

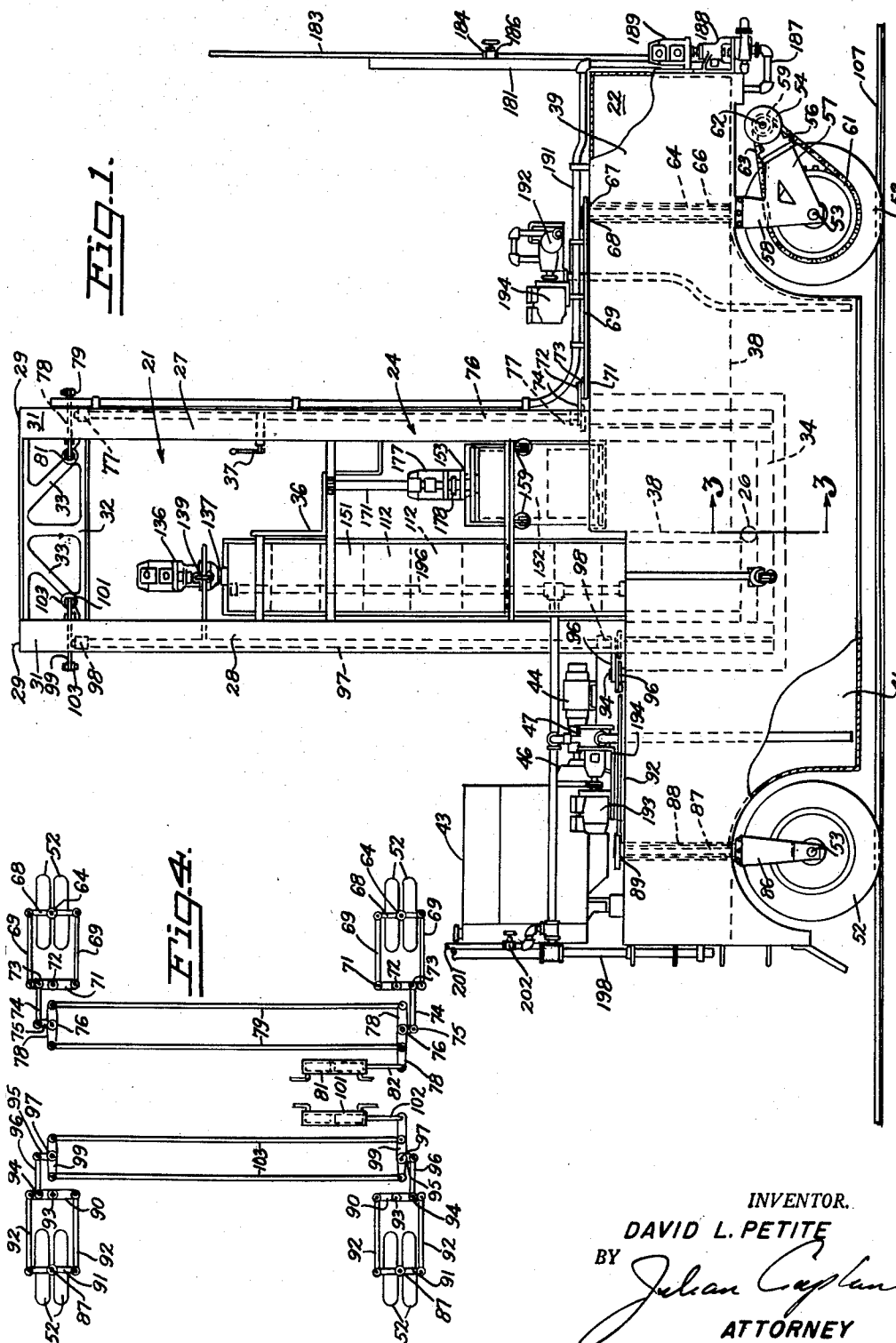
Dec. 23, 1958

D. L. PETITE
RAILROAD CAR WASHER

2,865,034

Filed June 7, 1955

