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PATENTED DEC. 12, 1905.

W. A. ROUTSON.
CAN AND BOTTLE WASHING MACHINE.

APPLICATION FILED APR. 15, 1905.

5 SHEETS—SHEET 1.

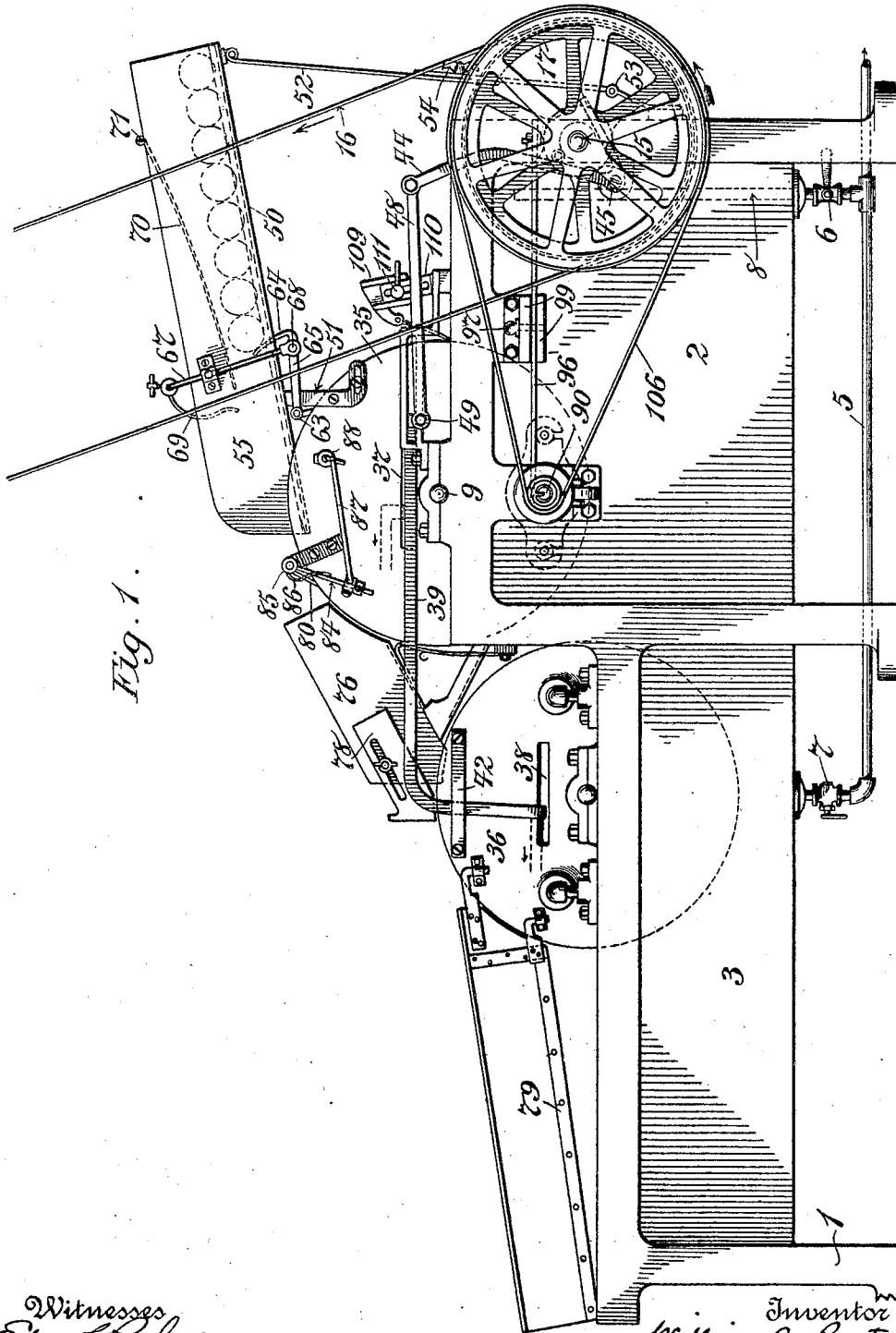


Fig. 1.

