United States Patent

Hanna et al.

[15] **3,701,356**

[45] **Oct. 31, 1972**

[54] CAR WASHING APPARATUS

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[73] Assignee: **said Hanna by said Ebeling and Hildebrand**

[22] Filed: **June 16, 1969**

[21] Appl. No.: **838,000**

Related U.S. Application Data

[63] Continuation of Ser. Nos. 526,161, Feb. 9, 1966, abandoned, and Ser. No. 734,835, May 31, 1968, abandoned.

[52] **U.S. Cl.**.....**134/58 R,** 46/202, 134/113, 134/123, 134/181, 340/40

[51] **Int. Cl.** **B60s 3/04,** B08b 3/02

[58] **Field of Search**....134/45, 57, 58, 113, 180, 181, 134/199, 123; 15/DIG. 2; 46/202, 228, 243; 118/313, 316; 340/40, 309.4

[56] **References Cited**

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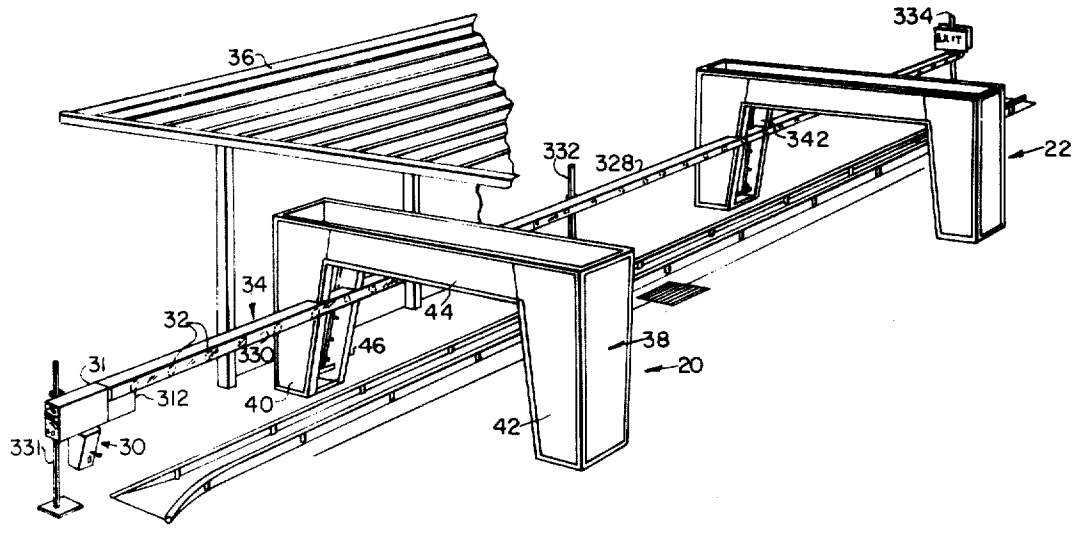
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Attorney—Buckhorn, Blore, Klarquist and Sparkman

[57] **ABSTRACT**

Nozzles mounted on inclined pipes project narrow, concentrated streams of washing liquid against a car and the pipes are oscillated so that the streams wash inclined, overlapping swaths on the car. Two of the pipes are on the side and are drivingly interconnected by a top pipe. The operations of the sprays in a plurality of arches of the car wash are controlled by a coin actuated timer which also sequentially lights a series of electric lamps extending along one side of the car wash to pace a driver of a car through the car wash.

