

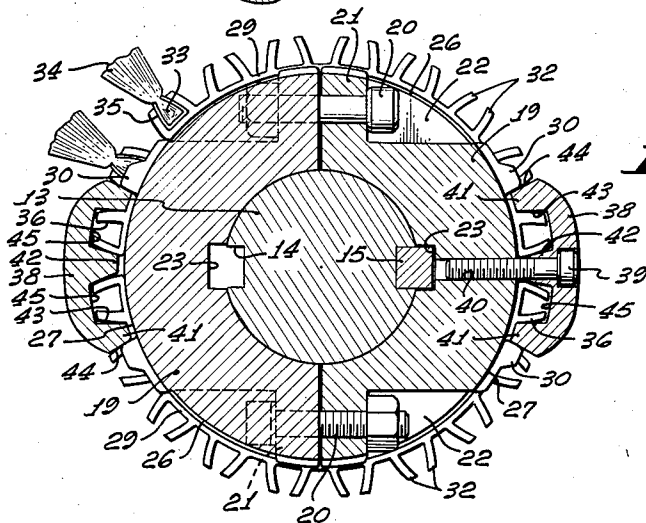
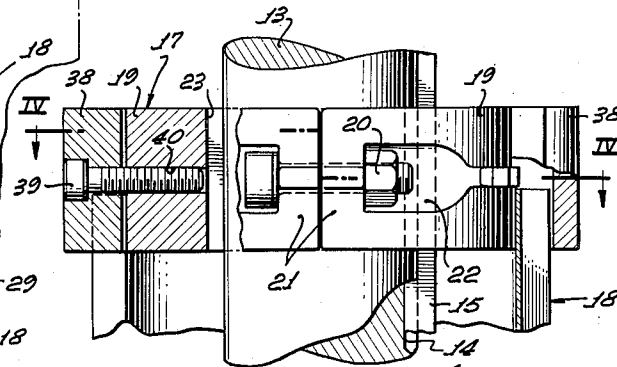
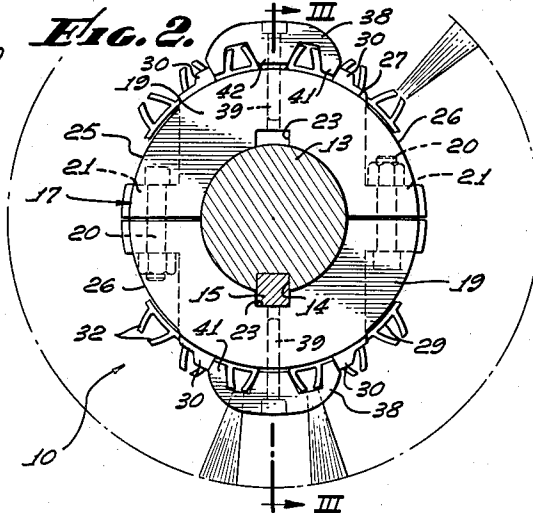
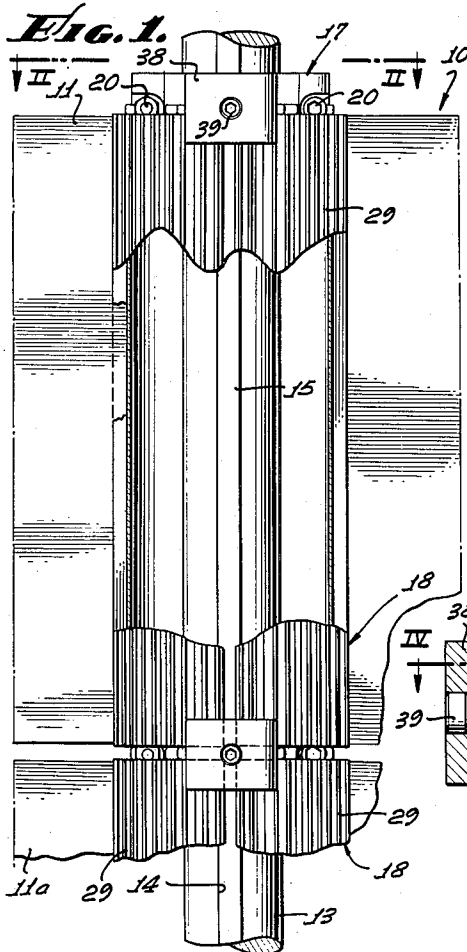
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QUICK-CHANGE BRUSH MEANS

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QUICK-CHANGE BRUSH MEANS

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This invention relates to industrial brushes and, more particularly, to brushes utilized to clean external walls and roofs of vehicles such as railway cars, buses, and the like which are slowly moved past a cleaning and washing station.