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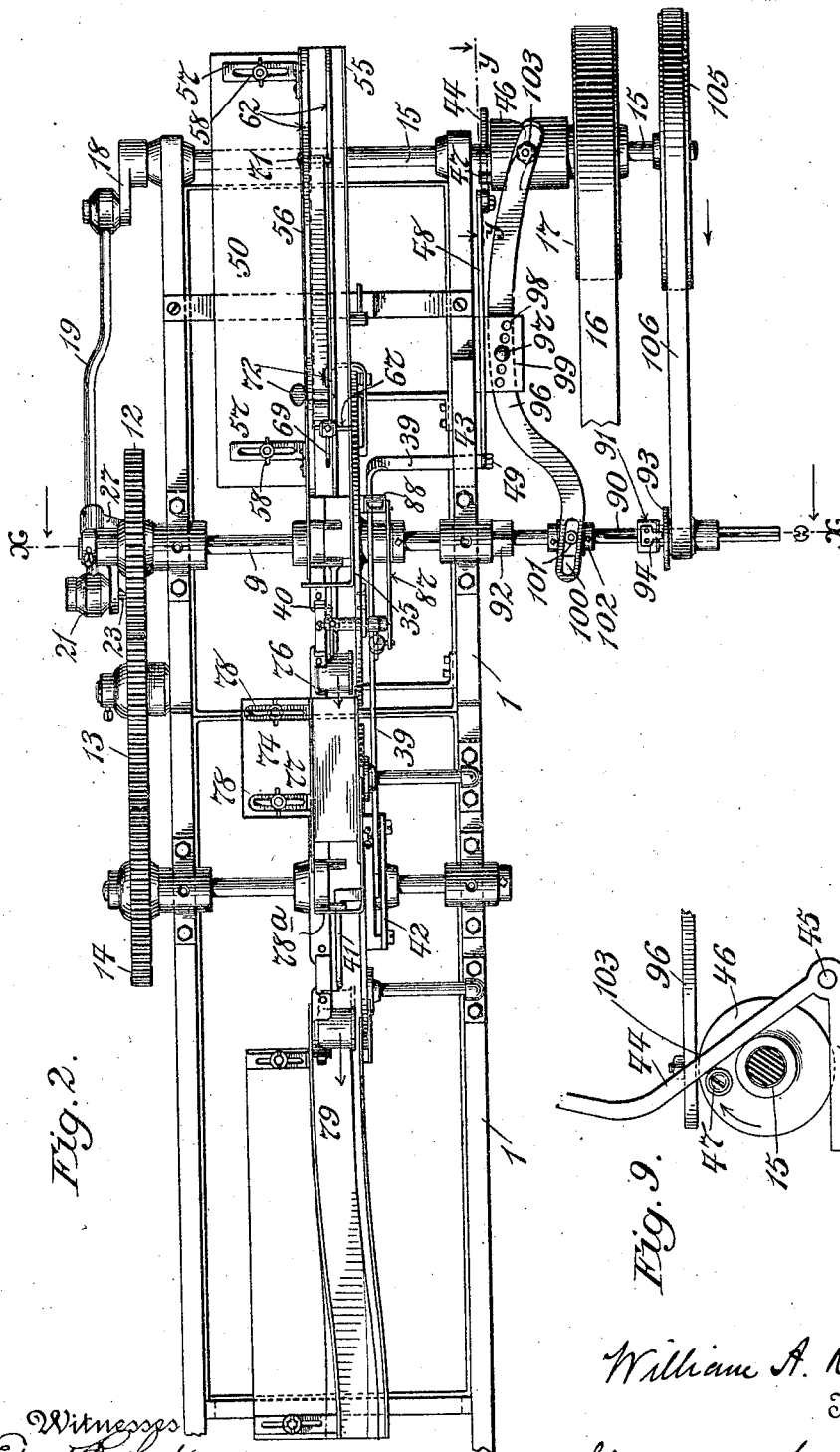


Fig. 2.

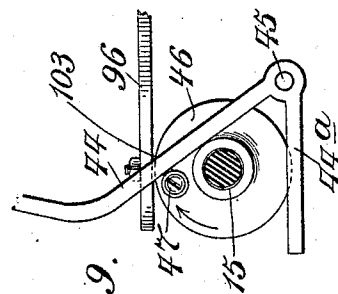


Fig. 9.