10 Claims, 17 Drawing Figures



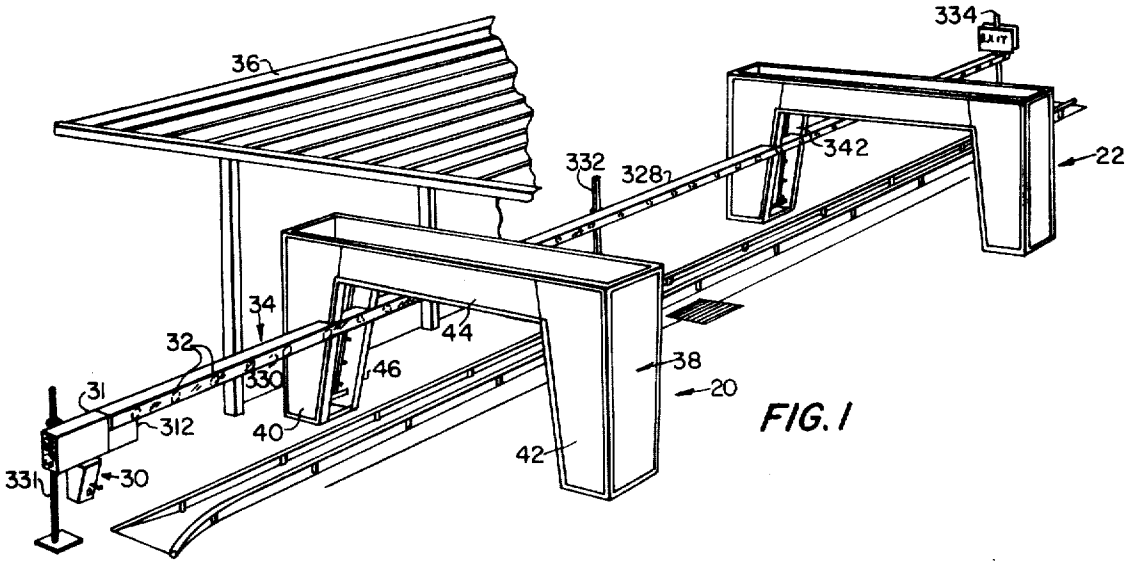


FIG. 1

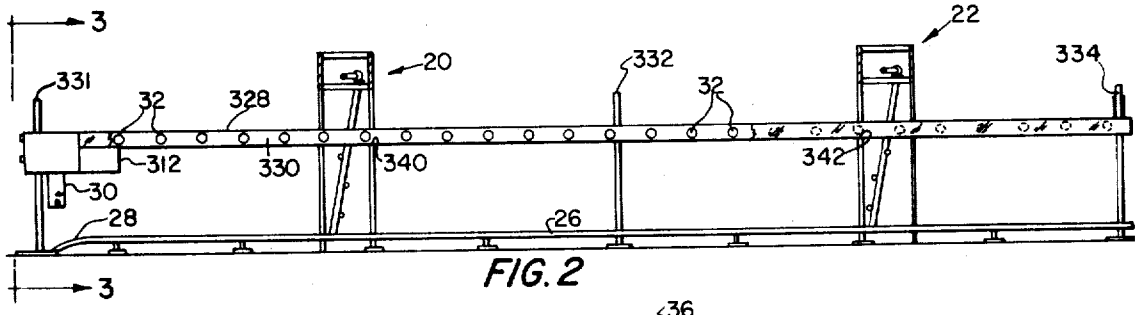


FIG. 2

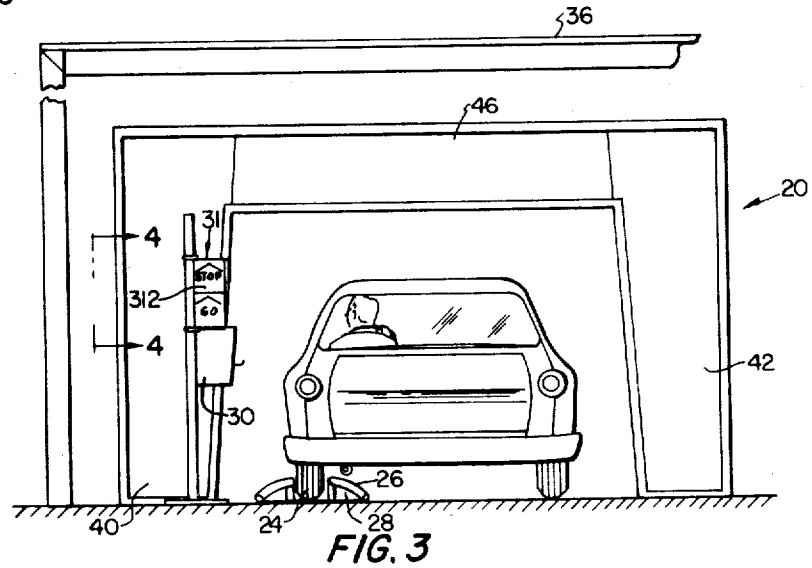


FIG. 3

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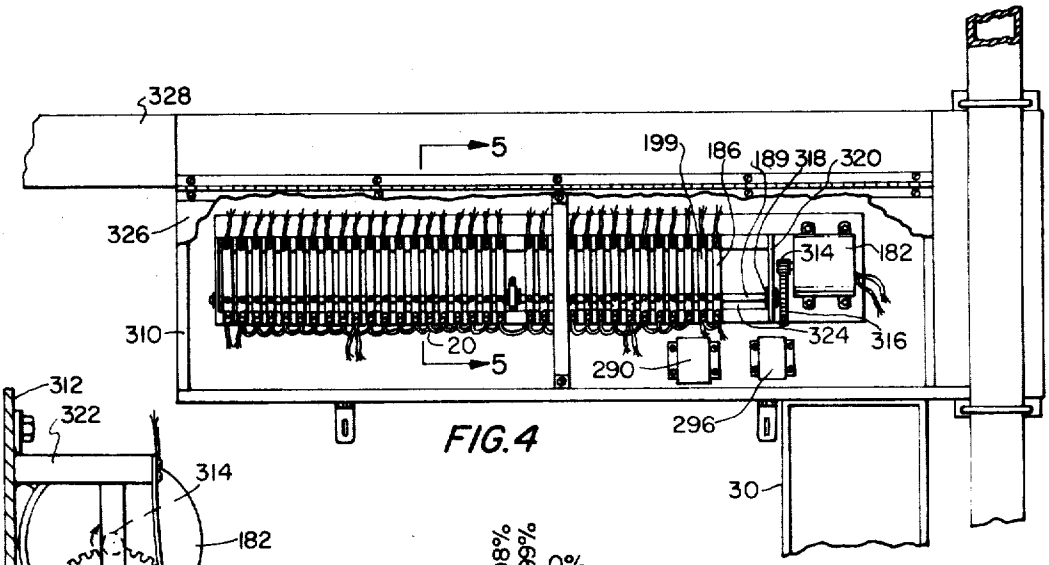


