United States Patent [19]

Walters

[11] **3,759,275**

[45] **Sept. 18, 1973**

[54] **CAR WASH INSTALLATION**

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[52] **U.S. Cl.** **134/45**, 134/180

[51] **Int. Cl.** **B60s 3/04**

[58] **Field of Search** 134/45, 123, 172, 134/180

[56] **References Cited**

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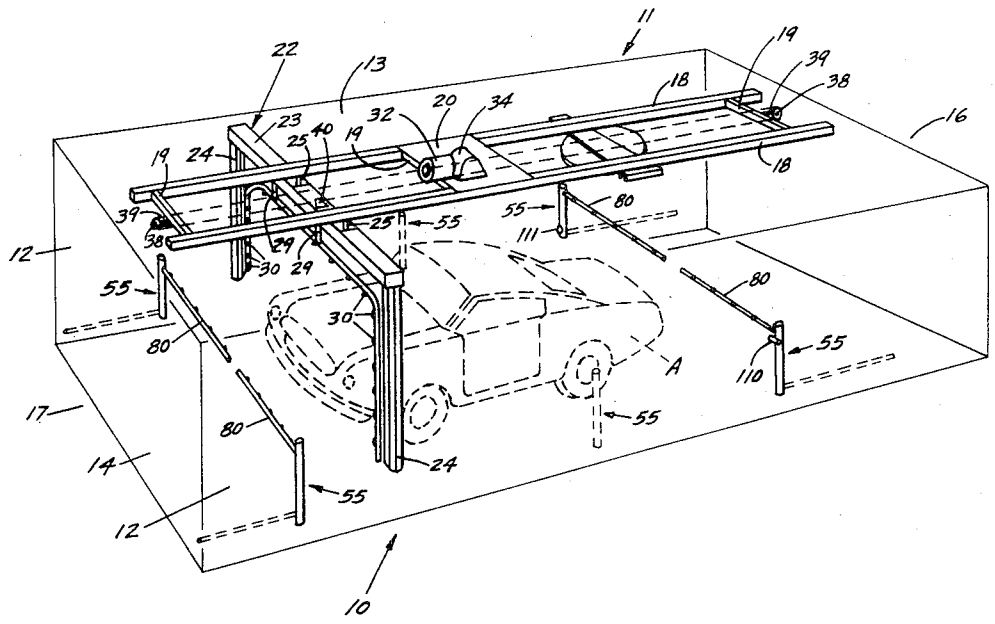
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Primary Examiner—Robert L. Bleutge
Attorney—Conrad Christel et al.

[57] **ABSTRACT**

A car wash installation comprising a housing having a suspended guide track for mounting an inverted U-shaped frame carrying a spray conduit reciprocable relative to a stationary vehicle. Four corner posts extend upwardly above the deck of the housing and are provided with horizontally extending spray wands normally extending parallel to the longitudinal axis of the vehicle in an inoperative position and pivotable approximately 90° to a position of use in front of and behind the vehicle for vertically traversing the front and rear ends of the vehicle. Two of the laterally spaced posts are carried by a carriage mounted beneath the deck of the housing. The carriage is movable lengthwise of the vehicle for positioning such posts in close proximity to one end of the vehicle for accommodating vehicles of various lengths.