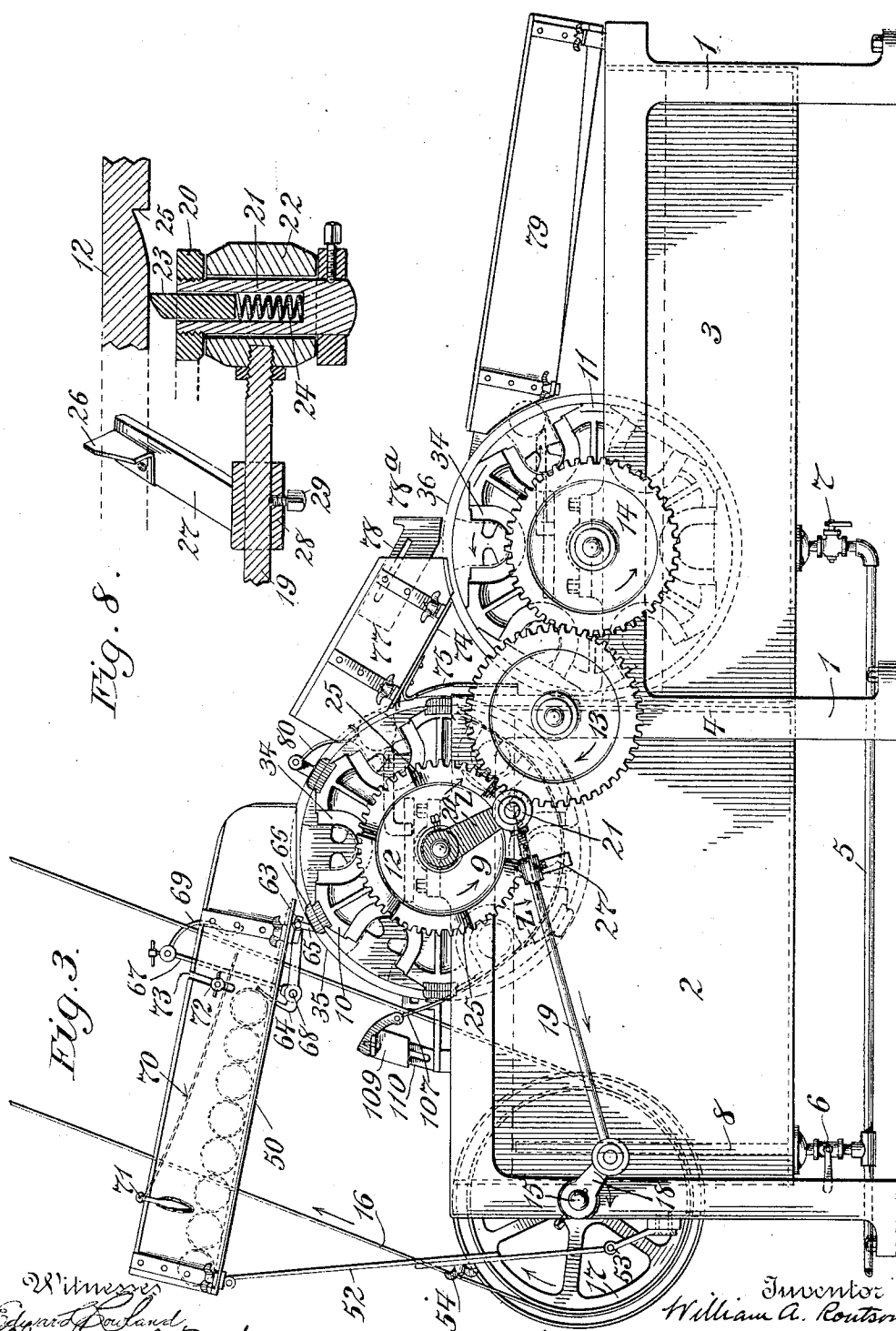
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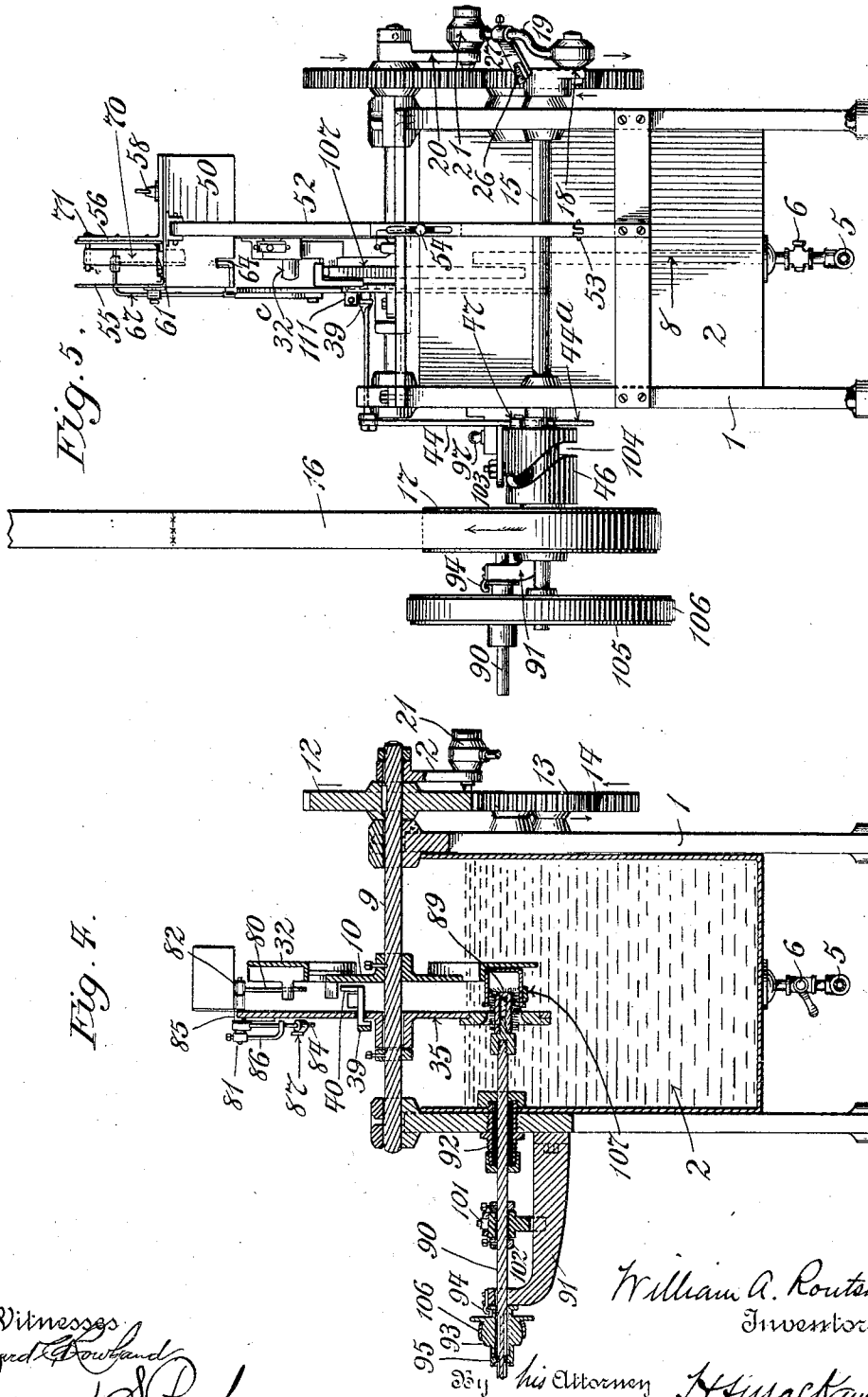
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5 SHEETS—SHEET 4.