FIG. 4

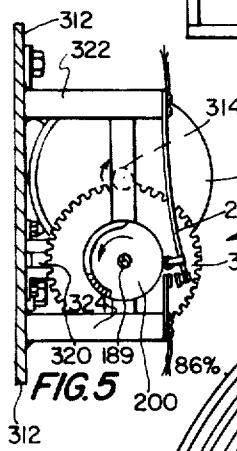


FIG. 5

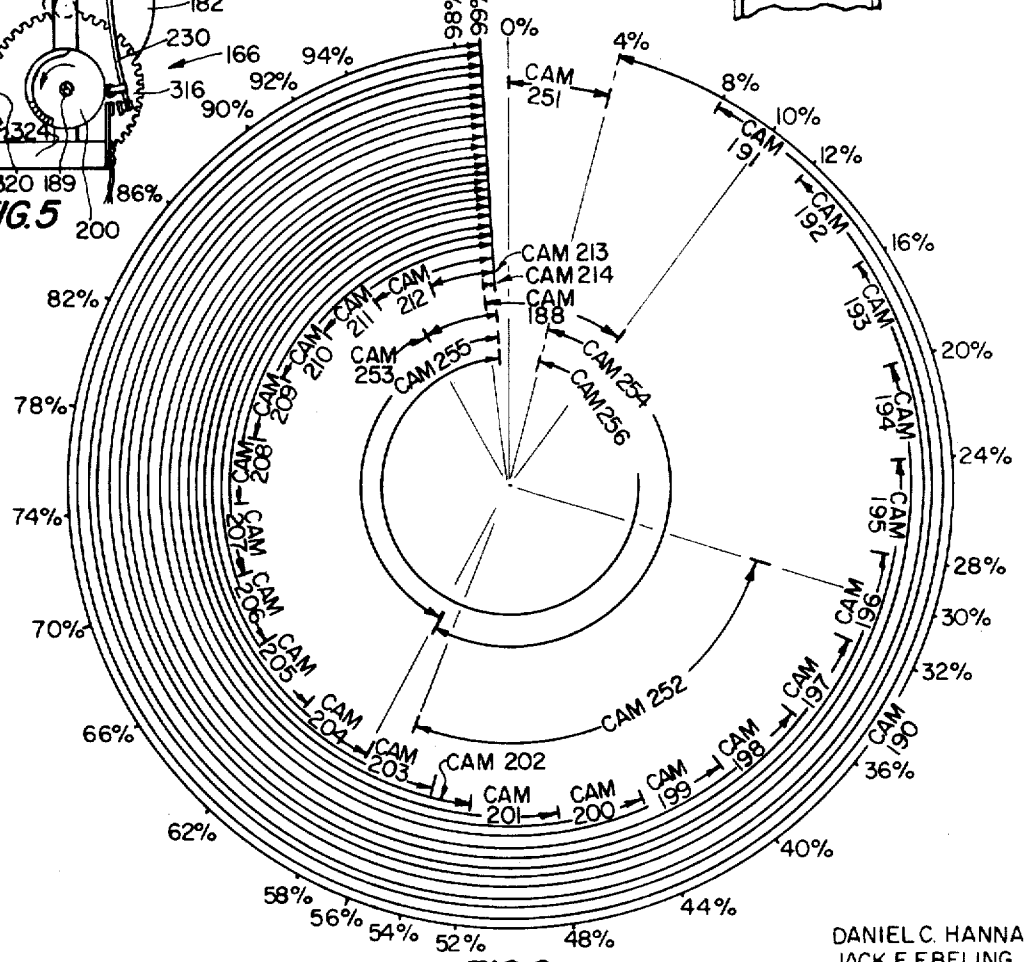


FIG. 6

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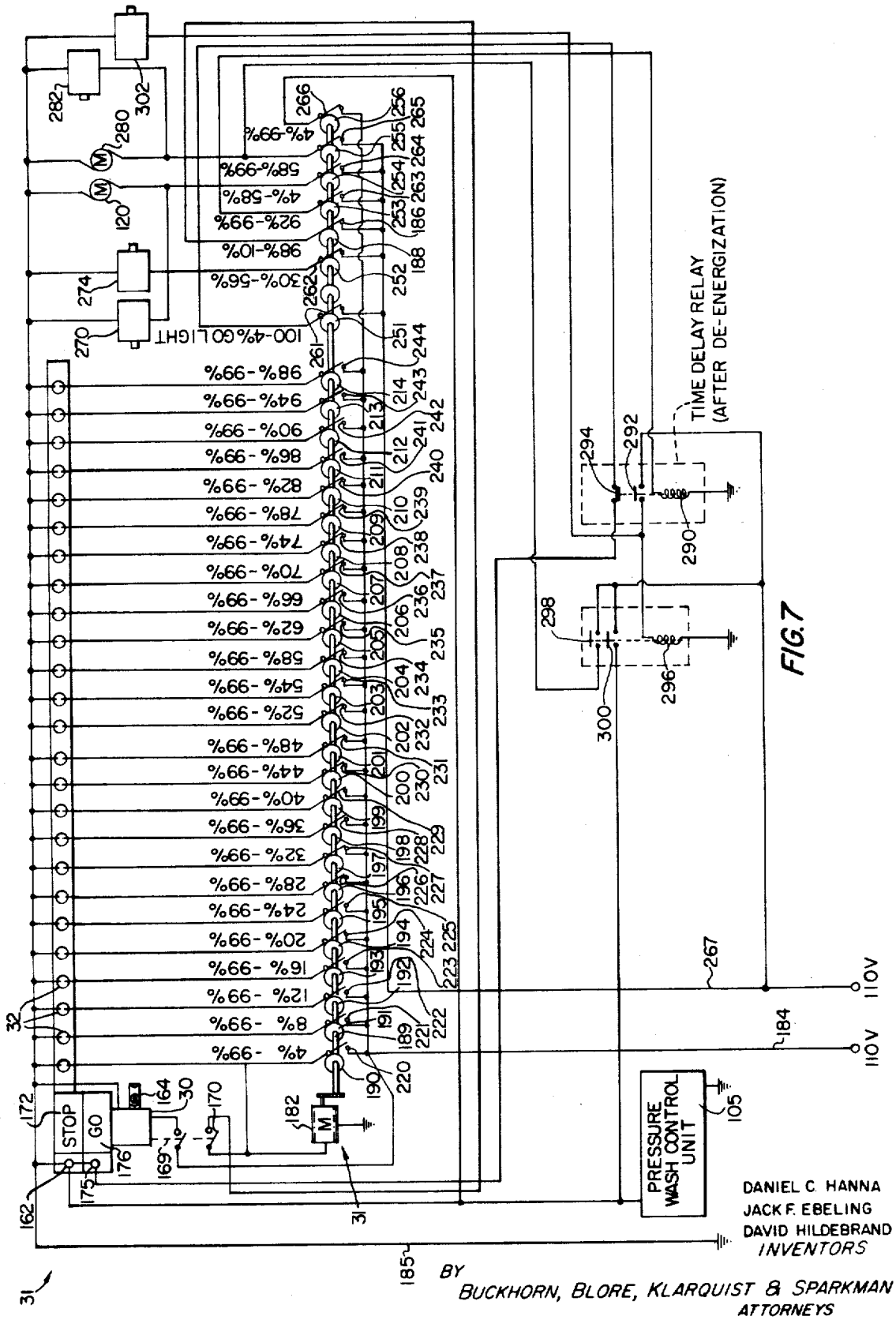


FIG. 7

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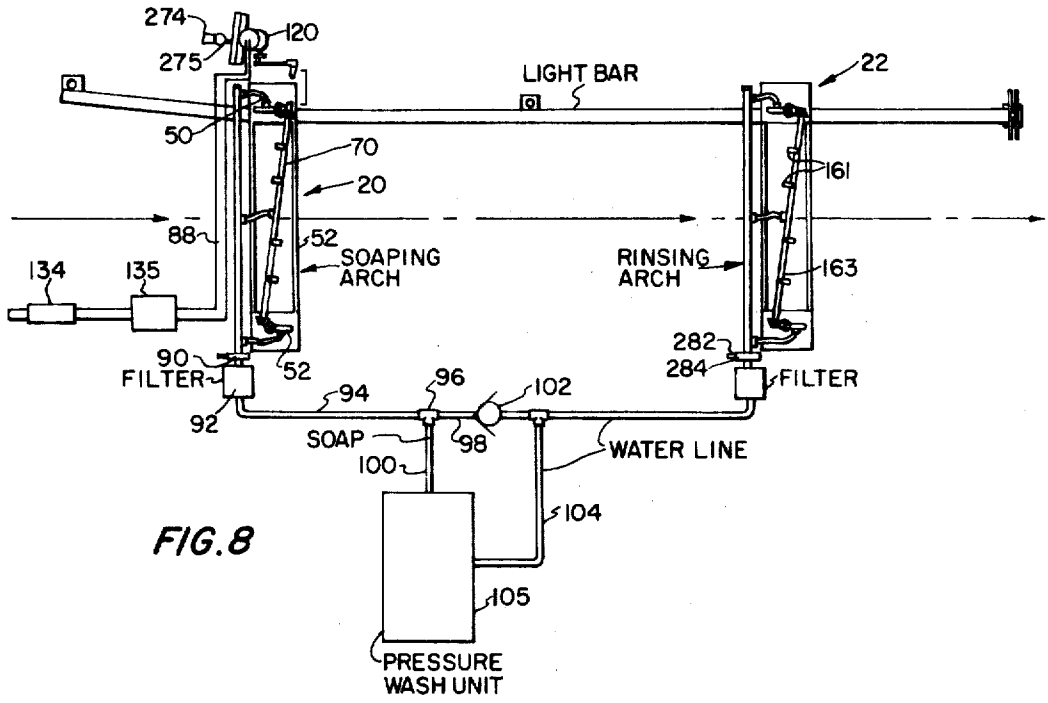


FIG. 8

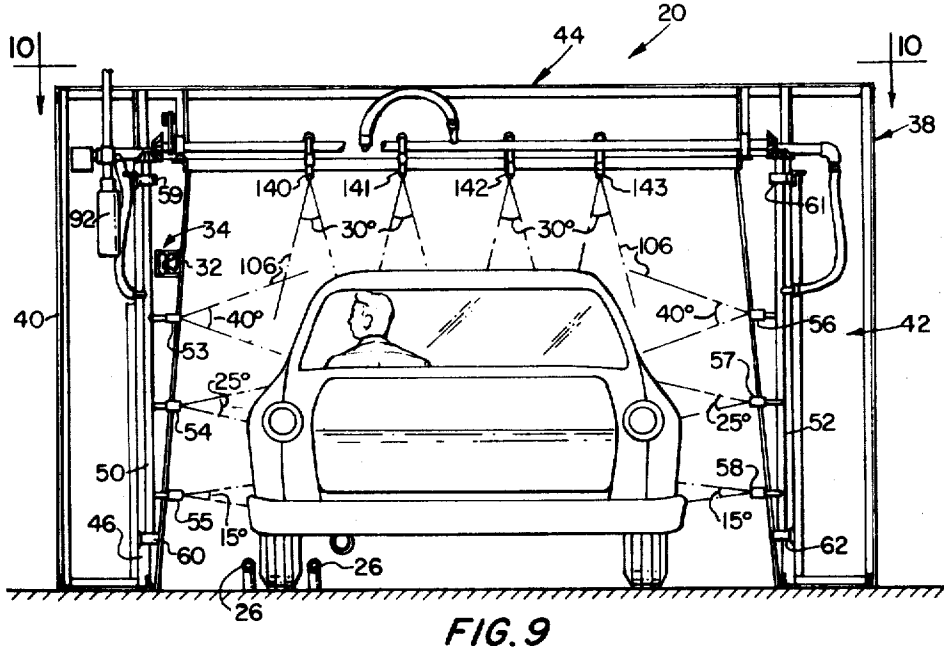


FIG. 9

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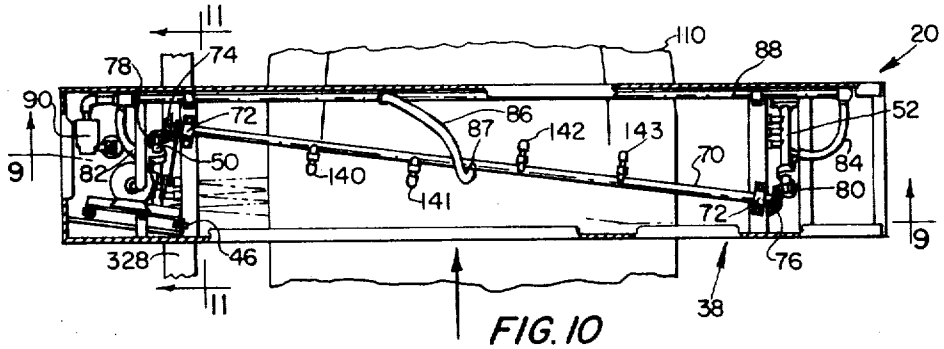


