

June 19, 1923.

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C. B. VAN HORN

BOTTLE SCRUBBING AND WASHING MACHINE

Filed June 24, 1919

3 Sheets-Sheet 1

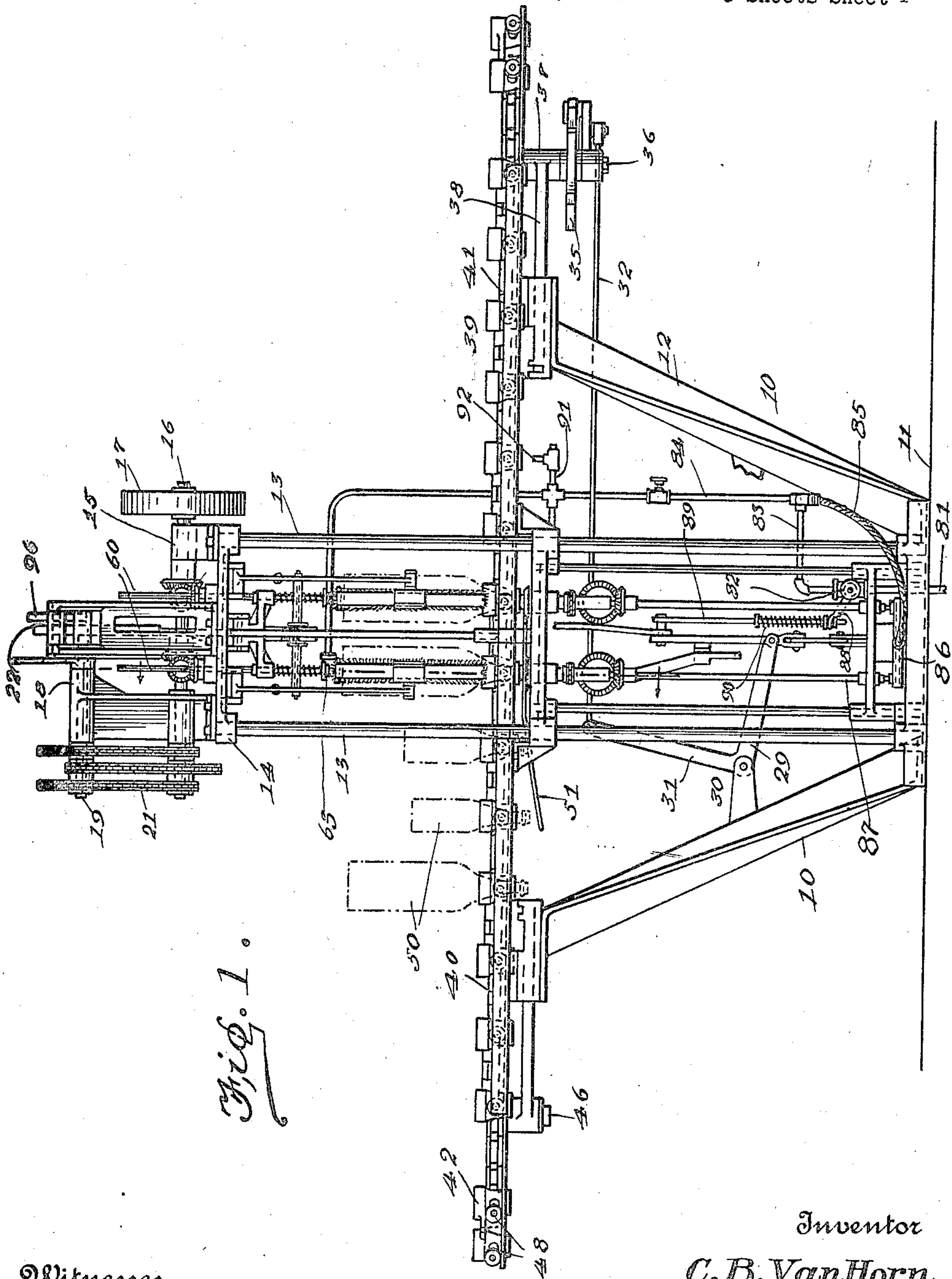


Fig. 1.