5 Sheets-Sheet 1



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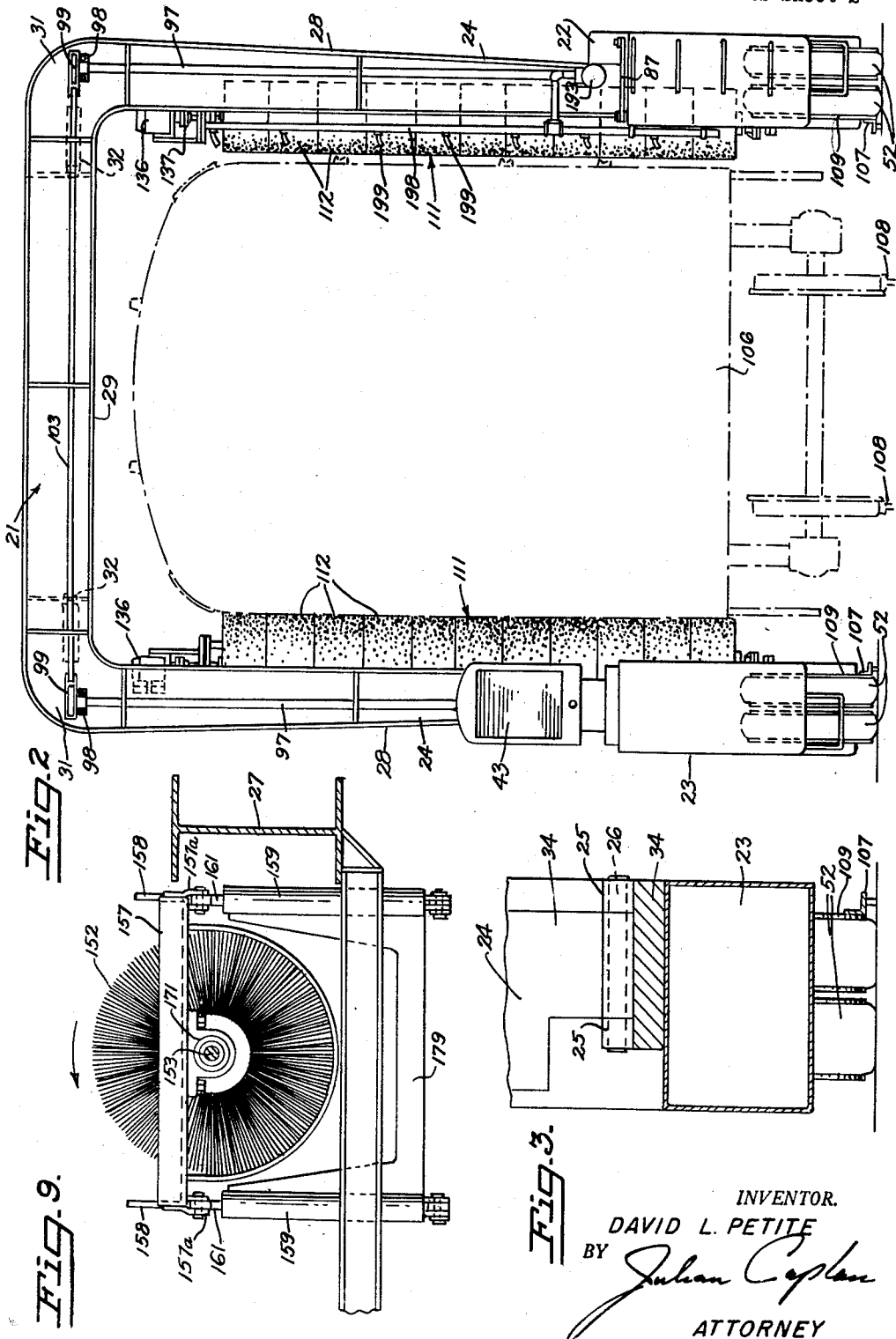