12 Claims, 11 Drawing Figures



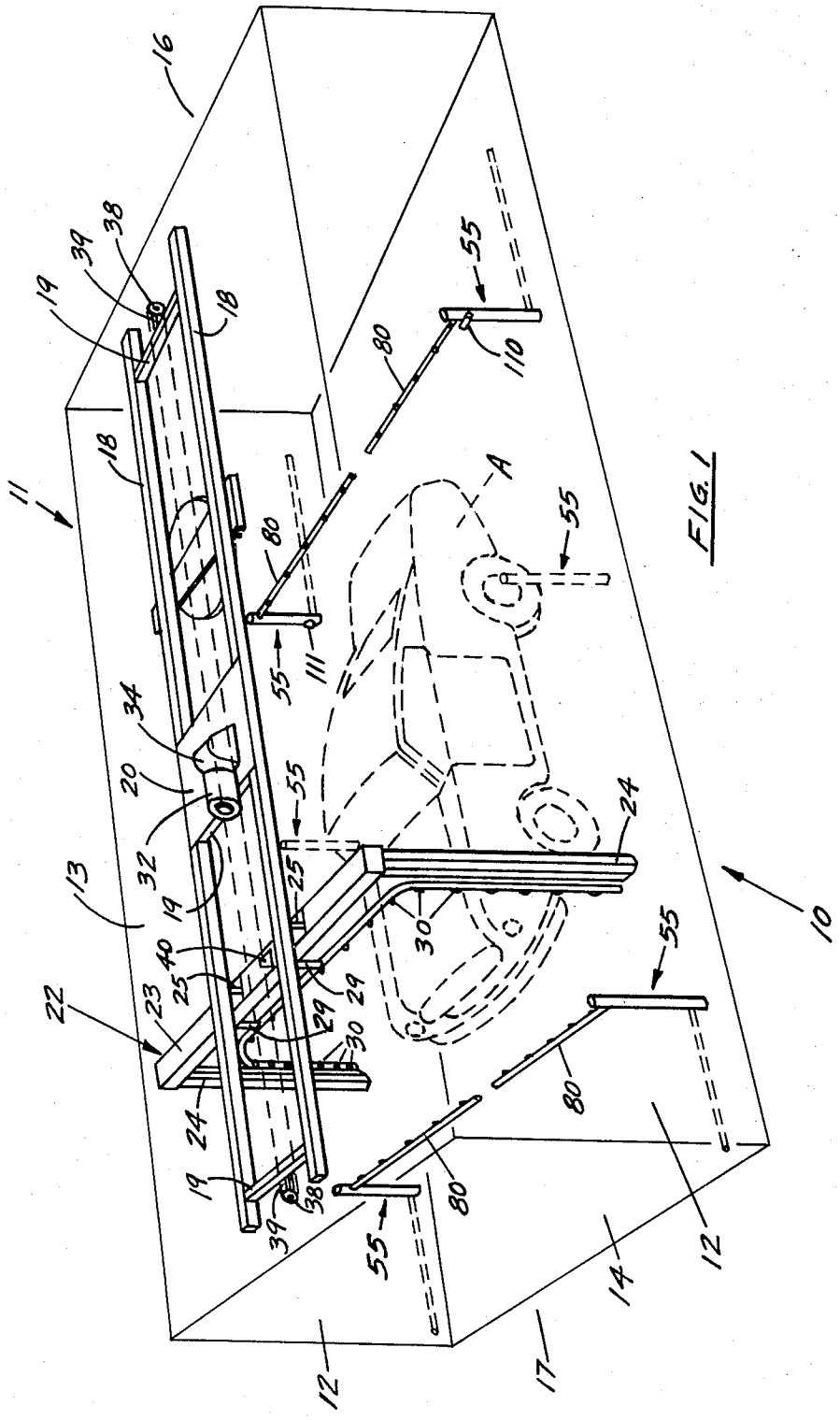

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FIG. 1

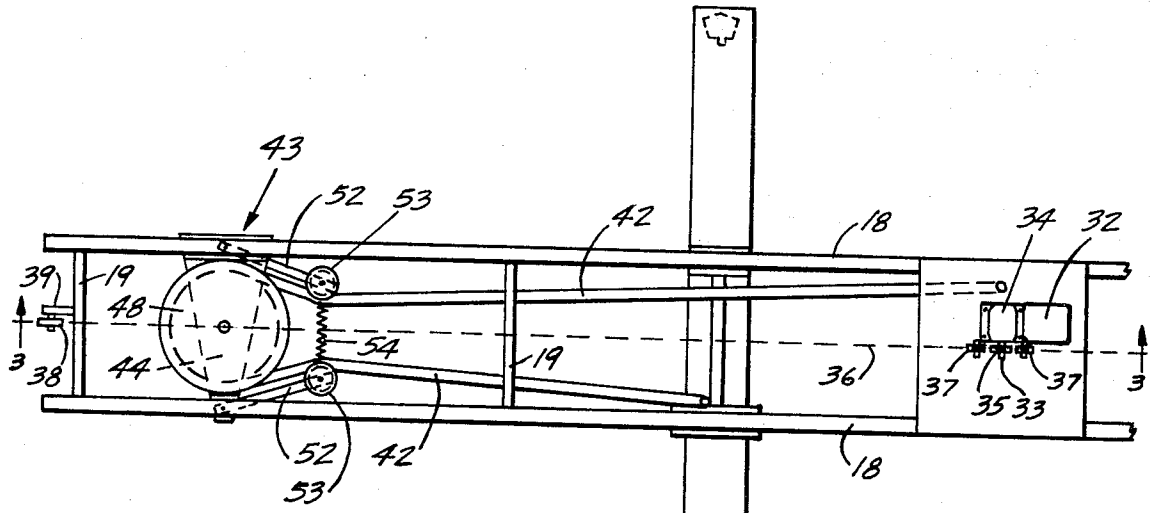

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FIG. 2

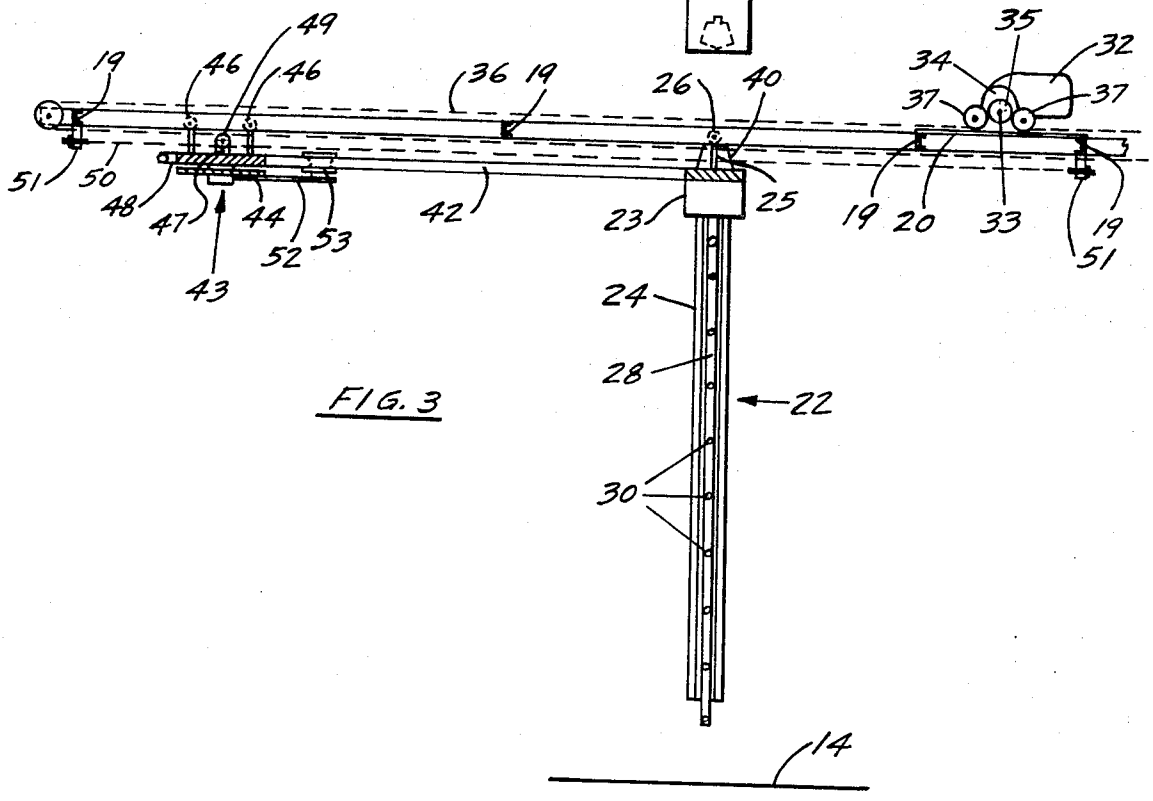

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FIG. 3

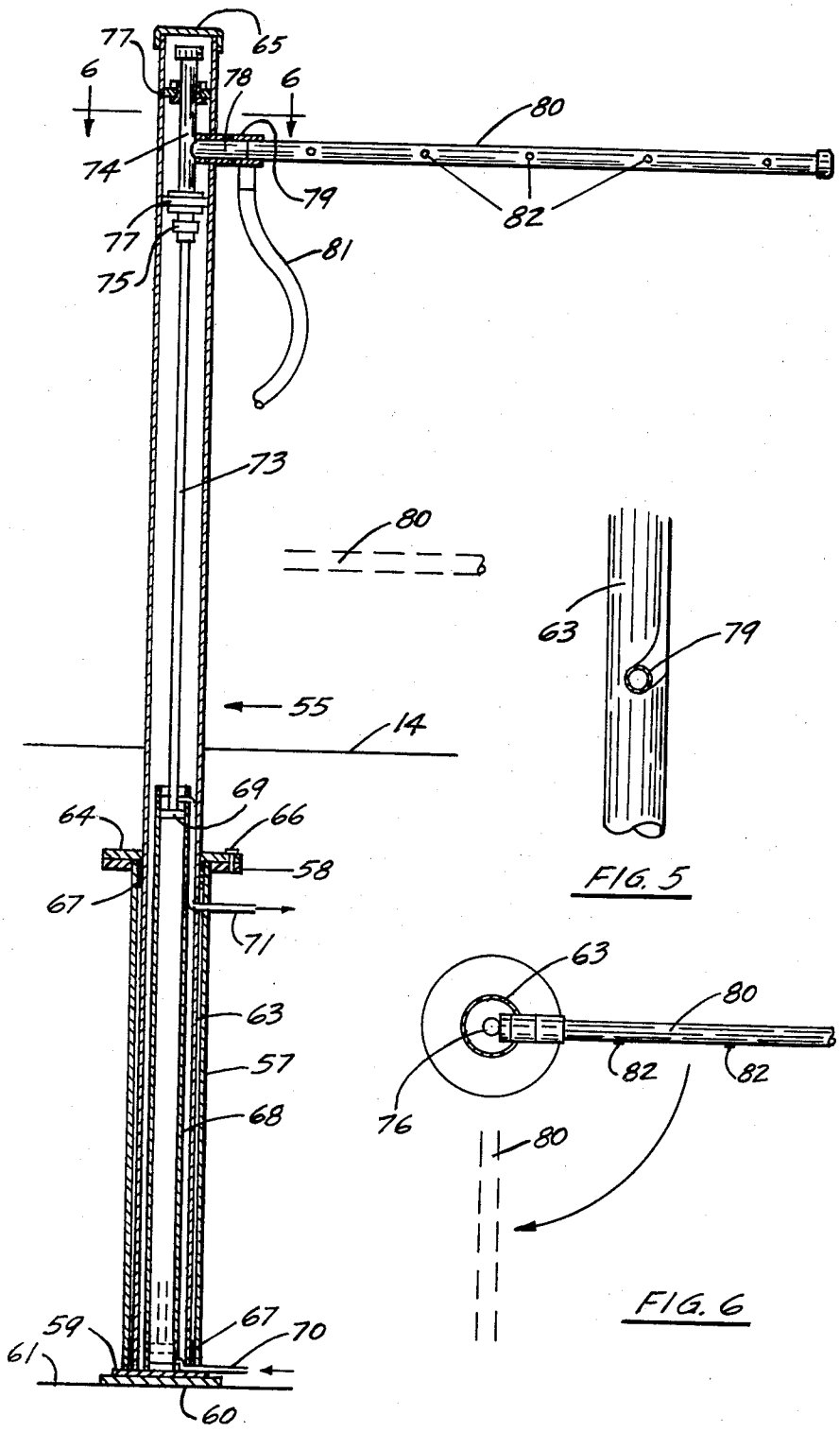


FIG. 4

FIG. 5

FIG. 6

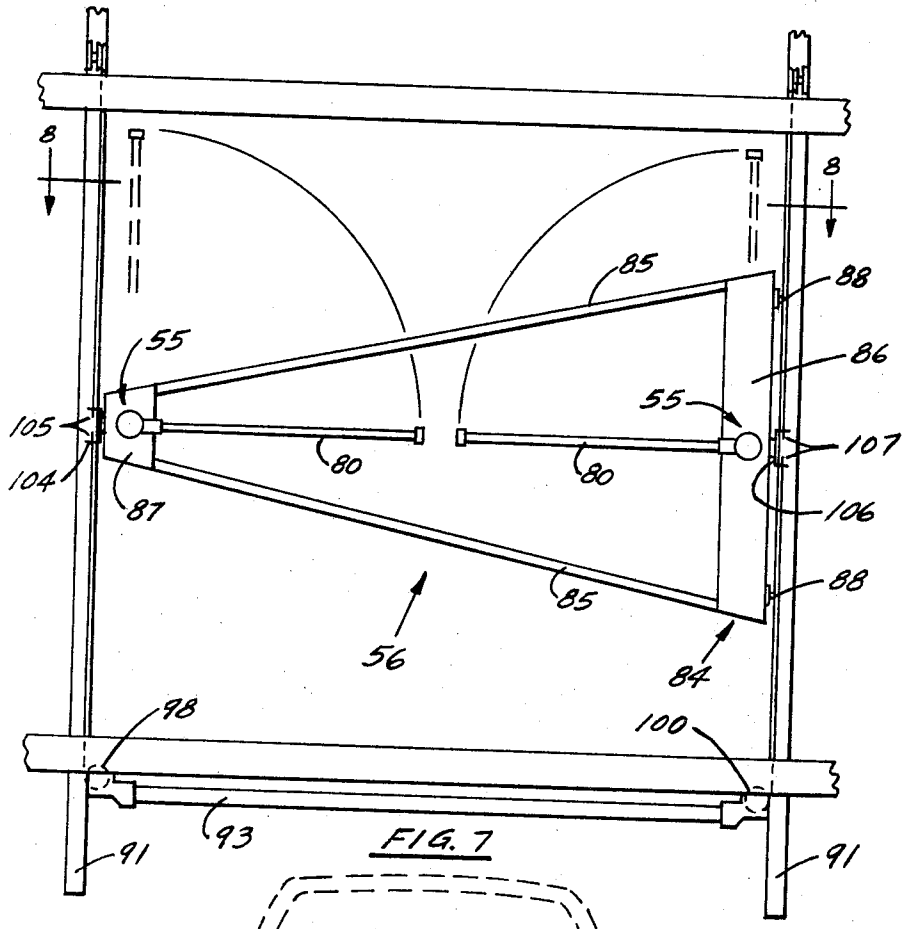

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FIG. 7

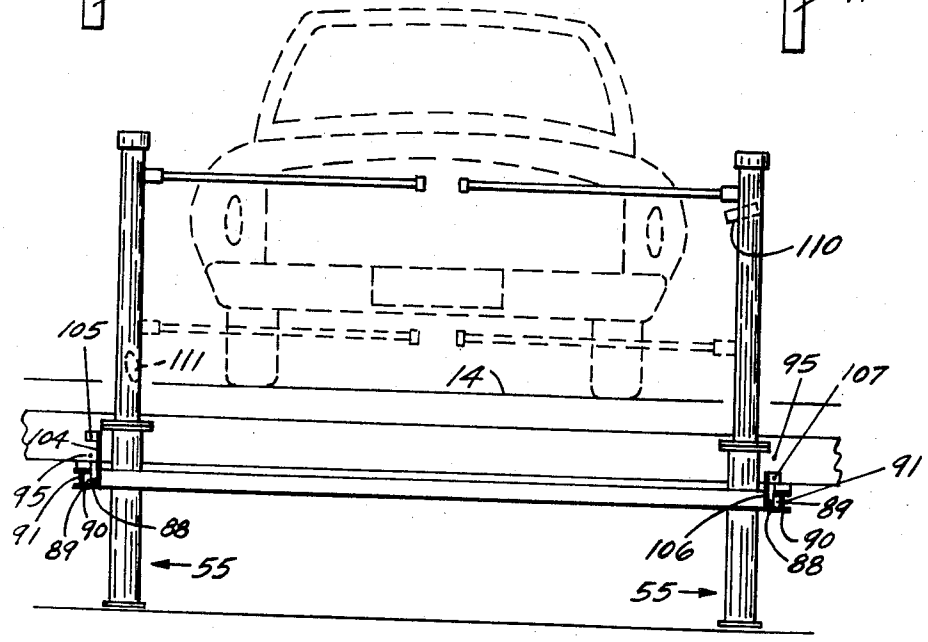

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FIG. 8

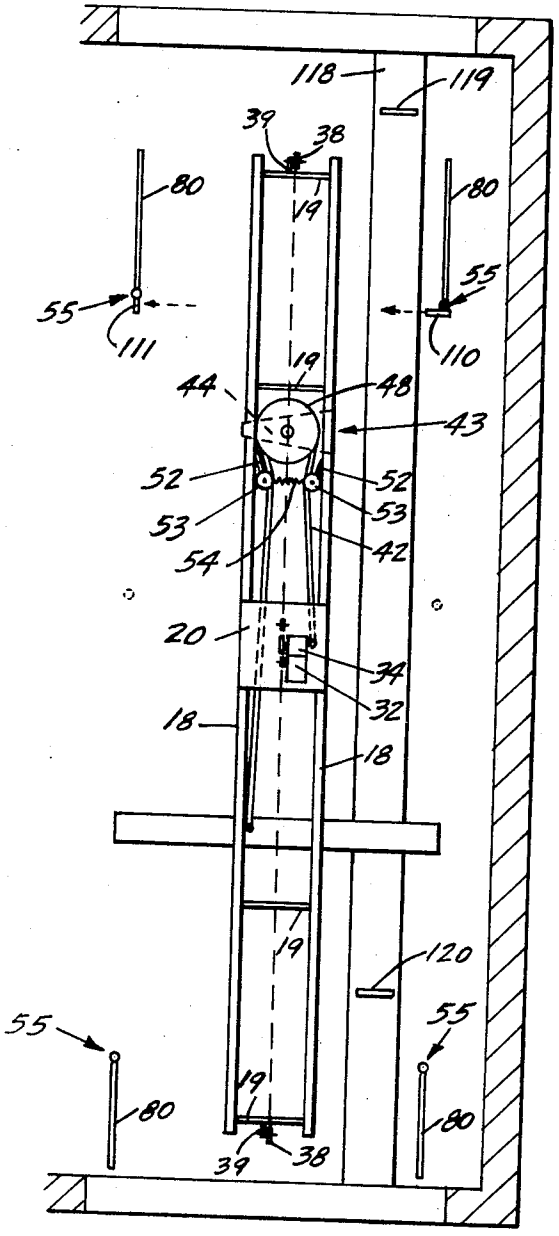


FIG. 9

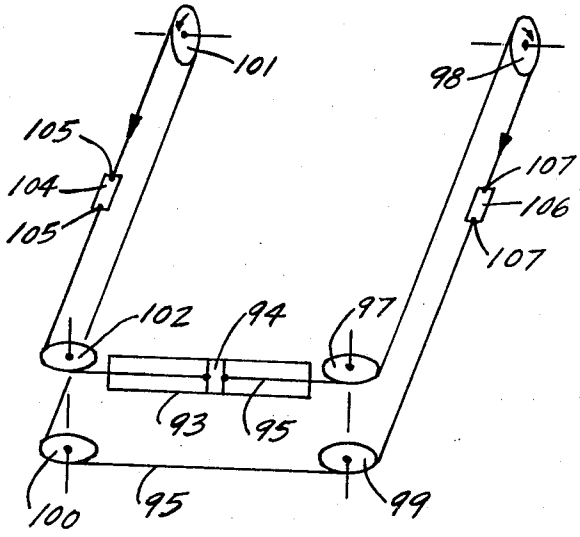


FIG. 11

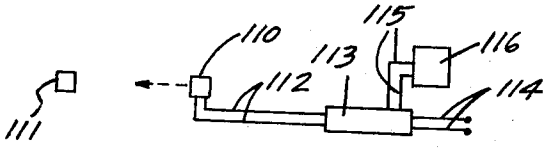


FIG. 10

CAR WASH INSTALLATION

BACKGROUND OF THE INVENTION

This invention relates generally to apparatus for cleaning motor vehicles and, more particularly, to an automatic car wash installation of the type which may be coin operated.

Various types of automatic car washers have been designed in recent years and have found increasing acceptance due to their convenience and economy. In the most conventional technique, the car washing apparatus is generally stationary, having a series of stations past which the vehicles are advanced by means of a conveyor arrangement. While this type of car washer represents an advance in the art, it is not completely satisfactory because of the space and labor requirements.

