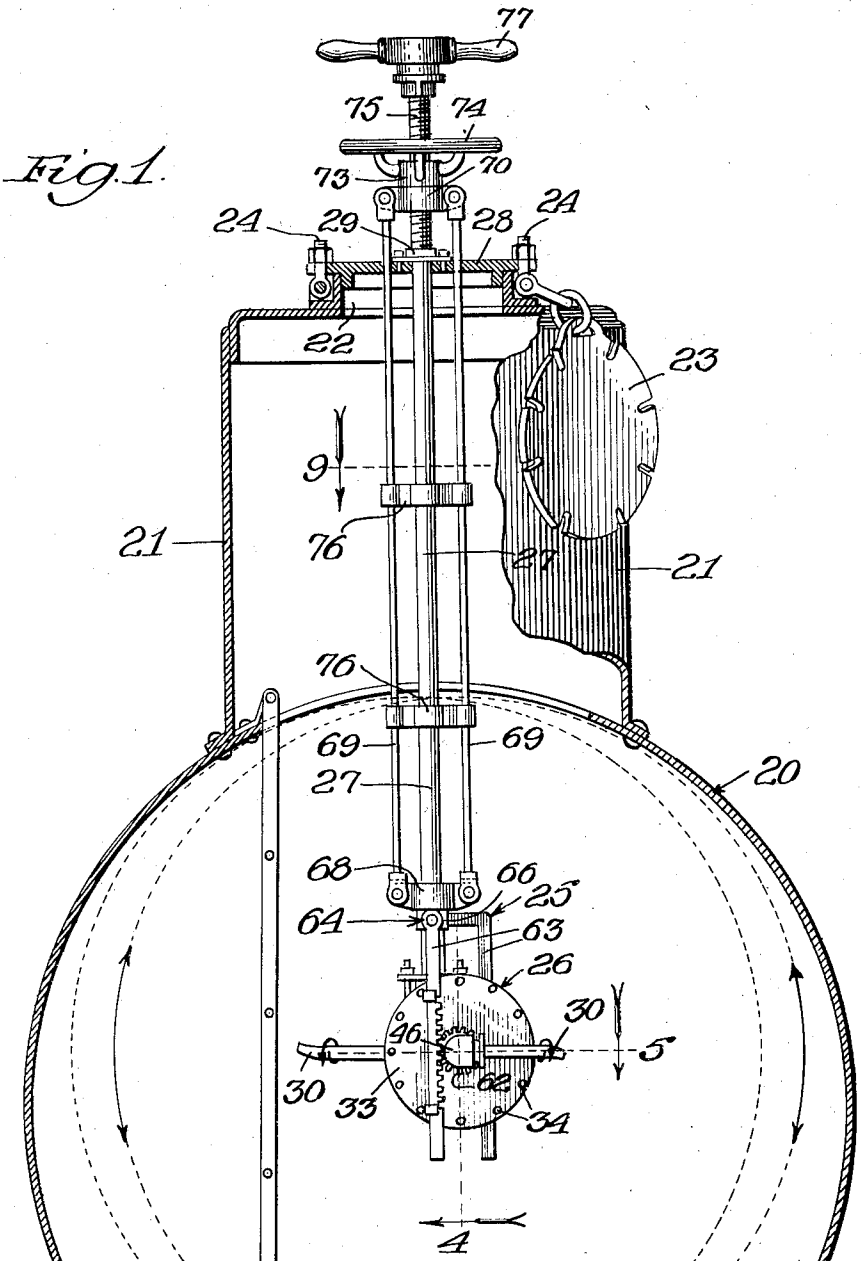
Nov. 10, 1931. F. H. PARIS 1,831,029

TANK CAR WASHER

Filed Aug. 12, 1929 4 Sheets-Sheet 1

Fig. 1.



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TANK CAR WASHER

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Fig. 3.