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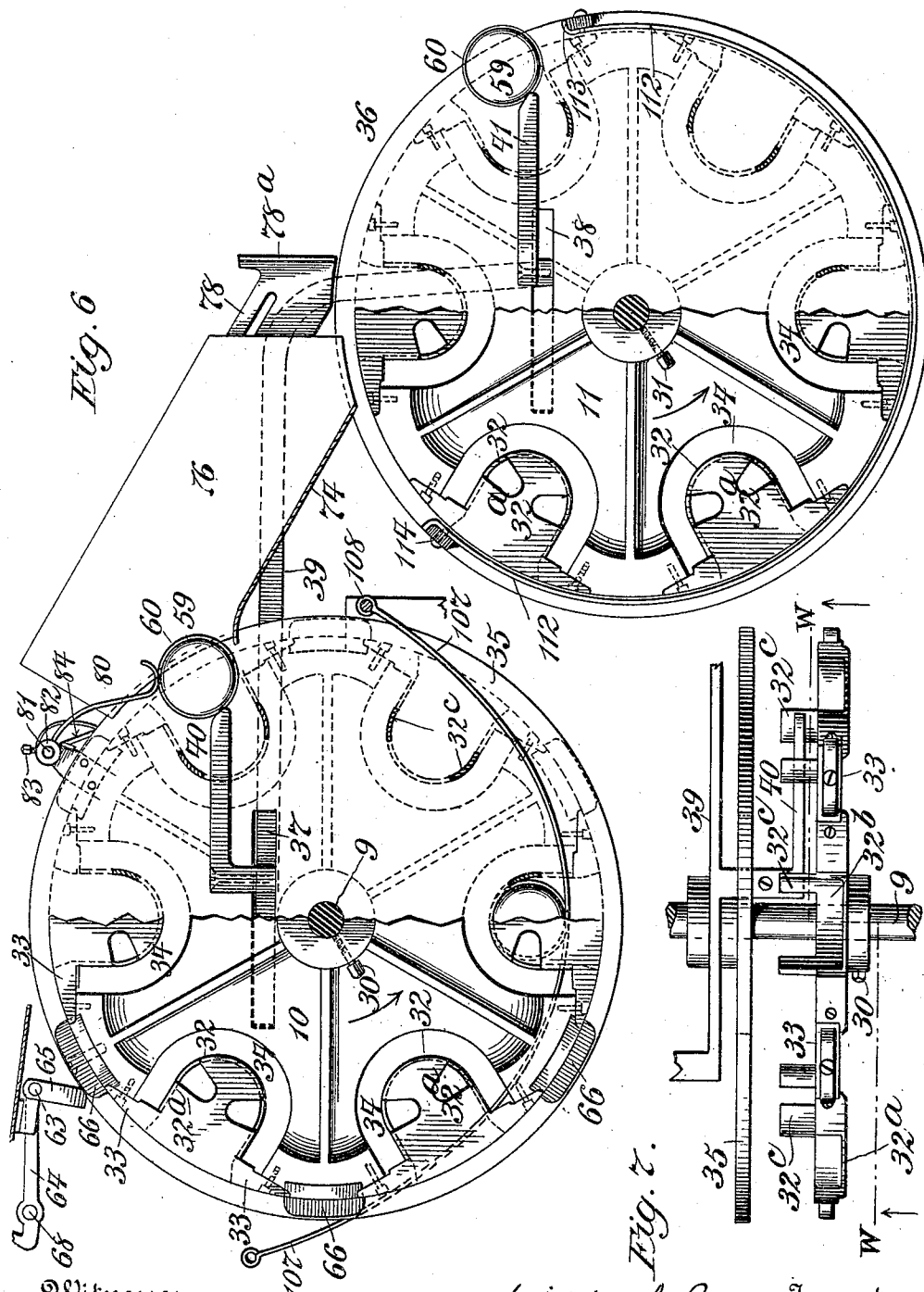
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

WILLIAM A. ROUTSON, OF NEW YORK, N. Y.

CAN AND BOTTLE WASHING MACHINE.

No. 806,846.

Specification of Letters Patent.

Patented Dec. 12, 1905.

Application filed April 15, 1905. Serial No. 255,680.

To all whom it may concern:

Be it known that I, WILLIAM A. ROUTSON, a citizen of the United States, residing in the city, county, and State of New York, have invented a certain new and useful Improvement in Can and Bottle Washing Machines, of which the following is a specification.

The present invention relates to a simple and reliable mechanism for thoroughly washing, scrubbing, and rinsing out containers of various kinds, and particularly cans and bottles.

In its preferred form my improved device is so constructed that the receptacles to be cleaned are merely fed into the machine at one end and are automatically delivered for drying at the other end after being scrubbed, washed, and rinsed.

The basic principle of my invention involves the use of one or more carrying-wheels, which may lie with their planes in any desired position, said wheels being adapted to hold a number of the containers, in combination with a reciprocating swabber so placed as to enter the containers successively as one of the carrying-wheels bears them past said swabber. These elements are preferably combined with tanks to hold the washing fluid, as well as with a number of other auxiliary devices hereinafter described.

I have herein shown and described my invention as embodying carrying-wheels vertically placed, with pockets and other accessories adapted for treating tin cans and similar vessels; but it is to be understood that my invention is equally well adapted to treatment of various other containers and that neither the specific number or position of the wheels herein shown is essential to the invention.

One preferred embodiment of this invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of my complete device. Fig. 2 is a plan view thereof. Fig. 3 is a view similar to Fig. 1, but taken from the opposite side of the machine. Fig. 4 is a transverse section on the plane xx in Fig. 2. Fig. 5 is a rear end view. Fig. 6 is a large scale side view of the two carrier-wheels, each cut by a plane, such as vv on Fig. 7. Fig. 7 is a large scale plan view of one of said carrying-wheels. Fig. 8 is an enlarged detail view on the plane zz in Fig. 3, and Fig. 9 is a sectional detail taken on the plane yy in Fig. 2.

The particular embodiment of my invention

shown in the accompanying drawings involves the use of two wheels, one of which carries the cans or bottles for active washing, while the second wheel receives the washed articles from the former wheel and carries them through the rinsing-tank.

As shown in Figs. 1 and 3 particularly, the main frame 1 carries two tanks 2 and 3, preferably arranged, as shown, in the form of a double tank having a separating-wall, (shown at 4 in dotted lines in Fig. 3.) These tanks can be supplied with water in any desired way. The pipe 5 serves to drain them both through the valves 6 and 7, respectively. The valve 6 controls exit from an interior stand-pipe 8, through which the water in the tank 2 overflows and which is of such a length, as shown, that the liquid is maintained at the proper level within such tank. In the form shown the liquid is kept at a higher level in tank 2 than in tank 3.

The carrying-wheel for the containers to be scrubbed or swabbed, hereinafter specified as the "washing-wheel," turns with a shaft 9, placed over tank 2, to which shaft it is adjustably secured. (See Fig. 4.) This wheel is shown at 10. The second wheel, called herein the "rinsing-wheel," is carried over the tank 3. Each wheel is so placed that its lower part dips under the water in the tank below it. This second wheel is shown at 11. The wheel 10 communicates movement to the wheel 11, preferably by means of the gear-wheel 12, also fast on the shaft 9, which acts through the idle pinion 13 to drive the gear-wheel 14, attached to the carrying-wheel 11. Thus the two carrying-wheels turn together in the same direction, as indicated by the arrows in Fig. 3.

The main driving-shaft of the machine is shown placed at 15, and this shaft is driven by the belt 16 and pulley 17 or otherwise, if desired. The direction of movement of this driving belt and pulley is shown by arrows in Figs. 1 and 3.

