June 15, 1971 L. LECHENE ET AL 3,584,328

STREETSWEEPER BRUSH

Filed Dec. 2, 1969 2 Sheets-Sheet 1

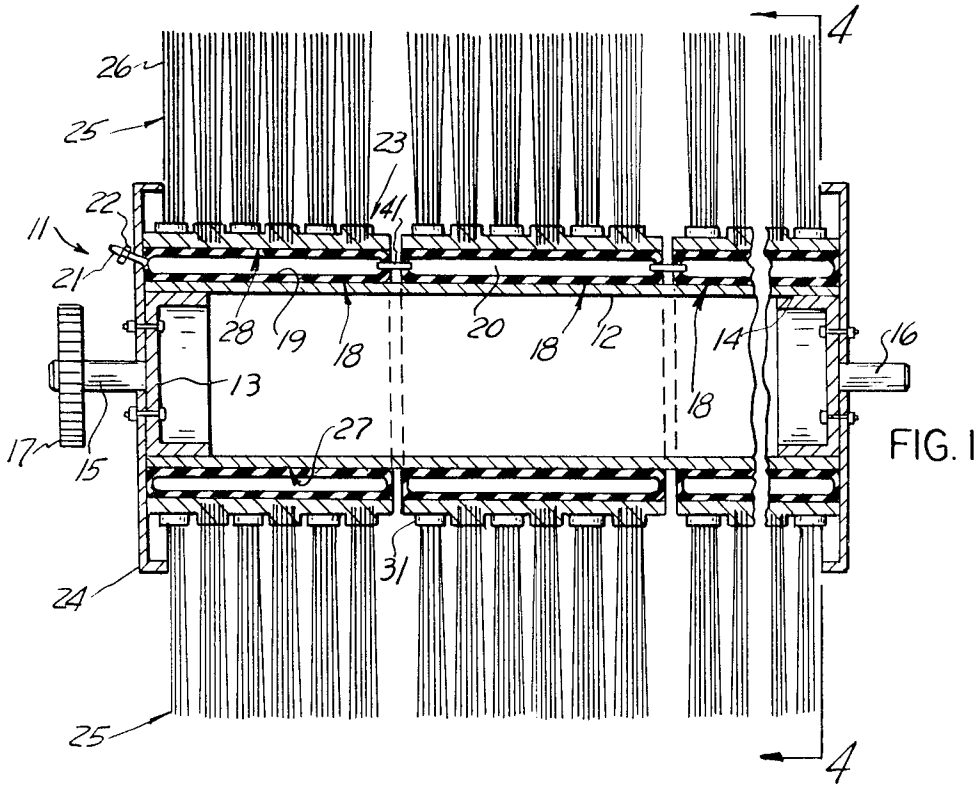
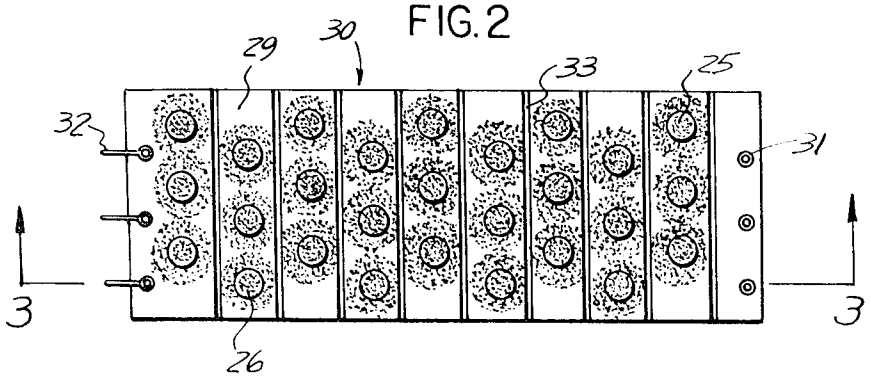


