

April 11, 1961

R. B. PARK

2,978,726

ROTARY CYLINDRICAL BRUSH

Filed June 20, 1958

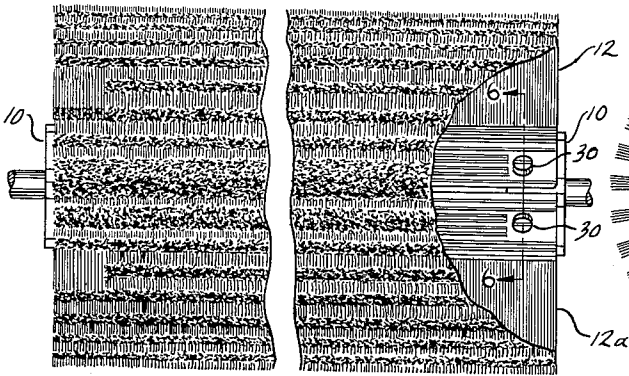


FIG. 1.

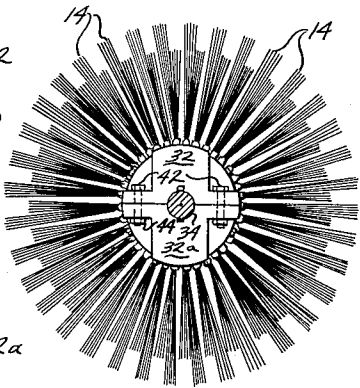


FIG. 2.

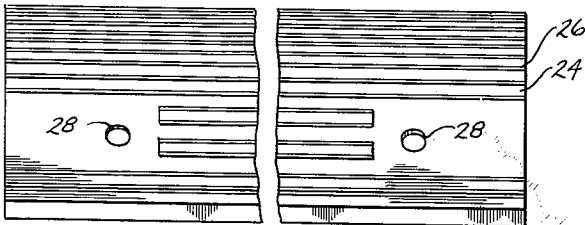


FIG. 3.

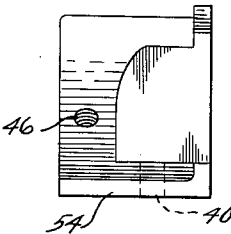


FIG. 4.

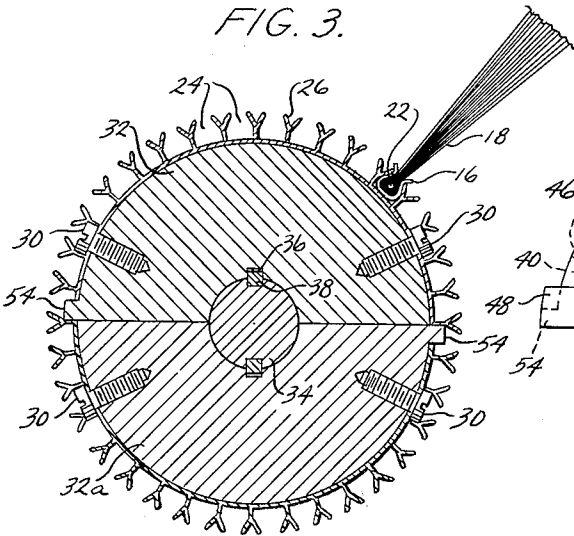


FIG. 6.

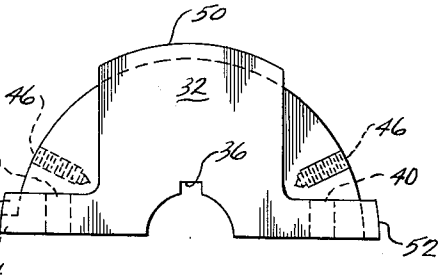


FIG. 5.