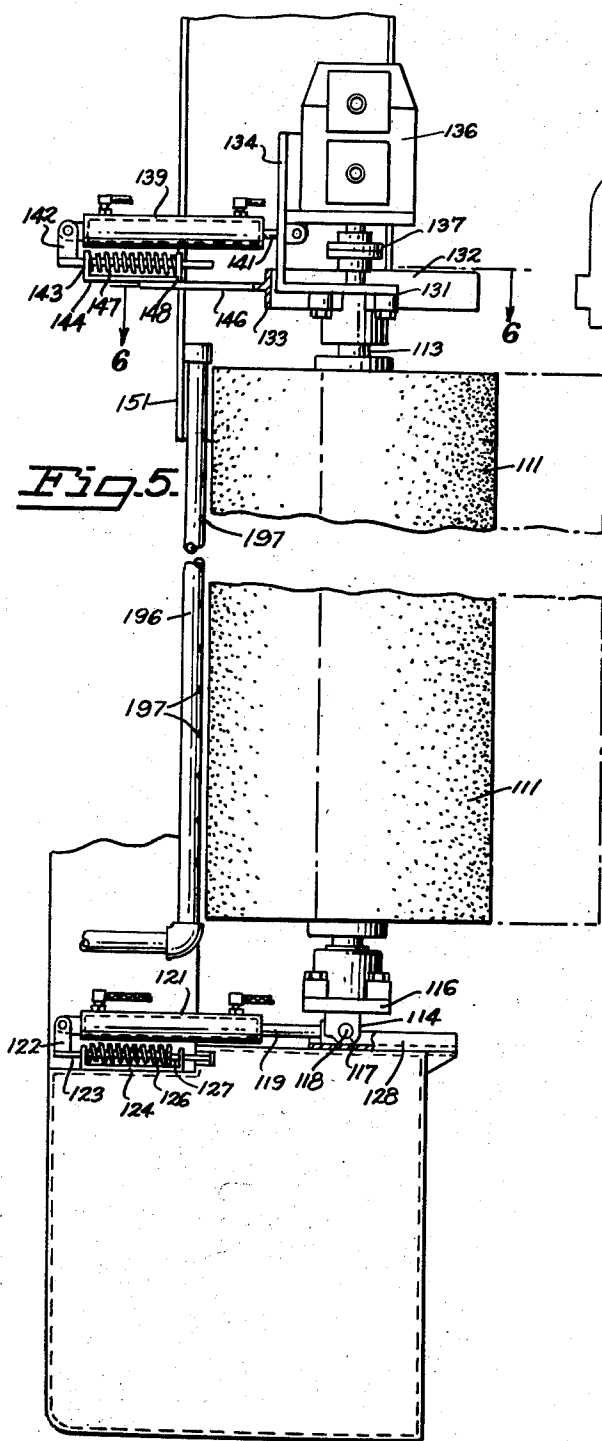
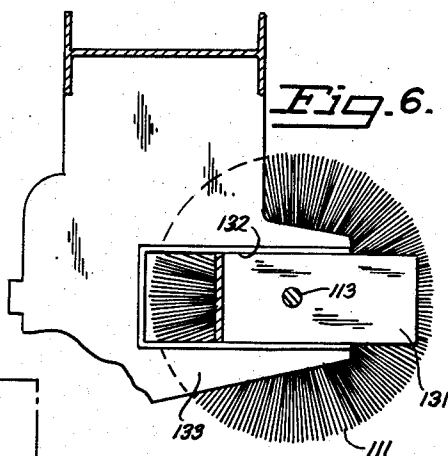
Fig. 3.