Witnesses

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3 Sheets-Sheet 2

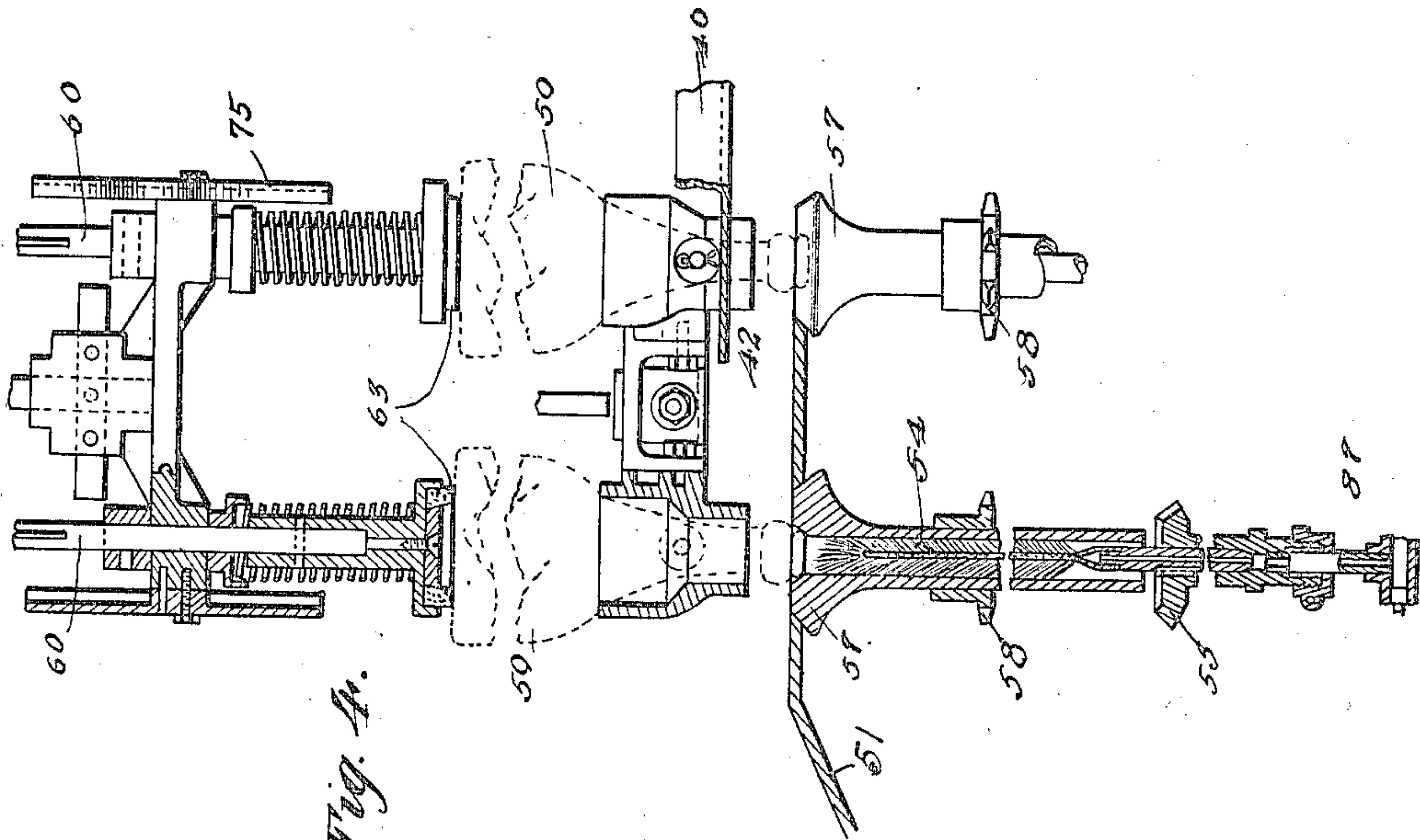
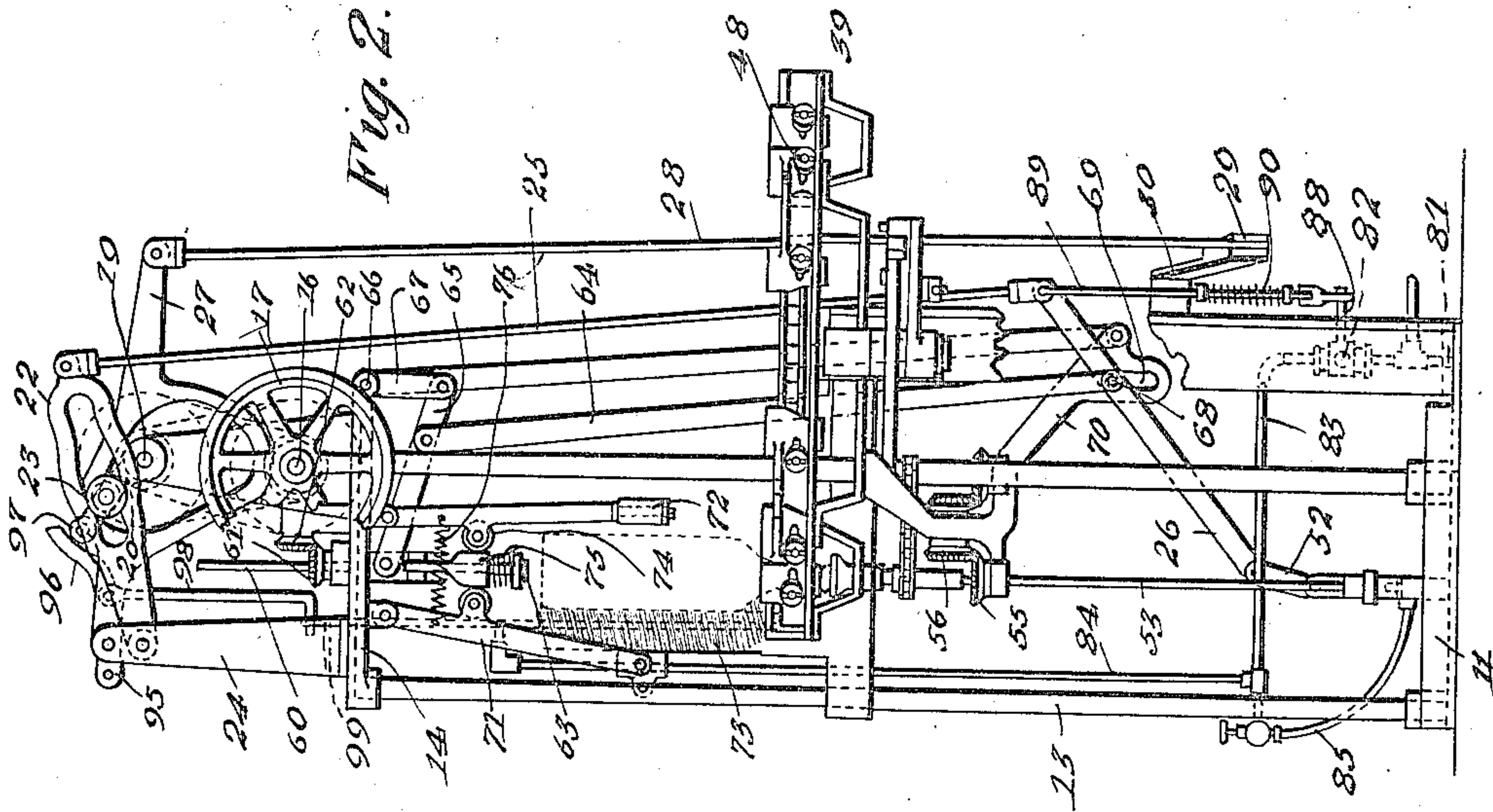