FIG. 10

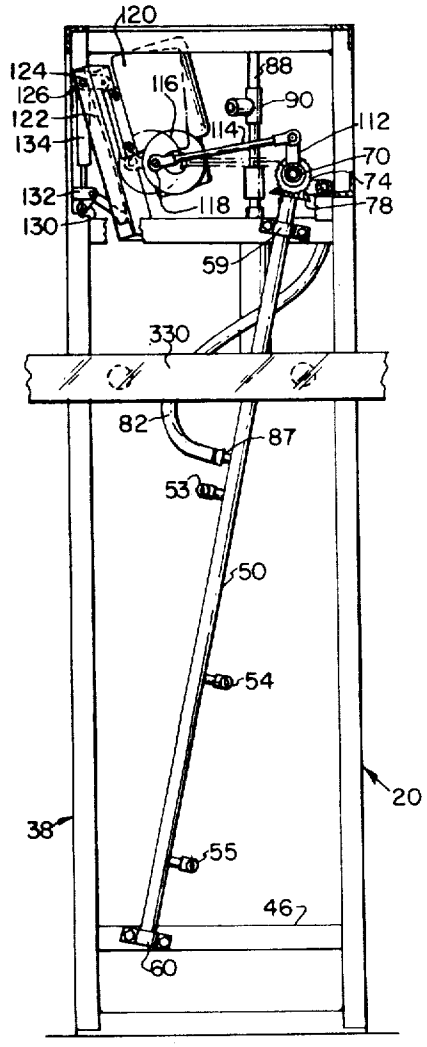


FIG. 11

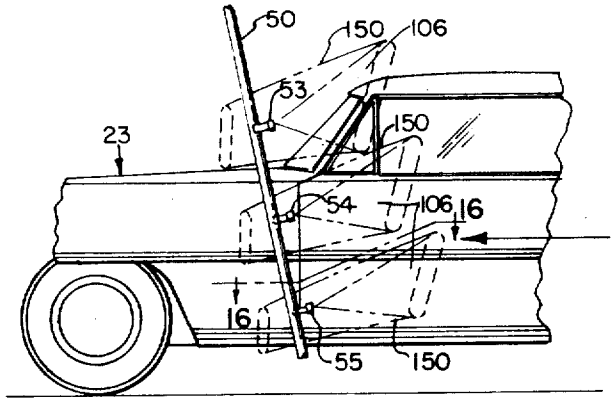


FIG. 12

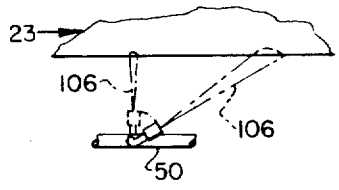


FIG. 16

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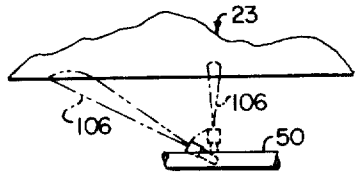


FIG. 17

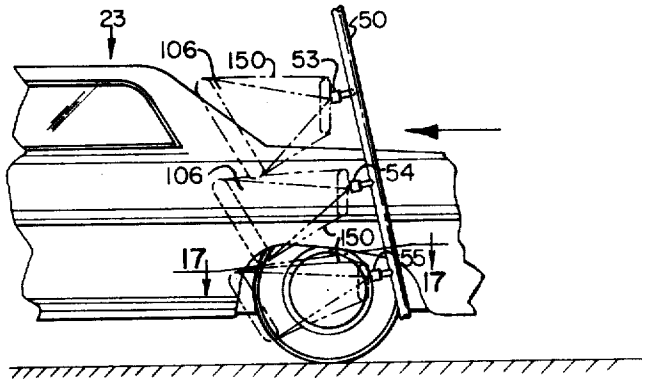


FIG. 13

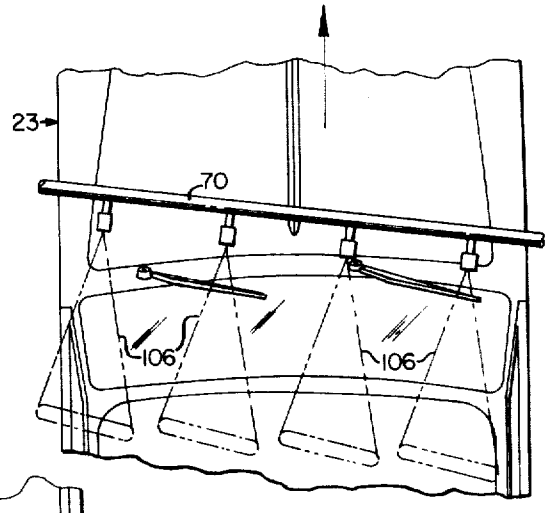


FIG. 14

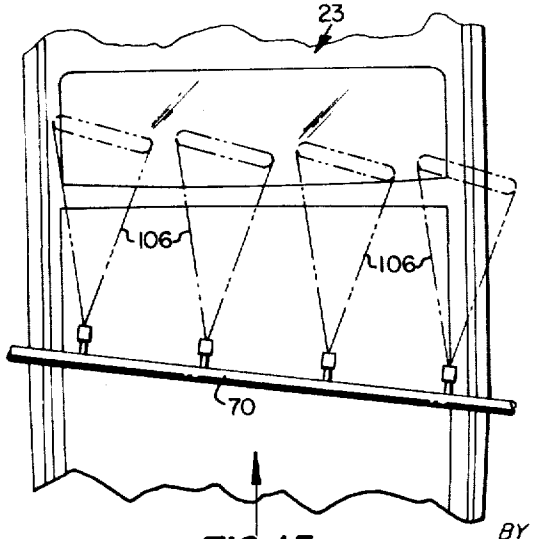


FIG. 15

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CAR WASHING APPARATUS

This application is a continuation of applications Ser. No. 526,161 filed Feb. 9, 1966 on CAR WASHING APPARATUS, now abandoned, and application Ser. No. 734,835, filed May 31, 1968, now abandoned.

This invention relates to an improved car washing apparatus, and more particularly to a new and improved coin-operated car washing apparatus.

Car washing apparatus known hitherto have required a large number of nozzles and high capacity hot water sources to adequately clean the cars. To lessen the number of nozzles the sprays have been widened and thinned to effect the coverage needed, but this greatly decreases the cleaning efficiency of the sprays. It would be desirable to provide a car washing apparatus having a small number of nozzles with thick, narrow sprays and still effect the necessary coverage.

There has been known coin-operated car washing apparatus in which a driver of the car deposits a coin to start operation of the apparatus, and then drives through the apparatus in accordance with the actuation of a series of signal flags positioned along the path of the car and actuated in timed relationship to the actuation of washing and rinsing devices of the apparatus. Such signaling or guiding system has occupied an excessive amount of space, is excessively complex and expensive and has been unsatisfactory.

An object of the invention is to provide a new and improved car washing apparatus.

Another object of the invention is to provide a new and improved coin-operated car washing apparatus.

Another object of the invention is to provide a car washing apparatus having complete, efficient coverage with a minimum number of nozzles and a minimum capacity hot water source.

A further object of the invention is to provide a car washing apparatus provided with a plurality of nozzles adapted to direct thick, narrow sprays of soapy water and rinsing water against the surface of a car to be cleaned, the nozzles being oscillated to cover swaths on the car as the car is moving, with the swaths parallel to each other and at angles relative to the direction of movement of the car so that the swaths overlap one another as the car moves.

Another object of the invention is to provide a car washing apparatus in which a soaping arch has a single row of spaced nozzles and a rinsing arch has a single row of nozzles staggered relative to the nozzles of the soaping arch, the lower nozzles preferably delivering heavier streams of water than the upper nozzles.

A still further object of the invention is to provide a car washing apparatus in which a soaping arch covers a car with soapy water and, as the car moves through a rinsing arch, nozzles thereof are directed toward and rearwardly of the car until all the soapy water is flushed off the front and top of the car and then are reversed to flush the rear portion of the car.