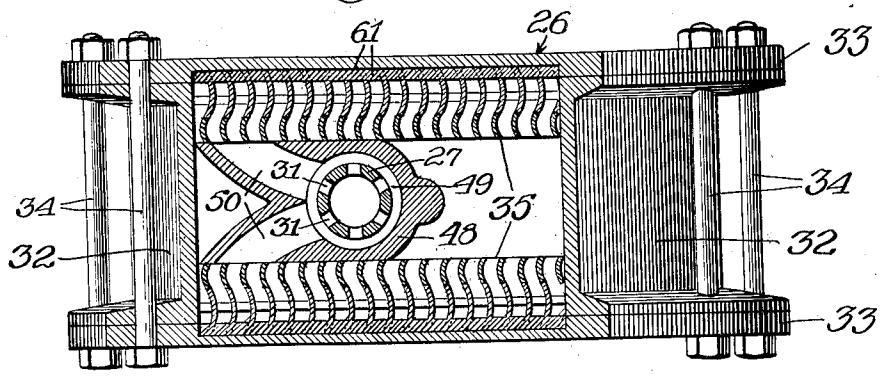
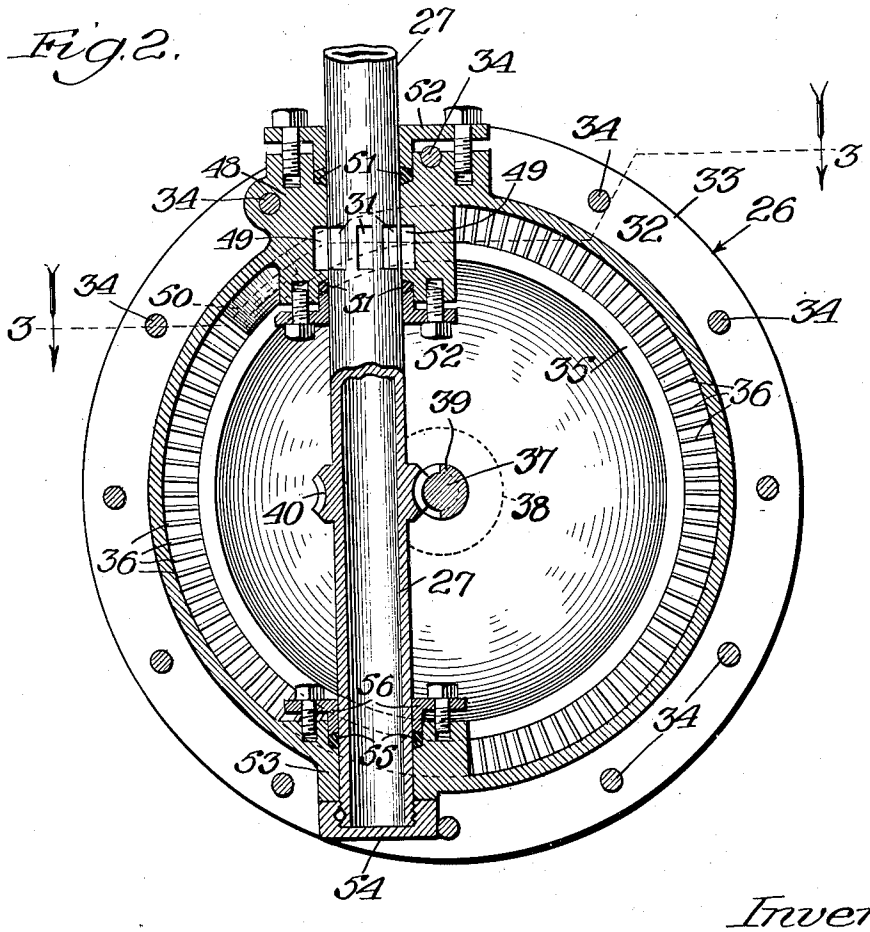


Fig. 2.