Other types of car washing apparatus employ rotary brushes which advance and retract toward and away from a stationary vehicle body for cleaning the same. In these types of car washers, the brushes tend to collect grit and other hard particles causing the vehicle surface to be scratched and scarred by contact of the rotary brushes with the vehicle body.

Still other types of car washing apparatus employ various mobile frames or carriages which move relative to a stationary vehicle and which carry spray discharge units for directing a spray of water and detergent against the vehicle surface. While these car washing installations conserve space and labor and perform satisfactority in general, they also have shortcomings. Such mobile carriages have a fixed path of orbital travel about the vehicle body and are not adjustable to efficiently accommodate vehicles of different sizes. Such car wash installations become less efficient in washing the smaller sized vehicles, such as the increasingly popular compacts, owing to the rapid pressure drop of the liquid jets away from the spray discharge nozzles.

SUMMARY OF THE INVENTION

The car washing installation of the present invention, as hereinafter described, provides a new and improved car washing apparatus having novel means for effectively cleaning the front and rear ends of the vehicle, such means being adjustable to accommodate various sizes of vehicles.

Generally speaking, the car wash installation of the present invention comprises a housing having a guide track for mounting an inverted U-shaped frame thereon for reciprocating movement relative thereto. The U-shaped frame is provided with a conduit having spray nozzles for directing a liquid spray against the top and sides of a vehicle to be