ROTARY BRUSH PLASTIC BRISTLE HOLDER AND MOUNTING MEANS

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ABSTRACT

Disposable hollow plastic holders secure bent wire bristles in rotary brooms such as gutter brooms. Bristle bends are completely enclosed; bottom slots in the holders direct the bristles outward and downward. Holders are constructed in three sections bonded together to form smooth outer surfaces. Several holders are slid radially inward into inverted "T" shaped bars under a permanent plate. After all holders have been slid into place, an encircling retaining collar is dropped over the holders and is bolted to the plate.

11 Claims, 6 Drawing Figures
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ROTARY BRUSH PLASTIC BRISTLE HOLDER AND MOUNTING MEANS

BACKGROUND OF THE INVENTION

Gutter brooms on road sweeping machines are usually built of a number of arcuate segments which, when assembled together, comprise the completed broom. The segments, usually from four to six in number, are mounted on a permanent circular plate, which is attached to a rotary shaft. Bristle holding segments have been made of materials such as wood and steel. Each segment has a number of slots on a face opposite from a face in contact with the plate.

Outward and downward projecting bristles are constructed of conventional materials, for example, high carbon flat steel wire having transverse dimensions of about 0.025 inch by 0.125 inch.

Quantities of perhaps 18 to 20 strands are medially bent and both ends are pushed down through slots. The medial portion is held by wires extending across the slots or alternatively by a portion of the segment between adjacent slots. When holes are filled with wires, the segments are bolted against the bottom of the permanent plate. The plate prevents the wire from being pushed back up the slots as the broom contacts a street surface. The bristle bights in the segments have been exposed; in alternate forms the bights have been covered.

Building up of the broom using multiple segments has proved to be a time consuming effort, and the handling of the segments while building the gutter broom has been difficult. Dismantling has been likewise time consuming and difficult because of the great number of bolts involved in each broom.

The weight of the segments may be anywhere from 20 to 25 pounds each when filled with flat metal bristles. The weight makes it awkward for a single person to hold the segment against the backing plate, turn a nut and hold a bolt in assembling or dismantling the broom.

Disposable wooden or metal segments were introduced because of the difficulty experienced when the strands of bristles had become worn and needed to be replaced. A disposable segment can be thrown away and replaced by a new segment which has been threaded with new strands of bristle. Increased production costs have resulted from manufacturing segments with drilled holes and from stamping and welding metal segments.

Dangers from exposed bristle bights and wooden splinters or sharp metal edges have increased handling times and have made disassembly and assembly procedures arduous and distasteful to broom operators and maintenance men.

SUMMARY OF THE INVENTION

The present invention concerns the production of an improved brush apparatus, and more particularly, to an inexpensive bristle holder means for securing brush bristles which can be easily attached to a brush support and retained using a minimum number of parts.

One of the objects of the invention is to produce a bristle holder means which is inexpensive and disposable. This object is achieved by making the holder of a molded plastic material. Apart from the inexpensiveness of the material, the holder can be made in a shape that permits easy handling. The bristle holder can be made in a number of sections where one of the sections covers the bristle bight. The sections can be secured together before or after the bristles have been threaded. The sections can be secured by means of welding, bolting or bonding. The use of plastic material, also, reduces the total weight slightly.

By making the holders of molded plastic, it becomes possible to arrange the manufacture of a number of distinct holders having their slots so positioned that the bristles can be flared out to a number of different angles, depending upon the nature of the broom, merely by setting at the time of manufacture one member in the molding apparatus in a predetermined position.

A further object of the invention is to produce a bristle holder which will secure plastic bristles or bristles of a non-metallic material as well as metal bristles. The use of plastic bristles would serve to substantially cut both the cost of manufacture and the total weight of the holder filled with bristles.

A further object of the invention is to produce a bristle holder which can be easily mounted to a brush support. This object is achieved by providing the holder into a “T” shaped bars permanently attached to a circular plate, the plate forming part of the brush support. The advantage of this lies in the fact that the holder need no longer be held by the person securing the holder to the plate, the holders being wedged between inverted “T” shaped bars instead, once the holders have been slid into place. After the holders have been inserted, they may be locked in place by a convenient retaining means for securing the holders to the brush support. Preferably, the retainer has a minimum number of fasteners which must be manipulated. Another convenient form of retainer is a collar of a concentric ring design which fits over and encircles the rim of the circular plate.

When the holders are in place, the collar is lowered over the arcuate outer sides of the holders to retain the holders within the radial spaces within the inverted “T” shaped bars. The collar is then bolted to the plate using one or two bolts. The holders need not be bolted to the collar or the plate. To dismantle the brush, two bolts are loosened, the collar is lifted to an upward, detent held position, and the holders are slid out of the “T” bars. Old holder segments are discarded and new ones are inserted. Handling of the holders is reduced to a minimum.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an assembled view of a gutter broom.

FIG. 2 is a disposable gutter broom segment.

FIGS. 3 and 4 are exploded views of the disposable segments.

FIG. 5 is a bottom view of a permanent gutter broom plate configured to hold disposable segments.

FIG. 6 is a view of the carrier plate showing the insertion of a segment.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a gutter broom assembly with rotary shaft 10 fixed to a permanent circular steel plate 12. Collar 14 partially overlies and encircles plate 12 and retains holder inserts inward. Collar 14 is attached to plate 12 by means of bolts 16, which are secured in thread holes in the plate. Bristles 18 are outward and downward for maximum curb dirt digging action as the gutter broom turns. The rotary shaft 10, circular plate 12, collar 14 and bolts 16 are permanent components of the road sweeping assembly; bristle holders and bristles 18 are disposable.