INVENTOR.
RICHARD B. PARK
BY *Teller & McCormick*
ATTORNEYS

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ROTARY CYLINDRICAL BRUSH

Richard B. Park, West Hartford, Conn., assignor to The Fuller Brush Company, Hartford, Conn., a corporation of Connecticut

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2 Claims. (Cl. 15—183)

This invention relates to a rotary cylindrical brush which is particularly adapted for use in machines for washing automobiles and other vehicles.

Brushes of the type here involved generally include a plurality of longitudinal circumaxially spaced brush strips, each comprising a rigid holder and a layer of fibers extending radially outwardly therefrom. Since the brush fibers become worn with use, removal and replacement thereof is desirable and it has been a conventional practice to detachably connect the brush strips with a central brush core or frame. Thus, when the brush fibers become worn and lose washing effectiveness, the brush strips may be individually detached from the brush core or frame and replaced by new strips.

It will be apparent that in an automobile washing machine which includes a comparatively large number of rotary brushes each having a plurality of brush strips, the individual replacement of the strips is a tedious and time consuming task. Furthermore, the losses in machine operating time which are occasioned by such replacement of the brush strips may be excessive.

The present invention has as its general object the provision of a rotary cylindrical brush which is particularly adapted for use in automobile washing machines and the like and which includes a plurality of brush strips which may be removed and replaced in two groups rather than individually, the brush being of an improved construction which permits the ready removal and replacement of the groups of brush strips in a minimum of time.

The drawing shows a preferred embodiment of the invention and such embodiment will be described, but it will be understood that various changes may be made from the construction disclosed and that the drawing and description are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing:

Fig. 1 is a side view partially in section of a rotary brush embodying the invention.

Fig. 2 is an end view of the rotary brush of Fig. 1, a supporting shaft for the brush being shown in section.

Fig. 3 is an enlarged side view of a brush strip carrier adapted to be detachably connected to two brush hubs and to support a group of brush strips.

Fig. 4 is an enlarged side view of a half-section of a brush hub.

Fig. 5 is an end view of the hub half-section of Fig. 4.

Fig. 6 is an enlarged transverse sectional view taken as indicated by the line 6—6 of Fig. 1, but showing only a single brush strip supported on the upper brush strip carrier.

A rotary cylindrical brush constructed in accordance with the present invention includes two similar generally cylindrical hubs 10, 10 which are adapted to be attached in longitudinally spaced positions on a central longitudinal shaft. The brush also includes two similar brush strip carriers 12, 12a each comprising a generally semi-

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cylindrical shell having its ends open. The carriers 12, 12a are adapted to be detachably connected at their ends to the hubs 10, 10 so as to extend longitudinally therebetween and to cooperatively form a tubular brush core or frame on which a plurality of longitudinal circumferentially spaced brush strips 14, 14 are fixedly supported. When it is desired to replace worn brush fibers, the two carriers 12, 12a, each supporting a group of the brush strips 14, 14 are detached from the hubs 10, 10 and discarded. Two replacement carriers, each supporting a group of new brush strips, are then attached to the hubs 10, 10 whereupon the brush is restored to its original washing effectiveness.

While the brush strips 14, 14 may take various forms within the scope of the invention, a conventional form is shown, each brush strip 14 comprising a rigid longitudinal fiber holder 16 and a longitudinal layer of fibers 18 which extend from said holder in a generally radial direction. As best illustrated in Fig. 6, the holder 16 is preferably a longitudinal channel member which has a core wire 22 extending longitudinally therewithin. The fibers 18 of said layer are folded around the core wire 22 and their end portions extend outwardly from the channel member. The sides of the channel member 16 are pressed toward each other to firmly grip the fibers and the ends of said channel member are preferably closed to prevent the endwise escape of fibers therefrom.

As best illustrated in Fig. 2, the fibers 18 are preferably folded around the core wire 22 off their mid-points so that they extend a greater distance from one side of said core wire than from the other side thereof. It has been found that a layer of fibers arranged in such a manner exhibits a desirable stiffness and is yet sufficiently yieldable to readily conform to and properly engage the different surfaces of an automobile or the like without marring the finish thereof.