Fig. 2. Fig. 4.



WITNESS:  
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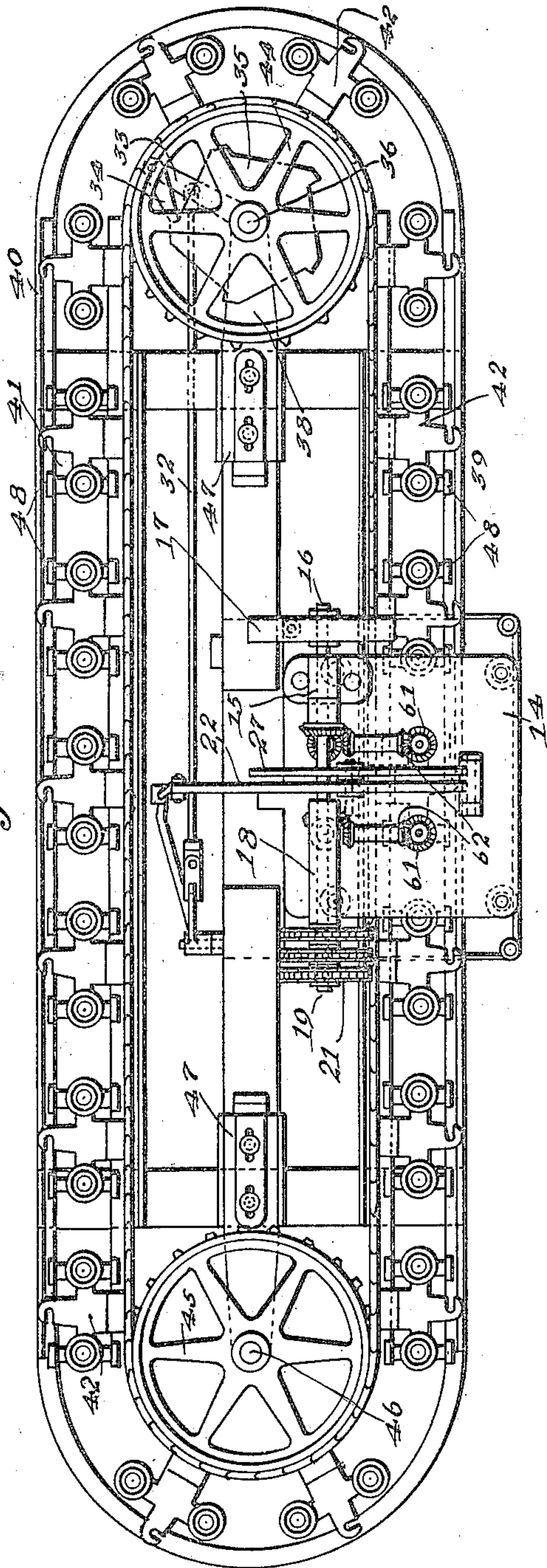
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3 Sheets-Sheet 3

Fig. 5.