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TANK CAR WASHER

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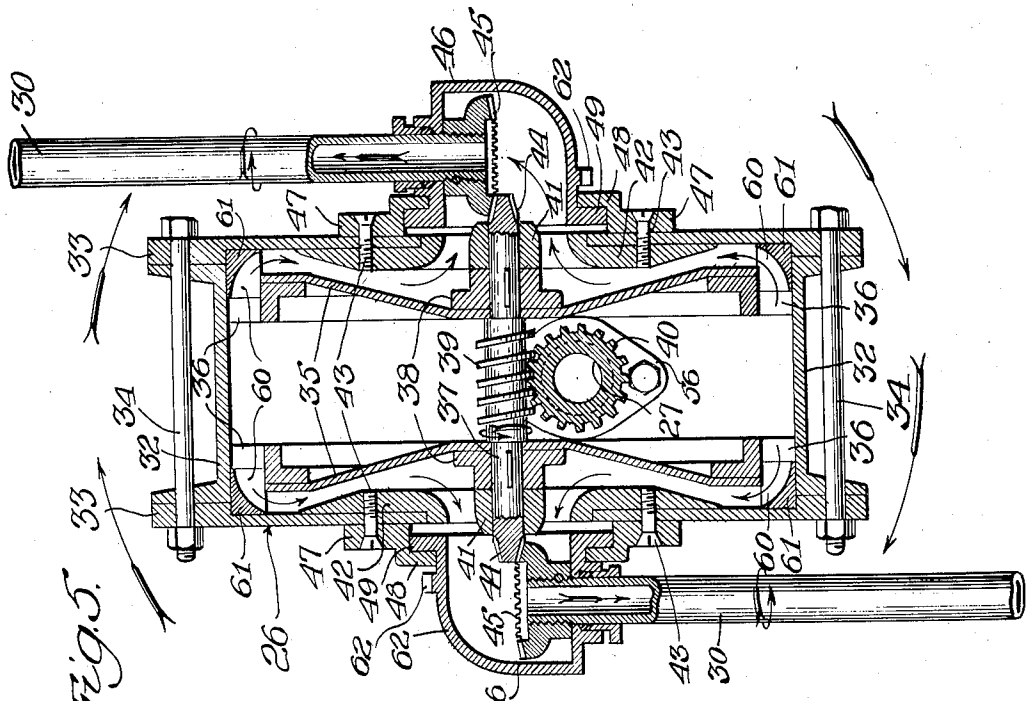


Fig. 5.