Yet another object of the invention is to provide a coin-operated car washing apparatus in which the driver of an automobile places a coin in a coin box and then follows a series of signal lamps arranged in a row and lighted seriatim to keep abreast of the lighted lamps, and washing and rinsing devices are actuated in accordance with the position of the car as it is moved through the car washing apparatus.

Yet another object of the invention is to provide a car washing apparatus requiring only a single soaping arch and a single rinsing arch, with a single row of nozzles being provided in each arch.

The invention provides car washing apparatus including a soaping arch and a rinsing arch. Each arch includes a plurality of nozzles mounted in a U-shaped row preferably canted relative to the perpendicular to the direction in which a car is moved through the nozzles, and each of the nozzles supplies a heavy, high velocity, narrow spray of water to the car with the sprays preferably being progressively heavier proceeding downwardly. The nozzles are oscillated relative to the car as the car is moved therethrough so as to spray swaths on the car which, when the row is canted, extend angularly relative to the direction of movement of the car and which overlap as the car is moved so that all parts of the surface of the car are cleaned. Since the swaths overlap, the sprays need not overlap and can be narrow and heavy to have high momentum and cleaning efficiency. The car washing apparatus also preferably is of the coin-operated type and includes a timing device which is actuated by a coin-operated mechanism to light one after another of a plurality of lamps positioned in a row extending along the path which the car is driven, and which also actuates the spraying units of a soaping or washing arch and a rinsing arch so as to sequentially wash and rinse the car as it is moved in accordance with the lights as the lights are turned on one after another. Preferably each arch includes side rows of nozzles and a top row of nozzles, and the row of nozzles of the soaping arch is so oscillated as to be directed rearwardly relative to the advancement of the car as the first half of the car travels to and past the arch, and then the nozzles are oscillated in a range directed generally forwardly relative to the car as the rear half of the car is moved to and through the arch. Thus only a single row of nozzles is required to both spray the front half of the car and the rear half of the car. Preferably the nozzles of the rinsing arch are staggered relative to those of the soaping arch so that the more efficient central portions of the sprays from the nozzles of the rinsing arch strike portions of the car not struck by the more efficient central portions of the sprays from the nozzles of the soaping arch. Also, the nozzles of the rinsing arch are oscillated in a rearwardly directed range of oscillation until the rear portion of the car is abrease of the nozzles so that all of the soapy water on the top and side windows of the car is flushed off to the rear and then, when the nozzles of the rinsing arch are oscillated in a forwardly directed range of oscillation, as the rear portion of the car passes through the rinsing arch, the forwardly directed sprays from the rinsing arch nozzles will not push the soapy water back onto the central and front portions of the car. Only a small number of nozzles are required because of the oscillation and the shift of the range of the nozzles, and only a small capacity source of hot water is required to very adequately supply the car washing apparatus.

A complete understanding of the invention may be obtained from the following detailed description of a car washing apparatus forming a specific embodiment thereof, when read in conjunction with the appended drawings, in which:

FIG. 1 is a fragmentary, perspective view of a car washing apparatus forming one embodiment of the invention;

FIG. 2 is a vertical, sectional view of the car washing apparatus of FIG. 1;

FIG. 3 is an elevation view taken substantially along line 3—3 of FIG. 2;

FIG. 4 is an enlarged, fragmentary, side elevation view of the car washing apparatus of FIG. 1, taken substantially along line 4—4 of FIG. 3;

FIG. 5 is an enlarged, fragmentary, vertical sectional view taken substantially along line 5—5 of FIG. 4;

FIG. 6 is a timing chart of the operation of the car washing apparatus of FIG. 1;

FIG. 7 is a diagrammatic view of an electrical control circuit of the car washing apparatus of FIG. 1;

FIG. 8 is a schematic view of the car washing apparatus of FIG. 1;

FIG. 9 is a vertical sectional view of an arch of the car washing apparatus of FIG. 1;

FIG. 10 is a top plan view, with portions thereof broken away, taken substantially along line 10—10 of FIG. 9;

FIG. 11 is an enlarged, vertical, sectional view taken substantially along line 11—11 of FIG. 10;

FIG. 12 is a fragmentary, schematic view of the car washing apparatus of FIG. 1 showing a side of the front half of a car being sprayed by the car washing apparatus of FIG. 1;

FIG. 13 is a schematic, side elevation view of a portion of the car washing apparatus of FIG. 1 spraying the rear half of the side of a car being washed by the apparatus;

FIG. 14 is a fragmentary, schematic, top plan view of the car washing apparatus of FIG. 1 while the front half of a car is being advanced through an arch thereof;

FIG. 15 is a schematic, fragmentary, top plan view of the car washing apparatus of FIG. 1 showing the rear half of a car being advanced through an arch thereof;

FIG. 16 is a fragmentary, schematic view taken substantially along line 16—16 of FIG. 12; and

FIG. 17 is a fragmentary, schematic view taken substantially along line 17—17 of FIG. 13.

Referring now in detail to the drawings, there is shown therein a car washing apparatus forming a specific embodiment thereof including a soaping or washing arch 20 (FIG. 1) and a rinsing arch 22 which serve to sequentially wash a car 23 and rinse the car as the car is driven therethrough. The driver of the car drives the car so that the lefthand wheels 24 thereof (FIG. 3) enter between and travel along tubular guide rails 26 forming a guideway having a flared entrance opening 28. At the start, the driver puts a coin in a known coin box actuator 30 to start the car washing apparatus, the coin box actuator 30 then starts a timed control mechanism or programmer 31 which lights incandescent lamps 32 seriatim, starting at the lefthand end of a light bar 34 and progressing on to the exit end of the apparatus, the driver of the car keeping abreast of the lights as they are turned on, and the programmer 31 operated by the coin box 30 sequentially actuates the soaping arch 20 to spray hot, soapy water onto the car in thick, high velocity streams as the car passes through the arch 20, and to actuate the rinse wash 22 to spray thick, high velocity streams of hot rinsing water onto the car as the car comes to and passes through the rinsing arch 22. A roof 36 covers the car washing apparatus.

The arches 20 and 22, except that the arch 20 is supplied with hot, soapy water while the arch 22 is supplied with hot, rinsing water, are substantially identical in their construction and operation, and only the arch 20 will be described in detail. The arch 20 includes a housing 38 having vertical paneled portions 40 and 42, open at the inside, and a paneled horizontal top portion 44, open at the bottom thereof. The housing 38 includes an integral framework 46 (FIG. 9) and forms an attractive enclosure. Side spray pipes 50 and 52 carry nozzles 53 to 58 thereon, and are mounted in radial and thrust bearings 59 and 60 and 61 and 62, respectively, the radial and thrust bearings being supported by the frame 46. As best illustrated in FIG. 10, the side spray pipes 50 and 52 are mounted in parallel vertical planes but are canted relative to the vertical as illustrated by the pipe 50 in FIG. 11, the pipes 50 and 52 being canted equally and in opposite directions from the vertical. The pipes 50 and 52 are preferably canted at an angle of about 15° relative to the vertical.

A top spray pipe 70 (FIG. 10) is mounted rotatably in bearings 72 carried by the frame 46, and has pinned thereto bevel gears 74 and 76 which mesh with bevel gears 78 and 80, respectively, which are pinned to the pipes 50 and 52, respectively. Both ends of each of the pipes 50, 52 and 72 are plugged so that no water can pass therefrom. Flexible hoses 82, 84 and 88 and centrally located stub pipes 87 connect the pipes 50, 52 and 70, respectively, to a manifold pipe 88 connected to a solenoid controlled valve 90 and a filter 92 (FIG. 8) connected by a pipe 94 to a T-coupling 96 connected to a hot water pipe 98 and to a concentrated soapy water pipe 100, the hot water pipe 98 being connected by known check valve 102 to a hot water supply pipe 104 leading to a source of hot water under pressure of a known boiler or supply plant unit 105 which also supplies hot, concentrated soapy water to the pipe 100 at the desired rate relative to that of the hot water supplied. Each of the nozzles 53 to 58 (FIG. 9) delivers a thick or heavy, fan-like spray or stream 106 in a vertical plane, the stream being of high velocity and impinging on the car 23 with high momentum.

