

- [54] **BRISTLE MAT ASSEMBLY FOR BRUSHES**
- [72] Inventors: **Leo Lechene, Patton; John Campbell,**
Coalport, both of Pa.
- [73] Assignee: **Fab Fibre Company, Patton, Pa.**
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Primary Examiner—Peter Feldman
Attorney—Cullen, Settle, Sloman & Cantor

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- [51] Int. Cl.....**A46b 1/00**
- [58] Field of Search.....**15/159, 179-183,**
15/104.19, 104.2, 201, 230.16, 230.19; 300/21

[57] **ABSTRACT**

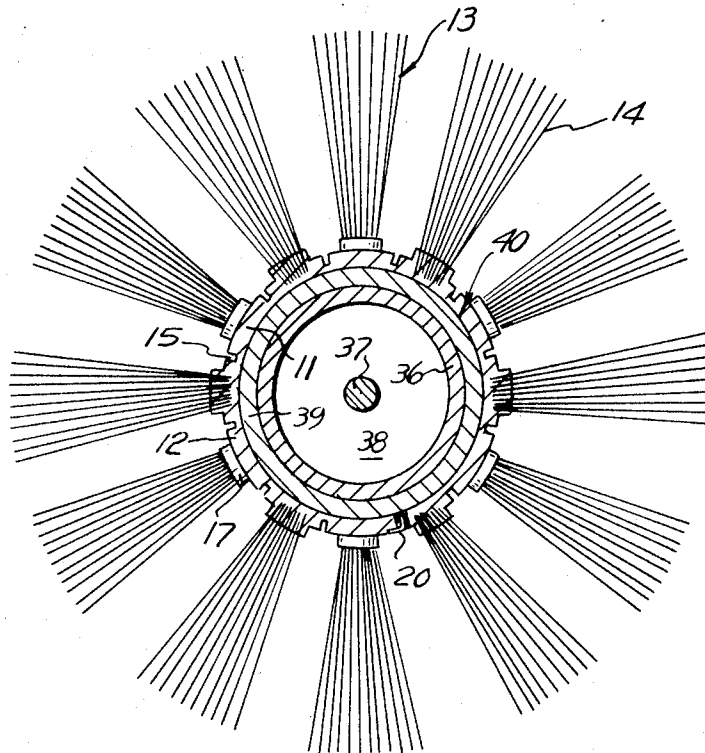
A bristle mat assembly for brushes which consists of a mat of rectangular shape, having a fastening device at its opposite ends so that the strip may be formed into a cylinder with its ends interconnected, and a series of spaced rows of longitudinally spaced plastic bristle bundles overlying one side of the strip, with the bristle ends projected through the mat, fused and bonded thereto and extending at right angles thereto; and the method of making same wherein the mat is pressure molded to shape with the bristle bundles assembled into the mold with the bristle ends projected through the mold cavity.