The manner in which the brush strips 14, 14 are fixedly supported on the generally semi-cylindrical shells 12, 12a may be varied, but preferably said shells are each provided with a plurality of circumferentially spaced longitudinal grooves 24, 24 into which are fitted the channel members 16, 16 of the brush strips. The grooves 24, 24 on each shell are defined by a plurality of longitudinal flanges or ribs 26, 26 which have a generally V-shaped cross section. The location and spacing of the flanges or ribs 26, 26 and the grooves 24, 24 defined thereby on the shells 12, 12a are preferably such that the several brush strips on the two shells are equally spaced circumaxially when said shells are in assembled relationship as shown in Fig. 2.

It will be seen that by effecting relative longitudinal movement between each carrier or shell and the brush strips, the channel members of the brush strips will be entered in the grooves of said carriers or shells. Permanent connection of the brush strips 14, 14 to the shells 12, 12a may then be accomplished, as by upsetting the ends of the channel shaped holders or by spot welding. As shown, there are 18 brush strips fixedly supported on each carrier or shell.

Each of the shells 12, 12a is provided, in accordance with the invention, with at least one radial opening near each end thereof. Preferably there are two radial openings 28, 28 provided adjacent each end of each of the shells and said openings are adapted to receive suitable screws 30, 30 whereby said shells may be detachably connected to the hubs 10, 10. As shown in Fig. 3, the ribs or flanges 26, 26 which are aligned with the radial openings 28, 28 in the shells 12, 12a are shorter than the remaining ribs or flanges 26, 26 so that smooth bearing surfaces for the heads of the screws 30, 30 are provided. Four of the brush strips 14, 14 are of lengths

corresponding to the four short grooves 24, 24 which are defined by the shortened ribs or flanges 26, 26.

Each of the hubs 10 is preferably but not necessarily formed in two generally semi-cylindrical half-sections 32, 32a. The hubs serve to support the two shells 12, 12a and to connect them with each other and they also serve to mount the entire brush on a shaft such as 34. Each hub half-section has a semi-cylindrical opening for receiving and fitting said shaft. The hubs 10, 10 are preferably connected to the shaft 34 for rotation therewith by a key connection, each hub half-section being provided with a keyway 36 for receiving and fitting a corresponding key 38.

Each of the hub half-sections 32, 32a is provided with two opposite similar deeply countersunk holes 40, 40. The holes 40, 40 in one hub half-section register respectively with the holes 40, 40 in a companion hub half-section when said hub sections are placed on the shaft and are adapted for receiving bolts 42, 42. The bolts 42, 42 when entered in the holes 40, 40 and tightened in suitable nuts 44, 44 serve to hold the two half-sections of the hubs in proper relation with each other and in proper spaced relationship along the shaft 34.

The hubs 10, 10 enter and fit end portions of the shells 12, 12a and when two radial openings 28, 28 are provided adjacent each end of each of said shells, there are two radially extending threaded openings 46, 46 provided in each hub half-section. The two threaded openings 46, 46 in each hub half-section are positioned to register respectively with the two radial openings near the ends of each of the shells 12, 12a so that the screws 30, 30 may be extended through said shell openings and threaded into said hub openings. To facilitate the proper longitudinal alignment of the shells 12, 12a on the hubs 10, 10, there is preferably provided at the outer end of each of the hub half-sections three radially extending flanges 48, 50 and 52, which flanges engage the end surfaces of said shells.

An important feature of the present invention is the provision on each of the hubs 10, 10 of means adapted to engage the shells mounted thereon and to prevent rotation of said shells relative thereto. The said means may take various forms but preferably comprises a longitudinal flange 54 formed integrally on each of the hub half-sections and extending radially outwardly from the periphery thereof. As shown, the flanges 54, 54 are disposed substantially diametrically opposite each other when the hub half-sections are connected together.