Exterior wall surfaces of vehicles include many irregularities principally caused by windows, doors, other openings, and the like. Such exterior irregularities cause uneven wear along the length of brush means positioned at a cleaning station. Obviously, for thorough cleaning worn brush portions must be promptly replaced and for this purpose such brush means are made in longitudinally disposed brush sections of selected length mounted on a suitable driving shaft. Heretofore such brush sections were usually removed by disassembling the entire brush means from the brush driving means and support therefor, the worn brush sections being slipped endwise off the shaft. A new brush section was then substituted and the several brush sections assembled and connected to the driving shaft.

Sometimes a worn brush section was reconditioned by removing worn brush strips from a cylindrical member holding the brush strips. Each brush strip was usually pushed lengthwise out of longitudinally disposed gripping means for the strip. Since the cylindrical member was often made of wood or plastic material, the brush strip gripping means formed thereon were broken or scarred so that when a new brush strip was installed therein, difficulty was encountered in properly positioning and in holding the brush strip during operation. Generally, such rehabilitation of worn brush sections was extremely difficult, tedious, and costly in terms of labor and the resulting product.

This invention contemplates a quick-change industrial brush means wherein worn portions or sections may be readily replaced without disassembling the brush means from its supporting carrier or driving means and without slipping worn brush sections over the end of an associated driving shaft during disassembly. A brush means embodying this invention permits the worn brush sections thereof to be laterally separable from the driving shaft, thereby facilitating and saving considerable time with respect to replacement of intermediate worn brush sections. The invention contemplates the construction of a brush means which is adapted to be utilized on shaft means on which prior proposed brush means have been installed and to replace such prior proposed brush means.

It is, therefore, the primary object of this invention to disclose and provide a quick-change brush means for use in cleaning exterior wall surfaces of vehicles and embodying a novel assembly of brush holding means.

An object of this invention is to disclose and provide a vehicle brush means wherein brush holding segments provided thereon are longitudinally positioned with respect to each other and laterally selectively and independently separable from the brush means.

Another object of this invention is to disclose and pro-

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vide an industrial brush means which is inexpensive to manufacture and is of simple, efficient construction.

A further object of this invention is to disclose and provide a brush means wherein novel support or collar means are selectively longitudinally spaced along a shaft for longitudinally positioning laterally removable brush holding segments.

Still another object of this invention is to disclose and provide an industrial brush means wherein a shaft means carries brush strip holding means laterally and longitudinally separable and wherein locking means are provided for holding said brush strip holding means in assembly on said shaft means.

Generally speaking, this invention contemplates an industrial brush means comprising an elongated shaft carrying thereon a plurality of selectively longitudinally spaced support or collar members in accordance with the length of brush strip holding means to be arranged and supported thereon. Each brush strip holding means may comprise a plurality of part-cylindrical brush holding segments which, when assembled, encircle said shaft and which are longitudinally positioned by means on said collar members. Each part-cylindrical brush holding segment includes longitudinally extending pairs of brush strip retaining ribs. Certain of said ribs provide engagement means cooperable with a locking means for removably securing and holding brush segments supported by each collar in assembly therewith and in such a manner that brush segments may be readily removed or installed by lateral movement of the brush segment with respect to the collar and shaft, thereby permitting rapid replacement of intermediate brush strip holding means when worn.

Other objects and advantages of this invention will be readily apparent from the following description of the drawings in which an exemplary embodiment of this invention is shown.

In the drawings:

Fig. 1 is a fragmentary side view of a brush means embodying this invention, a portion of the brush being broken away and shown in section.

Fig. 2 is a top view of the brush means shown in Fig. 1, the view being taken in the plane indicated by line II—II of Fig. 1.

Fig. 3 is a fragmentary side view, partly in section, of a support or collar means shown in Fig. 1, the section being taken in the plane indicated by line III—III of Fig. 2.

Fig. 4 is a transverse sectional view through the support means taken in the planes indicated by lines IV—IV of Fig. 3.