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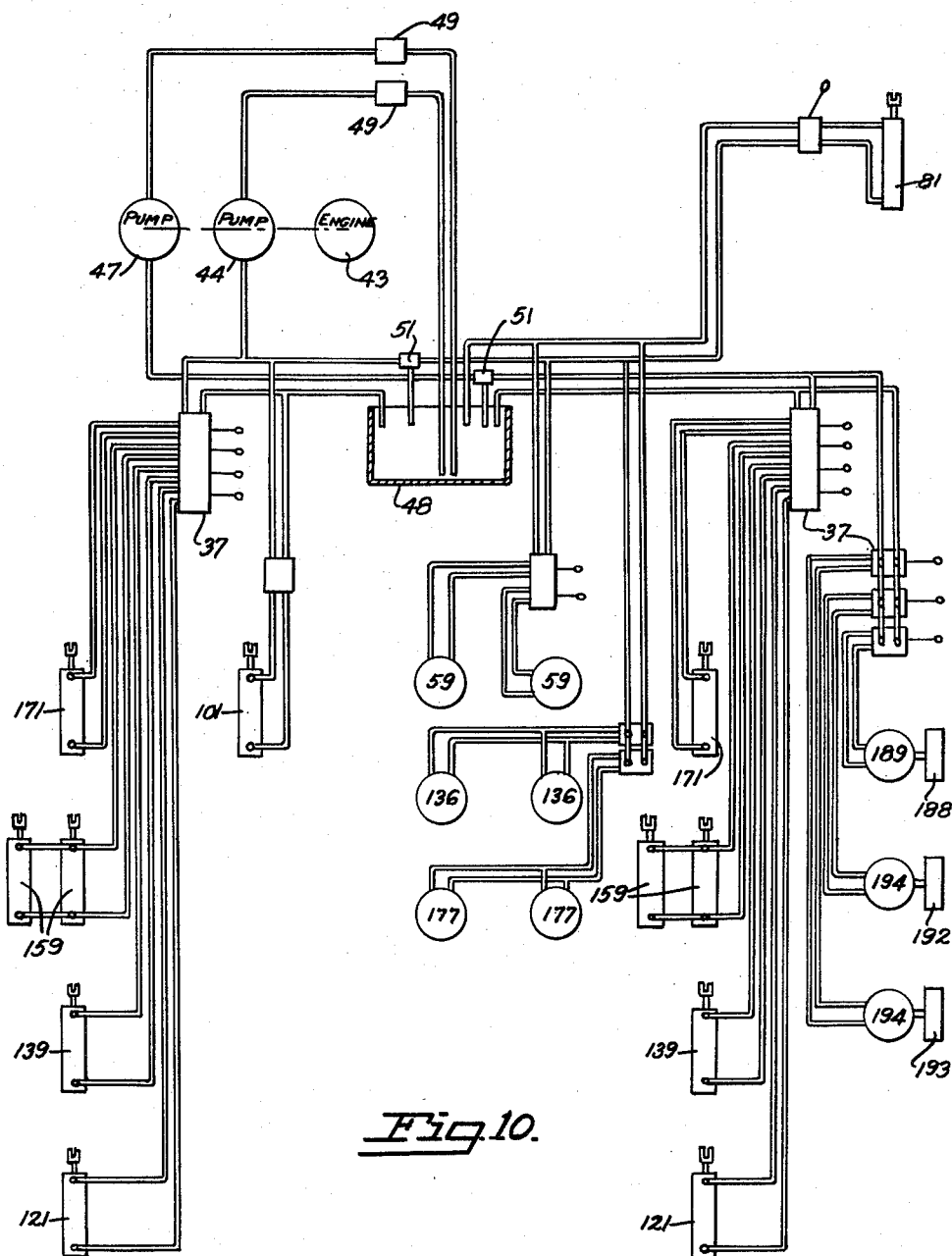
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5 Sheets-Sheet 5



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2,865,034

RAILROAD CAR WASHER

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3 Claims. (Cl. 15—53)

This invention relates to a new and improved mobile railroad car washer. More particularly, the invention relates to a self-contained unit which is self-propelled. Accordingly, it is not necessary in operating the car washer which is the subject of this invention to couple with water, air, or electric current lines. Sufficient storage capacity is included in the construction of the device so that as many as 37 regulation passenger cars may be cleaned without the necessity of refilling the storage tanks of the device.

One of the features and advantages of the present invention is the fact that the unit contains means for applying detergent to the sides of the car, then brushing the sides to clean the same, and finally spraying the sides with water to rinse the detergent and loosened dirt so that it may run down to the ground.

Another feature of the invention is the provision of one brush on each side of the device to clean the sides of the car and a separate brush to clean the car windows, which are frequently inset from the vertical plane of the car sides.

Still another feature of the invention is the provision of means for independently moving the side brushes in and out toward and away from the car body, and for raising and lowering, as well as moving inwardly and outwardly, the window brushes. The mounting of the brushes, hereinafter set forth in detail, insures application of uniform pressure both at the top and bottom of the car, even though the platform over which the machine travels is uneven or the tracks are so located that the car is not perpendicular to the platform.

One of the principal objects and advantages of the invention is the saving in time and labor over manual car washing operations. The present invention requires the use of two moderately skilled operators to replace the large crews conventionally required in car washing operations. At the same time, the invention eliminates the necessity of using a switching crew of locomotive engineer, fireman and switchman.

