle handling apparatus, and more particularly to loading or so called charging mechanism for such machines as those of continuous operation used in washing bottles.

Among the objects of the invention are to provide thoroughly reliable and efficient loading mechanism in which may be placed quite a number of bottles in excess of instant demands and which will automatically feed the bottles as needed to the bottle holders of the apparatus; to provide bottle loading mechanism that will operate with ease and precision and in such manner as to avoid breakage of the bottles; and to provide mechanism of the foregoing character that is relatively simple of construction and operation, is durable, and is not liable to get out of order.

Another object is to provide loading mechanism, for use with that class of bottle washing apparatus or the like equipped with automatic stopping means, which incorporates a thoroughly dependable actuator that is operated by a bottle not fully inserted in the bottle holder of the apparatus by said mechanism, to the end that the apparatus will be stopped before the bottle is broken.

Other objects and advantages of the invention will appear as I proceed to describe the same in detail by reference to the accompanying drawings forming a part hereof and wherein like characters designate corresponding parts throughout the several views.

In the drawings, Fig. 1 is a rather diagrammatic representation of a bottle washing machine in side elevation equipped with my improved loading mechanism; Fig. 2, which is on a scale somewhat larger than that of Fig. 1, shows the loading mechanism and the adjacent part of the machine in side elevation, the casing of the automatic stopping means being in section; Fig. 3 is a plan view of the loading mechanism and the adjacent end of the machine, this, and the remaining views, being on a further enlarged scale; Fig. 4 is a longitudinal section on the line 4—4 of Fig. 3; Fig. 5 is a front elevation of the loading mechanism with the bottle washing machine indicated therebeyond, and Fig. 6 is a transverse section through the loading mechanism on the line 6—6 of Fig. 3.

The bottle washing machine in connection with which I have illustrated my present invention is designated generally by the reference numeral 1 and is of that type in which the bottles are carried through soaking tanks, brushing apparatus and rinsing means by an intermittently moving endless conveyor designated 2 in Figs. 3 and 4, the same being represented in the latter view by a dot-and-dash line. The conveyor incorporates holders 3 by which the bottles are carried.

For the purpose of description the end of the machine into which the bottles are fed by my loading mechanism, and the end of said mechanism in which the bottles are placed for feeding to the machine, will be referred to as the forward ends of the machine and mechanism, respectively. The loading mechanism, designated generally by the reference numeral 5, is supported by brackets 6 from, and in operative relation to, the forward end of the machine, and the same comprises longitudinally slotted side members 8 that are inclined upwardly and rearwardly from their forward ends and are curved over and inclined rearwardly and downwardly toward their rear ends to a point adjacent that at which the bottles are inserted into the holders 3. The slots in the side members 8 are designated 9 and, by reason of said slots, the members constitute tracks, as will hereinafter appear. Extending along the under side of the members 8 and from one to the other of them is a plate 10 that stops short of both ends of the members. Applied to this plate 10 are bars 11 and 11ª that define guideways 12 along which the bottles are moved toward the holders 3 by bottle propelling means presently to be described. It may be explained that the bars 11ª are preferably made of wood or the like, while those designated 11 are of metal, and interposed between the former bars and the plate 10 is a relatively thin pad 13 of rubber or other cushion material. As will be obvious from the following disclosure, the purpose of this is to reduce the possibility of breakage of the bottles as they are fed from

the magazine to the guideways 12 preparatory to their being propelled therealong to the bottle holders of the apparatus.

Secured to forward extensions 15 of the side members 8 is a frame structure 16 within a front cross member 17 whereof are journaled the forward ends of screws 18, the bearing apertures being provided with bushings 19, as best shown in Fig. 3. The rear ends of the screws are piloted on studs 20 that project forwardly from a rear cross member 21 that is angular in cross section, as shown in Fig. 4. Extending along and over the upper edge of the substantially vertical flange of the cross member 21 is a curved strip 23 whose highest portion is approximately in the plane of the tops of the screws 18. Suitably supported between the cross members 17 and 21 are partitions 25 that divide the space between the side members of the frame 16 into stalls corresponding in number and arrangement with the screws 18. It will be observed that these stalls are in alignment with the guideways 12 that lead directly to the bottle holders 3 of the apparatus 1. This portion of the loading mechanism that has just been described, involving the frame 16, the screws 18 and the partitions 25, constitutes a bottle magazine in the individual stalls of which may be placed several bottles. By means presently to be described, the bottles are fed from the magazine in single transverse rows to the bottle holders of the apparatus, the bottles that remain in the magazine moving rearwardly to fill the space vacated by the ones that have been fed to the apparatus. It is evident, therefore, that an operator is allowed time to take care of other duties while attending the machine, such as the shifting of bottle crates to and away from the machine and the handling of bottles removed from the machine in case the apparatus is of the type in which the bottles are discharged in proximity to the loading station, it being only necessary for the operator to see that the stalls of the magazine are kept supplied with bottles somewhat in excess of the demands of the machine.