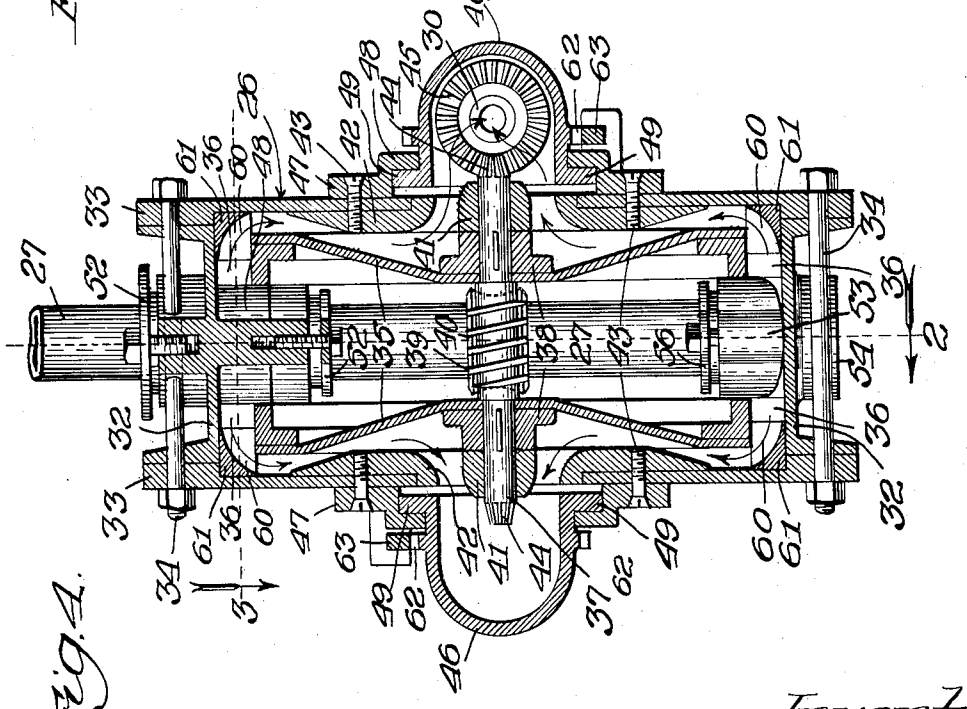


Fig. 4.

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TANK CAR WASHER

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Fig. 6.

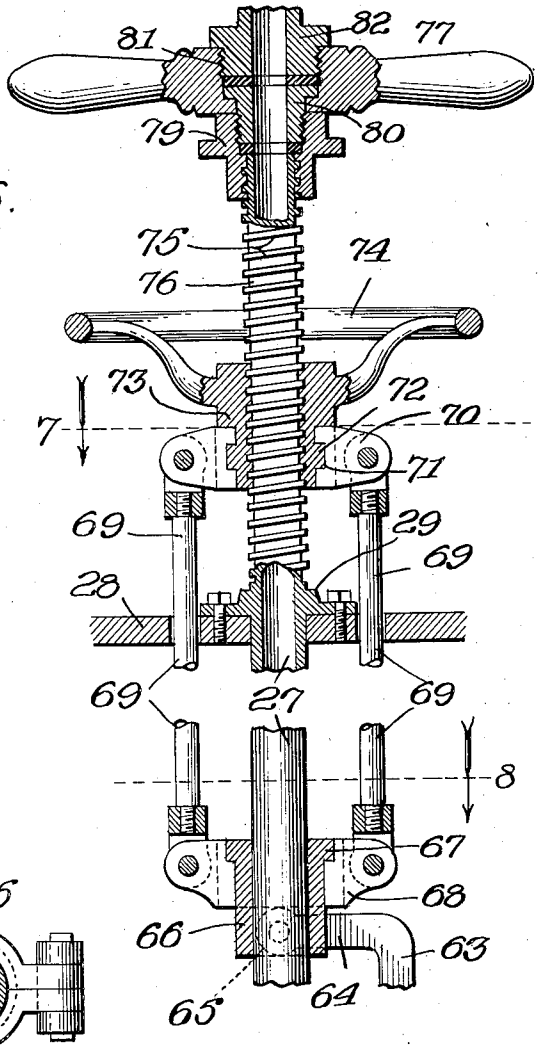


Fig. 10.

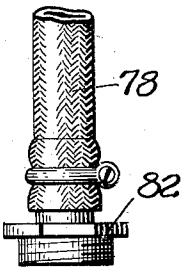


Fig. 7.

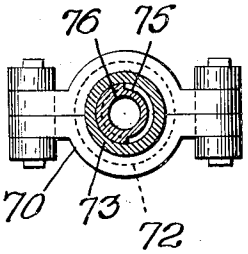


Fig. 8.

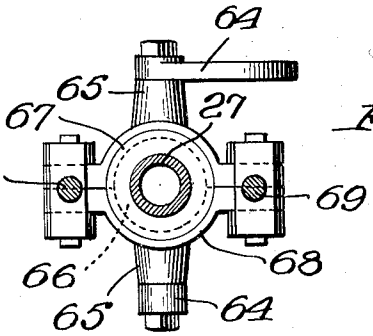
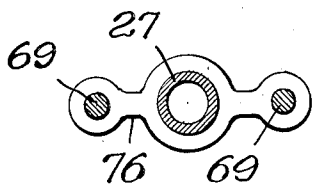


Fig. 9.