cleaned. Four corner posts are located in the housing and are provided with horizontally extending spray wands pivotable from an inoperative position of rest to an operative position of use in front of and behind the vehicle. These wands are raised and lowered to traverse the front and rear ends of the vehicle and direct a cleaning liquid spray directly thereagainst. Two of the laterally spaced posts are mounted on a carriage beneath the deck of the housing for automatically adjusting the position of such posts relative to the rear end of the vehicle in a longitudinal direction for accommodating vehicles of varying sizes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective somewhat schematic view of one form of a car washing installation constructed in accordance with the present invention, showing a vehicle indicated in phantom;

FIG. 2 is a top plan view of a spray unit incorporated in the car washing installation of FIG. 1;

FIG. 3 is a fragmentary vertical sectional view taken on the line 3—3 of FIG. 2;

FIG. 4 is a longitudinal sectional view of an upright post constructed in accordance with this invention and including an actuator for swinging and raising a spray wand during the washing operation;

FIG. 5 is a fragmentary, side elevational view of a portion of the post of FIG. 4;

FIG. 6 is a cross-sectional view taken on the line 6—6 of FIG. 4 showing the swinging path of movement of the spray wand;

FIG. 7 is a fragmentary top plan view, on an enlarged scale, showing the carriage for certain of the posts illustrated in FIG. 4;