Proceeding with the description of the construction of the magazine: 26 are brackets that are carried by and extend forwardly from the side members of the frame 16; and in bearings 27 thereof is journaled a shaft 28 that has fastened to it beveled pinions 29 that mesh with similar pinions 30 secured to the forward ends of the screws 18. To the near end of the shaft 28, as the machine is viewed in Figs. 1, 2, and 3, is a sprocket wheel 31 over which a chain 32 is engaged that is carried through tubes 33 to the opposite end of the machine where it embraces a sprocket wheel 34 on a drive shaft 35. The gears 29 and 30 are covered over by a shield 38 that is supported by and between the forward ends of the brackets 26.

Journaled in bearings in depending portions of the brackets 26 is a rock shaft 39 to the ends of which are secured arms 40. The rear ends of the arms 40 are connected by links 41 to a transverse bar 42 which, incidentally, is tubular, and the projected ends of which carry rollers 43, preferably faced with cushion material, such as rubber. The bar 42 extends through the slots 9 of the side members 8, and between said members has secured to it a plate constituting a gate designated 45. The structure of the gate also includes a shorter transverse bar 46 whose ends are likewise guided in the slots 9. The purpose of the gate 45 is to prevent bottles from being discharged from the magazine while others are being propelled therefrom to the bottle holders of the apparatus, and it is biased toward bottle obstructing position by means of a spring 47 that is coiled about the shaft 39 adjacent one of the side members of the frame 16 and has one of its ends secured to the shaft and its opposite end to said frame, the spring being arranged to effect rotation of the shaft in a direction to elevate the free ends of the arms 40, and consequently the gate structure through the intervention of the links 41. The elevated position of the gate is determined by the engagement of the arm 40 on the near side of the mechanism, as the same is viewed in Figs. 1, 2, and 3, with a stop 48 that in the present instance, consists of a screw threaded through a part 49 projecting from the forward extension 15 of the adjacent side member 8.

Operating within the slots 9 of the side members 8 are the end portions of a bottle propelling means designated 50, the same being in the nature of a plate that is suitably secured to a cross bar 51 that extends a material distance beyond the side members 8 and has its ends engaged through slots 52 in the upper ends of arms 53 and 54 that are secured to a shaft 55. This shaft extends transversely of the machine and is journaled in bearings 56 that depend from the forward end thereof. The shaft 55 is adapted to be rocked through the medium of a member 57 that is operatively connected to the shaft through yielding means which constitutes no part of the present invention but which I shall briefly describe. (For a more complete understanding thereof, reference may be had to my copending application Serial No. 478,343, filed August 28, 1930, that discloses and specifically describes an embodiment of this same feature.) Referring to Figs. 1, 2, and 5, 58 is an arm that is pivoted at 59 to a forwardly offset portion of the member 57, and said arm carries a projection or roller 60 that normally rests within a notch in a flange 54ª on the hub of the arm 54. A rod 61 is pivoted at 62 to a rearward extension of the member 57 and the same extends upwardly through the free end of the arm 58, and a compara-

tively heavy coiled spring 63 surrounds the rod and is compressed between the end of the arm 58 and an abutment 64 that is carried by the upper end of said rod.

