This invention relates to a spray apparatus for an automatic car wash and especially to a spray apparatus which is power driven to cause individual spray nozzles to spray in a vertical, fan-shaped pattern overlapping sufficiently to cover and spray the sides of an automobile moving therebetween.

Automatic car wash installations are well known. One primary factor in such installations is the minimum time for putting a car through from beginning to end. Another primary factor is the result obtained insofar as the cleanliness of the car body after it has been run through in the minimum length of time. After the car is initially prepared, it is important that fast and effective spray wash with whatever special preparations, either soaps, detergents or without wax compounds are used, be employed to remove all of the dirt and soap and other unwanted material from the car. Stationary sprays which have been employed in installations are not satisfactory because they lack the necessary movement and agitation required effectively to remove the cleansing agents with the dirt and other deposits. There is a need for an effective, fast-operating spray arrangement for removing the cleansing agents and dirt while the car is in motion passing through the automatic car wash.

An object of this invention is to provide a spray-nozzle arrangement for automatic car washers which is power driven to wash all of the side and top surfaces of the car in such a manner as to remove the cleansing agents and the unwanted dirt and deposits therewith.

A further object of this invention is to provide a spray-nozzle arrangement in an automatic car wash which may be power driven from electric motors and which employs a minimum number of nozzles operating in an oscillating motion horizontally to provide a vertical fan-shaped spray.

Another object of this invention is to provide an arrangement of spray-nozzles contained in a housing constructed with opposite sides facing each other through which the vehicle passes and a top housing connecting the sides and supporting the power drive apparatus for the spray nozzles on the sides.

Still another object of this invention resides in an arrangement of electric motors on opposite sides of the housing which has the movable spray nozzles mounted therein and also the mechanism employed for causing the vertical water pipe to oscillate to move the spray nozzles in a horizontal path for spraying a fan-shaped spray in a vertical pattern.

Generally described, without restriction on the scope of my invention as contained in the appended claims, one preferred embodiment of the present invention comprises a substantially U-shaped housing arrangement employing a pair of columnar-like housing members having a substantially horizontal top housing thereby providing a spray support arrangement through which a vehicle is propelled by the conveyor mechanism or other arrangement used in an automatic car wash. The top housing provides a shelf or support base on which on opposite ends thereof is located a drive electric motor each having a substantially identical spray nozzle drive arrangement attached thereto. Each spray nozzle drive arrangement comprises a drive cam or lever rigidly attached to the motor shaft and adapted to rotate 360° therewith and having the outward end thereof loosely pinned by a crank shaft connector or other pin to a connecting or connecting arm having a clevis or bifurcated end member which is loosely pinned to a pipe link attached by means of a U-bolt or other arrangement around a vertical water pipe which is supported vertically in the respective side of the side housings. Each of the side housings has two or more ports or openings formed therein through which protrudes a spray nozzle having the apertures therein arranged to spray in a vertical and fan-shaped spray pattern and with the distance between the nozzles such that at the contact with the side of the vehicle the spray overlap sufficiently to cover the surface. The nozzles are attached by pipe fittings or other suitable means to receive water received through the vertical water pipe which in turn is received by a connection to the main water supply. A water pipe extends across the top support housing and leads to a center nozzle which sprays vertically downwardly in a large fan-shaped spray to cover the top of the vehicle.

In the operation of the device, electric power is delivered from a suitable conduit to the electric motor which operates constantly or which can by suitable switching arrangement be made to operate each time a car approaches the spray and discontinue operation after it has left. During the spraying of the vehicle, the motors operate continuously and the connecting rod is driven in a reciprocating manner to cause the vertical water pipe to oscillate thereby oscillating the nozzles in a horizontal path to cause the vertical fan-shaped spray therefrom to impinge upon the surface of the vehicle and to move across it in a lengthwise motion as the vehicle is moving therethrough.

This combination of vertical spray together with lengthwise movement against the vehicle combined with the overlapping sprays causes the deposits and the cleansing agent to be thoroughly removed during the time that the vehicle is pulled between the nozzles.

Other and further objects and advantages of my invention will become apparent upon consideration of the following specification taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of the spray housing arrangement with a pair of spray nozzles on each side spraying on a typical vehicle moving therethrough.

FIG. 2 is a top plan view looking into the top of the horizontal housing with the top cover removed.

FIG. 3 is a cross-sectional view taken substantially along lines 3—3 in FIG. 1.

FIG. 4 is an elevation view of one side of one of the side support housings shown in FIG. 1.

FIG. 5 is a front elevation view in enlarged detail of one of the nozzles.

FIG. 6 is a fragmentary elevation view looking into one of the nozzle slots and one of the nozzles shown in FIG. 1.

FIG. 7 is an elevation view looking directly into the center of the motor shaft and taken substantially in the lines of 7—7 in FIG. 2.