[56] **References Cited**

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1 Claim, 5 Drawing Figures



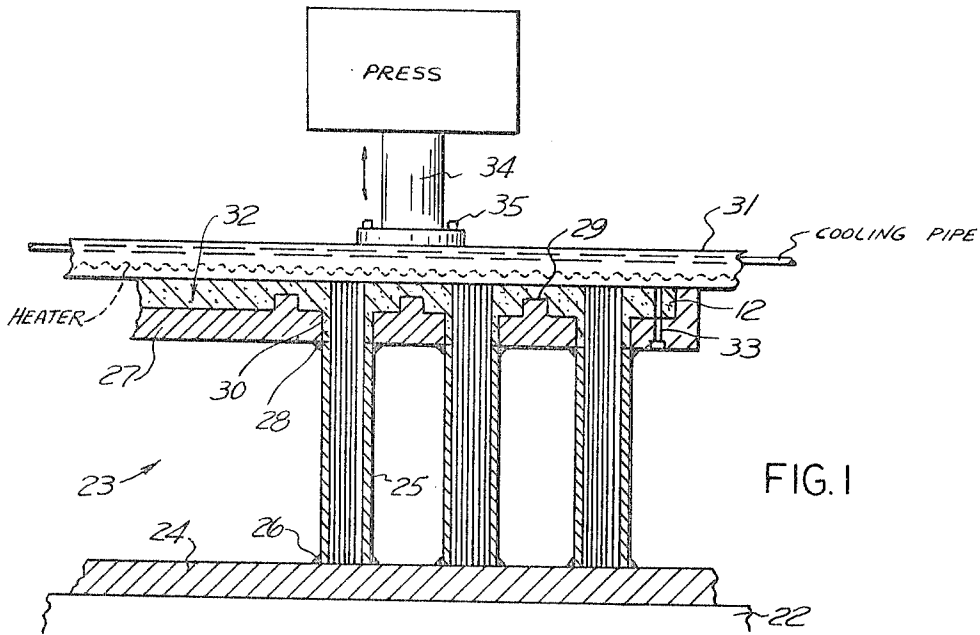


FIG. 1

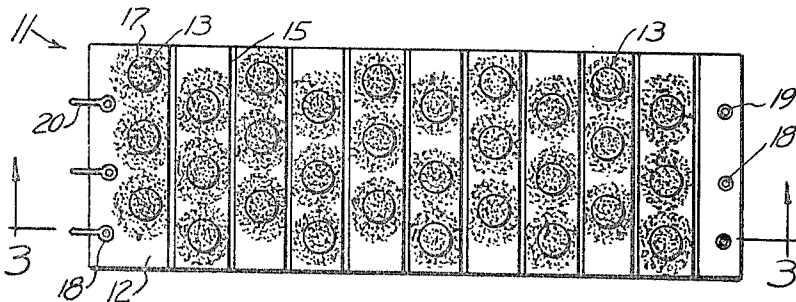


FIG. 2

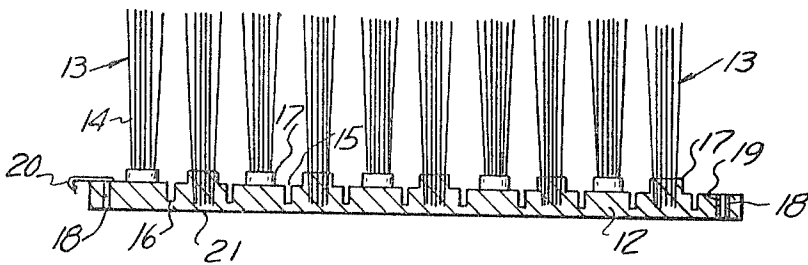


FIG. 3

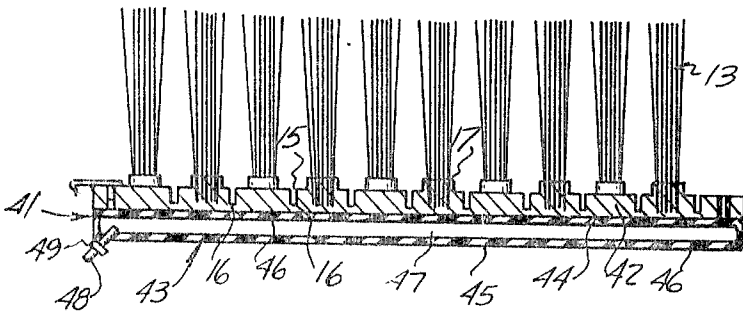


FIG. 5

INVENTORS
 LEO LECHENE
 JOHN CAMPBELL

BY *Cullen, Settle, Sloman & Cantor*

ATTORNEYS

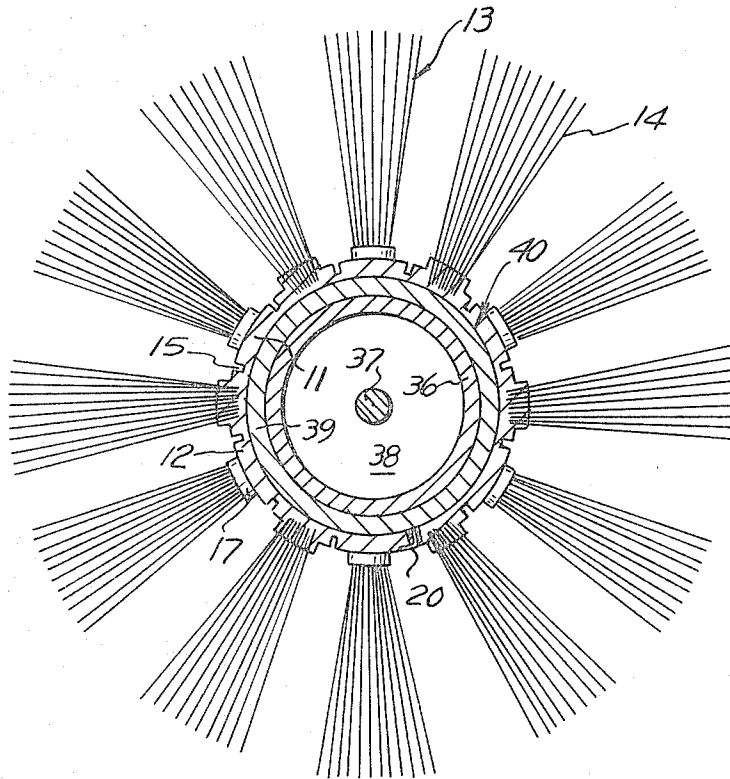


FIG. 4

INVENTORS

LEO LECHENE
JOHN CAMPBELL

BY *Cullen, Settle, Skousan & Cantor*

ATTORNEYS

BRISTLE MAT ASSEMBLY FOR BRUSHES

BACKGROUND OF THE INVENTION

Heretofore, in the manufacture of brushes for various purposes, and including brushes used for street sweeping, but not limited thereto, various types of bristles have been employed and various means have been employed for assembling the bristles with respect to a power driven core or other support. The difficulty has been in affixing the bristle assemblies or bristle bundles to a supporting means mountable upon a central core or support.

Various methods have been employed for assembling the bristles with respect to a backing member, securing them in one way or another for accomplishing this result.

BRIEF DESCRIPTION

It is an object of the present invention to provide an improved bristle mat assembly for brushes wherein, the bristle bundle and its supporting mat are molded together as a unit, and wherein, there are provided a series of rows of longitudinally spaced bristle bundles assembled with respect to the mat body, molded and imbedded down thereinto to provide a unit assembly.