One of the chief features and advantages of the present invention over stationary car washers of this general type is the fact that it is not necessary to move the cars relative to the car washing machine, thereby considerably reducing the expense of operating the device, inasmuch as a switching crew is not required.

A further feature of the invention is the fact that its overall width is such that it can be moved between adjacent rows of railroad cars, even though the clearance between the cars is very slight. This feature of the invention makes it possible to employ the machine in conventional existing railroad yards with standard distances between adjacent tracks.

The machine is constructed with an elongated, narrow tank member on each side and an arch over the top of the car joining the tank members together. This construction insures lateral stability despite the narrow clearance between tracks and despite the considerable sideward thrust necessarily applied when pressure is applied to force the brushes against the sides of the car. The construction hereinafter described balances the thrust of the brush on one side of the car against that on the other, thus overcoming any tendency to tip over. The elongation of the tanks and the location of the mounting

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wheels on the extreme ends of the tanks resists longitudinal tipping.

A further advantage of the invention is a swivel mounting of one tank relative to the overhead arch and opposite tank which enables the machine to accommodate itself to unevenness of platforms and lack of perpendicularity of the car being washed to the platform.

Another feature of the invention is its extreme maneuverability, inasmuch as the front and rear wheels are independently steered, thereby making possible the use of the device while the cars are parked on curves and further making possible an abrupt turn which is required when the machine is moved from one row of cars to the next.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

Fig. 1 is a side elevation of the device partly broken away in section to reveal portions of the interior construction;

Fig. 2 is an end elevation;

Fig. 3 is an enlarged fragmentary vertical sectional view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary top plan of the steering mechanism;

Fig. 5 is a fragmentary, side elevation of one of the brushes used to wash the sides of a car, together with its mounting and maneuvering mechanism;

Fig. 6 is a sectional view taken substantially along line 6—6 of Fig. 5;

Fig. 7 is a side elevation of one of the window washing brushes, together with its mounting and maneuvering mechanism;

Fig. 8 is an end elevation of the structure of Fig. 7;

Fig. 9 is a top plan of the structure of Fig. 7; and

Fig. 10 is a schematic piping diagram of the hydraulic control and driving system.

The car washer comprises a frame on which are mounted rotary brushes and spraying equipment, as well as an engine, pumps and hydraulic control equipment, all as hereinafter set forth in greater detail. The frame comprises an arch 21 which extends over the top and down either side of a railroad car, and a tank 22, 23 on each side having an extended length and a width conforming to the clearances in a standard railroad yard. One vertical leg 24 of the arch 21 is fixed at the bottom to the righthand tank 22, and the other lower end of the arch is mounted on a swivel 26 rotatively received in a mounting bracket 25 secured at approximately the midpoint of the lefthand tank 23. The swivel mounting enables the machine to adapt itself to uneven contours.

The arch 21 comprises a fore and an aft inverted U-shaped member 27, 28 having a vertical leg 24 on each side, a horizontal span 29 which spans the roof of the car and a bend 31 at each of the corners. An upper longitudinal connector 32 is disposed on each side joining the fore and aft channels 27, 28 together. The connector 32, as best shown in Fig. 1, is provided with crossbraces 33 to tie the two channels together in a rigid structure. Bottom longitudinal connectors 34 tie together the lower ends of the two legs 24 on each side. The arches 21 carry seats 36 for the operators elevated well above the tank so as to improve visibility, and positioned immediately in front of such operators' seat is a control bank 37 of hydraulic valves which control the various hydraulic cylinders, as hereinafter described. The machine requires the service of only two operators, one for each side, who control the speed and steer the machine, move the brushes in and out, raise and lower the window-wash-

ing brushes, and control the flow of detergent and rinse water.

The righthand tank member 22 is formed with a dividing compartment 38 comprising a detergent tank 39 and a water tank 41. The lefthand tank 22 comprises a water tank.

Mounted on the lefthand tank member 23 is a gasoline engine 43 of conventional construction which is connected to a hydraulic pump 44, 47, with a clutch 46 interposed between the motor and the pump. The pump 44, 47 has a high pressure stage 44 and a low pressure stage 47. Pumps 44, 47 draw hydraulic fluid from a hydraulic fluid tank 48 mounted on the lefthand tank member 23 and by means of conduits which are shown in detail in the piping diagram of Fig. 10, the fluid is conducted to the various hydraulic motors and cylinders hereinafter described, with valves in the bank of valves 37 at the control stations controlling flow of hydraulic fluid through the various conduits. Filter 49 and pressure relief valve 51 are included in each circuit in conventional manner.