The complete automatic car wash arrangement does not in itself form any part of the present invention. From time to time general reference may be made to the operation of such establishments which are well known in the art. Automobiles are received in one end of such establishments and after a preliminary interior cleaning are hooked onto a conveyor carried on the ground and pulled through a shed or semi-tunnel like affair during which time they receive such operations as soaping and brushing the tires, soaping and scrubbing the body, rinsing and washing away the cleansing agents and deposits, and finally the drying and finished touches. It is to that part of the operation referred to as applying cleansing agents and washing away the deposits and cleansing agents to which the present invention is directed. It is to be understood that the vehicle is moved either by a conveyor, gravity or
slow driving at a very small rate of speed through the present invention.

In FIG. 1 there is shown typically a vehicle 10 having a body 12 and tires 14, 16. The vehicle has the usual outer body surface 18 which is painted in an attractive manner and which is washed and cleansed by the present operation.

Supported on the floor or ground 20 is a substantially U-shaped spray housing arrangement 21 of the present invention comprising hollow housings or conduits consisting of a pair of side housings or conduits 22, 24 supported for vertical, opposed and substantially parallel relationship and consisting of sheets metal or other material plates 26 fastened by suitable plates 26 joined together at their edges and also containing a horizontal shelf or support platform 30 for supporting part of the mechanism of the present invention.

Referring to FIG. 2 for further temporary description, it is seen with the top plate of housing 28 removed that the shelf 30 supports rear opposite ends thereof identical electric motors 32 fastened in place by motor mounting plates 54 secured or bolted to the shelf 30 and each motor having an output shaft 36. Motors 32 are driven by electricity supplied through a conduit 38 and wiring 40 which, as seen in FIG. 3, may also lead to an on-off or automatic switch through the control lead 42. Each motor 33 has connected thereto a respective drive lever 44 which is rigidly fastened at one end to motor shaft 36 and which is loosely pinned by a drive pin 46 to one end of a connecting rod 48, the other end of which is bifurcated or formed with a clevis 50 which is loosely pinned by pin 52 to a pipe oscillating lever or member 54 attached to the water pipe 56 by means of a U-bolt 58.

Water pipe 56 is a vertical pipe of any suitable diameter and construction such as three-quarter (3/4) inch galvanized water pipe supported vertically substantially throughout the length of a respective side housing 22, 24 as by bearing support 60 at the bottom and a suitable journal or bearing arrangement 62 supported in the respective housings 22, 24. By this arrangement, the vertical water pipes 56 are supported in the respective side housings 22, 24 for oscillation therein. Water pressure and water is delivered to the respective water pipes 56 by means of a supply pipe 64 leading into one side of the sides 22, 24 and having respective flexible water hoses such as heavy duty industrial water hose connected from a water fitting 66 of a pressure or supply pipe 66 to the respective water pipes 56. Through this arrangement, water is delivered to the flexible hose 67 which may be displaced as the pipe 56 oscillates. Also leading from the supply pipe 64 on shelf 30 is a center, top spray arrangement comprising a short pipe 70 connected by a fitting 72 with a rigid top spray nozzle 74 which sprays downwardly in a vertically fan-shaped pattern across the top of the vehicle 10.

As seen in FIGS. 3 and 4, attached to the vertical pipe 56 by means of a T-fitting 78 and a short nipple 80 is a conventional water spray nozzle 82 having a restricted orifice 84 shown in FIGS. 5 and 6 arranged in an elliptical vertical opening to provide a substantially vertical fan-shaped spray which impinges upon the side 18 of the vehicle 10. Two of the nozzles 82 and fittings 78 and related structure are attached on each of the side water pipes 56 to protrude through a respective opening 80 of sufficient length to allow unrestricted motion of the nozzle 82. The distance measured vertically along the water pipe 56 between the centers of the nozzles 82 on each side is sufficiently determined according to the distance from the end of the nozzle to the side of an average vehicle to assure that the vertical-fan shaped patterns 86 produced by each of the nozzles 82 overlap at the intersecting area shown generally at 88 thereby to assure that water impinges or strikes the side 18 of the vehicle at every spot thereon.

In the operation of the spray arrangement which is reviewed apart from the discussion contained previously, continuous operation of each of the motors 32 causes rotation of the members 44 which drives through pin 46 the connecting rod 48 which because of the eccentric connection reciprocates in a straight line and through the connecting pin 52 in the clevis 50 oscillates the respective pipe 56 substantially the amount angularly shown in FIG. 3. It is to be noted that as described previously the sprays are oscillated and are produced in a vertically fan-shaped pattern and pick up the automobile as it approaches the side frame members 22, 24 and continues to oscillate as the automobile passes between the vertically disposed fan-shaped sprays. It is to be noted that the forward motion of the automobile 10 at times is in opposition to the direction of impingement of the front edge of the sprays 86 which provides an agitated contact between the sprays and the sides of the automobile 10 important from the standpoint of dislodging and removing the cleansing agent and deposits then adhering to the surface of the vehicle. It is partly through this agitated action that the present sprays are so effective in removing the unwanted material from the surface of the vehicle during the short period of time that the vehicle has to pass through the sprays.