FIG. 8 is a vertical sectional view taken on the line 8—8 of FIG. 7, showing the spray wands swung into a position of use;

FIG. 9 is a horizontal sectional view showing the major part of the car wash installation in plan view;

FIG. 10 is a diagrammatic view illustrating a photoelectric control circuit, used in conjunction with this invention; and

FIG. 11 is a diagrammatic view illustrating a drive arrangement for the carriage used in conjunction with this invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now in detail to the drawings, there is shown in FIG. 1 a preferred form of car wash installation, generally designated **10**, constructed in accordance with this invention and disposed in an enclosure or housing **11** having a pair of side walls **12**, a roof **13**, a deck **14** and open at each end whereby a vehicle A to be washed can be driven therethrough. The entrance and exit ends are identified by reference numerals **16** and **17**, respectively, and may be provided with doors or closures (not shown) of the overhead type which are raised and guided in tracks as is well known in the art.

Two parallel, laterally spaced track rails **18** are supported by suitable support structure (not shown) from the ceiling of housing **11** above the vehicle A which is adapted to be driven therebeneath. A plurality of cross bars **19** are rigidly secured at their opposite ends to the track rails **18** and span the space therebetween for rigidifying the latter. A support plate **20** is mounted on two adjacent cross bars **19** and is secured at its opposite ends to rails **18** for supporting a drive mechanism as will presently become apparent.