The nozzles 53 to 58 are positioned about one foot from the sides and top of the car. Since the lower portions of the car usually are the dirtiest and the car becomes cleaner processing upwardly, the nozzles 55 and 58 produce the heaviest sprays with the narrowest angle of the fan-shaped sprays, this angle preferably being about 15°, the sprays from the nozzles 54 and 57 are the next heaviest and with the next narrowest angle, preferably about 25°, and the sprays from the upper nozzles 53 and 56 are the least heavy and the largest angle, preferably about 40°. The sprays from the nozzles 53 to 58 being progressively heavier proceeding downwardly, the scrubbing action is progressively more intense proceeding downwardly along the sides of the car.

The pipes 50, 52 and 70 are each continuously oscillated through ranges of about 60° as the car 110 is moved to the arch 22 and therethrough. The oscillations are effected by an arm 112 (FIG. 11) keyed to the pipe 70 and the bevel gear 74 and connected by a link

114 mounted on a crank member 116 driven through a reduction gear 118 driven by an electric motor 120. The oscillation preferably is at a rate of about 79 oscillations per minute. The electric motor 120 is mounted on a plate 122 hinged at its top end by a pintle 124 carried by a bracket 126 secured to the frame 46 of the arch. The plate 122 is pivoted relative to the frame 46 to shift the ranges of oscillation of the pipes 50, 52 and 70, and the position of the plate 122 relative to the frame 46 is controlled by a bell crank lever 130 mounted pivotally on a bracket 132 and driven by a water driven cylinder 134 controlled by a solenoid operated three-way valve 135 (FIG. 8). When the car 23 is approaching the arch 20 and until it has passed halfway through the arch 20, the plate 122 is in the raised, full line position thereof shown in FIG. 11 in which the nozzles 53 to 58 and nozzles 140, 141, 142 and 143 (FIG. 10) carried by and supplied with soapy water by the pipe 70, are moved through a range directed generally rearwardly relative to the travel of the car and such that the fan-like streams from the nozzles are directed from 30° relative to the direction of movement of the car 23 to 90° relative to the direction of the car 110 through the arch. Each of the nozzles 140 and 143 emits a spray 106 subtending an angle of about 30°. While the rear half of the car is passing through the arch and for a short time thereafter, the cylinder device 134 holds the plate 122 in its lower, broken-line position thereof shown in FIG. 11 in which the nozzles 53 to 58 and 140 to 143 are oscillated in a range from one extreme in which the streams are perpendicular to the side of the car to a second extreme in which the streams are directed forwardly relative to the car at an angle of 30° relative to the direction of movement of the car. The angles of the fan-like streams or sprays 106 are quite narrow and such that the streams themselves never overlap at any one instant, as illustrated best in FIGS. 12 to 17. However, the nozzles are oscillated to oscillate the streams to cover zig-zag swaths, one stroke of the swaths being shown approximately at 150 (FIG. 12). The swaths are canted or sloped relative to the direction of movement of the car and the car moves slowly through the arch, about 16.8 feet per minute being preferred. Since the nozzles are oscillated relatively rapidly, as compared to this movement of the car and the swaths are canted, the swaths 150 overlap each other and all portions of the side of the car are covered by the swaths. Similarly, the swaths from the nozzles 140 to 143 overlap each other as do also the swaths from the nozzles 56 to 58. All portions of the forwardly facing surfaces of the car of the half of the car adjacent the pipe 50 also are covered by the sprays as these portions of the car approach the arch 20. By having the relatively narrow angle sprays which do not themselves overlap, the streams may be maintained as heavy, thick, high volume, high velocity, high momentum streams which serve to efficiently scrub the car while using a minimum of water, and by having the swaths canted so that the swaths from adjacent sprays overlap so that each portion of the car is covered by the sprays or streams, the entire car is scrubbed with the heavy, high velocity streams of hot, soapy water and is very effectively cleaned, while a minimum number of nozzles is used and a minimum capacity of the plant 105 is required.

As the car 110 approaches the arch 20, the valve 90 (FIG. 8) is opened and hot, soapy water under a high pressure is supplied to the pipes 50, 52 and 70 (FIG. 9) and the motor 120 is turned on. The cylinder device 134 is extended by the water under pressure supplied thereto to hold the plate 122 in its full line position as viewed in FIG. 11, which is the front half or approach position in which the nozzles of the arch 20 are directed in a range varying from one extreme of about 60° in a rearward direction relative to the travel of the car to a second extreme in which the nozzles are perpendicular to the car, and the nozzles are oscillated back and forth in this range. As the car approaches the arch 20 the heavy, high velocity, high momentum streams of soapy water are directed against the front and grill of the automobile, and then, as the car continues to travel and the nozzles oscillate, the nozzles direct the streams against the sides and the top of the front half of the automobile. Then, as the car, which is moving in accordance with the lighting of the lamps 32 with the driver keeping approximately abreast of the lamp just lighted, comes to a position in which it is centered longitudinally in the arch 20, the cylinder device 134, by cutting off the supply of water under pressure thereto, is actuated to move the plate 122 and the motor 120 to the broken line positions thereof shown in FIG. 11. This row sets the range of oscillation of the nozzles 53 to 58 and 140 to 143 so that they are directed at their forward extremes about 60° forwardly in the direction of advance of the car 23, and the nozzles are oscillated between this forward extreme and a rearward extreme in which the streams from the nozzles are directed perpendicularly toward the car.

The forwardly directed oscillation range of the nozzles is continued until after the car has passed out from under the arch 20 and the rear end of the car has been thoroughly scrubbed by the heavy, high momentum streams of hot, soapy water. Then the valve 90 is turned off and the car travels to the rinsing arch 22 which is substantially identical in construction and operation with the arch 20. The rinsing arch is supplied with only hot, clear, rinsing water, and the rinsing water is applied thoroughly to the car as it travels through the arch 22. The rinsing arch has nozzles 161 (FIG. 8) identical with but mounted by oscillated pipes 163 so staggered relative to the nozzles 53 to 58 and 140 to 143 (FIG. 9) that the central portions of the sprays of clear water from the rinsing arch impinge on the car midway between the areas on the car on which the central portions of the sprays of soapy water from the soaping arch 20 have impinged. Thus, the central portions of the sprays from the nozzles 161, which are, of course, the heaviest and most efficient portions of the sprays, scrub the areas which have been thoroughly covered and soaked with soapy water but not so thoroughly scrubbed by the central portions of the sprays from the soaping arch.

As the car approaches the rinsing arch 22 and for the first portion of the travel of the car through the rinsing arch, the nozzles 161 (FIG. 8) of the arch 22 direct the heavy, high velocity, high momentum streams of hot water over a range varying from 60° rearwardly to the direction of travel, to the perpendicular to the car. During the last portion of the travel of the car through the rinsing arch 22, the range of oscillation of the nozzles

of the arch 22 is changed to a range from perpendicular to the car at one extreme to 60° forwardly relative to the direction of advancement of the car at the other extreme of the range. In order to flush all the soapy water completely off the top and side windows of the car, the nozzles 161 are oscillated in their rearwardly directed range for substantially greater than one-half of the travel of the car through the rinsing arch, preferably until almost the entire top has passed the nozzles. Then the range of oscillation of the nozzles is changed from rearward to forward, but by this time all the soapy water has been flushed off the top and side windows of the car so that the forwardly directed nozzles do not carry any soapy water forwardly along the top and side windows.