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UNITED STATES PATENT OFFICE

FRED H. PARIS, OF ALTON, ILLINOIS, ASSIGNOR TO STANDARD OIL COMPANY, OF WHITING, INDIANA, A CORPORATION OF INDIANA

TANK CAR WASHER

Application filed August 12, 1929. Serial No. 385,331.

This invention relates to certain new and useful improvements in mechanism for washing the interior of all types of receptacles or tanks and is particularly adapted to be used in connection with railway tank cars employed for the transportation of hydrocarbon oils.

This invention will be fully understood from the following description illustrated in the accompanying drawings, in which—

Figure 1 is a vertical cross-sectional view of a tank of the type used on the standard railway tank car, the device of the present invention being shown within the same;

Fig. 2 is a vertical sectional view taken on line 2 of Fig. 4;

Fig. 3 is a cross-sectional view taken on lines 3 of Figs. 2 and 4;

Fig. 4 is an enlarged vertical sectional view taken on line 4 of Fig. 1;

Fig. 5 is an enlarged horizontal sectional view taken on line 5 of Fig. 1;

Fig. 6 is an enlarged fragmentary sectional view of the upper portion of the device;

Fig. 7 is a cross-sectional view taken on line 7 of Fig. 6;

Fig. 8 is a cross-sectional view taken on line 8 of Fig. 6;

Fig. 9 is an enlarged cross-sectional view taken on line 9 of Fig. 1;

Fig. 10 is an elevational view of a suitable means for connecting the conduit which supplies washing fluid to the washer.

Referring more particularly to the drawings: The numeral 20 designates a cylindrical tank of the type used on the standard railway tank car. This type of tank is provided with an upper dome 21 which is located substantially in the middle of the tank and which is provided with a manhole 22 adapted to be closed by a cover 23. The cover 23 is secured in closed position by one or more swing bolts 24.

The washing device of the present invention is designated as a whole at 25, and comprises a drum-like housing 26 rotatably mounted upon a tubular shaft 27. The upper portion of the shaft 27 is secured to a circular plate 28 by a bracket 29. The plate 28 serves to close the manhole 22 and at the same time functions to support the washing device within the tank 20. Each side of the housing 26 is provided with a nozzle 30, which nozzles are adapted to be pivoted in a vertical plane relative to the housing, and rotated in the line of their axes. It is to be noted that the nozzles 30 are somewhat curved at their ends. The washing fluid is supplied to the device through the tubular shaft 27 which is provided with a plurality of ports 31 which communicate with the interior of the housing 26. The washing fluid is discharged from the interior of the housing through the nozzles 30.

The housing 26 comprises a cylindrical body portion 32, the ends of which are closed by a pair of circular plates 33 which are removably secured by means of a plurality of tie bolts 34. The housing 26 is rotated to the tubular shaft 27 by means of the following mechanism. A pair of turbine wheels 35, provided with a plurality of blades 36, are mounted within the housing upon opposite sides of the tubular shaft 27. The turbine wheels 35 are mounted upon a shaft 37. The middle portion of the shaft 37 is provided with a worm 39 which engages a worm gear 40 keyed to the tubular shaft 27. The turbine shaft 37 is journaled in bearings 41 which bearings are carried in a pair of spider plates 42. These spider plates 42 are secured to the housing side plates 33 by a plurality of screws 43. The side plates 33 are provided with central apertures which are somewhat larger in diameter than are the bearings 41 of the spider plates 42. The ends of the turbine shaft 37 protrude beyond the bearings 41 and through the apertures in the side plates to a point outside the side walls 33, each end of the shaft 37 being provided with a small pinion or miter gear 44. Each miter gear 44 meshes with a larger bevel gear 45 carried by the inner end of each of the nozzles 30, each nozzle being suitably journaled in a leak-proof manner in one end of a right-angled hollow elbow member 46. The other end of each of the elbows 46 is journaled on the housing side plates 33 in a leak-proof manner. In the construction shown, a split annular ring 47 is secured to the housing side plate 33

by the screws 43. This ring 47 is provided with an offset flange 48 which engages an annular flange 49 formed on the elbow 46. If desired, these flanges may have a ground fit or a suitable packing may be interposed between them.