FIG. 1

FIG. 2



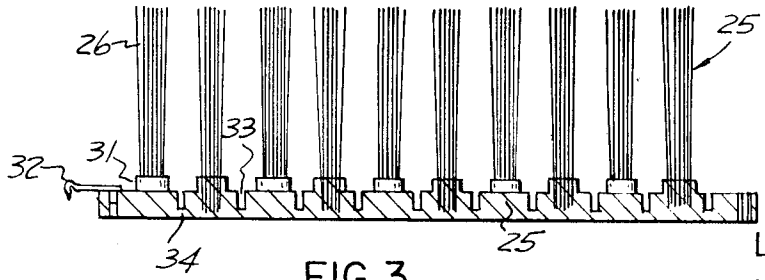


FIG. 3

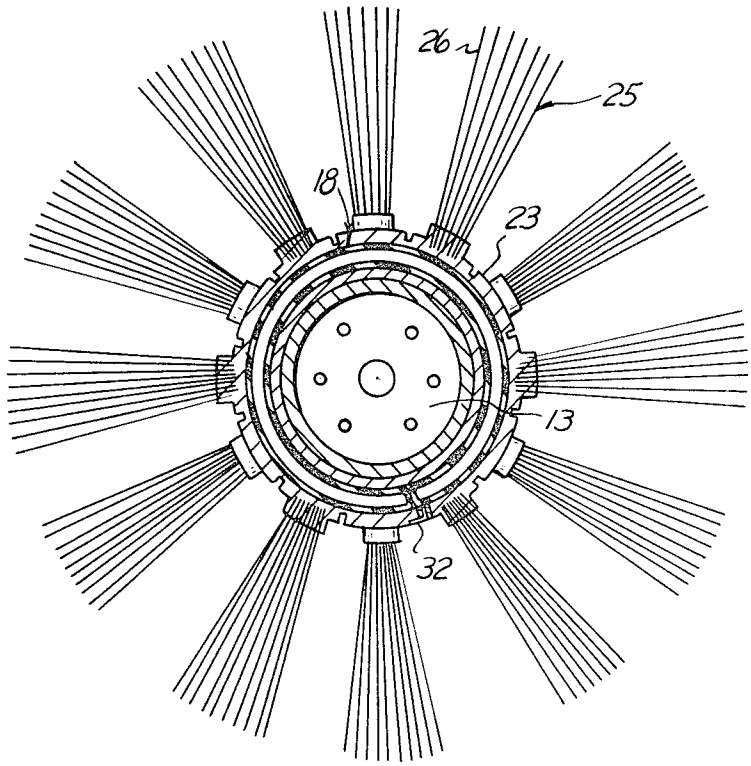
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FIG. 4



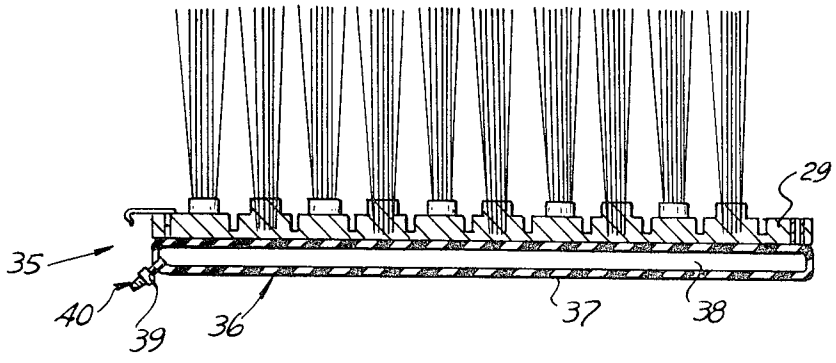


FIG. 5

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STREETSWEEPER BRUSH

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Int. Cl. A46b 1/00, 7/02
U.S. Cl. 15—179 12 Claims

ABSTRACT OF THE DISCLOSURE

In a streetsweeper brush, having a power rotated core, one or more elongated hollow tubular inflatable flexible mandrels mounted on and along said core, and one or more bristle mat assemblies of sleeve form mounted on said mandrels, pressurizing and expansion of said mandrels affixing said mandrels to the core and to said bristle mat assemblies, the bristle mat assembly including an elongated strip of plastic material, having a series of parallel rows of spaced bristle bundles of plastic material, the bristles extending down into said strip at right angles thereto and imbedded and bonded thereto.