Witnesses

R. A. Thomas.

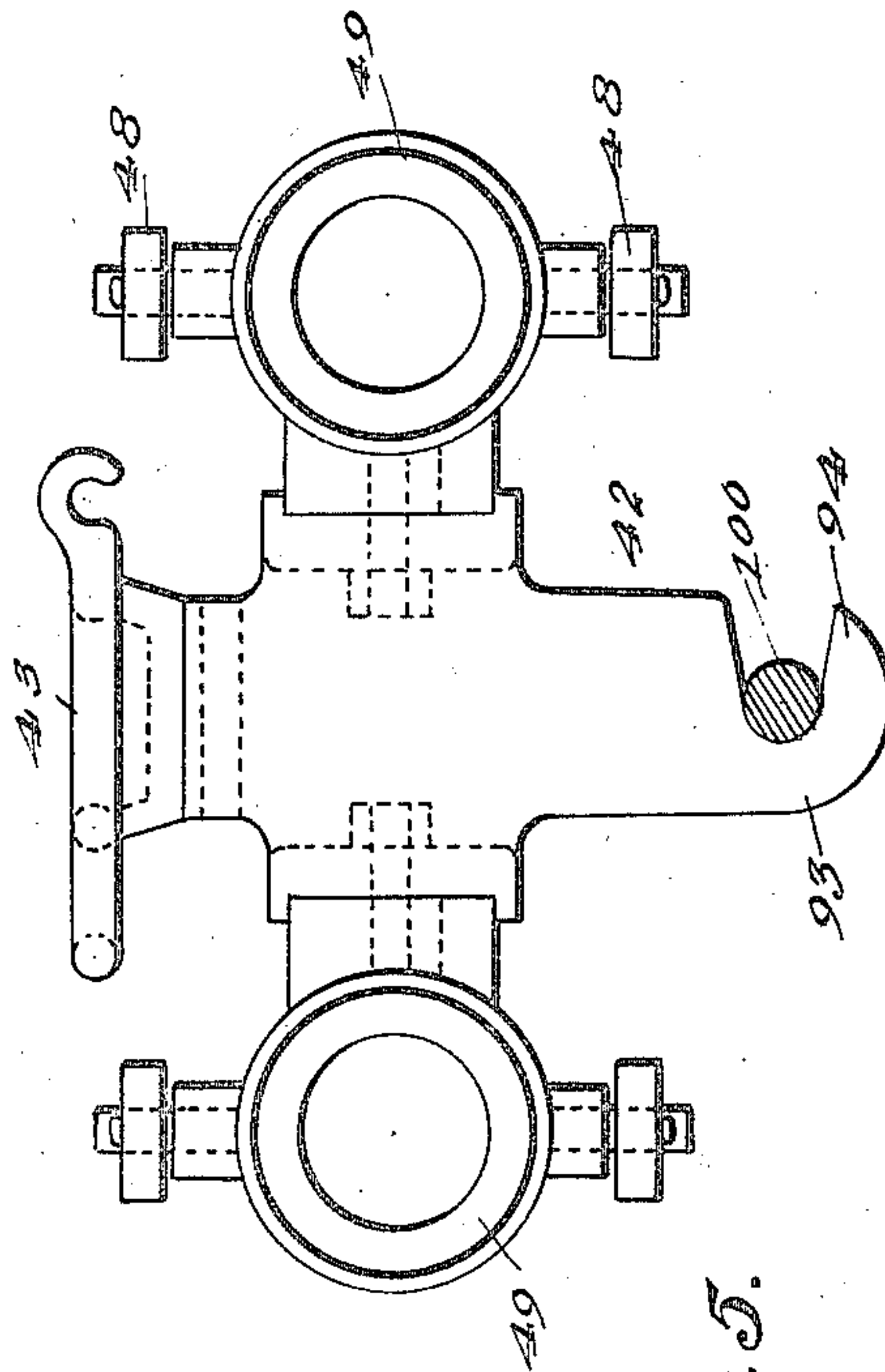


Fig. 5.

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# UNITED STATES PATENT OFFICE.

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BOTTLE SCRUBBING AND WASHING MACHINE.

Application filed June 24, 1919. Serial No. 306,312.

*To all whom it may concern:*

Be it known that I, CHARLES B. VAN HORN, a citizen of the United States, residing at #402 Beaubien Street, Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Bottle Scrubbing and Washing Machines, of which the following is a specification.

The invention relates to washing apparatus and more particularly to bottle and can washers and has for an object to provide a machine for scrubbing and washing bottles and like containers, both exteriorly and interiorly.

The invention comprehends among other features, a machine which operating as a unit, scrubs and washes bottles exteriorly and interiorly, in substantially one operation in that the bottle or container will be carried into position for scrubbing and washing and then will be simultaneously scrubbed inside and outside and at the same time washed to remove any foreign matter, the bottle or bottles being then re-conveyed to a suitable place of disposal to make room for the next bottle or bottles to be subjected to the scrubbing and washing operation.