The driving-pulley 17 is on one side of the machine, and at the other side of the machine on the other end of the shaft 15 there is fastened a crank-arm 18, to the outer end of which is pivoted the connecting-rod 19 for driving the carrying-wheels. The opposite end of the connecting-rod 19 is supported by the reciprocating link-arm 20, which turns around the same shaft 9 as the carrying-wheel 10, but turns loosely thereon. At the outer end of the link 20, and preferably at its junction with

the connecting-rod 19, I employ the driving-pawl 21. (Shown in detail in Fig. 8.) This pawl comprises, preferably, a pin shown at 21, surrounded by the sleeve 22, which is secured to the connecting-rod 19, said pin 21 having an axial cavity in which there slips a bolt 23, which is pressed outward by an appropriate spring 24 within the cavity. The bolt 23 is beveled, as shown, and its advancing face is adapted to fall in behind the ratchet-teeth 25, which are formed, as shown in Figs. 3 and 8, on the outer face of the gear-wheel 12.

There is one ratchet-tooth 25 for every pocket or chamber in the carrying-wheel 10, and the distance through which the pawl 21 moves back and forth is such that the gear-wheel 12 is moved in the direction of the arrow through the space of one tooth for each reciprocation of the pawl.

In order that the carrying-wheels may be secured firmly at the end of each intermittent forward movement and that there may be no danger of excessive movement by reason of inertia or otherwise, I prefer to employ a stop-pawl 26, carried on the end of an arm 27, fixed to a sleeve 28, which surrounds the connecting-rod 19 and can be adjusted thereon by means of the set-screw 29. The position of the pawl 26 is such that just as the driving-pawl 21 reaches the extreme of its forward movement the stop-pawl 26 enters a space between two successive peripheral teeth on the under side of the gear 12, and thus prevents vibration of either of the carrying-wheels one way or the other. This action insures the proper receiving position for both carrying-wheels, and as the crank-arm 18 continues its rotation the stop-pawl 26 is lowered, while the driving-pawl 21 begins its rearward movement. It will be thus seen that the carrying-wheels are left free during the backward movement of the pawls; but at this time there is no tendency, due to inertia or otherwise, to disturb the proper position of these wheels. Moreover, the brush or cleaner is at this time in active position and tends to hold the wheel firm.

It will be seen from the above description that while the driving-shaft 15 and the crank-arm 18 revolve continuously, as shown by the arrow in Fig. 3, the two carrying-wheels will be given a series of forward movements separated by intervals of immobility.

The two carrying-wheels are operated as described thus far for the purpose of receiving the containers to be washed, which are to be placed first in the washing-wheel, by which they are carried under the first water and from which they are discharged onto the rinsing-wheel to be carried by it through the second water. It is obvious that where rinsing is not necessary the second wheel may be dispensed with.

The two carrying-wheels may be constructed in any desired manner whereby they are

adapted to carry out the functions above named; but I prefer to construct these wheels in the manner specifically shown in Figs. 6 and 7 in detail.

As shown in its preferred form, each carrying-wheel is fixed to the shaft which supports it—for instance, by means of the set-screws 30 31—and each wheel consists of a strong ribbed-metal frame 10 11, symmetrically cut away at intervals to receive the movable pockets 32, which can be made of various sizes and shapes for accommodating the particular form of container intended to be washed. The preferred form given to these containers where plain tin cans are to be cleaned is shown in rear view and section in Fig. 6 and in top view in Fig. 7. As there shown, each pocket consists of a rear wall 32^a, a semicircular bottom 32^b, Fig. 2, and concave arms 32^c, conformed to the curve of the pocket. There are furthermore provided two wings 33, whereby each pocket may be bolted or otherwise fastened to the wheel-body, and these wings are so shaped, as shown in Fig. 6, as to make the outer edge of each pocket conform to the circular periphery of the wheel. The cut-away portions of the wheel are made considerably larger than the pockets in the form shown in Figs. 6 and 7, leaving spaces 34. This is to provide room for pockets of a larger size, those shown being supposed to be medium-sized pockets. Various sizes and shapes of pockets to accommodate containers can thus be applied to either wheel.

Mounted loosely on the shaft of each wheel and adjustable, as shown in Fig. 4, there is placed a guard-plate, preferably circular in form, as shown at 35 and 36. These plates are loosely mounted and do not revolve with the wheels. They are employed simply to keep the cans or bottles in place in their pockets as the wheels revolve. Containers of different sizes can be accommodated by suitably adjusting the distance between the wheels 10 11 and their guard-plates or by a suitable exchange of pockets.

The guard-plates 35 and 36 are slotted, as shown at 37 and 38, and these slots are provided to admit the expelling-bars, which act to discharge the containers one at a time from each wheel.

In the form of device shown the expelling means take the form of a main expelling-bar 39, adapted to reciprocate horizontally at one side of the machine close to the guard-plates 35 36 and provided with two expelling-fingers 40 and 41, which extend from the main expelling-bar through the slots 37 and 38, respectively, and are adapted to come in contact with the containers at the proper time, as shown in Fig. 6. At one end the expelling-bar 39 turns downward toward the slot 38 and is confined by the slide-rest 42 on the guard-plate 36. The other end of the bar

turns outward, as shown in Fig. 2, and slides along the slide-rest 43.

Movement of the expelling-bar 39 is accomplished in the manner shown in Figs. 1, 2, 5 and 9. For this purpose a two-armed lever 44 is pivoted at 45 to the main frame on the machine near the driving-shaft 15 and somewhat below it. The two arms 44 and 44^a of this lever radiate from the pivot 45, extending on opposite sides of the main shaft 15 and occupying a plane between the main frame and the cam-block 46, fixed to the shaft 15. A pin 47 projects from the inner face of said cam-block in such a position that as the cam-block revolves in the direction of the arrow in Fig. 9 said pin comes in contact with and slides along the surface of each of the arms 44 44^a in succession. The outer end of the longer arm 44 is pivoted to a connecting-rod 48, the opposite end of which is pivoted at 49 to the end of the expelling-bar 39.

It will be seen from this description that as the main driving-shaft 15 revolves continuously the two-armed lever 44 44^a, and therefore the expelling-bar and expelling-fingers, are impelled first in one direction and then in the other, the opposite movements being separated by intervals of rest.