Each tank unit 22, 23 provides mounting for a pair of wheels 52 at the front and back, each pair of wheels being mounted on an axle 53. The front wheels are driven by means of dual vane hydraulic motors 54 mounted on support blocks 56 on the wheel motor supports 57 attached to the front wheel forks 58 in which front axles 53 are mounted. Sprockets 59, 61 are mounted on the motor shaft 62 and on the front axles 53 and connected by roller drive chain 63.

The front wheel forks 58 project downwardly from vertical steering shaft 64 which extends upwardly through the tank 22, 23, being encased in pipe 66 to protect it from the action of the contents of the tank. The upper end of the shaft 64 carries a bearing 67 on which is mounted a transversely extending steering control arm 68. A pair of tension rods 69 extend rearwardly from the front steering arm 68 and are attached to the opposite sides of the rear steering control bar 71, which is pivotally mounted by means of pivot 72 on the upper surface of the tank 22, 23. Rear steering control bar 71 is controlled by steering eccentric 73 attached thereto, which is in turn pivotally connected to a connecting rod 74 connected to crank 75 on the lower end of upper steering spindle 76 which is rotatably mounted in the front channel section 27 of arch 21 by means of pillow blocks 77. Upper steering bar 78 on the upper ends of spindles 76 extends fore and aft at the upper end of the arch 21 and the upper steering bars 78 on opposite sides of the machine are connected by upper tension steering rod 74 so that the two front wheels 52 turn together.

Steering of the front wheels 52 is accomplished by means of a double-acting hydraulic steering cylinder 81 which is mounted on the span 29 of the front arch 27 with its piston rod 82 pivotally connected to the righthand upper steering bar 78. Thus by control of the flow of hydraulic fluid into the front wheel steering cylinder 81, the front wheels 52 may be turned in unison.

The rear wheels 52 are also turnable. Accordingly each rear axle 53 is mounted in rear wheel fork 86 which is connected to the lower end of vertically disposed steering shaft 87 encased in a pipe 88 inside the tank 22, 23. The upper end of shaft 87 carries a steering bearing 89 on which is mounted a transversely extending steering control arm 91, to the opposite ends of which are pivotally connected longitudinally extending lower steering tension bars 92. The forward ends of tension bars are connected to transverse steering control bar 90, mounted on pivot 93. Bar 90 is controlled by eccentric 94 attached thereto and which is pivotally connected to connecting rod 96 connected to crank 95 on the lower end of rear upper steering spindle 97 which is journaled in the rear channel 28 of arch 21 by means of pillow blocks 98. The upper end of upper steering spindle 97 carries an upper steering bar 99 extending longitudinally, which is oscillated by means of rear wheel double-acting hydraulic steering cylinder 101 having its piston rod 102 connected thereto.

In order to insure that the rear wheels turn in unison, the opposite upper steering bars 99 on opposite sides of the arch are connected by transversely extending rear upper tension steering rods 103.

To maintain proper alignment alongside the car 106, longitudinally extending angles 107 are provided which parallel the tracks 108 where the car wheels are mounted on the platform, the vertical flanges of the angles facing outwardly. The wheels 52 are provided with metal annular wearing disks 109 which bear against angles 107 and hence hold the wheels 52 in proper alignment parallel to tracks 108.

The main or side brushes 111 are made up of a plurality of brush sections 112. Each brush section 112 is mounted on vertical brush shaft 113, the lower end of which is rotatably mounted in a bearing block 114 received in a fitting 116 having a clevis 117 on its lower surface pivotally connected by means of pin 118 to the outer end of horizontally transversely disposed piston rod 119 of hydraulic cylinder 121. Cylinder 121 is pivotally connected at its opposite end to clevis 122 which carries counter-balance 123 slidably received in spring frame 124 fixed to tank 22, 23. Helical spring 126 surrounding rod 123 inside spring frame 124 and bearing against the outer end of spring frame 124 at one end a washer 127 fixed to rod 123 at the other counterbalances the weight of the brush. Thus as hydraulic pressure is applied to the opposite ends of cylinder 121, bearing block 114 is moved in or out, being guided by the transversely disposed channel 128 fixed to tank 22, 23 so that brush 111 is moved toward and away from the sides of the car being washed. Channel 128 supports the weight of the brush, its driving motor 136 and the bearings at either end of shaft 113.