Still further the invention comprehends a machine which includes what might be termed, suitable compensating mechanism whereby bottles and like containers can be scrubbed and washed regardless of the particular shape and size thereof. To this end it may be here stated that an instance of such operation would be in a case where in the use of the machine for the scrubbing and washing of milk bottles for instance, and the bottles subjected to the scrubbing and washing operation could be either quart, pint or one-half pint bottles and by reason of the novel form of compensating mechanism, it is possible to successively scrub and wash bottles of either or any of the mentioned sizes and capacity, without changing the adjustment of any part of the mechanism of the machine. With this as one of the distinctive features, the machine therefore comprehends a structure in which the entire operation of the mechanism can be controlled and looked after by one operator, it being only necessary for the latter to see that the mechanism is operating properly and load on to the carrier the bottles or containers that are to be subjected to the action of the machine.

In the further disclosure of the invention, reference is to be had to the accompanying drawings, constituting a part of this specification, in which similar characters of reference denote corresponding parts in all the views, and in which,—

Figure 1 is a front elevation of the machine, various of the containers being shown in dotted lines.

Figure 2 is an end elevation.

Figure 3 is a plan view.

Figure 4 is a fragmentary enlarged detail, partly in section, taken through the spindle brush and a part of the bottle-holding mechanism, and

Figure 5 is an enlarged plan view of one of the units of the carrier.

Referring more particularly to the views, I provide a frame 10 carried on a suitable base 11, and which frame includes angular uprights 12 and standards 13 with a suitable superstructure 14 carried by the standards 13, said superstructure including various brackets and bearings, as will be hereinafter more fully set forth. Bearings 15 of the superstructure 14 revolubly support a main drive shaft 16, carrying a suitable driving pulley 17 connected up with any form of power desired in any suitable manner. Also mounted upon the superstructure 14, and constituting a part thereof, is bearing 18 for the counter shaft 19, the latter carrying an eccentric arm 20 which will of course rotate with the counter shaft 19, when the latter is rotated, said latter shaft having a suitable chain or other connection 21 from the main drive shaft 16.

In the upper portion of Figure 2 I have shown a cam 22 pivoted on the upright 24 and engaged by cam roller 23. This roller is mounted on crank arm 20, carried by shaft 19, and one end of the cam is pivotally connected with rod 25, the latter being pivoted at its lower end to lever 26. A second cam 27 having one end fulcrumed on the bracket 24, is also operated upon by the roller 23 and at its free end carries a lever arm 28 which extends downwardly to connect with an arm 29 of a bell crank lever 30, pivoted upon one of the inclined standards 12, the other arm 31 of said bell crank lever having pivoted thereto, a lever arm 32 which extends horizontally to pivotally connect with an arm 33 carrying a pawl 34, the latter being adapted to be operated over a ratchet 35, said arm 33 and ratchet 35 being sup-



ported on a vertical shaft 36 in bearings 37 on an extended portion 38 of one of the standards 12. It will be noted by reference to Figures 1 and 3, that the construction just described is a part of what may be termed the operating mechanism for the carrier 39. The carrier 39 consists of a continuous runway 40 in which is arranged to operate a conveyor 41, the latter consisting of a series of connected units 42, each including a link 43. Links 43 are of the form shown in Figure 5. These and similar links connect the units in spaced relation forming chain 43' of Figure 3. The chain is engaged by wheel 44 rigid with ratchet wheel 35. The carrier 39 of course includes a second toothed wheel 45, carried on a stud 46 on the opposite side of the machine and it will be apparent that the distance between the shafts or studs 36 and 46 can be varied by the adjusting mechanism 47 so as to allow of tightening or loosening the conveyor as desired. Each carrier unit 42 is provided with rollers 48 operating over the runway and also includes suitable bases or supports 49 for bottles or containers 50, each carrier unit 42 preferably providing for two of the bottles or containers and which latter are placed in inverted position upon the carrier as shown in Figure 1. It will now be apparent that when the operation of the cam 27 actuates the lever 28 which in turn operates the bell crank lever 30, there will be exerted upon the lever arm 32, a pull, causing the pawl 34 to engage with one of the teeth of the ratchet 35 and thus rotate the toothed wheel 44 thereby actuating the carrier 39. This mechanism is so geared and arranged that each time the toothed wheel 44 is operated through the medium of the pawl and ratchet mechanism, the carrier will be advanced on the runway to bring one of the carrier units 42 and its accompanying containers, in position to be operated upon for scrubbing and washing and as noted in Figure 1, there is provided an incline 51 which, when the conveyor is actuated causes the heads or the necks of the bottles to ride up upon the incline so that when a plurality of the bottles or containers are in position to be operated upon for scrubbing and washing, their necks will lie substantially in the same horizontal plane to the end that proper operation of the mechanism will be assured to work upon the bottles or containers regardless of the length thereof.

The links 26 mentioned heretofore and which have connection with the lever arm 25, may include an auxiliary link 52 and forms a part of what I term the compensating mechanism, taking care of the bottles or containers relative to the positioning thereof and the scrubbing and washing operation, regardless of the size of said containers and to this end the auxiliary link

or links 52 connect with a stem 53 which as shown in Figure 2 is vertically movable and carries on its upper end a brush 54, the same being known as the interior brush for the container. The stem 53 is mounted to turn as well as to slide and carries a toothed wheel 55, the latter meshing with a bevel wheel 56, having connection in any suitable manner with the main drive shaft 16 so as to insure the rotation of the stem 53. To receive the neck or head end of the bottle or container, I provide a tubular support 57 through which the brush 54 is adapted to slide and support 57 preferably carries a sprocket 58 connecting with a chain 59 which latter may be connected in any suitable manner with the driving shaft 16 so as to impart the rotation to the tubular support 57, said rotation being opposite to the rotation of the stem 53.

