Oct. 14, 1952 L. J. ROUSSEAU 2,613,383

ROTARY VEHICLE WASHING BRUSH

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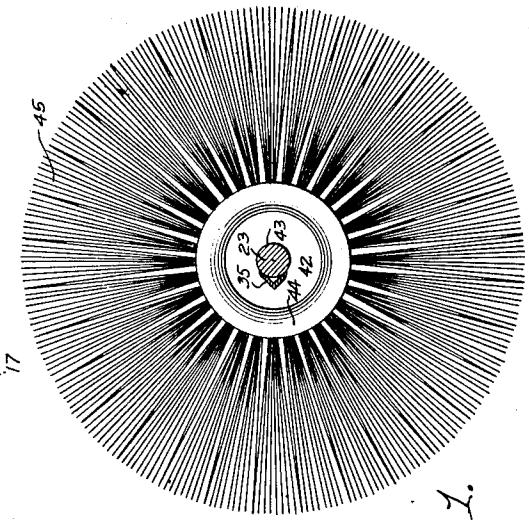


Fig. 1.

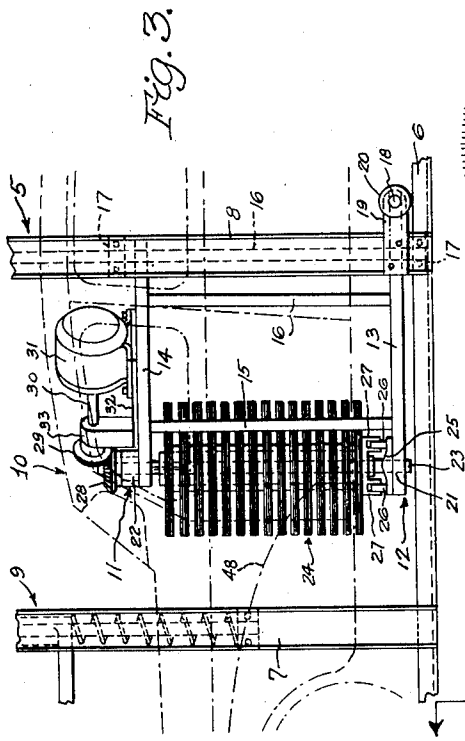


Fig. 3.

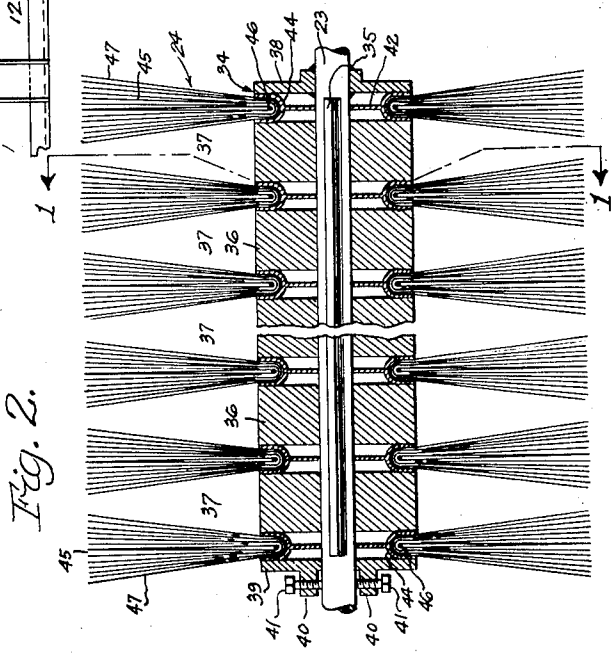


Fig. 2.

Inventor

Leo J. Rousseau

By Barthel & Bugbee

Attorneys

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ROTARY VEHICLE WASHING BRUSH

Leo J. Rousseau, Grosse Pointe, Mich., assignor to Minit-Man, Inc., Detroit, Mich., a corporation of Michigan

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1 Claim. (Cl. 15—181)

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This invention relates to brushes and, in particular, to rotary washing brushes.

One object of this invention is to provide a rotary washing brush which is especially well-adapted to conform to undulating surfaces while cleaning such surfaces, especially when used in the presence of a cleaning liquid, such as water.

Another object is to provide a rotary washing brush wherein the bristles become soft and yielding when subjected to a cleaning liquid, such as a water spray, so that the bristles will conform to an undulating surface to be washed without scratching or otherwise injuring the surface, even though it has particles of grit on the surface embedded in mud or other foreign matter.

Another object is to provide a rotary washing brush wherein the bristles will be softened sufficiently in the presence of a cleaning liquid such as water to tend to droop but wherein the drooping tendency will be counteracted by centrifugal force resulting from the rotation of the brush, so that the brush will adapt itself to surfaces of varying configuration such as are encountered in a motor vehicle body without injury to the vehicle yet effecting a thorough cleaning of the surface thereof.

Another object is to provide a rotary washing brush as set forth above, wherein the brush consists of approximately annular brush units with radial bristles, these units being spaced axially from one another in order to provide space into which the bristles can be pushed back when they encounter projecting portions of the vehicle or other article being washed.