An inverted U-shaped frame, generally designated **22**, is mounted for longitudinal movement relative to the track rails **18** and comprises an upper horizontal bight portion **23** and a pair of laterally spaced legs **24** depending from the opposite ends of bight portion **23**. The frame **22** is carried by the track rails **18** and includes a pair of spaced upstanding rods **25** extending vertically from the bight portion **23** and having rollers **26** at the distal ends thereof supported in the rails **18** for reciprocating rectilinear movement therealong. An inverted U-shaped conduit **28** is supported from the bight portion **23** of frame **22** by means of vertically extending connections in the form of conduits **29**. The

legs of the U-shaped conduit 28 may be clamped or attached to the legs 24 of frame 22 by any suitable fastening means (not shown) for added support. The conduit 28 is provided with a plurality of spray nozzles 30 oriented in such a manner as to direct a liquid spray inwardly and downwardly toward the sides and top of the vehicle A.

Means are provided for moving the frame 22 back and forth along track rails 18, such means including an electric drive motor 32 carried by the plate 20 and connected to a suitable power source (not shown) for rotating a drive shaft 33 through a suitable gear reduction mechanism 34 mounted on the plate 20. As best shown in FIG. 3, a drive sprocket 35 is rigidly secured to drive shaft 33 for driving a drive chain 36, also trained about idler sprockets 37 carried by the plate 20, and sprockets 38 located at the opposite ends of rails 18. The sprockets 38 are mounted on brackets 39 attached to and extending outwardly from the endmost cross bars 19. The ends of the drive chain 36 are anchored to a bracket member 40 fixedly secured to the bight portion 23 of frame 22. Thus, motor 32 is effective to move frame 22 longitudinally back and forth along the rails 18 by means of the sprocket and chain arrangement described above.

In order to convey the cleaning or washing liquids to the conduit 23, a flexible hose 42 is provided and is mounted at one end to the plate 20 and suitably connected to a supply line (not shown) leading to a source of cleaning liquid, also not shown. The other end of the hose 42 is mounted to the bight portion 23 of frame 22 and is connected by suitable coupling means (not shown) to the short conduits 29 for introducing the cleaning liquid into conduit 28 which distributes the same through nozzles 30 as a spray against the top and sides of the vehicle A.

Since the frame 22 moves toward and away from the stationary plate 20, it is necessary to provide some means for guiding and taking up the slack in hose 42 to prevent entanglement thereof and interference with other parts of the installation. To this end, a tension mechanism is provided and comprises a trolley 43 mounted for reciprocating movement on rails 18. Trolley 43 comprises a base plate 44 disposed beneath the rails 18 and having upwardly extending rods 45 adjacent the opposite ends thereof provided with rollers 46 engaging the rails 18 for rolling movement therealong. A vertically extending shaft 47 is suitably journalled in base plate 44 and carries a take-up pulley 48 about which flexible hose 42 is guided. A sprocket 49 is journalled for rotation on the upper end of trolley 43 and is engagable with the lower run of drive chain 36. Sprocket 49 also is engagable with a stationary chain 50 disposed below the lower run of drive chain 36 and suitably connected at its opposite ends to bracket members 51 depending from cross bars 19. As the lower run of drive chain 36 travels in a rectilinear path for moving the frame 22, the engaged sprocket 49 is caused to rotate. Since the chain 50 is fixed, rotation of sprocket 49 effects movement of the trolley 43 in the same direction as frame 22 but at one-half the speed of the latter so as to maintain the flexible hose 42 taut at all times during reciprocating movement of the frame 22.

In order to maintain the flexible hose 42 tightly wrapped about the pulley 48, a pair of swinging arms 52 are pivotally mounted on trolley 43, as shown in FIG. 2, and are provided with pulleys 53 at their distal ends for guiding flexible hose 42. A compression spring 54 is mounted between the arms 52 for urging the same toward each other to insure tight engagement of hose 42 about take-up pulley 48.

An important feature of the present invention is the provision of means for thoroughly spraying the front and rear ends of the vehicle A, such means comprising four standards or upright posts 55 disposed in the four corners of housing 11. The first pair of posts 55 located at the exit end 17 of housing 11 are fixed while the other pair of posts 55 at the entrance end 16 are mounted on a carriage, generally designated 56 (FIGS. 7 and 8) for longitudinal movement within housing 11 to accommodate the varying lengths of different sized vehicles.

As shown in FIG. 4, each post 55 comprises an outer housing or cylindrical shell 57 having an upper flange 58 and a lower flange 59 which, in the case of a stationary post, may be secured to a base plate 60 mounted on a pit floor 61 or other suitable substructure below the deck 14. The lower end of an inner shell or tube 63 is mounted within shell 57 and has an annular flange 64 intermediate its opposite ends suitably secured to the upper flange 58 of shell 57. The flanges 58 and 64 are secured together by means of a shear pin 66 extending through aligned openings in such flanges for a reason that will hereinafter become apparent. Tube 63 extends through the deck 14 and terminates in an upper end disposed above the deck 14. The upper end of tube 63 is closed by a cap member 65. A pair of spacer rings 67 are provided between tube 63 and shell 57 at the upper and lower ends of the latter to maintain them in a properly spaced, concentric relationship.

Mounted within the tube 63 is a pneumatic actuator comprising a cylinder 68 having a piston 69 mounted therein for relative reciprocating movement. Conduits 70 and 71 are tapped into the head and rod end of cylinder 68, respectively, for alternately supplying or evacuating air pressure to and from the head and rod end of the cylinder 68 to raise or lower piston 69. A piston rod 73 is connected to piston 69 and extends axially outwardly through the cylinder 68.

An extension 74 is mounted on the distal end of piston rod 73 by means of a suitable connection 75. The extension 74 comprises a length of pipe or conduit journalled for rotation in spaced bearings 77. The extension 74 is closed at both ends and is provided with a horizontal pipe 78 projecting radially therefrom. A rotatable sleeve coupling 79 is carried by the pipe 78 for securing a spray wand 80 thereto and for connecting the latter to one end of a flexible hose 81 connected at its other end to a suitable source of cleaning liquid. The spray wand 80 is formed of a length of hollow tubing capped at the free end thereof and provided with a series of longitudinally spaced spray nozzles 82.