In superposition to the bottle or container that is to be scrubbed and washed there is disposed a vertically movable spindle 60 capable of rotation as well as vertical movement, said spindle receiving its rotation by reason of the provision of a toothed wheel 61 in mesh with a beveled or toothed wheel 62 connected up with the main drive shaft in any convenient manner, the spindle 60 at its lower end carrying a contact cushion or member 63 of any suitable design or formation and which if desired, may be spring actuated, said cushion member being adapted to bear against the bottom of the inverted bottle or container.

To insure co-incident operation of the lower stem or spindle 53 carrying the brush 54 and the upper stem or spindle carrying the cushion 63, it will be seen that I provide a link 64 which connects with the link 26 and with a second upper link or arm 65, the latter being suitably fulcrummed at 66 by reason of an interposed link 67 to the frame of the machine with the free end of the link or arm 65 connecting with the spindle 60 through the medium of a collar or the like, in order to move the spindle upwardly or downwardly to bring the cushion member 63 into or out of engagement with the bottom of the inverted container or bottle and by reference to Figure 2 it will be seen that when the rod 25 is moved downwardly by the action of the roller 23 upon the cam 22, the link 26 will swing downwardly and it will be noted that the link carries a cross pin 68 operating in the slot 69 of a depending bracket 70 forming a part of the frame. Now the downward movement of the cam 22 will exert a downward pull on the link 64 which in turn will exert a downward pull on the free end of the lever or arm 65 thus causing the spindle 60 to move downwardly by the pull or its own weight, bringing the cushion 63 against the bottom of the invert-



ed bottle or container. Now at the moment the cushion engages the bottom of the bottle the fulcrum of the link 26 will be changed, the pin 68 engaging the lower part of the bracket 70, because of the continued downward movement of the rod 25, and therefore the lower end of the link 26 will receive an upward thrust, causing the latter to move the stem 53 upwardly thereby advancing the brush 54 into the bottle or container.

In order to facilitate the proper centering of the bottle which is being operated upon, I provide a combined centering and brush mechanism which consists of a plurality of opposed arms 71 one of which on its free end carries a roller 72 and the other of which carries an exterior brush 73, so called because its operation is confined to the exterior of the bottle.

These arms 71 pivotally depend from the under side of the super-structure, and each carries a roller 74, the rollers adapted to engage a head 75 on the cross head of spindle 60 which mounts the cushion member 63 (Figures 2 and 4). This head has inclined portions and is enlarged toward its lower end, so that when rollers 74 engage with the enlarged portion of the head, the roller 72 and brush 73 will be spaced from the periphery of the bottle or container, whereas, when the spindle 60 is moved downwardly a contractile spring 76 connecting the arms 71 to pull them together, will cause the rollers to operate over the reduced portion of the head, thus permitting the roller 72 and brush 73 to be moved toward each other and engage the periphery of the bottle or container thereby facilitating the centering of the latter.

From the foregoing description it will be seen that with the mechanism thus far described a series of operations take place either synchronously or successively to the end that a bottle or container will be brought into position for the scrubbing and washing operation, which latter then ensues. Attention is called to the fact that although I have described the mechanism as taking care of merely one of the bottles or containers at a time, I in fact have designed and shown the mechanism in the drawings in such a manner that two bottles or containers are operated upon at the same time and therefore, summarizing what has been said, it will be seen that when the drive shaft 16 is actuated, the carrier will be placed in operation to be intermittently moved so as to bring a plurality of bottles into position for the washing and scrubbing operation and while so doing, elevating those bottles or containers to be operated upon, by the provision of the incline 51. Now when the bottles have reached the position desired, the further operation of the machine causes the cushion member and what might also be

termed the bottle holding mechanism, to be actuated so as to provide sufficient rigidity for the bottle, after which and in almost the same instant, the interior brush is elevated to the interior of the bottle and by reason of its rotation, operates upon the interior surface of the bottle, while simultaneously the exterior brush is also brought into position to operate upon the periphery of the bottle, all of these operations depending to a great extent upon the particular cams 22 and 27 and the roller 23 as mentioned heretofore.