The upper end of brush shaft 113 is rotatably received in a bearing block 131 which slides in the throat 132 of a C-shaped horizontally disposed guide frame 133, which controls transverse inward and outward movement of the upper end of brush 111 with respect to the side of the car being washed. Guide frame 133 guides in and out movement of the upper end of the brush 111 and also transmits the torque of rotation of the brush to the arch 21. The upper end of bearing block 131 is connected to a motor mounting support 134 which carries a hydraulic motor 136 and a coupling 137 connecting the motor to the shaft 113. Motor 136 is driven from pump 44 and is controlled by valve 138. Hydraulic cylinder 139 controls inward and outward movement of the upper end of the brush 111. The outer end of the piston rod 141 is pivotally connected to motor mounting support 134. The opposite end of cylinder 139 is pivotally connected to clevis 142 which is attached to transversely extending rod 143 received in spring bracket 144 which is mounted on an extension 146 of the C-shaped guide frame 133. Spring 147 inside bracket 144 surrounds rod 143 and bears against bracket 144 at one end and washer 148 connected to rod 143 at the other to counterbalance the weight of the brush 111.

The two cylinders 121 and 139 operate independently and by manipulation of the controls governing the flow of hydraulic fluid to said cylinders, the brush 111 may be maintained in vertical position and moved in and out toward the side of the car, or may be tilted to conform to the contour of the car, depending upon the width and the shape of the particular car being washed. The operator is positioned so that he can observe the contour of the individual cars and can manipulate the brushes properly for inward and outward movement of each end thereof. In a preferred embodiment of the invention, the maximum travel of each brush is approximately seven inches. The brush 111 is surrounded by an arcuate sheet metal shield 151 fixed to arch 21 which protects the operator from splash of the water as the brushes rotate.

Separate brushes 152 may be provided to wash the

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car windows. Frequently the windows of railway cars are recessed relative to the sides of the car, and, further, the elevation of windows of various cars may vary. Accordingly the window brushes 152 are made movable independently of the side brushes 111 and are vertically adjustable, as hereinafter appears. The brush 152 is mounted on a shaft 153. The upper and lower ends of the shaft 153 are received in bearing blocks 154 and 156, respectively, which are mounted in longitudinally extending horizontal frame members 157 connected to vertical members 158 at the front and rear of the brush. A pair of horizontal transversely disposed hydraulic cylinders 159 are provided for each window brush 152 to control inward and outward movement, one in front of and one behind the brush. The piston rods 161 are pivotally connected to vertical brush frame members 158 by clevises 157^a. The mounting of piston rods 161 approximately at the center of vertical members 158 insures that the brushes 152 will bear against the windows in proper parallel position and with equal pressure at top and bottom. Bearing stop 160 on the tank 22, 23 limits inward movement of the lower end of the lower brush bearing block 156. The opposite end of each cylinder 159 is pivotally connected to clevis 162 which carries spring rod 163 slidably received in spring frame 164 which is mounted on the arch 21. Helical spring 166 surrounding rod 163 and bearing against spring frame 164 and washer 167 on rod 163 counterbalances the weight of the brush.

Vertical movement of each brush 152 is controlled by vertically disposed cylinder 171, the upper end of which is pivotally connected to channel 172 attached to arch 21. The lower end of the piston rod 173 of cylinder 171 is pivotally connected to clevis 174 which is carried by motor mounting bracket 176 attached to top horizontal brush frame member 157. By control of the hydraulic cylinder 171, the elevation of motor mounting bracket 176 and brush shaft 153 may be adjusted for variations in height of the windows of the car 106. The brush shaft 153 is rotated by means of hydraulic motor 177 mounted on the motor bearing mounting bracket 176 and connected to shaft 153 by coupling 178. Twisting of the mounting for the window brush 152 is restrained by means of crossbracing 179 which rigidly connects the opposite cylinders 159.