It is another object to provide an improved bristle mat assembly wherein, during the molding operation of the bristle mat, the respective bristle bundles are arranged in a series of staggered rows of spaced bristle bundles and wherein the ends of the individual bristles of each bundle are assembled within the cavity of a pressure molding machine so that a plastic material is pressed and assembled so that the bristle ends are imbedded down into and fused with the finished bristle mat assembly providing a unit article.

It is a further object to provide an improved bristle mat assembly of the type described and wherein, there is applied to one side of the mat defining strip an elongated double-walled hollow inflatable resilient and expandable support mandrel assembly adapted to be filled with air under pressure and for radial expansion for securing the cylindrically formed bristle mat assembly around a corresponding support member.

These and other objects will be seen from the following specification and claims and drawing.

THE DRAWING

FIG. 1 is a fragmentary schematic and sectional view of a pressure molding apparatus for making the present bristle mat assembly.

FIG. 2 is a plan view of the molded bristle mat assembly.

FIG. 3 is a section taken in the direction of arrows 3—3 of FIG. 2.

FIG. 4 is a fragmentary cross-sectional view showing one form of brush utilizing the present bristle mat assembly.

FIG. 5 is a view similar to FIG. 3 illustrating a modification which includes an inflatable mandrel.

DETAILED DESCRIPTION

Referring to the drawing, FIGS. 2 and 3 illustrate the present unit molded bristle mat assembly which may be adapted for an annular brush construction such as shown for illustration in FIG. 4.

Bristle mat assembly, generally indicated at 11 includes elongated plastic strip 12 of rectangular shape in plan, for illustration and including a series of spaced rows of longitudinally spaced bristle bundles 13.