Another object is to provide a rotary washing brush composed of axially-spaced annular brush units having annular hubs with radial bristles secured thereto and diverging outward therefrom so as to form annular spaces between the brush units which are relatively wide near the hubs and which converge outward toward the tips of the bristles.

Another object is to provide a rotary washing brush as set forth in the object immediately preceding, wherein the brush units are removable and replaceable, so that worn brush units, particularly those at the bottom of the brush, can be replaced without disturbing the unworn brush units.

This application is a continuation in part of my copending application Serial No. 547,837, filed August 3, 1944, for Motor Vehicle Cleaning Apparatus, which has matured into Patent Number 2,579,866, dated December 25, 1951.

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In the drawings:

Figure 1 is a cross-section through a rotary washing brush according to a preferred form of the invention, taken along the line 1—1 in Figure 2;

Figure 2 is a central longitudinal section through the rotary washing brush shown in Figure 1 with the shaft and key in side elevation; and

Figure 3 is a fragmentary side elevation of a vehicle-washing machine showing the rotary washing brush of Figures 1 and 2 applied to the cleaning of a motor vehicle, shown in chain lines.

Hitherto, in the washing of objects with undulating surfaces, such as passenger automobile bodies, great difficulty has been encountered in reaching all parts of the body and at the same time avoiding scarring the paint by reason of grit embedded in mud or other foreign matter on the body. Ordinary brushes have been found either too stiff to properly reach all parts of the surface or else they have caused scouring of the surface which has resulted in the removal of the paint.

The present invention has successfully eliminated this difficulty by employing annular brush units with radial bristles, these units being spaced axially at intervals along a rotatable shaft. The bristles are preferably made of fibrous material which, when subjected to a cleaning liquid such as water, becomes soft and yieldable. Since the brush units are spaced apart from one another, the intervals provide space into which the bristles can yield when they encounter the protuberance, such as an automobile fender. At the same time, the wet bristles do not scour the surface of the vehicle, hence do not remove the paint. Particles of grit are washed off by these water-softened bristles, without causing scratches or marring the surface in any way.

Referring to the drawings in detail, Figure 1 shows the central portion of a vehicle washing machine, generally designated 5, such as is disclosed and claimed in my co-pending application, Serial No. 547,837, filed August 3, 1944, for Motor Vehicle Cleaning Apparatus, of which the present application is a continuation in part, as previously stated. The vehicle washing machine 5, insofar as it is shown in Figure 1, includes upwardly facing channel members 6 which serve as guide rails or pathways for the vehicles to be washed, and which are therefore spaced approximately the same distance apart as the wheels of an automobile. A conveyor (not

shown) travelling between the channel members 6 tows the vehicle between vertical frame members 7 and 8 which form a portion of a framework 9 extending over the vehicle 10 and interconnected at their upper portions by members not shown herein.

The framework 9 carries swinging rotary brush assemblies 11, one of which is shown in Figure 3. The brush assembly 11 consists of an oscillatable frame generally designated 12 having parallel horizontal arms 13 and 14 interconnected by vertical members 15. The outer ends of the horizontal arms 13 and 14 are pivotally connected to a shaft 16 which is rotatably mounted in bearing brackets 17 secured to the upright 8. The lower ends of the uprights 7 and 8 are preferably embedded in the floor, which is preferably of concrete, so as to rigidly mount them. The lower arm 13 extends rearwardly and outwardly beyond the upright 8 into contact with the end of a stop screw 18 which is threaded through a bracket 19 secured to the upright 8 and having a hand wheel 20 for adjusting the point to which the frame 12 will swing inwardly toward the vehicle 10. The axis of the shaft 15 is preferably tilted slightly inward toward the vehicle 10 so that the weight of the brush assembly 11 will cause it to naturally swing toward the vehicle 10 under the influence of the force of gravity.

Journaled in bearing bushings 21 and 22 mounted respectively on the outer ends of the lower and upper arms 13 and 14 is a vertical brush shaft 23 forming a portion of a rotary brush generally designated 24. The bearing bushing 21 is optionally made in the form of a cam having raised portions 25 and engaged by rollers 26 journaled in a radial hanger 27 which in turn is secured to the shaft 23. As a consequence, when the shaft 23 is rotated, the rollers 26 travel in a circular path and are caused to rise and fall as they pass over the raised portions 25, causing the rotary brush 24 likewise to rise and fall.

To rotate the shaft 23, the upper end thereof carries a bevel gear 28 which meshes with a bevel gear 29 mounted on the outer end of the armature shaft 30 of an electric motor 31. The base of the motor 31 is bolted to a base plate 32 which also carries a bearing bracket 33 rotatably supporting the outer end of the shaft 30.