BACKGROUND OF THE INVENTION

Heretofore, in the making of brushes mounted upon power rotated cores, such as used in street sweeping brushes, though not limited thereto, difficulties have been incountered and providing bristle supporting assemblies by which said bristle assemblies may be mounted on the power rotated core in driven relation thereto and which may be removed and easily replaced. Various efforts in this direction have been made, mostly accompanied by complicated and involved structures difficult to assemble and disassemble.

BRIEF DESCRIPTION OF THE INVENTION

The present invention is directed to power rotated brushes, and particularly, the street sweeper brush which has a conventional tubular core which is power rotated and to which the bristle mat assembly of cylindrical form is immovably and retainingly mounted thereon.

It is an object of the present invention to provide an improved resilient expansive air pressurized mandrel assembly mountable upon the power driven core which mounts thereon the present bristle mat assembly in sleeve form and upon expansion by pressurizing; is self anchoring to the core and self securing to the bristle mat assembly.

It is another object to provide an improved street sweeper brush wherein mounted upon the rotatable core there are provided one or a plurality of tubular inflatable mandrels, and mounted upon said mandrels, one or more bristle mat assemblies, each individually formed into cylindrical form with ends interconnected whereby upon pressurizing of the respective mandrel or mandrels, radial expansion of the said mandrel frictionally anchors the mandrel to the core and frictionally anchors the bristle mat sleeves onto the mandrel.

It is another object to provide improved bristle mat construction for such street sweeper brush wherein, bristle mats are formed from elongated strips of plastic material which have mounted thereon a series of parallel rows of spaced bristle bundles with the bristles extending at right angles to the plane of the mat strip while flat and imbedded and bonded thereinto as an integral part thereof.

It is a further object to provide an improved bristle mat and mandrel assembly wherein the said bristle mat construction formed into sleeve form mounts upon its interior a tubular inflatable flexible mandrel which is thus self securing upon a power rotated broom core.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawing.

THE DRAWING

FIG. 1 is a fragmentary longitudinal section of a street sweeper brush in accordance with the present invention.

FIG. 2 is a plan view of a bristle mat assembly before bending into tubular form.

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

FIG. 4 is a fragmentary section taken in the direction of arrows 4—4 of FIG. 1.

FIG. 5 is a longitudinal section similar to FIG. 3 showing the present unit molded bristle mat assembly with integral mandrel.

DETAILED DESCRIPTION

Referring to the drawing, the present street sweeper brush generally indicated at **11**, FIG. 1 is in longitudinal section for illustration and partly broken away for illustration.

As it is conventional with street sweeper brushes, there is provided a power rotated core or tube support **12** which includes cup shaped end plates **13** secured within the ends of tube **12** as by welding at **14**.

In the illustrated form, a pair of axle shafts **15** and **16** axially project in alignment from the end plates **13**, shaft **15** mounting a suitable sprocket **17** for driving said core in a conventional manner.

One or a plurality of tubular resilient inflatable mandrels **18** are loosely positioned upon said core **12** and extend through the length thereof.

Each mandrel consists of spaced or double walls **19** defining air chamber **20**. Air inlet **21** connects the mandrel wall for communication with said air chamber and includes air valve **22**. This, provides a means for inflating said mandrels utilizing pressures up to and in the range of 60 pounds per square inch approximately, though not limited thereto.

Inflatable mandrels of this type are presently available on the market and are sold by B. F. Goodrich of Akron, Ohio, and possibly others.

One or a plurality of bristle mat assemblies in the sleeve form are slidably positioned over the respective mandrels such as shown at **23**, FIG. 1. Said bristle mat assembly sleeves are of such length as to normally correspond with and register and overlie the corresponding inflatable mandrel **18**, FIG. 1.