It is obvious that the mere use of interior and exterior brushes upon the bottles or containers, cannot ordinarily bring about the scrubbing and washing operation and therefore to insure proper scrubbing and washing of the bottles, a suitable fluid is provided to operate upon the bottles in conjunction with the interior and exterior brushes. To this end I provide a main supply pipe 81 which is provided with a suitable valve 82 and includes a pipe arm 83 connecting with a vertical pipe 84, the latter extending upwardly to a point immediately above the bottom of the inverted bottle or container or bottles or containers, which are to be scrubbed and washed, said pipe 84 having a suitable hose 85 coupled thereto and which hose is connected to a cross pipe 86 having suitable connection with the tubes or pipes 87 supplying water to the stem 53 of the brush 54. The valve 82 has an operating valve arm 88 connected to a rod 89 which may or may not be supplied with a suitable spring 90 and the rod 89 has pivotal connection with the lever arm 25 at the point of coupling on the lever 26. Now referring to Figures 1 and 2, it will be seen that when the rod 25 moves downwardly, the downward pressure exerted on the rod 89 will open the valve 82 permitting the water in the supply pipe 81 to pass into the pipe 84 and from which a portion will pass upwardly in the pipe 84 to be sprayed out upon the exterior of the inverted bottle or bottles in washing position, while the remainder of the water will pass through the hose 85 and into the cross pipe 86 to go up into the interior brushes and to be sprayed into the interior of the bottles that are now in washing position.

The vertical pipe 84 also carries a cross arm 91 having one or a plurality of jets 92 which may be disposed immediately beneath the carrier so as to further spray water into the bottles or containers after they have left their washing positions and are carried on around to a point of disposal, although it will of course be understood that this is merely a supplemental washing or rinsing that can be provided in conjunction with the machine if desired.

It will be apparent that in the operation



of the carrier it is necessary to provide for the exact stop of one of the carrier units 42 at the moment the two bottles carried thereby are brought to the position where they are to be later operated upon by the interior and exterior brushes and to effect the proper positioning of each carrier unit, I have provided the same with an extension 93 having an open slot 94, this being shown in detail in Figure 5. Now referring to Figure 2 it will be seen that I provide near the upper portion of the machine an arm 95 having an off-set portion 96 which latter is normally engaged by a roller 97 on the extremity of the eccentric arm 20 and that connected to the arm 95 is a depending rod 98, the lower end of which hooks into a second depending rod 99 with the lower extremity of the latter providing a stop indicated by the numeral 100 in Figure 5 and adapted to be received in the slot 94. Now when the eccentric arm 20 is actuated to operate the roller 23 over the cam 27 to actuate the carrier and intermittently move the same, the roller 97 will be moved away from the off-set portion 96, thereby causing the same to gravitate by reason of the weight of the rods 98, 99 so that the stop 100 will drop into the path of the extension 93 and when the particular carrier unit 42 reaches the position whereby its bottles will be in washing position, the engagement of the extension 93 with the stop 100, will bring the particular carrier unit to a standstill by arresting the movement the carrier had obtained by the impetus of rotation imparted through the medium of the toothed wheel 14. The last described mechanism and which I term my stop mechanism for the carrier, it will be seen is also automatic in its operation and forms another step or link in the chain of actions that take place in the operation of the entire machine whereby it is possible to effectively operate the latter without the necessity of several operators.

Summarizing once more the various steps and movements that ensue in the operation of the machine, it will be now understood that when the machine is placed in operation the carrier is first intermittently moved to bring a plurality of the bottles into washing position and is then permanently stopped by the stop mechanism while the washing and scrubbing operation take place; that at the moment the carrier is brought to a stop the interior and exterior brushes and the cushion or centering mechanism are all brought into play to perform their particular functions and co-incident therewith the desired supply of water or other cleansing fluid is brought forward to co-operate with the brushes and wash the interior and exterior walls of the bottles. Thus when this has been effected the continued operation of the machine will cause the roller 23 to resume its journey

about the cams 22 and 27 to the end that they will be returned to initial positions thus also returning the various operating parts to initial positions so that the carrier will be again ready to be operated and moved forward to bring two unwashed bottles into position for scrubbing and washing and simultaneously carry away the two washed and scrubbed bottles to a point of disposal.

While various slight alterations may be made from the construction set forth in the drawings and described in the specification, it will be understood that these would involve merely structural details not apt to change the principle of operation or the operation of the various parts of the machine to bring about the desired result and that although I have shown a particular form of device in the drawings, I reserve the right to make various slight changes without departing from the spirit of the invention, the scope of which is defined in the appended claims.

Having described my invention, I claim;

1. A bottle scrubber and washer comprising a frame, a bottle carrier on said frame, means for moving said carrier in a step by step movement to advance said bottles into and out of scrubbing position, means for supporting and centering said bottles in position for scrubbing and washing, scrubbing mechanisms simultaneously operable to scrub the interior and exterior of said bottles, means operable co-incident with said scrubbing mechanisms to supply washing fluid to the bottles during the scrubbing operation, and a controlling means for the exterior scrubbing mechanism, said means including a pivoted element and a device of varying cross-section co-operating with said pivoted element and a bottle holding device projecting from the device of varying cross-section.

2. A bottle scrubber and washer comprising a frame, a bottle carrier on said frame, means for moving said carrier in a step by step movement to advance said bottles into and out of scrubbing and washing position, means for supporting and centering said bottles in position for scrubbing and washing, and scrubbing mechanisms simultaneously rotating and vertically moving towards said bottles to effect the scrubbing operation, said last mentioned means including a vertically moving element of varying cross-section and a swinging element engaged by the element of varying cross-section adapted to contact with the exterior of said bottles.