Each bristle bundle is made up of a number of elongated bristles 14 formed of a plastic material such as polypropylene, with the one ends of the bristles embedded down into the molded mat as shown at 21, FIG. 3, and intimately bonded and affixed thereto.

A series of transversely extending parallel spaced channels 15 are formed across the strip as shown in FIGS. 2 and 3 to define with the remaining portion of the strip, a series of flex hinge members 16 to facilitate bending the bristle mat as-

sembly into a cylindrical form such as shown in FIG. 4 around a suitable similarly shaped support means 39, for illustration.

In the illustrative embodiment, the bristle mat assembly is 34 inches long and 12 inches wide, though not limited to these dimensions. The total thickness of the strip is one quarter of an inch approximately and with its channels being three sixteenths of an inch deep and the remaining flex hinge members 16 having a thickness of approximately one sixteenth of an inch, for illustration.

In the illustrative embodiment, there are employed six spaced rows of longitudinally spaced bristle bundles 13 with the bundles of the adjacent rows staggered as best shown in FIG. 2.

The present bristle mat assembly includes as an integral part thereof, a series of bristle supporting sleeves 17 which project from one side of the strip 12, surround the individual bristle bundles, being fused and secured and bonded thereto to provide an additional support for the bristle bundles and the individual bristles with respect to the elongated strip 12 from which the bristles extend at substantially right angles thereto, such as shown in FIG. 3.

Across and adjacent the respective ends of the strip 12 are a series of transverse spaced apertures 18, FIG. 2. Apertured gromets 19 are projected through the apertures at one end of the strip and corresponding formed hooks 20 are projected through and interlocked with the corresponding other series of apertures at the opposite end of the strip.

These gromets and hooks may be assembled with respect to the strip after or during the molding operation to thus, provide a means by which the bristle mat assembly may be bent into cylindrical form such as shown in FIG. 4 with respective ends of the strip in registry and interconnected by the said gromets and hooks to form a cylindrical brush member, such as shown for illustration in FIG. 4 around a suitable support 39.

FORM MOLDING APPARATUS

The present bristle mat assembly is form molded such as in the apparatus 23 mounted upon bed 22 fragmentarily shown.

Said apparatus includes mold support plate 24 mounted on said bed having affixed thereto a series of spaced rows of spaced steel bristle bundle supporting tubes 25 affixed to support 24 by the welds 26.

Bottom mold plate 27 registers with the opposite or upper ends of the respective tubes 25 and is affixed to the respective tubes as by the welds 28, there being formed within bottom mold plate 27 and extending therethrough for registry with the upper ends of the tubes 25, a series of sleeve molding bores 30.

The top mold pressure plate 31, schematically shown, includes preheating means as well as pipes for circulating cold water for chilling molded article before separation of the mold plates 27 and 31.

The said plates define therebetween in the mold position shown, the mat and bristle end mold cavity 32.

A series of longitudinally spaced ribs 29 extend across mold bottom plate 27 to thus define in the molded article a series of transverse channels 15, FIG. 2.

The mold top plate 31 is under the control of a suitable press, so indicated, capable of exerting pressures up to 50 tons, for illustration, which through the use of a suitable connector 34 or reciprocal power rod is joined as at 35 to the said mold top plate for exerting a uniform molding pressure upon a mass of extruded plastic material. This has been preheated and interposed between the mold plates before the application of pressure thereto for molding in a conventional form molding operation.

In the illustrative embodiment and method, the heater which may be an electric heater, embedded or connected to the top mold plate 31 for illustration produces a preheating of approximately 350° F. The plastic material employed in the illustrative embodiment is polypropylene which is suitably extruded when applied in a mass into the cavity 32 before the

plates 31 and 27 are brought compressively together as shown in the molding position FIG. 1.

While polypropylene has been described as a plastic material employed in the form molding operation for the making of the present bristle mat assembly for brushes, it is contemplated that other equivalent plastic materials of similar characteristics may be employed.

FIG. 4 schematically shows one simple form of basic brush construction which includes elongated tubular support 36 with end plates 38 mounting suitable journaling means or axle ends 37.