An elongated slot 83 extends longitudinally of tube 63 for accommodating and guiding the sleeve coupling 79 as the extension 74 is raised and lowered by piston rod 73. The slot 83 extends from the upper end of tube 63 downwardly in a rectilinear direction for a major portion of its extent and then curves laterally causing the spray wand 80 to swing approximately 90° as it approaches the end of its downward travel. The free rotary movement of the piston 69 in cylinder 68 allows this swinging movement of the spray wand 80 relative to tube 63. The spray wands 80 are oriented toward the entrance and exit ends, respectively, and downwardly

adjacent the deck 14 in their non-operative positions of rest, as shown in phantom in FIG. 1. When elevated, the spray wands 80 first swing ninety degrees into position in front of and behind vehicle A and then move vertically to traverse the front and rear ends of such vehicle.

As earlier mentioned, the posts 55 located at the entrance end 16 of housing 11 are mounted on the carriage 56 for reciprocating movement relative to the rear end of the vehicle to be washed. As shown in FIGS. 7 and 8, the carriage 56 comprises a generally triangularly shaped frame 84 having a pair of structural members 85 extending from the opposite ends of a cross plate 86 in a converging relation and connected to a cross plate 87. Extending laterally outwardly from the cross plate 86 are a pair of shafts 88 having rollers 89 suitably journalled thereon and guided for movement on a track 90 defined by the lateral flanges of a structural beam 91 mounted on suitable substructure beneath the deck 14. In a similar construction, the cross plate 87 also is provided with at least one laterally extending shaft 88 having a roller 89 journalled thereon and guided on a track 90.

The means for reciprocating the carriage 56 along tracks 90 is shown diagrammatically in FIG. 11 and includes an elongated cylinder 93 mounted at its opposite ends to beams 91 and including a piston 94 having a cable 95 anchored to the opposite sides of the piston 94. The cable 95 extends through the opposite ends of the cylinder 93 and is trained about horizontally disposed pulleys 97 and 98. The cable 95 has an upper run and a lower run in substantial vertical alignment and is anchored to the opposite ends of the carriage 56. The cable 95 extends from the piston 94, through the right end of cylinder 93 as viewed in FIG. 10, and is then trained about a horizontally disposed pulley 97, around and over a vertically oriented pulley 98, about horizontally disposed pulleys 99 and 100, around a vertically oriented pulley 101, and a horizontally disposed pulley 102 and then through the left end of a cylinder 93 to piston 94. The pulleys 98 and 101 are disposed in spaced vertical planes and the pulleys 97 and 102 are disposed in a common horizontal plane spaced vertically above the common horizontal plane in which pulleys 99 and 100 are disposed. The pulleys 97 and 99 are in vertical alignment, as are pulleys 100 and 102. The upper run of the cable 95 is anchored to a bracket 104 as shown at 105 in FIGS. 7 and 8, the bracket 104 being connected to and extending upwardly from one end of the carriage 56. The lower run of the cable 95 is anchored to a bracket 106 as shown at 107 in FIGS. 7 and 8, the bracket 106 connected to and extending upwardly from the other end of carriage 56. Thus, fluid pressure applied to the left end of cylinder 93 moves piston 94 to the right effecting a movement of the cable 95 in the direction of the arrows shown in FIG. 10 to move the carriage 56 forwardly or toward the exit end 17 of the housing 11. Of course, movement of piston 94 in the opposite direction effects reverse movement of the carriage 56.

Prior to use, the various components of the car wash installation of this invention are initially disposed in the position shown in FIG. 1. The entire operation, including the wash cycle, preferably is programmed to operate in a timed relationship by means of an electrical control system (not shown). Actuation of the cylinders 68 in posts 55 and the cylinder 93 for driving carriage 56 is suitably controlled by fluid control valves integrally tied in to the overall control system. Proper sequencing of the operation of the several control valves for effecting the foregoing operations and for energizing the various pumps and drive motors is by conventional limit switches incorporated in the control system, such switches being activated when predetermined movements of the parts or vehicle occur. Each of the switches triggers the subsequent stage of operation. The number of switches, their positioning etc., is conventional and it is believed no further amplification is necessary except for the operation of the photoelectric sensing means, described below.

As shown in FIG. 8, a photoelectric control 110 is mounted on the forward side of one of the posts 55 mounted on carriage 56 for emitting a light beam from a suitable light source in the control 110 to a reflective target 111 mounted on the forward side of the other post 55 on carriage 56. The light beam is reflected from target 111 on the same axis emitted and received onto a suitable photocell in the control 110. The light beam is directed downwardly at an angle from the photoelectric control 110 to insure that the most rearwardly projecting component on the vehicle A will interrupt the light beam. As shown in FIG. 10, the photoelectric control 110 is connected by conductor lead 112 to a suitable electrical circuit, diagrammatically indicated at 113 which, in turn, is connected through conductors 114 to a suitable electrical power source (not shown). The circuitry diagrammatically identified as 113 includes the usual amplifier for the output of the photocell and other conventional components to transmit the output of such cell through conductors 115 to a signal responsive means, diagrammatically indicated at 116, which controls the operation of cylinder 93 for moving or stopping the carriage 56.

The operation of the apparatus is as follows: The driver of the vehicle to be washed inserts a predetermined amount of money into a coin box located exteriorly of the housing 11 to close the main switch (not shown) connecting the control system circuit to a suitable source of power. The driver of the vehicle then slowly enters housing 11 through the entrance end 16 and steers the left front and rear wheels on a track 118. As the left front wheel engages a treadle switch 119, the control circuit is conditioned in preparation for the beginning of the wash cycle. The vehicle A is further driven forwardly until the left front wheel depresses a treadle switch 120 for completing a circuit to initiate the wash operation. The track 118 may be provided with a gently sloping surface leading to the switch 120 and terminating in an abutment rearwardly of the switch 120 to advise the vehicle operator that the vehicle A is correctly positioned.