The conveying of the containers to the washing-wheel, thence to the rinsing-wheel, and lastly out of the machine is accomplished by the following means. An inclined platform 50, preferably of sheet metal, is supported adjustably at one end by the slotted leg 51, attached to guard-plate 35, and at the other end by a two-part prop 52, hinged at 53 to the main frame and having its two parts adjustably secured by the butterfly-nut 54. By these means the platform 50 can be moved backward and forward slightly, and its inclination to the horizontal can also be varied. As shown in Figs. 2 and 5, the platform 50 is provided with one permanently-placed side 55 and a movable or adjustable side plate 56, to which are preferably fastened the slotted angle-pieces 57, with which the butterfly-nuts 58 cooperate in securing said side 56 in any desired position. This adjustable arrangement of the side wall 56 provides a channel between said wall and the wall 55 in which containers of different lengths may be laid one after the other side by side, as indicated in dotted lines in Fig. 1.

In the specific form shown in the drawings it is intended to accommodate tin cans having rounded bottom, as shown at 59 in Fig. 6, and provided with an outwardly-turned lip 60, as also there shown. For the accommodation of these specific cans I prefer to provide a bottom plate, such as shown at 61 in Fig. 5, the two specially-molded edges of which are represented at 62 in Fig. 2.

In order to automatically discharge the containers one by one at the proper time upon the washing-wheel, I prefer to employ the

means shown in Figs. 1, 2, 3, and 6. Here a short shaft 63 is mounted beneath the platform 50. A bent lever 64 on said shaft extends upward through an opening in the bottom of the platform, so as to stand in the path of the advancing containers. Another shorter lever 65, also fixed to the shaft 63, projects downward into the path of a series of lifting-blocks 66 on the periphery of the carrying-wheel 10.

At the permanent side or wall 55 there slides a wire or rod 67, which is pivoted at 68 to the arm 64. The upper end of the rod 67 projects over the channel in which the containers move, and there is fixed thereto a downwardly-curved restraining-arm 69. (Best shown in Fig. 1.)

As the carrying-wheel 10 moves intermittently forward the lifting-blocks 66 are brought successively into contact with the arm 65, thus turning the shaft 63 and pushing the upwardly-turned end of the arm 64 in between the lowermost of the file of containers and the one behind it. At the same time the wire arm 69 is lifted and allows the lowermost container to fall by gravity into the topmost pocket on the wheel 10. As soon as the lifting-block passes the arm 65 the arm 64 drops, allowing all the containers to move forward by gravity until they are arrested by the restraining-arm 69, which moves downward, together with the arm 64.

In order to insure orderly forward movement of all the containers together down the feeding-channel and to prevent accidental riding of one container over another, a guard-plate 70 is provided, the position of which is shown in dotted lines in Figs. 1 and 3 and in rear view in Fig. 5. In the form shown this plate is pivoted at its rear end at 71, and its forward end is supported by an adjustable nut 72, capable of sliding up and down in the slot 73, so as to be adjustable at various elevations. (See Fig. 3.) This adjustment is desirable for accommodation of containers of different sizes.

There has been thus far described the means whereby a continuous file of containers lying on their sides are conveyed by gravity toward the first wheel, are then automatically deposited one by one in successive pockets on said wheel, and are then conveyed by rotation of said wheel in the direction of the arrow in Fig. 6 to the point of discharge therefrom. There has also been described the means for ejecting the containers one by one at the point of discharge.

Where two or more wheels are employed, the container as it leaves the first wheel is received in a channel similar to that already described for delivering the containers into the first wheel. In the drawings this is shown to consist of an inclined platform or metal plate 74, supported on the main frame by the bracket 75, (see Fig. 3,) which plate is pro-

vided with a fixed side wall 76 and an opposite movable wall 77, which is adjustable by means of the slotted fasteners 78 in the same manner as the adjustable wall 56, already described above.

It is preferred to supply an adjustable stop-plate 78^b, which is movably secured to the fixed side wall 76 and is bent around, as shown at 78^a in Fig. 2, in such a manner that the containers which roll down the platform 74 one at a time are arrested just above the pocket in the second wheel, which is at the time in the proper position.

The containers after falling into the second wheel are carried around step by step in the direction of the arrow in Fig. 3 and after passing through the rinsing-water in the tank 3 are finally ejected by means already described upon the inclined platform 79, which is provided with a channel of adjustable width constructed as already described with regard to the feeding-channels. The containers which roll down the inclined channel 79 are received upon a drier or any appropriate receptacle, as may be desired.

In the preferred form of machine shown I supply a counting mechanism whereby the number of containers which pass through the machine is recorded. For this purpose a variety of means may be employed, and I have shown the curved wire bail 80 fixed to the cross-shaft 81 by means of a sleeve 82 and set-screw 83. (See Figs. 4 and 6.) The curved end of this bail extends into the path of movement of the containers as they are ejected from the first wheel. As best shown in Fig. 1, a lever 84 depends from a sleeve 85, which is loose on the shaft 81, and a spring 86 is fixed to the shaft 81 and extends under said lever 84, so that each time the bail 80 is lifted said spring 86 turns the lever 84 toward the left in Fig. 1. A connecting rod or wire 87 transmits each movement of the lever 84 to an appropriate counting device 88, which may be of any well-known pattern and is fastened to the side of the guard-plate 35.