FIG. 2 shows assembled bristle holder 20 with bristles 18 directed outward and downward from slots on the bottom of holder 20. In conventional gutter brooms, holder 20 is bolted to the bottom of a permanent circular plate by the usual means of bolts. Thus, the holder segments of the present invention are useful in conventional gutter brooms as well as in the quick assembly brooms which are described herein.

Sides 30 of bristle holder 20 are convergent plane surfaces. Front and rear 32 and 34 are segments of cylindrical surfaces. Bristle holder 20 comprises cover section 22, middle section 24 and lower section 26. Preferably, the holder sections are molded from similar resins having qualities of toughness, flexibility, resilience and form retention. A suitable resin is, for example, a polyolefin, typically polypropylene.

Preferably, the bristle holding segments 20 are hollow, with each section having a generally planar medial portion. Middle and bottom sections have integrally formed spacing edges generally transverse to their medial portions. Bristles are inserted in corresponding slots in the middle and bottom sections, and the cover section is added. Abrupting edges of the sections are permanently joined such as by fusing or bonding.
with a suitable adhesive, and the bristle holding segments are ready for use.

FIG. 3 shows an exploded view of holder 20 having a cover section 22, a middle section 24 and a bottom section 26. Bristle 36 has a central bight portion 38 and leg portions 39. Bight portion 38 overlies bar 40 in holder middle section 24. Leg portions 39 and bristle 36 are directed downward and outward through slots 42 laterally adjacent bars 40. Leg portions 39 extend through slots 44 in lower holder section 26.

The bight 38 of bristle 36 is in contact with the curved portion of bar 40. There is a space between bight 38 and the underside of cover section 22. In use, the space is entirely filled by bristles. For example, there may be approximately 20 bristles around each bar 40 so that the space between bar 40 and the underside of cover section 22 is filled by these bristle bights. In a similar manner, slots 42 in mid-section 24 and slots 44 in mid-section 24 are tightly packed with bristles to prevent wear-causing hammering vibrations from bristle leg portions in contact with the walls of the slots.

Cover section 22 has elongated depressions 50 which extend downward into bight receiving recesses to force the bights downward toward bar 40 and to distribute the bights along the bars.

As shown in FIGS. 3 and 4, bight holding bars 40 are solidly formed elements which extend from the inner face of holder section 24 to the outer face of the holder section. Recesses 52, which contain bight holding bars 40 and slots 42, have substantially vertical outer faces 54 and have sloping inner faces 56. Since depressions 50 in cover 22 have front to rear dimensions less than similar dimensions of the upper portions of recesses 52, pressing the depressions in toward the bristle bights tends to distribute the bights along the bars so that bristle legs extend outward at slightly varying angles to give a full brush effect at the active ends of the bristles.

The forward depression 58 simply spaces the bristle holding recesses toward the inside of middle section 24 to facilitate the outward flaring of the bristles.

In lower holder section 26, walls 60 of slots 44 are extended upward into the body of the section and are solid to promote strength of the section.

The upper edge of central section 24 is recessed 62 to receive a corresponding downward extending lip 64 spaced inward from the periphery of cover 22. Lower section 26 has an upper recess 66 to receive a corresponding downward extending lip 68 on middle section 24.

After all of the bristles have been assembled, the downward extending lips may be coated with an adhesive material before the sections are snapped together to form a permanently joined assembly. Alternatively, the sections may be snapped together and heat applied around the intersections to fuse the corresponding lips and recesses. In the finished product, the holder comprises a smooth surface body without rough interruptions.

Holes 70 extend through the cover, middle and outer sections 22, 24 and 26, respectively, so that the bolts may fasten the holders to permanent plates of conventional gutter broom assemblies.

FIG. 5 shows a view of the permanent plate of the present invention. A "T" shaped bars 72 mounted radially on one face of the plate. The bars 72 have base or throat sections 74, which are connected to the plate, and ledge portions 76, which extend outward. The ledges hold bristle retainers up against the downward face 78 of plate 12. When holders 20 have been inserted between the ledges and the plate, collar 14 is lowered to its downward position to encircle the holders 20 and bar 72, wedging the holders into place.

In alternative forms of the invention, the fingers may be cantilevered outward to underly portions of the bristle holders between bristle rows to further rigidify the brush structure.

As shown in FIG. 6, when bristles are worn, bolts 16 are loosened or removed so that retaining collar 14 may be lifted. The disposable segment holders 20 are withdrawn from between the "T" shaped bars 72 and are discarded. New hol-
outward therefrom circumferentially enclosing the bars, whereby bristle holders supported on ledges of the bars are retained inward by the retaining means.

10. The apparatus of claim 9 wherein the bars comprise "T" shaped bars having central portions connected to the plate and having ledge portions remote from the plate for partially enclosing a space between the plate and the ledge portions and wherein the retainer means further partially encloses the space between the plate and the ledge portions whereby bristle holding apparatus are placed on the ledge portions between the plate and ledge portions and whereby the retaining means hold the bristle holders inward.

11. The apparatus of claim 9 wherein the movable annular retaining means comprises a cylindrical hoop with an inward projecting flange overlying the plate on a side thereof opposite the bars, and fasteners connecting the inward flange to the plate, whereby unfastening the fasteners from the flange permits moving of the hoop, thus opening spaces between the bars for access to bristle holders.