Upon actuation of switch 120, a circuit is energized to actuate the control valve for cylinder 93, directing air pressure to the left side thereof for moving piston 94 to the right, causing carriage 56 and the posts 55 mounted thereon to move from the solid line position shown in FIG. 1 forwardly toward the rear end of the vehicle A. Simultaneously, the photoelectric control 110 is energized for emitting a beam of light from such control. This light beam strikes target 111 and is reflected back to the photocell in control 110. However, when the light beam is interrupted by the rear end of the vehicle A, the signal responsive means 116 is triggered to stop movement of the carriage 56, thus posi-

tioning the posts 55 in close proximity to the rear end of the vehicle.

When the carriage posts 55 are properly positioned, the control valves for the cylinders 68 are actuated to direct air pressure to the lower ends thereof, raising pistons 69 and effecting swinging movement of the wands 80 through ninety degrees toward the front and rear ends of the vehicle A. Simultaneously, the washing cycle is initiated whereby water is conveyed through hoses 42 and 81 to the U-shaped conduit 28 and to the wands 80, respectively. The motor 32 is energized to reciprocate the U-shaped frame 22 and its associated conduit 28 back and forth lengthwise of the vehicle to thoroughly spray the top and sides thereof. The frame 22 may undergo any number of reciprocating passes to first spray water on the vehicle, then spray a detergent and water mixture, then a spray rinse of water, and finally a spray of wax, as desired, in a timed relationship. Similarly, the wands 80 may be raised and lowered a number of times to thoroughly spray the front and rear ends of the vehicle A. However, during this wand traversing cycle, the wands 80 are not lowered to the extent that they reach the curvature in slot 83 so that they remain in their swung positions during the washing cycle. After the washing cycle is completed, the wands 80 are completely lowered and as they approach their lowermost positions, are swung to the positions shown in phantom in FIG. 1. The vehicle A can now be driven past the stationary posts 55 and through the exit end 17.

If any of the wands 80 should become locked in their extended operative positions due to a malfunction in the wand actuating mechanism or should the vehicle operator negligently drive forwardly before the termination of the wash cycle, contact of the moving vehicle A with the wand 80 will generate a force transmitted through the wand 80 to the tube 63, urging the latter to rotate within the shell 57 and shear the pin 66. This enables the wand 80 to be swung out of the way by vehicle A without any serious damage to the latter.

The present invention thus provides an improved car wash installation having novel means for thoroughly cleaning the front and rear ends of a vehicle. Such means are in the form of standards or posts having horizontally extending spray wands pivotable into an operative position of use in front of and behind the vehicle and which are reciprocated vertically for traversing the front and rear ends of the vehicle. One pair of laterally spaced posts are mounted on a carriage movable lengthwise of the vehicle for positioning such posts in close proximity to one end of the vehicle, thereby effectively accommodating vehicles of varied lengths.

A preferred embodiment of this invention has been described and illustrated in detail but it is to be understood that numerous modifications may be made without departing from the broad spirit and scope of this invention.

I claim:

1. In a car wash installation having a deck on which a vehicle to be washed is positioned comprising: a pair of laterally spaced posts fixedly mounted at one end of said deck and projecting upwardly above said deck in proximity to one end of a vehicle, a reciprocating carriage disposed below said deck, a second pair of laterally spaced posts mounted on said carriage and projecting upwardly above said deck, means moving said carriage toward and away from the first pair of posts for positioning said second pair of posts adjacent to the other end of the vehicle, said posts being provided with movable spray members, means moving said spray members into an extended operative position of use in front of and behind said vehicle in close proximity thereto and into a retracted inoperative position of nonuse out of the path of said vehicle.

2. A car wash installation according to claim 1 wherein each of said posts comprises tubular means mounted below said deck and projecting upwardly therefrom, an actuating cylinder in the lower portion of said tubular means and having a piston rod extending upwardly, a spray member carried by said piston rod and extending radially outwardly from said tubular means.

3. A car wash installation according to claim 2 wherein said inner tube is provided with an elongated slot having a curved lower portion for swinging said spray member upon initial upward movement of said piston rod thence guiding the same vertically upwardly.

4. A car wash installation according to claim 2 wherein said spray member comprises an elongated conduit having a plurality of spray openings spaced therealong.

5. A car wash installation according to claim 1 wherein said spray members comprise elongated conduits having a plurality of spray openings spaced therealong.

6. A car wash installation according to claim 1 including means for sensing the length of a vehicle, means responsive to said sensing means for operating said carriage moving means to position said second pair of posts in close proximity to said other end of said vehicle to adjust the same for vehicles of various lengths.

7. A car wash installation according to claim 6 wherein said sensing means comprises photoelectric means.

8. A car wash installation according to claim 7 wherein said photoelectric means includes a light source for emitting a light beam in the path of the vehicle to be washed and a photocell for sensing said light beam, whereby establishment of said light beam on said photocell initiates actuation of said carriage moving means and an interruption in said light beam terminates operation of said carriage moving means.

9. A car wash installation according to claim 1 in combination with a track rail supported above said deck, said track rail being of a length greater than the length of the vehicle to be washed, and a frame having spray means suspended from said track rail for reciprocating movement lengthwise of said vehicle, and means for reciprocating said frame.

10. A car wash installation according to claim 9 wherein said spray means is of inverted U-shaped configuration including an upper bight portion and a pair of downwardly extending legs adapted to receive a vehicle therebetween.

11. A car wash installation according to claim 9 including means connecting said spray means to a source of cleaning liquid, a pulley, said connecting means including a flexible hose having a portion looped about said pulley, trolley means suspended from said track rail for reciprocating movement relative thereto, said trolley means supporting said pulley for paying out and taking up said flexible hose upon reciprocating movement of said conduit.

12. A car wash installation according to claim 11 including means for resiliently urging said looped portion of said flexible hose against said pulley.

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