An industrial brush means embodying this invention, generally indicated at 10, is only fragmentarily shown and may comprise brush portions 11 and 11a of selected different length and sometimes of different outer diameter depending upon the exterior configuration of the vehicle to be cleaned by said brushes. Usually there may be more than two brush portions, the length of each brush portion being determined by the character of the surface to be cleaned. A surface having a large number of irregularities will generally be contacted by a brush portion of relatively short length which is subjected to wear more rapidly than other brush portions and which may be readily replaced. Since the various brush portions forming brush means 10 involve the same features of this invention, only brush portions 11 and 11a have been illustrated for the purpose of brevity.

The brush means 10 includes a longitudinally extending shaft 13 of selected length and diameter to carry brush portions 11 and 11a. The shaft 13 is adapted to be rotated by any suitable well known drive means (not shown). Shaft 13 includes a longitudinally extending

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keyway 14 adapted to receive a key 15 for locking brush means 10 to the shaft for rotation therewith.

Means for supporting brush portions 11 and 11a on shaft 13 may include a plurality of longitudinally spaced support or collar members 17, said support members being spaced apart from center to center the approximate length of a longitudinally disposed brush strip holding means generally indicated at 18. The support member 17 may be of split collar type including a pair of semi-circular collar elements 19, said elements 19 being clamped about shaft 13 by a pair of diametrically opposite securing nut and bolt assemblies 20. The nut and bolt assemblies 20 extend through aligned flanged portions 21 formed by recesses 22 cored out of the collar elements 19 between end faces thereof. The securing bolts and nuts 20 lie in recesses 22 within the circumference of support member 17.

Each collar element 19 includes a keyway 23, one of said keyways 23 of a pair of collar elements 19 being adapted to receive key 15 for locking the support member 17 on shaft 13 for rotation therewith. Support members 17 may be readily longitudinally adjusted and positioned on shaft 13 by loosening bolt and nut assemblies 20 and sliding support members 17 along the shaft into selected spaced positions and then tightening bolt and nut assemblies 20.

Each support member 17, when assembled and secured about shaft 13, includes a generally cylindrical exterior surface 25. Cylindrical surface 25 includes diametrically opposite recessed face portions 26 and diametrically opposite bearing face portions 27, said bearing portions 27 lying centrally of the semi-cylindrical surface of each collar element 19 and with the face portions 26 extending therefrom. The bearing face portions 27 provide seats for brush strip holding segments 29 forming the brush strip holding means 18. Brush strip holding segments 29 are generally semi-cylindrical and hollow, the recessed face portions 26 providing clearance for irregularities in curvature and width of said segments and to permit drawing of said segments into tight, snug relation with the support members as further described hereinafter.

Each collar element 19 may also include a pair of outwardly projecting lugs 30 formed at extremities of bearing face portions 27 and centrally of the collar element, said lugs 30 serving to longitudinally position brush holding segments 29 by abutment of ends of said segments thereagainst and to limit longitudinal play thereof.

The brush strip holding means 18 is positioned on and between the spaced support means 17 and encircles shaft 13. Each brush strip holding means 18 includes the pair of semi-cylindrical hollow brush holding segments 29, said brush segments 29 having longitudinal internal surface areas at each end adapted to seat on said bearing face portions 27. Each brush holding segment 29 is made preferably by extruding a suitable lightweight metal alloy such as aluminum. The brush segments 29 carry on their exterior face a plurality of longitudinally extending spaced converging pairs of external retaining ribs 32. Ribs 32 stiffen the semi-cylindrical hollow segments 29 so that relatively long segments are substantially rigid.

Each pair of retaining ribs 32 is adapted to longitudinally receive therein, as by endwise insertion, a brush strip 33 which may include a generally U-section elongated metal holder 35 within which is received and secured a plurality of bristles 34 in well known manner. Bristles 34 may be made of any suitable material and may project from brush segments 29 a selected distance. The brush strips 33 are secured in said pairs of retaining ribs 32 by pinching ends of said ribs, said converging ribs serving to retain the brush strips intermediate their length. It should be noted that the penultimate rib adjacent each longitudinal edge of brush holding segment 29 is of slightly thicker metal section as at 36, said

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thicker section rib providing at opposite ends lock engagement means.

Means to removably lock semi-cylindrical brush holding segments 29 at each end to support members 17 includes a locking member 38 positioned exterior of bearing face portions 27 of each collar element 19. Each locking member 38 may be secured to collar element 19 as by a recessed set screw bolt 39 which extends into a threaded bore 40 in collar element 19. Locking member 38 may be of rectangular curved configuration to correspond with the curvature of the cylindrical brush holding means 18. Each locking member 38 includes outer inwardly directed, spaced lock engagement portions 41 and an intermediate inwardly extending portion 42. Lock engagement portions 41 may be provided with wedge faces 43 and 44 adapted to be received within and to correspond to opposed faces on ends of adjacent pairs of retaining ribs 32. Intermediate portion 42 extends between ultimate or edge retaining ribs 32 of assembled semi-cylindrical segments 29 and serves to properly, circularly space said segments 29. The portions 41 and 42 define parallel recesses 45 adapted to receive edge pairs of retaining ribs 32.