As heretofore stated, the containers while in the pockets of the first or washing wheel are successively scrubbed or swabbed out while under the level of the water in the tank 2. The wheel 10 is moved forward step by step as before described, and it is during intervals of rest of said wheel that the scrubbing action takes place. The means employed for this purpose are preferably as follows: The scrubbing or swabbing agent, such as the brush 89, (see Fig. 4,) is carried by a shaft 90, which is capable of rotation and reciprocation simultaneously. One end of this shaft is carried in an outer bearing on the bracket 91, which is supported by the frame of the machine, while the other end of said shaft passes through an appropriate stuffing-box 92 into the tank 2 below the level of the water and exactly opposite the position occupied by

the opening of the can or bottle to be cleaned when in its lowest position on the first carrying-wheel 10. As shown in Figs. 2 and 4, the outer end of the shaft 90 is provided with a small driving-pulley 93, which is prevented from movement in the direction of the shaft 90 by any appropriate means—such as the catch 94, for instance. The shaft 90 is appropriately shaped, so that the pins 95 inside of the driving-pulley 93 are allowed to engage with said shaft in a manner which permits the shaft to slide longitudinally within the driving-pulley, while causing the pulley to impart rotary movement to said shaft in every position. A variety of shapes in cross-section may be given to the shaft 90 for this purpose, as is well understood in the art; but the cross-section shown in Fig. 2 is preferred in ordinary cases. This provides two longitudinal channels in the shaft which receive the pins 95 for the purpose above mentioned. Reciprocation of the shaft is accomplished by means of a shifting-lever 96, preferably pivoted on a movable pin 97, which can be inserted in any one of a number of holes 98 in the fulcrum-plates 99, between which said lever 96 is free to be tilted. This arrangement admits of adjusting the amplitude of movement of the cleaner 89 to suit containers of different depths. At one end of the lever 96 a slot 100 fits over a pin 101, which projects upward from a sleeve 102, fixed to the shaft 90 between its bearings. The opposite end of the lever 96 is provided with a downwardly-extending pin 103, (see Fig. 5,) which enters an appropriate slot 104 in the surface of the cylindrical cam 46.

As the main shaft 15 is revolved in the direction indicated by the various arrows in the drawings the cam 46 acts, through the lever 96, to push the shaft 90 and the brush or swabber 89 into the container on the wheel 10 and out again at proper intervals, while at the same time the large pulley 105 acts, through the belt 106, to rotate the pulley 93, and with it the brush 89.

It is important that the containers should be held firmly while they are subjected to the action of the rotating brush or swabber, and to accomplish this I prefer to employ the device shown in Figs. 3 and 6. This consists of a flexible metal band 107, fixed at one end to the stationary pin 108 (see Fig. 6) and at the other end to an adjustable abutment 109, which can be moved up and down on a solid standard 110, being fixed by means of the nut 111. (See Fig. 1.) This band embraces the lower portion of the wheel 10 and is so placed that the container which is at any time in the lowermost pocket in said wheel is firmly gripped between the band 107 and the bottom of said pocket, as plainly shown in Fig. 6. This will prevent the swabber or brush from imparting its movement of rotation to the container itself. The band 107 also serves to prevent the con-

tainers from dropping out of the pockets as they are carried by the wheel below the horizontal plane through the shaft 9. A somewhat similar metal band 112 is fastened to appropriate abutments 113 and 114 on the guard-plate 36 and is so placed as to embrace the lower part of the second or rinsing wheel 11. The object of this band is merely to prevent the containers from falling out of the pockets in said wheel.

Having thus described the construction of the various parts of my preferred device, I will now explain the operation of the same through one complete cycle of action.

The containers are placed on their sides one behind the other on the inclined platform 50, as shown in Figs. 1 and 3, the machine being in the position actually shown in the various drawings. In this position the brush 89 is on its way into the container, but has not reached the bottom thereof. As the driving-shaft 15 continues its movement the cam 46 completes the reciprocating movement of the shaft 90 with the brush 89, and if there is a container in place the scrubbing out of the same is completed. As shown in Fig. 5, the pin 103 no sooner reaches the top of the groove 104 in the cam 46 than the action of said groove begins to reverse the movement of the shifting-lever 96, so as to withdraw the brush from the pocket or the container, if in place. It is during this last movement of the brush 89 inward and outward that the pin 47 (shown in Fig. 9) acts on the lever 44 to operate the expelling-fingers as hitherto described, and if the containers are in the proper pockets these fingers will cause one container to be ejected from each wheel and the passage of one of these containers to be recorded by the counting mechanism above described. As the driving-shaft 15 continues its rotation the connecting-rod 19 is drawing the feeding-pawl 21 backward at the same time that the cam 46 is bringing the shaft 90 into its outward position. By the time the pawl 21 has been drawn back so that its bolt 23 drops in behind the next ratchet-tooth 25 the pin 27 has withdrawn the expelling-fingers by impinging on the inner face of the lever-arm 44^a, as heretofore described, and when the crank-arm 18 passes the center so that the pawl 21 begins its forward movement again these fingers are in such a position as to permit movement of both the carrying-wheels. Further movement of the driving-shaft then causes rotation of the two carrying-wheels in the direction of the arrows, and the lifting-block 66 is moved past the short arm 65, so that the upwardly-turned arm 64 is depressed, carrying downward with it the restraining-wire 69. The whole file of containers moves downward by gravity as soon as released by withdrawal of the arm 64 and is brought to rest by coming against the restraining-wire 69. The forward movement of the carrying-

wheels continues until a fresh pocket is brought into the top position opposite the lower end of the platform 50, when a new lifting-block 66 raises the arm 64 and the wire 69, so as to release the lowermost container while holding back the remainder. Said container drops forward into the proper pocket, the wheel being stationary, and the cycle heretofore described begins over again.

It will be seen from this description that each one of the containers is dropped in turn into a pocket in the first carrying-wheel, is carried around into the lowermost position under water where it is scrubbed or swabbed out, is then carried up to the ejecting position and records its movement as it is pushed out onto the second platform which carries it to the rinsing-wheel, where it is simply carried through fresh water to rinse it out. At the end of this operation the container reaches the ejecting position in the second wheel and is pushed out by the lower ejecting-finger onto the delivery channel or platform.

The principle of my invention is applicable to use of any desired number of wheels in any desired position and also to the use of any desired number of pockets on each wheel. Indeed, many variations may be made in the construction of this device without departing from the spirit of my invention, and I am not to be limited to the details herein shown and described.

What I claim is—

1. In a device of the class described, a tank, a carrying-wheel mounted partly in said tank, a receptacle on said wheel, a cleaning device and a reciprocating holder therefor projecting through the side of said tank opposite said wheel, substantially as described.