Bristle mat retainer end plates **24** are centrally apertured so as to loosely overlie the axle shafts **15** and **16**, and engage and are secured to the respective core end plates **13**.

Outer peripheral portions of said retainer end plates cooperatively and retainingly engage portions of the bristles **26** of adjacent bristle bundles **25** which form a part of the bristle mat assembly.

On pressurizing of the mandrel **18** by application of air pressure through the fitting **21–22**, there is provided radial inward expansion of the inner wall of the mandrel as at **27** whereby said mandrel frictionally grips the adjacent portions of core **12** and is adapted to transmit torque therefrom on power rotation of said core.

Upon pressurizing of said mandrel, there is additionally radial outward forces as shown at **28** by which the outer wall **19** of the mandrel operatively and retainingly and expansively engages interior wall of the bristle mat assembly sleeve for effectively securing the same upon the mandrel and for use on power rotation of the broom core assembly, FIG. 1.

Each bristle mat assembly includes an elongated plastic strip **29** such as made of polypropylene or similar plastic material and as shown in FIGS. 2 and 3 is initially molded into a flat strip into a bristle mat assembly generally indicated at **30** and which includes a plurality of parallel spaced rows of spaced bristle bundles **25**. Each bundle includes a plurality of plastic bristles **26** which extend at right angles to the plastic strip **29** and are embedded down into said strip and molded and bonded thereto as an integral part during the/or after the molding operation.

The detail of the construction of the bristle mat assembly is described with illustrative apparatus in our copending patent application, Ser. No. 881,530 entitled, Bristle Mat Assembly for Brushes and Method of Manufacture executed on even date with the present application.

In the form molding operation of the bristle mat assembly, the construction of a mold is such that there surrounds each of the bristle bundles **25** at its base a sleeve **31** which is bonded not only to the bristles adjacent thereto but to the bristle mat strip **29** as an integral part thereof.

This sleeve strengthens the securing of the bristle ends within the strip **29**, it being noted that the bristles actually extend down through the body of the strip **29** and are bonded thereto.

The preferred plastic material employed for the bristles as well as the strip is polypropylene for illustration though other equivalent plastics could be employed.

The bristle mat assembly **30**, FIGS. 2 and 3 when used is formed into a cylindrical sleeve as shown at **23**, FIG. 4, for mounting over mandrel **18**.

In the molding operation for the bristle mat assembly **30**, FIGS. 2 and 3, a row of spaced apertures are formed across the respective ends of strip **29**, FIG. 2, with one set of end apertures receiving grommets **31** and the other set of apertures receiving fastener hooks **32**, the said grommets and fastener hooks being adapted for assembly separately onto the strip, or secured thereto during the molding and forming operation.

This provides one means by which the bristle mat assembly strip may be bent into cylindrical shape with its ends in engagement and interconnected using the grommets **31** and hooks **32**.

It is contemplated that other means may be employed for interconnecting the registering end portions of strip **29** such as shown for illustration in FIG. 4.

A series of elongated transverse and parallel spaced channels **33** are formed across the strip **29** leaving within the said strip therebelow a series of flex hinges **34** to facilitate bending of the strip into the sleeve form of FIG. 4.

Modification

A modified bristle mat assembly is shown at **35**, FIG. 5 which is of a construction almost the same as that shown in FIGS. 2 and 3 except that there is provided a mandrel assembly **36** of double wall construction as shown at **37** and including air chamber **38** which may be pressurized by air inlet **39** and associated air valve **40**.

Accordingly, instead of the separate mandrels employed such as shown in FIG. 1 to which the bristle mats are separately applied for securing thereon, a mandrel assembly as shown in FIG. 5 is formed as an integral part of the bristle mat assembly.

In use the bristle mat assembly **35** with associated mandrel assembly **36** is formed into a sleeve such as shown in FIG. 4 with the respective ends again interconnected such as by the grommets or hooks or other means, after which the mandrel is inflated to the correct pressure in the area of 60 pounds per square inch, though not limited thereto.