When locking member 38 is positioned and is secured by bolt 39, corner areas of segments 29 are pressed against bearing face portions 27 and wedge faces 43 of locking portions 41 wedge tightly against the thickened section retaining rib 36 so as to tightly and snugly secure ends of the brush holding segments 29. Variance in curvature of semicylindrical segments 29 will be permitted by recesses 26 in the surface of the support member 17 so that locking portions 41 may properly engage the lock engagement means on said segments.

In assembly of a brush means described above, support member 17 may be first secured to shaft 13 in selected spaced relationship to accommodate the brush portions 11 and 11a of preselected length. The brush means 18 may then be positioned about the shaft 13 by placing each brush holding segment 29 laterally against the support member 17 and between and against longitudinal positioning lugs 30. The semi-cylindrical elements 29 may then be secured in position by locking members 38 which extend over adjacent corner portions of adjacent cylindrical segments, the lock engagement means on said segments being engaged in wedge relation with locking portions 41 of the locking member. Tightening of the set screw bolt 39 on each locking member 38 secures the brush means 18 to the support means 17 and thereby to shaft 13.

When a brush portion 11, for example, becomes worn, it will be readily apparent that brush means 18 forming said portion may be readily removed and replaced by releasing the set screw bolt 39 from each locking member 38 which engages brush means 18, laterally withdrawing the cylindrical brush holding segments 29 from support means 17 and then replacing said worn segments with new segments. It will be apparent that in this operation adjacent brush portion 11a is retained on the shaft in assembled relation therewith. Those skilled in the art will readily understand that removal and replacement of a brush portion on a brush means which utilizes this invention may be quickly and rapidly made since only worn brush portions are handled.

The brush holding segments 29 of extruded lightweight metal alloy are of such low cost that they may be thrown away when the brush strips carried thereby are worn. However, if it is desired to replace brush strips 33, spreading apart the pinched ends of the retaining ribs 32 will permit relatively easy extraction of the brush strip held thereby. Since the extruded ribs are relatively smooth, a new brush strip can be readily inserted if desired.

It will be understood by those skilled in the art that a quick-change brush means has been provided which reduces to a minimum the time and labor required to recondition or rebuild a worn brush means. Under prior

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proposed brush constructions, a day or more was necessary to repair a worn brush. Under the brush construction described above, a worn portion may be replaced in less than an hour.

All changes and modifications in the brush means described above coming within the scope of the appended claims are embraced thereby.

I claim:

1. In a quick-change brush means, the combination of: a shaft adapted to be rotated; support means on said shaft in longitudinal spaced relation; a plurality of brush strip holding means supported in longitudinal, slightly spaced, end to end relation by said support means and encircling said shaft, each brush strip holding means comprising a plurality of brush holding segments of curved transverse section arranged in adjacent lateral relation to form a cylinder, each segment being provided with a plurality of longitudinally extending parallel external ribs for retaining a brush strip therein; and means to releasably lock longitudinally and laterally adjacent holding segments to said support means and to longitudinally align said ribs comprising lock engagement means on each segment in adjacent relation to lock engagement means on an adjacent segment, and an external locking member provided with engagement means cooperable with each of said adjacent lock engagement means on longitudinally and laterally adjacent holding segments.

2. A quick-change brush means as stated in claim 1 wherein said locking member includes a body portion overlying portions of longitudinally and laterally adjacent segments and wherein the engagement means on said external locking member and the engagement means on said holding segments include wedge surfaces for drawing laterally adjacent segments toward each other.

3. In a quick-change brush means; the combination of: a shaft; spaced support means on said shaft, each support means including an external surface; a plurality of brush support holders in cylindrical arrangement about said shaft and having end faces seated on said external surfaces, each holder including a longitudinally extending wall arcuate in section and provided with a plurality of laterally spaced external longitudinally extending ribs cooperable to retain a plurality of brush strips; and means to removably lock in assembly laterally adjacent holders including lock engagement means provided on ends of certain of said ribs, and an external locking member overlying and extending across portions of adjacent holders and having radially inwardly directed wedge lock engagement portions cooperable with said lock engagement means.