Any spray nozzle 82 which produces a substantially satisfactory vertically disposed, substantially fan-shaped spray is satisfactory. One such spray nozzle is sold under the trademark or trade name "Universal" and may be obtained through commercial purchase. Other spray nozzles also sold commercially may be adaptable to the suited purpose.

While I have shown and described a particular embodiment of my invention together with a suggested operation thereof and various objects and results, it is to be understood that this is no sort of limitation on the scope of my invention since various alterations, substitutions, eliminations, deviations, changes, and variations may be made in the embodiment shown and described without departing from the invention set forth in the appended claims.

We claim:
1. In a spray arrangement for an automatic car wash in which automobiles are moved,
   (a) a spray housing comprising opposed side frames and a top support across said side frames,
   (b) water supply pipes substantially vertically disposed and mounted for movement in each of said side frames,
   (c) means for oscillating said respective water pipes about the vertical axes thereof,
   (d) spray nozzles mounted on each of said water pipes and being spaced vertically apart for oscillation therewith,
   (e) each of said nozzles having an orifice arranged to provide a substantially vertical and fan-shaped spray directed toward the side of an automobile moving adjacent thereto and said nozzles being spaced apart on said supply pipe a distance with relation to the distance to said automobile to have the fan-shaped sprays intersect at the side of said automobile,
   (f) an electrical power means on said spray frame for continuously driving said means in paragraph (c).
2. In a spray arrangement for an automatic car wash wherein automobiles are run continuously through said wash:
   (a) a spray frame comprising said frame housing supported on the ground and standing substantially vertical therefrom,
   (b) a top frame support connected to and extending between said side frame members and being located above an automobile passing therebeneath and between said side frames,
(c) each of said side frame housings having a substantially vertical water supply pipe mounted for oscillation therein,
(d) an electric motor located adjacent each of said side frame members, there being one electric motor for each of said supply pipes,
(e) a connecting rod reciprocated by said motor,
(f) a connecting link connecting said connecting rod with said respective supply pipe whereby said reciprocating motion of said connecting rod oscillates said pipe,
(g) a main supply water inlet leading to said spray frame arrangement,
(h) a flexible water line connecting said main supply to each of said respective vertical water pipes,
(i) spray nozzles attached on each of said supply pipes and facing inwardly toward an automobile passing between said side frame members and facing each other and adapted to spray water on the sides of said automobile,
(j) each of said spray nozzles being connected on said vertical pipe and each nozzle having a substantially elliptical opening therein having the main axis of the ellipse substantially vertical whereby a substantially fan-shaped, vertical spray emits from said nozzle and fans out to contact the side of the vehicle,
(k) said nozzles being oscillated in a horizontal path whereby to move said fan-shaped spray horizontally as said spray is fanned out in a vertical plane,
(l) and said sprays being spaced apart on each water pipe a distance sufficient with respect to the distance to the side of the automobile to have the sprays intersecting thereon whereby all of the surfaces are contacted by a driven spray,
(m) and an overhead spray mounted on said top frame support and spraying downwardly onto the top of said automobile.

3. In a spray arrangement for an automatic car wash in which automobiles are moved,
(a) a support comprising opposed sides,
(b) a liquid supply means for said side frames,
(c) spray nozzles mounted on each of said sides facing each other and being spaced vertically apart for oscillation,
(d) means for oscillating said respective nozzles,
(e) each of said nozzles having an orifice arranged to provide a substantially vertical and fan-shaped spray directed toward the side of an automobile moving adjacent thereto and said nozzles being spaced apart a distance with relation to the distance to said automobile to have the fan-shaped sprays intersect at the side of said automobile.
(f) said means for oscillating said spray nozzles including a member which connects spray nozzles on each of the sides with each other and with the liquid supply means, said member on each side being supported on that side and being disposed at an angle between 45 degrees and 90 degrees with the horizontal thereby locating said nozzles to spray on the side of a vehicle passing between nozzles on opposite sides.

4. In a spray arrangement for an automatic car wash in which automobiles are moved,
(a) a spray support comprising opposed sides,
(b) a liquid supply means for said sides of said spray support,
(c) spray nozzles mounted on each of said sides, facing each other and being spaced vertically apart,
(d) means for moving said respective nozzles in a direction forwardly and rearwardly of said automobile, said means including a member which connects spray nozzles on each of the sides with each other and with the liquid supply means, said member on each side being supported on that side and being disposed between 45 degrees and 90 degrees with the horizontal thereby locating said nozzles to spray on the side of a vehicle passing between nozzles on respective sides,
(e) each of said nozzles having an orifice arranged to provide a substantially vertical and fan-shaped spray directed toward the side of an automobile moving adjacent thereto and the nozzles on the same side being spaced apart on said supply means a distance with relation to the distance to said automobile to have the fan-shaped sprays intersect at the side of said automobile,
(f) power driven means on said frames for moving said spray nozzles, and,
(g) an electrical power means for continuously driving said last named means in paragraph (f).

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