Engagement of the flanges 54, 54 on the hub half-sections with the shells 12, 12a may be effected in various manners, but is preferably provided for by forming each of said shells to an arc-like cross section of less than 180°. Thus, when the shells are attached to the hubs 10, 10, the adjacent side edges thereof are spaced apart circumferentially. The hub flanges 54, 54 are disposed between and in engagement with the end portions of said shell side edges as illustrated in Figs. 1 and 6 and the shells are thereby prevented from rotating relative to said hubs. The screws 30, 30 are thus relieved of the full burden of positively securing the shells to the hubs 10, 10 and may be reduced in size and/or decreased in number whereby the operation of removing and replacing shells from the hubs may be expedited. It will be seen that the screws 30, 30 serve principally to restrain the end portions of the shell side edges from moving radially outwardly out of engagement with the hub flanges.

From the foregoing, it will be apparent that a rotary cylindrical brush of relatively simple but sturdy and durable construction has been provided. Provision has been made for securely connecting together all of the component parts of the brush in a manner which is particularly well suited to the ready removal and replacement of brush strips in two groups rather than individually. As a result, the task of brush strip replacement

in an automobile washing machine or the like is greatly facilitated and substantial time and cost savings are achieved.

The invention claimed is:

1. A cylindrical brush rotatable about a central longitudinal axis and comprising a plurality of similar longitudinal brush strips each comprising a rigid holder having a layer of fibers extending radially outwardly therefrom, two similar brush strip carriers each comprising a longitudinal shell with open ends and having a substantially uniform generally arcuate cross section of less than 180° which shell has a plurality of circumferentially distributed longitudinal grooves for respectively receiving and retaining therein the holders of said brush strips, two similar generally cylindrical hubs adapted to be attached to a central shaft in longitudinally spaced positions thereon and adapted respectively to enter and fit the end portions of said two brush strip carriers, each of said hubs comprising two separable generally semi-cylindrical half-sections each of which half-sections has integrally formed thereon a longitudinal flange which extends radially outwardly at the periphery thereof, the adjacent side edges of said carriers being spaced apart with the flanges on said hubs being disposed substantially diametrically opposite each other and between and in engagement with the end portions of said carrier side edges to prevent rotation of said carriers relative to said hubs, and means for detachably connecting said carriers to said hubs, said last mentioned means being adapted to restrain said end portions of the side edges of said carriers from moving radially outwardly out of engagement with said hub flanges.

2. A cylindrical brush rotatable about a central longitudinal axis and comprising a plurality of similar longitudinal brush strips each comprising a rigid holder having a layer of fibers extending radially outwardly therefrom, two similar brush strip carriers each comprising a longitudinal shell with open ends and having a substantially uniform arcuate cross section of less than 180° which shell has a plurality of circumferentially distributed longitudinal grooves for respectively receiving and retaining therein the holders of said brush strips and which shell also has at least one radial opening near each end thereof, two similar generally cylindrical hubs adapted to be attached to a central shaft in longitudinally spaced positions thereon and adapted respectively to enter and fit the end portions of said two brush strip carriers, each of said hubs comprising two separable generally semi-cylindrical half-sections each of which half-sections has formed therein at least one radially extending threaded opening and has formed integrally thereon a longitudinal flange which extends radially outwardly at the periphery thereof, the adjacent side edges of said carriers being spaced apart with the flanges on said hubs disposed substantially diametrically opposite each other and between and in engagement with the end portions of said carrier side edges to prevent rotation of said carriers relative to said hubs, and a plurality of screws adapted respectively to enter and fit the openings near the ends of said carriers and to be threaded into the openings in said hubs whereby to detachably connect said carriers to said hubs.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,978,726

April 11, 1961

Richard B. Park

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 39, after "uniform" insert -- generally --.

Signed and sealed this 26th day of September 1961.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents

USCOMM-DC