The programmer 31 (FIG. 7) operates to turn on the lamps 32 one after another at time intervals, starting at the lefthand end lamp 32, as viewed in FIG. 7, and proceeding to the right along the apparatus. The driver of the car drives the car so that he keeps abreast of the most extreme lamp 32 that is lighted. The programmer also sets the range of oscillation of the nozzles of the arch 20 and the supply of soapy water thereto while the car travels through and beyond the arch 20, and then similarly controls the ranges of oscillation of the nozzles of the arch 22 and the supply of water thereto in synchronization with the lighting of the lamps as the car approaches the arch 22, travels through the arch 22 and leaves the arch 22. Prior to starting the cycle of the programmer 31, the driver of the car drives the car to the coin box actuator 30 at which a "stop" lamp 162 for lighting a "Stop" sign 172 is darkened and a "go" lamp 175 is energized to illuminate a "Go" sign 176. The driver stops, places a coin in the coin box actuator 30, which is of a well known, commercially available type having a timer therein, and this actuates the timer of the actuator 30, which timer is adapted to run for about one-third of the cycle encompassing the period of operation for one car to pass through and be washed and rinsed by the car washing apparatus.

When the coin box actuator 30 is actuated, the timer thereof immediately closes contacts 169 and 170. The closing of the contacts 170 completes a circuit through contacts 186 to a programmer motor 182 to start the motor 182. The contacts 169 start the timer motor (not shown). At this time the motor 182 is connected across powerline conductors 184 and 185 through contacts 186 which are permitted to be closed at this time by a cam 188 driven by shaft 189 driven by the motor 182. The cam 188 permits the contacts 186 to be closed from before the start of the car washing operation through about the first 10 percent of a complete revolution of the shaft 189. The shaft 189 also has cams 190 to 214 which bring in contacts 220 to 244, except for the contacts 234, at 4 percent intervals of the revolution of the shaft, to light the lamps 32 one after another, proceeding from left to right as viewed in FIG. 7, the motor 182 driving the shaft 189 one complete revolution for one cycle of the controller 31. The driver of the car merely drives so that he is abreast of the latest lighted lamp 32 always.

Cams 251, 252, 253, 254, 255 and 256 also are provided on the shaft 189 and are driven thereby. The cams 251 to 256 control contacts 261 to 266, respectively, which are connected to a powerline conductor 267 which is at the same voltage as the powerline conductor 184. The contacts 261 are in series with the "-Go" lamp 175 and are closed during the last fraction of 1 percent of one cycle to the first 4 percent of the succeeding cycle. The contacts 262 are closed from 30 to 56 percent of the cycle, the contacts 263 are closed from 92 to 99 percent of the cycle, the contacts 264 are closed from 58 to 99 percent of the cycle, and the contacts 266 are closed from 4 to 99 percent of the cycle.

When the contacts 264 are closed, the motor 120 is energized and a solenoid winding 270 is energized. The motor 120 oscillates the pipes 50, 52 and 70 (FIG. 10) and when the solenoid winding 270 is energized, it opens the valve 90. Thus, the first arch 20 runs from 4 to 58 percent of the cycle, with soapy water being sprayed and the oscillation of the nozzles of the arch 20 being effected through this portion of the cycle. The car travels halfway through the arch 20 during the portion of the cycle from 4 to 30 percent of the cycle, and during this portion of the cycle the nozzles are in their rearwardly directed range of oscillation, the cylinder device 134 being supplied with the water under pressure to keep it extended and to keep the plate 122 swung counterclockwise to its extreme upward position, as shown in full lines in FIG. 11. Then, at the end of the half of the movement of the car through the arch, the contacts 262 are permitted by the cam 252 to close to energize solenoid 274, which actuates the valve 135 (FIG. 10) to close the supply of water off from the cylinder device 134 and drain the cylinder device of water. This causes the cylinder device 134 to contract and swing the bell crank lever 130 clockwise, as viewed in FIG. 11, as the plate 122 with the motor 120 thereon bears against the bellcrank lever 130 and moves to the lower positions thereof shown in phantom lines in FIG. 11 to change the oscillation of the nozzles 53 to 58 and 140 to 143 from the rearwardly directed range to the forwardly directed range thereof.

After the car has been moved a short distance beyond the arch 20, which is sufficient to thoroughly wash with the hot soapy water the rear portion of the car, the contacts 262 and 264 are opened, to de-energize the motor 120, de-energize the solenoid 270 and de-energize the solenoid 274. The solenoid 270 closes the valve 90 to shut off soapy water from the source 106 (FIG. 8) and stops the oscillation of the nozzles of the arch 30, and the de-energization of the solenoid 274 opens the valve 135 (FIG. 8) to the cylinder device 134. At this time the car is approaching the rinsing arch 22 and the cam 255 permits the contacts 265 to close, and they remain closed 58 to 99 percent of the cycle. When the contacts 265 are closed, a motor 280, which oscillates pipes 163 (FIG. 8) carrying the nozzles 161 of the arch 22, is energized, the motor 280 being identical in construction and operation to the operation and construction of the motor 120. Closing of the contacts 265 also energizes solenoid 282 to open valve 284 (FIG. 8) in the hot water line 104 to supply the pipes 286 of the arch 22 with hot rinse water, which is applied to the car by the nozzles 161 of the arch 22, the nozzles being directed rearwardly toward the front end of the car as the car approaches and travels most of the way through the arch 22 to scrub and flush all of the soapy water off the front portions, all of the top and substantially all the sides of the car.

After the car has passed somewhat over two-thirds of the way through the arch **22**, the contacts **263** are closed. Closing of the contacts **286** causes energization of a time delay relay winding **290** which closes contacts **292** and opens contacts **294**. Opening of the contacts **294** opens one circuit to the lamp **175**. Closure of the contacts **292** causes energization of a relay winding **296** to close contacts **298** and **300**. Closing of the contacts **300** closes the circuit to the "Stop" lamp **162**. Closure of the contacts **298** closes a circuit to the motor **280** in parallel to the contacts **265** in order to drive the motor **280** for a short time after the completion of the cycle, the time delay relay **290** delaying dropping out for a few seconds after the motor **182** has stopped. When the contacts **292** are closed, a solenoid **302** is energized, which so adjusts the position of the motor **280** of the arch **22** that the oscillation of the spray nozzles of the arch **22** are through a range of from perpendicular to the car to 30° to the line of travel of the car and in the direction of travel of the car. Thus the rear half of the car is rinsed by streams of rinse water having substantial portions of the oscillation components in the same direction as the travel of the car. The rinse spray is continued until the car has traveled out of the arch **22** and the rear end of the car has been rinsed. At the end of the cycle, or the 100 percent mark, the contacts **220** open to stop the motor **182** at the zero position, the contacts **170** having been opened previously by the timer of the coin box actuator **130** having timed out. The relays **290** and **296** also drop out a few seconds later to de-energize the motor **280** and the solenoid **302**. The operation described above then may be repeated with another car.

The programmer **31** is mounted in a cabinet **310** (FIG. **4**) to which is secured the coin box actuator **30**. The motor **182** is mounted on a panel **312**, and drives the shaft **190** through gears **314** and **316**. The shaft **189** is journaled in bearings **318** carried by a frame **320** secured to the panel **312**, and the contacts **186** and **220** to **244** and **261** to **266** are mounted on bars **322** and **324** of electrical insulating material secured to the panel **312**. A hinged cover **326** provides access to the controller **160**. The lamps **32** are supported in an elongated sheet metal housing **328** having a translucent cover **330** facing the path of the car and enclosing the lamps **32** while making light from them visible to the driver of the car. The housing **328** forms a continuation of the cabinet **312**, and posts **331**, **332** and **334** (FIG. **1**) support the cabinet **312** and housing **328** along with the arches **20** and **22**, the housing fitting into notches **340** and **342** in the arches **20** and **22**, respectively. The housing **328** with the lamps **32** is positioned above the nozzles **53**, **54** and **55** as illustrated in FIG. **11** but sufficiently low as to be readily visible to the driver of the car, preferably being at or slightly above the level of the eyes of the driver.