As mentioned in the preamble of the specification, the bottle washing machine or apparatus in connection with which my present improvements are used, involves an automatic stopping means, and the purpose of this is to arrest operation of the machine in the event that opposing forces are imposed upon any of its working parts superior to the power normally required to operate them. The stopping means constitutes no part of my present invention, and on this account and especially in view of the fact that such means are common and well known in the art, it is deemed unnecessary to go into detail in illustrating or describing such a means in the present disclosure. However, since one feature of my present invention does pertain to an actuator for the stopping means, the latter is shown in part in Fig. 2. On a pivot member 65 is journaled a bell crank lever 66 which has secured to it a latch 67 so that the lever and latch move in unison. To the shorter branch of the bell crank lever is connected a link 68 that operates, through suitable mechanism (not shown), a clutch or switch that controls the operation of the machine, and the unit comprising the bell crank 66 and the latch 67 is adapted to be rocked in a direction to pull the link 68 so as to render the stopping means effective by a spring 69 that has one of its ends connected to the latch 67 and its opposite end anchored to a stationary bracket 70. The parts just described are held in ineffective position by a hook like keeper 71 that is pivoted on a shaft 72 and is secured to an arm 73 to the free end of which the upper end of a push rod 74 is operatively connected. The opposite end of said rod is pivoted at 75 to a plate 76 that is fastened to the previously mentioned arm 58 near its free end. When the parts are in normal condition, the pivotal connection 75 between the rod 74 and the plate 76 is coincident with the axis of the shaft 55.

It will be seen from the above description that if anything should occur to prevent the normally free movement of the arms 53 and 54, the projection or roller 60 on the arm 58 would ride out of the notch in the flange 54^a, camming said projection or roller upwardly so as to elevate the free end of the arm 58 against the action of the spring 63 and swing said arm and the plate 76 attached thereto in such manner as to shift the pivotal connection between said plate and the rod 74 laterally of the axis of the shaft 55 and lift said rod and, through it, the arm 73 which would cause the free end of the keeper 71 to be elevated to release the latch 67 and allow the spring 69 to swing the unit comprising the latch 67 and bell crank 66 in a direction to draw downwardly on the link 68 and operate the stopping means. The parts are reset by means of the handle constituted of the longer branch of the bell crank lever 66. While on the subject of the stopping means, attention may be directed to a depending lug 78 of the keeper 71 which is in the path of the tapered end of a cam member 79 on a rod 80. This rod is reciprocable through guides 81 and is normally held in retracted position by a spring 82 that surrounds the rod and is compressed between the rear guide 81 and an abutment 83 on the end of the rod. It is clear from the construction that when said rod is pulled forwardly against the tension of the spring 82 the cam member 79 will elevate the lug 78 to swing the keeper 71 of which it forms a part upwardly to release the latch 67, thereby to effect operation of the stopping means as above described.

The forward end of a connecting rod 85 is pivotally connected to the upper end of the member 57 and, as shown in Fig. 1, the opposite end of the connecting rod is similarly attached to one branch of a bell crank lever 86 that is fulcrumed at 87 to a bracket 88 that is carried by the side of the machine. The free end of the opposite branch of the bell crank lever 86 is connected, through a rod 89, with a pin 90 on a crank disk 91 that is fastened to the previously mentioned drive shaft 35. From this it will be seen that upon each rotation of the shaft, the arms 53 and 54 will be swung to move the bottle propelling means 50 back and forth along the tracks constituted of the slotted side members 8.

When the arms 53 and 54 swing forwardly their upper ends engage the rollers 43 on the ends of the cross bar 42 of the gate structure and depress said structure against the tension of the spring 47 so as to lower the gate 45 below bottle obstructing position. When the gate is in this position, the bottle propelling means 50 is below the upper edge of the strip 23 and through the action of the screws 18 which are being rotated in a direction to feed the bottles resting thereon rearwardly, which action may be assisted by gravity due to the rearward and downward inclination of the screws, the rear transverse row of bottles is discharged from the magazine into the guideways 12 between the bars 11^a and immediately above the bottle propelling means 50. As the arms 53 and 54 are swung rearwardly, the bottle propelling means is moved to shove the bottles along the guideways and into the holders 3 of the apparatus, the gate 45 resuming bottle obstructing position through the action of the spring 47 as the bottle propelling means moves away from its forward position.