4. In a quick-change brush means, the combination of: a shaft; support means fixed to said shaft in longitudinal spaced relation, each support means including an external cylindrical surface; a plurality of longitudinally disposed brush strip holding means positioned on said support means in end-to-end relation, each holding means encircling said shaft and including a pair of semi-cylindrical segments having internal semi-cylindrical end surfaces for seating on a portion of the external cylindrical surface on said support means, each segment being provided with longitudinally extending parallel external retaining ribs for brush strips, certain of said retaining ribs providing lock-engagement means; and means to removably lock adjacent ends of said semi-cylindrical brush segments to each support means, said locking means including a locking member overlying said adjacent ends of said segments and provided with lock-engagement portions cooperable with the lock-engagement means on certain of said external ribs.

5. A brush means as stated in claim 4 wherein the said lock-engagement portions and said lock-engagement means on said ribs include cooperable wedge faces.

6. A brush means as stated in claim 4 wherein said support means includes a positioning lug on said external sur-

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face to longitudinally position each segment between said support means.

7. A brush holding segment for use with one or more laterally adjacent corresponding brush holding segments to form brush strip holding means for a plurality of brush strip elements and securement means for said segment, said segment comprising an extruded wall of arcuate transverse cross section providing an external convex surface, a plurality of longitudinally extending continuous parallel ribs longitudinally coextensive and integral with the said wall and projecting outwardly from said convex surface, said parallel ribs providing continuous longitudinally extending recesses adapted to receive brush strip elements, said wall having internal concave surfaces adapted to seat on support means for said segment, and certain of said ribs adjacent longitudinal edges of said wall having wedge surface portions adapted to cooperate with said securement means for said segment.

8. In an industrial brush means, the combination of: a shaft means; a plurality of longitudinally disposed brush holding means in end to end relation and of selected length positioned along said shaft means; each of said brush holding means including at least two laterally adjacent brush holding segments, each segment having an external convex surface and having end locking portions; and a lock member at adjacent end portions of laterally and longitudinally adjacent brush holding segments and extending over said adjacent end portions, said lock member having radially inwardly directed wedge means cooperable with the end locking portions of said segments whereby a selected segment may be laterally separated from said shaft means without disassembly of longitudinally adjacent segments.

9. In a quick-change brush means, the combination of: a shaft having an axis of rotation; a plurality of collar means fixed to the shaft in longitudinal spaced relation, each collar means providing external uninterrupted cylindrical surface portions; a plurality of longitudinally aligned elongated segments of arcuate transverse cross-section and having means to hold brush strips and arranged circumaxially about said axis of rotation, longitudinally aligned segments being in end to end relation with ends longitudinally adjacent, each segment having end surfaces seated on said surface portions of adjacent collar means; and lock means to secure said longitudinally and circumaxially adjacent segments to said collar means, said lock means including a locking member extending across end corners of such adjacent segments, said locking member and said segments being provided with cooperable, radially directed interlocking wedge portions.

10. A brush means as stated in claim 9 wherein a positioning lug extends from each collar means to longitudinally position said segments in end to end relation with respect to said collar means.

11. A brush holding segment for use with brush strip elements and a securement member comprising: an extruded wall of arcuate transverse cross-section providing an external convex surface, a plurality of longitudinally extending continuous parallel ribs integral with said wall, projecting outwardly from said convex surface, and extending for the length of said wall, said plurality of ribs including at least two ribs at each longitudinal edge of said wall, said parallel ribs providing continuous longitudinally extending recesses adapted to receive brush strip elements, said wall having internal concave surfaces adapted to seat on support means for said segment, said two ribs at each longitudinal edge of said wall having end portions with wedge surfaces adapted to cooperate with said securement member.

12. A brush holding segment for use with one or more laterally adjacent corresponding brush holding segments to form brush strip holding means for a plurality of brush strip elements and a securement member for said segment, said segment comprising an extruded wall of arcuate transverse cross-section providing an external convex sur-

face, a plurality of longitudinally extending continuous parallel ribs longitudinally coextensive and integral with the said wall and projecting outwardly from said convex surface, said parallel ribs providing continuous longitudinally extending recesses adapted to receive brush strip elements, said wall having internal concave surfaces adapted to seat on support means for said segment, and certain of said ribs on said wall having wedge surface portions adapted to cooperate with said securement member for said segment.

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