By this construction, the radial expansive forces exerted by the mandrel assembly will serve to frictionally anchor the bristle mat assembly and mandrel upon and along the surface of the power driven core **12** such as shown in FIGS. 1 and 4.

Where a series of mandrels are employed as units end to end such as shown in FIG. 1, there is designated at **41** a conduit means which could be the same as the air inlet pipe **21** by which the interiors of adjacent mandrels are interconnected. Accordingly, when air pressure is applied to the outer mandrel adjacent the air valve **22**, there will be pressurized all of the additionally series connected mandrels such as shown in FIG. 1.

While a series of tubular mandrels are illustrated in FIG. 1, it is contemplated that one continuous mandrel could be applied to the power rotated broom core **12**, if desired. Accordingly, the power brush could thus be made up of a single inflatable mandrel to which a series of bristle mat assemblies could be applied end to end and axially to complete the brush construction and with the bristle mat assemblies immovably secured in place upon pressurizing of the respective mandrel or mandrels.

FIG. 5 bristle mat and mandrel assembly **35** is shown as a double walled construction at **37** with air chamber **38**, applied to the under surface of the strip **29**. Alternately, as a part of the present construction, the mandrel may be in the nature of a single wall structure such as shown at **37** with peripheral portions sealed or otherwise connected to the under surface adjacent peripheral portions of the strip **29** which still define the inflatable air chamber **38**.

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

We claim:

1. In a street sweeper brush having a tubular power rotated core within axle supports;

the improvement comprising an elongated hollow tubular inflatable and flexible torque transmitting mandrel loosely overlying said core and having an air chamber adapted to receive air under pressure;

and a bristle mat assembly of sleeve form axially mounted over and along said mandrel;

pressurizing said mandrel effecting radial inward forces frictionally connecting said mandrel and core, and radial outward forces between said mandrel and bristle mat assembly.

2. In the brush of claim **1**, said bristle mat assembly including 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 be bent into cylindrical form upon said mandrel with its opposite ends in registry and interconnected;

and 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 imbedded into said strip and extending at right angles thereto.

3. In the brush of claim **2**, said strip and bristle ends being molded and fused together.

4. In the brush of claim **2**, said strip and bristle ends being made of polypropylene.

5. In the brush of claim **2**, said fastening means including a transversely extending row of apertures extending through end portions of said strip at its opposite ends;

apertured grommets extending through the apertures at one end of the strip and hooks connected into the apertures at the other end, adapted for interlocking registry with said grommets.

6. In the brush of claim **2**, a bristle supporting sleeve surrounding each bristle bundle, retainingly engaging and supporting the bristle end portion of each bundle bonded to said bristles and to the strip.

7. In the brush of claim **1**, said mandrel being coextensive with said bristle mat assembly and bonded and secured thereto, said bristle mat assembly providing one wall of the mandrel.

8. In the brush of claim 1, said mandrel being of hollow double walled resilient construction underlying and secured to said bristle mat assembly throughout its engaging surfaces, and a valved air inlet connected to said mandrel.

9. In the brush of claim 1, there being at least one additional mandrel mounted on said core;

and a corresponding additional bristle mat assembly of sleeve form axially mounted on each additional mandrel.

10. In the brush of claim 9, conduit means between said mandrels interconnecting their chambers respectively, whereby air pressure supplied to one mandrel chamber communicates air pressure to the additional mandrel chambers.

11. In the brush of claim 1, there being a plurality of said mandrels mounted end to end upon said core;

a corresponding additional bristle mat assembly mounted on each additional mandrel;

and conduit means between said mandrels interconnecting their adjacent chambers respectively, whereby air pressure supplied to one mandrel chamber communicates air pressure to the additional mandrel chambers.

12. In the brush of claim 1, said core comprising an

elongated tube, cup shaped end plates secured within opposite ends of said tube mounting said axle supports,

and an apertured bristle retainer plate of disc form mounted over said axle supports respectively and secured to said end plates;

peripheral portions of said bristle retainer plates retainingly engaging and holding portions of said bristles throughout 360 degrees.

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U.S. Cl. X.R.

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