2. In a device of the class described, a rotary carrying-wheel, receptacles for containers on the periphery thereof and a flexible band partly embracing said wheel and fastened at its ends, substantially as described.

3. In a device of the class described, a rotary carrying-wheel, receptacles for containers on the periphery thereof, a flexible band partly embracing said wheel, a fixed support for one end of said band and an adjustable support for the opposite end thereof, substantially as described.

4. In a device of the class described, a rotary carrying-wheel and a receptacle therein and extending across the same near its periphery, said container comprising a rear wall, a concave bottom and curved arms projecting from one side of the wheel, substantially as described.

5. In a device of the class described, a rotary carrying-wheel cut away at intervals near its periphery and removable pockets adapted to be secured in said cuts, substantially as described.

6. In a device of the class described, a rotary carrying-wheel cut away at intervals near its

periphery and pockets adapted to enter said cuts and provided with ears bolted to the periphery of said wheel, substantially as described.

5 7. In a device of the class described, a rotary carrying-wheel, a receptacle therein and opening at one side of said wheel and an adjustable guard-plate parallel and near to said carrying wheel on the same side as said opening, substantially as described.

10 8. In a device of the class described, a plurality of carrying-wheels having receptacles for containers and means for transferring containers from one of said wheels to the next, substantially as described.

15 9. In a device of the class described, a plurality of carrying-wheels, gearing connecting them, a common main driving-shaft therefor and feeding means operatively connected to said driving-shaft for transferring containers from one wheel to the next, substantially as described.

20 10. In a device of the class described, a plurality of tanks, a carrying-wheel mounted partly within each tank, and means for transferring containers from one wheel to the next, substantially as described.

25 11. In a device of the class described, two tanks, one of which is higher than the other, two carrying-wheels partly mounted in said tanks respectively and means for transferring containers from the higher to the lower wheel, substantially as described.

30 12. In a device of the class described, a series of carrying-wheels mounted in line and geared together; in combination with means for feeding containers through said series of wheels, said means comprising a number of inclined channels mounted over said wheels, substantially as described.

35 13. In a device of the class described, a carrying-wheel and an inclined channel for conveying containers thereto; in combination with a two-armed lever pivoted beneath said channel, one arm of which projects upward into the path of said containers and lifting-blocks on said wheel adapted to impinge upon the other arm of said lever for its operation, substantially as described.

40 14. In a device of the class described, a carrying-wheel and an inclined channel for conveying containers thereto; in combination with a two-armed lever pivoted beneath said channel, one arm of which projects upward into the path of said containers, a sliding rod carried on the same arm of said lever and projecting above said channel, a restraining-wire depending from said sliding rod and lifting-blocks on said wheel adapted to impinge against the shorter arm of said lever for its operation, substantially as described.

45 15. In a device of the class described, a carrying-wheel in combination with an inclined conveying-channel above said wheel, said channel comprising a platform, a fixed side wall

and an adjustable side wall, substantially as described.

16. In a device of the class described a carrying-wheel, an inclined channel above it and a guard-plate pivoted to a fixed pin at one end over said channel and an adjustable support for the other end of said guard-plate, substantially as described.

17. In a device of the class described, a frame, a carrying-wheel mounted thereon, an inclined channel over said wheel, a two-part slotted prop for one end of said channel and a nut for adjustably securing the two parts of said prop, substantially as described.

18. In a device of the class described, a series of carrying-wheels and a series of inclined channels over said wheels for conveying containers to and from said wheels, said channels having each a fixed side wall and an adjustable side wall, substantially as described.

19. In a device of the class described, a carrying-wheel having a series of receptacles on its periphery, an inclined channel over said wheel and an adjustable confining-plate movably fixed to one wall of said channel and extending across the lower end of said channel, substantially as described.

20. In a device of the class described, a carrying-wheel having a series of receptacles on its periphery, an inclined channel over said wheel and an adjustable confining-plate movably fixed to one wall of said channel and extending across the lower end of said channel, substantially as described.

21. In a device of the class described and in combination with means for holding articles to be washed, a main driving-shaft, a cam thereon, a reciprocating bar, a cleaner on one end thereof, a shifting-lever connected at one end with said bar and at the other end controlled by said cam and adjustable pivotal means between the ends of said shifting-lever whereby the degree of movement imparted to the reciprocating bar may be varied between certain limits, substantially as described.

22. In a device of the class described, a carrying-wheel having receptacles near its periphery, a driving-shaft for said wheel, a sliding ejecting-bar mounted so as to be movable across said receptacles and parallel to the plane of said wheel when in a given position and means connecting said bar with the driving-shaft for operation, substantially as described.

23. In a device of the class described, a carrying-wheel having receptacles near its periphery, a driving-shaft for said wheel, a sliding ejector-bar, an ejecting-finger carried by said bar and so placed as to move across said receptacles when in one position and means connecting said bar with the driving-shaft for operation, substantially as described.

24. In a device of the class described, a carrying-wheel and a driving-shaft therefor, in combination with a sliding ejector-bar, a pivoted operating-lever therefor having two

arms radiating from the pivot so as to straddle the driving-shaft and a pin carried by said shaft and adapted to impinge successively on the two arms of said operating-lever, substantially as described.

25. In a device of the class described, a plurality of carrying-wheels, a driving-shaft for rotating them, a sliding ejector-bar, ejecting-fingers carried by said bar and arranged to reciprocate parallel and near to each wheel and means for connecting said shaft with said ejector-bar for its operation, substantially as described.

26. In a device of the class described, a tank,

a shaft over said tank, a carrying-wheel adjustably secured on said shaft and a guard-plate parallel to said wheel and also supported on said shaft, substantially as described.

27. In a device of the class described, a tank, a shaft over said tank, a carrying-wheel secured on said shaft and a guard-plate adjustably secured on said shaft parallel to said wheel, substantially as described.

WILLIAM A. ROUTSON.

Witnesses:

H. S. MacKAYE,
FLORENCE PICK.