Detergent of a conventional type used in railway car washing is sprayed on the sides of the car 106 by means of vertically disposed pipes 181 having inwardly directed nozzles 182 on either side of the car. In order to accommodate cars of different heights, an auxiliary pipe 183 is disposed side by side with the main detergent pipe 181, a valve 184 controlling flow through a branch 186 which supplies the auxiliary pipe 183. Detergent is pumped from detergent tank 39 through ceramic pipe 187 to centrifugal pump 188 which is driven by hydraulic motor 189. The discharge from pump 188 is diverted partly to pipe 181 on the righthand side and partly through conduit 191 which extends around arch 21 to the detergent pipe 181 on the lefthand side. The detergent is applied in advance of the brushes to permit the chemical to act to loosen the dirt before the brushes contact the same.

Water is pumped from tank 41 by centrifugal water pumps 192 and 193, on the left and righthand sides of the machine, respectively. Pump 193 is located to the rear of arch 21, but because of the space occupied by engine 43 and pumps 44—47 on the left side, pump 192 is located forwardly of the arch 21. Pumps 192, 193 are driven by hydraulic motors 194. Part of the water discharged by pumps 192 and 193 is diverted by pipes 196 and sprayed by nozzles 197 on brushes 111 to improve the cleaning action. The rest of the water is conveyed to vertically disposed rinse pipes 198 disposed on either side at the rear of the machine and provided with nozzles 199 to rinse the sides of the car after brushing.

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Pipes 198 are used for cars of standard height, but parallel auxiliary rinse pipes 201 of extended length are used by higher cars, valve 202 controlling flow to the auxiliary pipes 198.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A railway car-washing machine comprising a first narrow, elongated tank member on one side of said machine, a second narrow, elongated tank member on the opposite side of said machine, an arch attached at the lower ends to said tank members and shaped to span the roof of a railway car, said arch being rigidly fixed to at least one said tank member, a vertically disposed rotary side brush mounted on each leg of said arch arranged to scrub the sides of a car over which said arch moves, a prime mover on said machine, at least one hydraulic pump driven by said prime mover, hydraulic traction means mounted on each of said tank members to advance said machine, first means for independently moving the upper end of each of said side brushes perpendicularly inward and outward relative to the side of the car being washed, second means for independently moving the lower end of each of said side brushes perpendicularly inward and outward relative to the side of the car being washed, side brush drive means for independently rotating each said side brush, a rotary window brush on each side mounted on each leg of said arch arranged to scrub the windows of said car, a central shaft for said window brush, third means for raising and lowering said shaft, fourth means for independently moving each window brush inward and outward, window brush drive means for independently rotating each of said window brushes, control means for independently manually controlling flow of hydraulic fluid from said pump to each of said traction means, first means, second means, third means, fourth means, side brush drive means, and window brush drive means.

2. A machine according to claim 1, which further comprises independent steering means for the front and rear of each said tank member, said steering means being hydraulically actuated, and steering control means for controlling fluid flow from said pump to said steering means.

3. A machine according to claim 1, which further comprises a detergent tank on at least one of said tank members, detergent spray pipes mounted on each said tank member in advance of said side brushes, a detergent pump for drawing detergent from said detergent tank and discharging detergent through said detergent spray pipes, a water tank on at least one of said tank members, rinse pipes mounted on each said tank member behind said side brushes, and a water pump for drawing water from said water tank and discharging water through said rinse pipes, said detergent pump and water pump being driven by said first-mentioned pump.

References Cited in the file of this patent

UNITED STATES PATENTS

867,282	MacFarren	Oct. 1, 1907
989,151	Hines	Apr. 11, 1911
1,951,129	Coffey	Mar. 31, 1934
1,988,665	Ross	Jan. 22, 1935
2,278,306	Cushman	Mar. 31, 1942
2,390,017	Wash	Nov. 27, 1945
2,530,720	Paulson	Nov. 21, 1950
2,636,198	Wilson	Apr. 28, 1953
2,646,586	Foutes	July 28, 1953
2,648,342	Vani et al.	Aug. 11, 1953
2,699,792	Fisher	Jan. 18, 1955
2,708,446	Phillips	May 17, 1955