It may happen from some cause or other that one or more of the bottles delivered to the holders 3 fail to assume proper position

therein. A bottle, for instance, may rebound, or may, in the first instance, not be fully inserted into the holder. In case this happens, the end of the improperly placed bottle will overlie the rear edge of a hinged plate 95 that constitutes an extension of the previously described plate 10. This plate 95 is incorporated in a structure that is designated generally by the reference numeral 96 and is pivoted at 97 to the side members 8. A part of the structure 96 that is disposed at substantially right angles to the plate 95 is connected by a link 98 with the forward end of the previously mentioned rod 80. As a consequence of this arrangement, when the bottle conveyor 2 advances in the direction indicated by the arrow in Fig. 4 any bottle extending over the plate 95 will depress the plate thereby to rock the structure 96 and, through the intervention of the link 98, draw the rod 80 forwardly thereby to cause the cam member 79 thereon to lift the keeper 71 and release the latch 67 so as to effect operation of the stopping means of the apparatus. The plate 95 is fitted with bars 11^b that define between them extensions of the guideways 12.

Having thus described my invention, what I claim is:

1. In bottle handling apparatus, the combination of bottle holders, bottle delivery means consisting of a continually rotating screw on which the bottles rest, means movable to and fro between bottle receiving and discharging positions for conducting bottles released from the delivery means to the holders, and bottle obstructing means restraining the delivery of bottles to the conducting means excepting at intervals when the last mentioned means is in bottle receiving position.

2. In bottle handling apparatus, the combination of bottle holders, bottle delivery means consisting of a continually rotating screw on which the bottles rest, means for receiving bottles from said delivery means and conducting them to the holders, said conducting means moving to and fro between bottle receiving and discharging positions, and bottle obstructing means for intercepting the passage of bottles from the delivery to the conducting means, said means normally reposing in bottle obstructing position and being removed therefrom by the direct action of the conducting means when the latter moves to bottle receiving position.

3. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means for delivering bottles to the guideway, means normally restraining delivery of bottles from said means to the guideway, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions, said restraining means being rendered ineffective when the propelling means moves to bottle receiving position.

4. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means for delivering bottles to the guideway, a gate for intercepting the passage of bottles from said means to the guideway, the gate normally reposing in bottle obstructing position, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions, said gate being retracted from bottle obstructing position when the propelling means moves to bottle receiving position.

5. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means for delivering bottles to the guideway, a gate for intercepting the passage of bottles from said means to the guideway, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions and acting when it moves to bottle receiving position to remove the gate from bottle obstructing position.

6. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means acting continually to deliver bottles to the guideway, a gate for intercepting the passage of bottles from said means to the guideway, the same being biased toward bottle obstructing position, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions and acting when it moves to bottle receiving position to remove the gate from the bottle obstructing position.

7. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means acting continually to deliver bottles to the guideway, means intercepting the passage of bottles from the former means to the guideway and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions, said intercepting means being rendered ineffective when the propelling means is in bottle receiving position.

8. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means for delivering bottles to the guideway, a gate for intercepting the passage of bottles from said means to the guideway, means tending to hold said gate in bottle obstructing position, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions and acting when it moves to bottle receiving position to remove the gate from bottle obstructing position.

9. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means for delivering bottles to the guideway and acting continually to urge the bottles in the direction thereof, a

gate for intercepting the passage of bottles from said means to the guideway and which is biased toward bottle obstructing position, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions, said gate being retracted from bottle obstructing position when the propelling means moves to bottle receiving position.

10. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means whereon bottles are adapted to be placed for delivering them to the guideway, said means being inclined downwardly toward the guideway to influence the movement of bottles in the direction of the latter, bottle obstructing means intercepting the passage of bottles from the bottle delivering means to the guideway, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions, the aforesaid obstructing means being ineffective when the propelling means is in bottle receiving position.

11. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means whereon bottles are adapted to be placed in a substantially upright position for delivering the bottles to the guideway, said means being inclined downwardly toward the guideway to influence the movement of bottles in the direction of the latter, the end of the guideway adjacent said means being inclined upwardly and away from said means, a gate for intercepting the passage of bottles from said means to the guideway, the gate being biased toward bottle obstructing position, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions and acting when it moves to bottle receiving position to remove the gate from bottle obstructing position.

12. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means for delivering bottles to the guideway comprising a screw on which the bottles rest, means for rotating said screw in a direction to feed the bottles toward the guideway, a gate for intercepting the passage of bottles from said means to the guideway, means biasing said gate toward bottle obstructing position, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions and acting when it moves to bottle receiving position to remove the gate from bottle obstructing position.

13. In bottle handling apparatus, the combination of guideways, holders for receiving bottles therefrom, means for delivering bottles to the guideways comprising a plurality of screws on which the bottles rest, partitions defining stalls above the respective screws, means for rotating said screws in a direction to feed the bottles toward the guideways, a gate for intercepting the passage of bottles from said means to the guideways, means biasing said gate toward bottle obstructing position, and bottle propelling means reciprocable along the guideway between bottle receiving and delivering positions and acting when it moves to bottle receiving position to remove the gate from bottle obstructing position.

14. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means for delivering bottles to the guideway, tracks extending along opposite sides of the guideway, a gate structure for intercepting the passage of bottles from said means to the guideway and whose ends are guided by said tracks, means tending to maintain said structure in bottle obstructing position, and a bottle propelling member movable along the tracks between bottle receiving and delivering positions, said member as it approaches receiving position engaging the gate structure and removing it from bottle obstructing position.

15. In bottle handling apparatus, the combination of a guideway, holders for receiving bottles therefrom, means for delivering bottles to the guideway, slotted members extending along opposite sides of the guideway, a gate structure for intercepting the passage of bottles from said means to the guideway and having parts guided within the aforesaid slots, means tending to maintain the gate structure in bottle obstructing position, bottle propelling means reciprocable along the guideway and having parts extending through the slots of the aforesaid members, means beyond the slotted members cooperating with the bottle propelling means for reciprocating it between bottle receiving and delivering positions and coacting with the aforesaid gate structure to remove the latter from bottle obstructing position when the propelling means moves to bottle receiving position.

16. In combination with bottle handling apparatus incorporating bottle holders, bottle guiding means supported in operative relation to the holders, slotted members extending along the opposite sides of the bottle guiding means, a magazine situated at the receiving end of the bottle guiding means and incorporating bottle feeding screws on which bottles are adapted to be placed, means for driving said screws in a direction to feed the bottles toward the guiding means, a gate structure having parts engaged within the slots of the aforesaid members whereby the structure is guided between a position in which it obstructs the passage of bottles from the magazine to the guiding means and an ineffective position, means tending to retain said structure in bottle obstructing position, bottle propelling means extending across the

bottle guiding means and having parts projecting through the slots of the aforesaid members, means cooperating with the ends of the propelling means for reciprocating said means along the bottle guiding means between bottle receiving and delivering positions, said means for reciprocating the propelling means serving to move the gate structure to ineffective position when the propelling means moves to bottle receiving position.

17. In combination with bottle handling apparatus incorporating bottle holders, bottle guiding means supported in operative relation to said holders, slotted members extending along the opposite sides of said guiding means, a bottle magazine situated at the receiving end of said guiding means and comprising a frame structure and a plurality of screws rotatably supported thereby whereon bottles are adapted to be placed for delivery to the guiding means, the screws being substantially parallel to the longitudinal axis of the guiding means, a shaft journaled within the frame structure and extending transversely of the screws, driving connections between the shaft and said screws, means for continually driving said shaft, partitions supported by the frame structure defining stalls above the respective screws, a gate involving cross bars whose end portions are guided within the slots of the aforesaid members, one of said bars extending a material distance outwardly beyond the opposed members, a shaft supported for oscillation by the frame structure, arms secured thereto, links connecting the free ends of the arms with the projecting ends of the last mentioned bar, a spring tending to rock the last mentioned shaft in a direction to elevate the gate through the intervention of said arms, links, and bar, to a position in which it obstructs the passage of bottles from the magazine to the guiding means, bottle propelling means extending across the guiding means and having its ends extending through the slots of the aforesaid members, and means cooperating with the ends of the propelling means for reciprocating the latter along the guiding means between bottle receiving and delivering positions, the means for reciprocating the propelling means being arranged to engage the extended ends of the last mentioned gate bar and depress the gate so as to liberate the bottles from the magazine when the propelling means moves to bottle receiving position.

In testimony whereof, I have hereunto affixed my signature.

JOHN R. GRUETTER.