A suitable cylindrically shaped mat mounting device 39 overlies the support 36 and provides a base around which the bristle mat assembly is bent into the cylindrical form shown with the ends of the bristle mat in registry and interlocked by the hooks 20 and gromets 19.

Other means of zipping together or otherwise interconnecting the respective registering ends of the bristle mat assembly may be employed.

The present invention is directed to the bristle mat assembly for brushes and including the method of making said bristle mat assembly. FIG. 4 is merely an illustration of how the bristle mat could be employed for the making of a brush, the details of which are omitted in the present disclosure but which form the part of a presently copending disclosure.

In FIG. 4 the preformed and premolded unit bristle mat assembly 11 is formed into cylindrical shape; is shown at 40 as a sleeve.

MODIFICATION

A modified bristle mat assembly is shown at 41, FIG. 5 which is of a construction very similar to the bristle mat shown in FIGS. 2 and 3, common portions to which are not redescribed.

The under surface of the strip 42 corresponding to strip 12 of FIG. 3 has applied thereto a preferably double walled inflatable resilient support mandrel assembly 43 of a similar plastic material molded as an integral part of the strip 42.

Said mandrel assembly includes hollow body 45 consisting of a pair of spaced walls 46 peripherally joined hermetically to define an air cavity 47.

A suitable air fitting 48 with associated air valve 49 communicates with said cavity; provides a means by which after the bristle assembly and associated mandrel have been bent into the cylindrical form similar to what is shown in FIG. 4, air may be applied to the said cavity for expanding the same radially.

For illustration in FIG. 4, assuming that the mandrel assembly 43 is a part of the bristle mat assembly 40, then the radial pressures exerted by the expansion of the mandrel 43 on application of air under pressure thereinto will cause the support assembly including the mandrel 43 to frictionally grip the central rodlike support 36 for the formation of a brush con-

struction.

In the illustrative embodiment with the dimensions before given as to the length and width of the mat assembly 11 of FIG. 2, the general diameter defined by the tubular form of the mat assembly shown at 40, FIG. 4 will be 10 and $\frac{3}{4}$ inches for illustration.

The hooks 20 of FIG. 2, instead of being separately assembled, may be pressed into or formed as a part of the bristle mat assembly during the molding operation if desired.

In the illustrative embodiment, the individual bristle bundles are arranged in rows and spaced at center distances of two inches for illustration.

Likewise, the rows are at center distances of 2 inches each.

In the illustrative embodiment of the unit mandrel assembly 43, a polyvinyl chloride may be employed or other suitable plastic material including rubber or neoprene or a flexible form of polypropylene and wherein, the mandrel assembly 43 is bonded to the under surface of the strip 42 as at 44 or suitably secured thereto.

In this construction, the bristle mat assembly has an expansive mandrel mounting. Accordingly, when the bristles are worn out, the complete assembly including the backing strip and mandrel mounting may be discarded and a new assembly substituted without disassembly of the mounting core.

Once the mandrel assembly 43 has been expanded by the application of air under pressure, utilizing a pressure of approximately 60 pounds per square inch, it need not be again inflated under most conditions.

Mandrel 43 may include a single wall 45 peripherally joined to strip 42 with air chamber 47 therebetween.

Having described our invention, reference should now be had to the following claims.

We claim:

1. A bristle mat assembly for brushes comprising, an elongated plastic strip of rectangular shape in plan;
- cooperable fastening means on the opposite ends of said strip, whereby said strip is adapted to bent into cylindrical form upon a support with its opposite ends in registry and interconnected;
- a series of spaced rows of longitudinally spaced plastic bristle bundles overlying one side of said strip, the bristles of each bundle at their one ends being immovably embedded into said strip and extending at right angles thereto;
- and an elongated flat hollow inflatable chamber defined by a series of resilient walls secured to and coextensive with the side of said strip opposite to the bristle-carrying side, said chamber being provided with a valved air inlet to enable said chamber to be inflated once the strip has been conformed around a cylindrical supporting mandrel and thereby frictionally secured to the mandrel by the radially inward expansion of said chamber.

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