The above-described car washing apparatus, by having only a small number of nozzles which have the relatively narrow, fan-like sprays **106**, requires only a small capacity pump and a small capacity heater (not shown) of the known unit **105** forming the source of the hot water and soapy water. Since the nozzles are few and the sprays narrow, the sprays are kept thick, and high velocity is maintained without using excess water, and this keeps the scrubbing or washing ability of the sprays at a maximum. While the sprays do not themselves intersect and provide complete coverage, they do by their oscillation form the canted or inclined swaths to completely cover the car as the car moves therepast. Since the rinsing nozzles are staggered relative to the soaping nozzles, the entire car is scrubbed hard by the central portions of the sprays from the nozzles. Since the entire top of the car and the entire side windows are flushed completely by rearwardly directed streams of water from the nozzles of the rinsing arch before the nozzles are shifted to their forward directions, no soapy water is pushed back onto the side windows and front portions of the car.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. In a car washing apparatus,
- a plurality of nozzles,
- mounting means mounting the nozzles in a row,
- supply means for supplying fluid under pressure to the nozzles,
- the nozzles serving to direct diverging streams of the fluid impinging on the adjacent surface of a car moved in a predetermined direction past the row of nozzles,
- and drive means for oscillating the nozzles angularly relative to said direction to cause the sprays to cover swaths which are inclined relative to the direction of movement of the automobile so that the swaths overlap each other as the automobile is moved past the nozzles,
- the mounting means including a pair of side pipes mounted at the sides of the path at opposite inclinations to the normal to the direction of movement of the car, and a top pipe extending from the upper end of one of the side pipes to the upper end of the other side pipe and inclined relative to a plane normal to the direction of movement,
- the nozzles being mounted on the pipes,
- the supply means supplying the pipes with liquid under pressure,
- the drive means serving to oscillate the pipes about the longitudinal axes thereof.

2. The car washing apparatus of claim **1** wherein the drive means includes means drivingly interconnecting the adjacent ends of the pipes, and means for oscillating one of the pipes.

3. The car washing apparatus of claim **1** wherein the drive means is variable from a first condition oscillating the pipes in a range in which the nozzles are directed primarily rearwardly and a second range in which the nozzles are directed primarily forwardly.

4. In a car washing apparatus,
- means for guiding a car in a predetermined direction along a predetermined path,
- a pair of generally vertical side pipes mounted at the sides of the path,
- a top pipe extending from the upper end of one of the side pipes to the upper end of the other side pipe,
- a plurality of nozzles mounted in substantially parallel positions on the pipes,

means for supplying the pipes with liquid under pressure, means drivingly interconnecting the pipes,

shiftable drive means for oscillating one of the pipes,

coin-operated means for connecting the means for supplying power to the lamps one after another, proceeding from the entrance end of the rails toward the exit end thereof,

a source of soapy water under pressure,

means for connecting the spray means in the washing arch to the source of soapy water under pressure as a car driven in accordance with the lighting of the lamps travels through the washing arch,

a source of hot water under pressure,

the timing means including means operable in accordance with the lighting of the lamps adjacent the rinsing arch for connecting the source of hot water under pressure to the nozzles in the rinsing arch so that the car is rinsed as it travels through the rinsing arch.

5. The car washing apparatus of claim 4 wherein the drive means for oscillating one of the pipe includes a motor,

and eccentric means driven by the motor and drivingly connected to said one of the pipes.

6. The car washing apparatus of claim 5 wherein the shifting means includes a plate supporting the motor,

means mounting the plate pivotally adjacent the pipes for movement between said first position in which the pipes are oscillated in a first range and said second position in which the pipes are oscillated in the second range,

and power means for pivoting the plate between said first position and said second position.

7. The car washing apparatus of claim 6, wherein the power means includes a cylinder device for shifting the plate, and means connected to the supply means for supplying water under pressure to the cylinder device.

8. In a car washing apparatus,

means for directing a car along a predetermined path in a predetermined direction,

means for applying soapy water to the car at a first point along said path,

a plurality of nozzles,

means for supplying rinsing water under pressure to the nozzles,

each of the nozzles serving to emit water in a divergent, fan-like spray therefrom,

mounting means mounting the nozzles at a subsequent point along said path in positions in which the nozzles direct the sprays onto the car to form generally parallel swaths on the car as the car is advanced therepast,

shifting means for shifting the mounting means from a first position in which the nozzles are directed somewhat rearwardly relative to the direction of movement of the car to a second position in which the nozzles are directed somewhat forwardly relative to said direction,

and timing means for actuating the shifting means to shift the mounting means from the first position to the second position when most of the top of the car has been flushed completely.

9. The car washing apparatus of claim 8 including, a pair of rails extending along said predetermined path having an entrance end and an exit end and between which rails the wheels on one side of a car are adapted to travel to guide the car along the path in a predetermined direction,

a plurality of incandescent lamps,

a lamp housing mounting the incandescent lamps in a row extending along the rails substantially at the same height as the head of the driver of the car,

a washing arch having a pair of legs and supporting the lamp housing on one of the legs thereof,

a plurality of spray devices,

the spray devices including spray nozzles mounted in the washing arch,

a rinsing arch having a pair of legs and supporting the lamp housing on one of the legs thereof,

the spray devices also including nozzles mounted in the rinsing arch,

the means for lighting the lamps including means for supplying power to the lamps,

the control means including driven timing shaft, a plurality of cams on the shaft and a plurality of switch

means actuated by the cams for actuating the cleaning devices and the pacing means.

10. In a car washing apparatus,

guide means for guiding a car along a predetermined path as the car is driven,

a plurality of cleaning devices spaced along said path for cleaning the car when the car is adjacent thereto,

control means for actuating the cleaning devices sequentially one after another in accordance with a timed program,

and pacing means adapted to provide a lighted signal movable along the path in synchronism with the operation of the actuation of the cleaning devices,

the lighted signal being positioned at the side of the driver's side window and at a level visible to the driver through the side window,

the control means serving to actuate the cleaning devices for operation on the car while the car is adjacent to each cleaning device when the car is moved to keep the head of the driver abreast of the signal light,

and means for shifting the drive means between a first position in which the pipes are oscillated in a first range in which the nozzles are directed rearwardly and a second position in which the pipes are oscillated in a second predetermined range and in which the nozzles are directed forwardly.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,701,356 Dated October 31, 1972

Inventor(s) Daniel C. Hanna, Jack F. Ebeling & David Hildebrand

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 28, change "row" to --now--

Column 7, line 17, change "time" to --timed--

Column 11, lines 4-19 (commencing with "coin-operated means" and ending with "the rinsing arch.") should be deleted and the following paragraph inserted therefor

--and means for shifting the drive means between a first position in which the pipes are oscillated in a first range in which the nozzles are directed rearwardly and a second position in which the pipes are oscillated in a second predetermined range and in which the nozzles are directed forwardly.--

Column 11, line 21, change "pipe" to --pipes--

Column 12, lines 27-31 (commencing with "the control means and ending with "the pacing means.") should be deleted and the following paragraphs inserted in place thereof:

FORM PO-1050 (10-69)

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* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

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It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

--coin-operated means for connecting the means for supplying power to the lamps one after another, proceeding from the entrance end of the rails toward the exit end thereof,

a source of soapy water under pressure,

means for connecting the spray means in the washing arch to the source of soapy water under pressure as a car driven in accordance with the lighting of the lamps travels through the washing arch,

a source of hot water under pressure,

the timing means including means operable in accordance with the lighting of the lamps adjacent the rinsing arch for connecting the source of hot water under pressure to the nozzles in the rinsing arch so that the car is rinsed as it travels through the rinsing arch.--

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,701,356 Dated October 31, 1972

Inventor(s) Daniel C. Hanna, Jack F. Ebeling & David Hildebrand

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 12, lines 52-57 (commencing with "and means for shifting" and ending with "directed forwardly.") should be deleted and the following paragraph inserted in place thereof:

--the control means including driven timing shaft, a plurality of cams on the shaft and a plurality of switch means actuated by the cams for actuating the cleaning devices and the pacing means.--

Signed and sealed this 24th day of April 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334