From the foregoing description it will be seen that when the turbine wheels 35 are rotated, the worm 39 will drive against the worm gear 40 to rotate the housing 26 upon the tubular shaft 27. At the same time the pinion gears 44 will drive the bevel gears 45 causing the nozzles 30 to rotate upon their axes.

The turbines 35 are driven by the cleaning fluid which is supplied through the tubular shaft 27. As already described, this fluid is discharged into the housing from the shaft 27, through a plurality of ports 31. The fluid is directed against the blades 36 of each of the turbines 35 by means of the following structure. The upper portion of the cylindrical housing member 32 is provided with a box 48 disposed between the turbines 35. The tubular shaft 27 is journaled within the box 48, the box being provided with a chamber 49 which communicates with the ports 31. A pair of passages 50 lead from the chamber 49. The mouths of each of these passages 50 are positioned adjacent the blade path of each of the turbine wheels 35, whereby the cleaning or washing fluid will be directed in streams against the blades 36 of the turbines. The box 48 may be provided with suitable packing 51 surrounding the tubular shaft 27, the packing being retained by gland plates 52. The lower portion of the housing 26 is journaled upon the shaft 27 by means of a box 53 secured to the cylindrical member 32. The lower end of the shaft 27 protrudes below the box 53 and is closed by means of a cap 54 which functions as a thrust bearing between the shaft 27 and the box 53. A leak-proof seal is provided between the box 53 and the shaft 27 by a packing 55 retained by a gland plate 56.

A plurality of stationary blades 60 are carried by the side walls 33, and are disposed immediately adjacent the blades 36 of the turbines 35. A series of curved deflectors 61 are mounted between each of the blades 60, so that the fluid discharged from between the turbine blades 36, and caught between the blades 60, will be directed in a path between the outside of the turbines 35 and the side plates 33 to the elbows 46 and the nozzles 30.

The nozzles 30 are lowered or elevated by means of the following structure. The elbows 46 are each provided with a gear 62 each of which is engaged by one of a pair of toothed racks 63 secured to the housing 26 for vertical sliding movement relative thereto. The upper ends 64 of the rack 63 are each connected to one of a pair of oppositely extending arms 65 provided on the sleeve 66 journaled upon the shaft 27 for rotatable and slidable movement relative thereto. The upper end of the sleeve 66 is provided with a horizontally extending flange 67. A split collar 68 is journaled on the sleeve 66, and is retained against vertical movement relative thereto by the flange 67 and the arms 65. A pair of rods 69 are connected at their lower ends to the collar 68 and are connected at their upper ends to a split collar 70. The collar 70 is provided with a groove 71 which engages an annular flange 72 formed on a hub 73 of a hand wheel 74. The collar 70 is journaled on the hub 73. The hub 73 is provided with a threaded bore which engages the threads 75 formed upon the upper portion of the tubular shaft 27. One or more suitable guide brackets 76 may be mounted upon the shaft 27 to guide or brace the rods 69. By means of the foregoing structure, the elbows 46 may be rotated to cause the nozzles 30 to be pointed upwardly or downwardly, as desired, by rotating the hand wheel 74.

The upper end of the tubular shaft 27 is provided with a suitable handle 77 which is used when inserting the washing device into the tank to be washed. In order to quickly attach a flexible washing fluid supply conduit 78 to the tubular shaft 27, the handle 77 is provided with a hub 79 which is firmly secured to the shaft 27. The handle 77 normally is free to rotate upon this hub 79, the handle being secured thereto by means of a flanged nipple 80 which has threaded engagement with the hub 79. The upper side of the handle 77 is provided with a threaded bore 81 adapted to receive the threaded end of a hose connecting nipple 82. Thus by rotating the handle 77, the flexible conduit 78 may be rapidly connected with, or disconnected from, the washing device.