The rotary brush 24 in addition to the shaft 23, consists of a multiplicity of annular brush units 34 spaced at intervals along the shaft 23 and driven by means of an angle bar 35 which is secured as by welding along the shaft 23 and thereby serves as a key or spline. The brush units 24 are separated from one another by cylindrical spacing blocks 36 so as to provide annular spaces 37 between adjacent brush units 34. In order to hold the brush units 34 in assembly upon the shaft 23, the shaft is provided with abutment discs or collars 38 and 39 (Figure 2). The abutment disc 38 is secured as by welding to the shaft 23 whereas the abutment disc 39 is provided with a flange 40 through which radial set screws 41 are threaded into clamping engagement with the shaft 23.

Each brush unit 34 consists of a circular hub 42 having a central aperture 43 for receiving the shaft 23, suitably notched at one side for the passage of the key 35. The hub 42 is provided with an annularly grooved periphery or rim in the form of an annular channel portion 44 into which the mid-portions of bristle clumps 45 are drawn and secured as by circular binding wires 46. Each bristle clump 45 therefore consists of individual bristles 47 approximately twice the length of the clump and bent into approximate U-shape before being lodged in the channel portions 44 and secured therein by the binding wires 46. The bristles 47 are preferably of a vegetable fiber material, such as sisal, having the property of becoming soft and pliable when they are soaked in water, such as being subjected to a water spray employed in washing the vehicle 10. The entire brush unit 24 may be of any suitable diameter, a diameter of two feet having been found convenient in certain vehicle-washing installations. The fibers 47 are combed in order to eliminate oversize fibers and to obtain the proper size of fiber.

In the operation of the invention, the motor 31 is supplied with electric current so as to cause the shaft 30 to rotate, thereby rotating the vertical shaft 23 through the bevel gears 28 and 29. As the shaft 23 rotates, a water spray is applied to the rotary brush 24, thoroughly soaking its fibers 47 and causing them to become pliable and soft. As these fibers of the brush units 24 encounter the surface of the vehicle 10, they clean the mud and other foreign matter off the body by a soft wiping action as the vehicle 10 is towed through the vehicle-washing machine.

In the stationary position, when wet, the bristles 47 droop downward but are swung upward by centrifugal force arising from the rotation of the shaft 23. When the fibers 47 encounter a protuberance such as the fender 48 of the vehicle 10, they yield inwardly toward the shaft 23, the clumps 45 spreading out or bulging into the spaces 37 between them, as provided by the spacers 36.

Since each brush unit 24 has its fibers 47 diverging from the central hub 42 the ends of the bristles of adjacent brush units 24 closely approach one another (Figure 2) whereas their inner ends are separated from one another by the spacers 36. The spacers 36 are thus tapered from a maximum width adjacent the spacers 36 to a minimum width at the ends of the bristles 47. This results in the creation of wide spaces at the inner ends of the bristles into which the bristles can be pushed backward when a projection or protuberance is encountered upon the article being washed. At the same time, the bristles are enabled to spread out at their outer ends so as to approach one another and present an almost continuous brush surface.

The removal of worn brush units and their replacement by new brush units is believed to be self-evident from Figure 2 and from the foregoing discussion of the construction and operation of the invention. To remove one or more of the brush units 34, the operator merely loosens the set screws 41 from their engagement with the shaft 23 and slides the collar or retaining disc 39 off the shaft 23. The brush units 34 and spacing blocks 36 can then be removed alternately until the brush unit or units which it is desired to remove are reached, whereupon these are removed, replaced with new brush units 34 and reassembled in the same manner with spacing blocks 36 between them. The retaining disc 39 is then replaced on the shaft 23, the assembly formed together snugly with the fixed retaining disc 38 as an abutment, and the set screws 41 retightened to secure the removable retaining disc 39 in position.

What I claim is:

A rotary vehicle washing brush with removable and replaceable brush units comprising

a driving shaft, and a multiple stacked brush unit and spacer assembly mounted on said shaft, said assembly including a plurality of bristle hubs of substantially equal diameters removably mounted on said shaft in axially spaced relationship and drivingly connected to said shaft, each hub comprising a disc having a central shaft aperture and an enlarged rim portion with an annular peripheral groove therein, said groove being of arcuate cross-section and said rim being secured to and integral with said disc, a multiplicity of tufts of approximately U-shaped bristle fibers having their connecting portions seated in each groove and having their free end portions projecting radially outward therefrom, an annular bristle-binding element encircling each annular groove outwardly of said connecting portions and securing said bristle tufts in said grooves, spacing collars of substantially the same diameters as said hubs removably interposed between successive discs in engagement with the sides of said rims, and retaining collars secured to said shaft at the opposite ends

of said assembly, at least one of said retaining collars being removably secured to said shaft.

LEO J. ROUSSEAU.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
599,044	Pain	Feb. 15, 1898
1,339,894	Johnson	May 11, 1920
1,597,998	Nielsen	Aug. 31, 1926
1,988,335	Robbins	May 22, 1933
2,044,361	McMenamin	June 16, 1936
2,409,309	Peterson	Oct. 15, 1946
2,495,559	Weiler	Jan. 24, 1950

FOREIGN PATENTS

Number	Country	Date
352,737	Great Britain	July 16, 1931
370,531	France	Oct. 17, 1906
421,640	France	Dec. 27, 1909