3. In a bottle scrubber and washer the combination with a bottle carrier, of a shaft actuated roller controlled cam mechanism associated with the bottle carrier for moving the bottles in a step by step movement into and out of scrubbing and washing positions,



interior and exterior bottle scrubbing mechanisms and a second shaft actuated and roller controlled cam mechanism associated with said first mentioned cam mechanism and co-operating therewith, to actuate the bottle washing mechanism immediately after the first mentioned cam mechanism has been actuated to move said carrier.

4. In a bottle scrubber and washer the combination with a bottle carrier, of cam mechanism associated with the bottle carrier for moving the bottles thereon into and out of scrubbing and washing positions, interior and exterior bottle scrubbing mechanisms for scrubbing the interior and exterior of the bottles, a second cam mechanism associated with the first mentioned cam mechanism and with said bottle scrubbing mechanisms for actuating the latter immediately after the bottles on the bottle carrier have been received in scrubbing and washing positions and a fluid supply apparatus associated with said second cam mechanism and said scrubbing mechanisms for supplying washing fluid to the scrubbing mechanisms and the interior and exterior of the bottles when said scrubbing mechanisms are actuated, said cam mechanisms including a plurality of pivoted cams, a shaft and a radial arm thereon, and an element carried by the arm and cooperating with both cams.

5. In a bottle washer and scrubber, including scrubbing and washing devices for operating on bottles, means for feeding bottles into and out of scrubbing and washing positions in a step by step movement, and shaft actuated roller controlled cam lever means simultaneously operable in conjunction with said scrubbing and washing devices for automatically positioning said bottles and controlling the automatic scrubbing and washing thereof, irrespective of the size of said bottles.

6. In a bottle scrubber for automatically scrubbing bottles of the same or different sizes, the combination with holding and scrubbing devices for the bottles, a lever and means directly operated thereby for automatically adjusting the holding and scrubbing devices as to the diameter and height of the bottles to insure the effective operation of the devices upon the bottles.

7. In a machine of the character described, bottle holding means, bottle cleaning elements, means for introducing cleaning fluid into said bottles, lever means, tripping means connected with said lever means for moving the bottle holding means into operative position, means operated by said lever means upon movement thereof through a further angle, adapted to move one of the cleaning elements into operative position subsequent to the operation of the holding means, and means including a shaft actuated roller controlled cam mechanism for auto-

matically moving and adjusting said lever means.

8. In a machine of the character described, bottle holding means, bottle cleaning elements, means for introducing cleaning fluids into said bottles, lever means, tripping means connected with said lever means for throwing the bottle holding means into operative position, means operated by said lever means upon movement thereof to a further angle adapted to move one of the cleaning elements into operative position subsequent to the operation of the holding means, a bottle carrier adapted to be operated in a step by step movement to move said bottles into and out of position to be cleaned, and shaft actuated roller controlled cam and ratchet means for actuating said bottle carrier in a timed step by step movement to position said bottles for the operation of the cleaning elements.

9. In a machine of the character described bottle holding means, bottle cleaning elements, means for introducing fluid into said bottles, lever means movable about separate fulcrum points, and adapted to move the holding means into operative position, means permitting said lever means to operate about a second fulcrum point for moving one of the cleaning elements to operative position, a shaft actuated roller controlled cam mechanism, and means operated thereby for controlling the levers.

10. In a machine of the character described, a rotatable shaft, a crank mounted thereon and rotating therewith, a roller mounted on said crank, a plurality of cams actuated and controlled by said roller when said shaft is rotated, bottle holding means, a bottle cleaning element, means directly operated by the movement of said cams for moving the bottle holding means and bottle cleaning element to operative position, means actuated and controlled by said cams controlling the admission cleaning fluid into the bottles, devices actuated and controlled by said cams and roller adapted to bring the bottles into position for cleaning, and a locking device controlled by said roller and cams for retaining the bottles in position during the cleaning operation.

11. In a machine of the character described, bottle holding means including a spindle, an arm actuating the spindle, a rod controlling the arm, a lever, the rod being pivoted to the lever intermediate of its ends and the lever being fulcrumed at one end, means for moving the lever and elements connected therewith for operating the bottle holding means upon the movement of the lever about said fulcrum, a bottle cleaning element, and means causing the lever to change in its fulcrum point and move the cleaning element to operative position.



12. In a machine of the character described, bottle holding means including a vertical spindle, a plurality of vertically depending roller carrying oppositely disposed pivoted arms, means carried on said spindle adapted to cause said arms to spread outwardly by the movement of the spindle in one direction, means carried on said spindle adapted to permit the movement of said arms toward each other when said spindle is moved in the opposite direction, spring means co-acting with said arms adapted to draw said arms together when said spindle is so oppositely moved, and a bottle cleaning device carried upon one of said arms.

In testimony whereof I affix my signature.

CHARLES BRIGHT VAN HORN.