The operation of the device should be apparent from the foregoing description. Any suitable cleaning fluid, such as hot water, oil or chemical solution, may be forced into the tubular shaft 27. The fluid is discharged from the passages 50 causing the turbine wheels 35 to rotate. The liquid then flows out the nozzles 30. The rotation of the turbines 35 causes the housing 26 to rotate around the shaft 27 so that the streams of liquid issued from the nozzles 30 will be directed in all directions in a horizontal plane. The rotation of the turbines also causes the nozzles to be rotated upon their axes. The slight curve at the ends of the nozzles causes the stream of liquid from each nozzle to travel in a circular path during the rotation of the nozzles upon their axes, so that a substantial portion of the tank walls will be washed with one adjustment of the nozzle elevating means. As the various upper or lower portions have been cleaned, the nozzles may be elevated or lowered at will, merely by turning the hand wheel 74.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be construed therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

I claim:

1. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing rotatably mounted upon said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on said housing and adapted to be pointed in several directions relative to said housing, said nozzle having communication with the interior of said housing whereby a stream of the washing fluid is discharged from said nozzle, means for rotating said housing upon said support and means for selectively pointing said nozzle in any one of its several directions during the rotation of said housing upon said support.

2. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing rotatably mounted upon said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on said housing and adapted to be pointed in several directions relative to said housing, said nozzle having communication with the interior of said housing whereby a stream of the washing fluid is discharged from said nozzle, means for rotating said housing upon said support and means for selectively pointing said nozzle in any one of its several directions during the rotation of said housing upon said support, said means comprising a toothed rack and a gear on said nozzle meshing with the teeth on said rack.

3. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing carried by said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on said housing constructed and arranged to be pointed in several directions relative to said housing and rotated on its longitudinal axis, said nozzle being in communication with the interior of said housing and having its orifice inclined at an angle relative to its longitudinal axis, means for pointing said nozzle in its several directions, and mechanism, operated by the flow of the washing fluid through said housing, for axially rotating said nozzle.

4. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing journaled on said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on said housing constructed and arranged to be pointed in several directions relative to said housing and rotated on its longitudinal axis, said nozzle being in communication with the interior of said housing and having its orifice inclined relative to the longitudinal axis of said nozzle, means for pointing said nozzle in its several directions, and mechanism, operated by the flow of the washing fluid through said housing, for axially rotating said nozzle and for rotating said housing relative to said support.

5. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing journaled on said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a discharge for said housing whereby a stream of the washing fluid issues from said housing, a shaft journaled within said housing and having an axis of rotation which is substantially at right angles to the axis of rotation of said housing upon said support, a rotatable turbine wheel secured to said shaft within said housing and adapted to be driven by the washing fluid flowing therethrough, and driving means between said shaft and said support whereby said housing is rotated relative to said support.

6. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing journaled on said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle carried by said housing and having communication with the interior thereof, whereby a stream of the washing fluid is discharged from said housing a shaft journaled within said housing and having an axis of rotation which is substantially at right angles to the axis of rotation of said housing upon said support, a rotatable turbine wheel secured to said shaft within said housing and adapted to be rotated by the washing fluid flowing through said housing, a worm secured to said shaft, and a worm gear secured to said support and engaged by said worm, whereby said housing is rotated relative to said support upon the rotation of said turbine wheel and said shaft.

7. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing carried by said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on each of opposite sides of said housing for rotation relative to said housing, each of said nozzles having communication with the interior of said housing whereby a stream of the washing fluid is discharged through each of said nozzles, a shaft journaled in said housing and provided at each of its ends with a gear, a rotatable element secured to said

shaft within said housing and adapted to be driven by the washing fluid flowing therethrough whereby said shaft is rotated, and a gear secured to each of said nozzles, one of said last named gears meshing with the gear on one end of said shaft and the other of said last named gears meshing with the gear on the other end of said shaft whereby said nozzles are rotated.

8. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing journaled on said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on said housing for axial rotation, said nozzle having communication with the interior of said housing whereby a stream of the washing fluid is discharged through said nozzle, a shaft journaled within said housing and having an axis of rotation which is substantially at right angles to the axis of rotation of said housing upon said support a rotatable turbine wheel secured to said shaft within said housing and adapted to be rotated by the washing fluid flowing through said housing, driving connections between said shaft and said nozzle, and driving connections between said shaft and said support comprising a worm carried by said shaft and a worm-gear carried by said support, whereby said nozzle will be rotated axially and said housing will be rotated relative to said support, upon the rotation of said turbine wheel and said shaft.

9. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing journaled on said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on said housing for axial rotation, said nozzle having communication with the interior of said housing whereby a stream of the washing fluid is discharged through said nozzle, a shaft journaled within said housing and having an axis of rotation which is substantially at right angles to the axis of rotation of said housing upon said support, a rotatable turbine wheel secured to said shaft within said housing and adapted to be rotated by the washing fluid flowing through said housing, and means for axially rotating the nozzle and rotating the housing relative to said support, comprising, a gear secured to said shaft, a gear carried by said nozzle and having engagement with the gear on said shaft, a worm secured to said shaft, and a worm gear secured to said support and having engagement with said worm.

10. In a device for washing the interior of closed receptacles, a housing, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled in said housing for rotation upon its longitudinal axis and adapted to be pointed in several directions relative to said housing during rotation of said nozzle, said nozzle being in communication with the interior of said housing and having its discharge orifice inclined relative to its axis of rotation, means for pointing said nozzle in any one of its several directions, and means for rotating said nozzle upon its longitudinal axis while it is pointed in any one of its several directions.

11. In a device for washing the interior of closed receptacles, a support, a housing rotatably mounted upon said support, means for supplying under pressure, a washing fluid to the interior of said housing, a nozzle journaled in said housing for rotation upon its longitudinal axis and adapted to be pointed in several directions relative to said housing during rotation of said nozzle, said nozzle being in communication with the interior of said housing and having its discharge orifice inclined relative to its axis of rotation, means for pointing said nozzle in any one of its several directions, means for rotating said nozzle upon its longitudinal axis while it is pointed in any one of its several directions, and means for rotating said housing upon said support.

12. In a device for washing the interior of closed receptacles, a support, a housing rotatably mounted upon said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled in said housing for rotation upon its longitudinal axis and adapted to be pointed in several directions relative to said housing during rotation of said nozzle, said nozzle being in communication with the interior of said housing and having its discharge orifice inclined relative to its axis of rotation, means for pointing said nozzle in any one of its several directions, and mechanism, operated by the flow of the washing fluid through said housing, for axially rotating said nozzle and for rotating said housing upon said support.

13. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing journaled on said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on said housing and adapted to be pointed in several directions relative to said housing, said nozzle having communication with the interior of said housing whereby a stream of the washing fluid is discharged from said nozzle, means operated by the flow of fluid through said housing for rotating said housing upon said support, and means for selectively pointing said nozzle in any one of its several directions during the rotation of said housing upon said support.

14. In a device for washing the interior of closed receptacles, a support adapted to be placed within the receptacle to be washed, a housing rotatably mounted upon said support, means for supplying, under pressure, a washing fluid to the interior of said housing, a nozzle journaled on said housing and adapted to be pointed in several directions relative to said housing, said nozzle having communication with the interior of said housing whereby a stream of the washing fluid is discharged from said nozzle, means operated by the flow of fluid through said housing for rotating said housing upon said support, and means for selectively pointing said nozzle in any one of its several directions during the rotation of said housing upon said support, said means comprising a toothed rack and a gear on said nozzle meshing with the teeth on said rack.

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