

United States Patent [19]

Parker

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- [54] **ROTARY BRUSH ASSEMBLY**
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Attorney, Agent, or Firm—Watts, Hoffman, Fisher & Heinke Co.

- [52] **U.S. Cl.**..... **15/182, 29/129.5**
[51] **Int. Cl.**..... **A46b 7/10**
[58] **Field of Search**..... 15/179, 180, 181, 182, 15/183, 41, 49 C, 366, 383, 386; 29/110, 113-130

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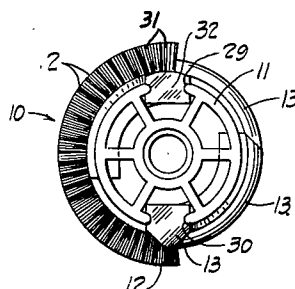
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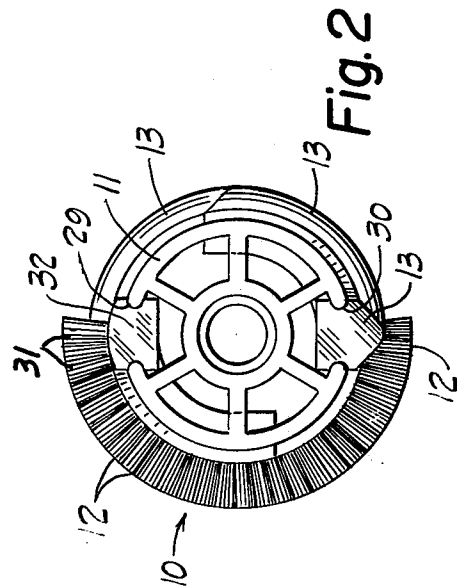
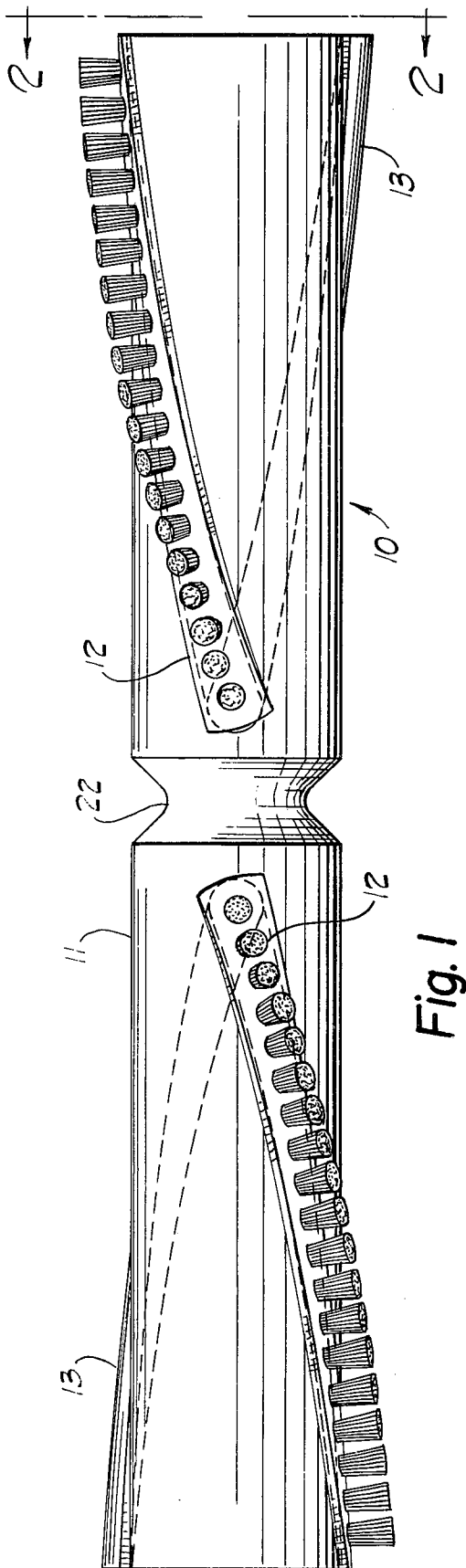
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[57] ABSTRACT

A roll for a rotary brush assembly characterized by a one-piece construction of good strength and rigidity including radially spaced coaxial inner and outer walls, ribs between the walls along the length of the roll, and slots in the outer wall for mounting brush and beater elements.

5 Claims, 7 Drawing Figures





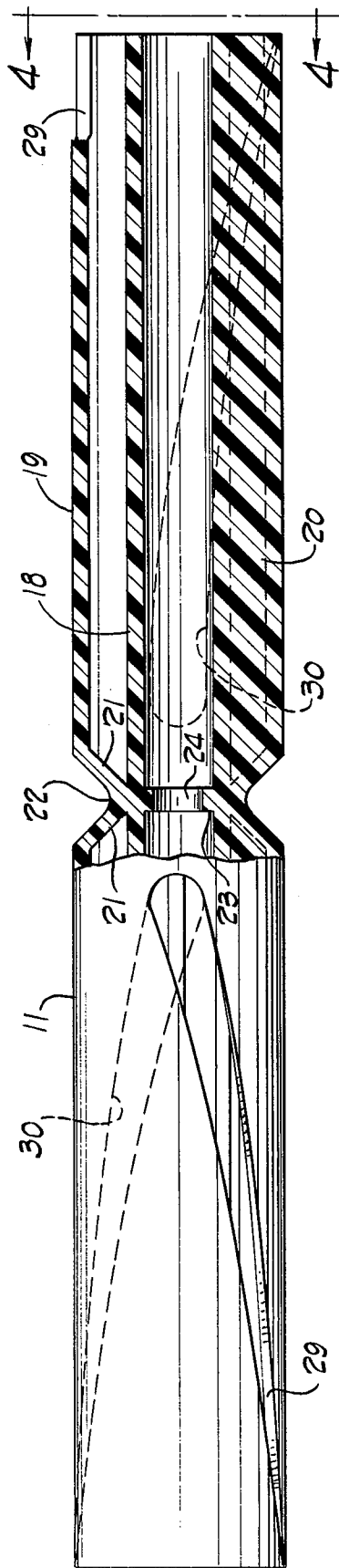


Fig. 3

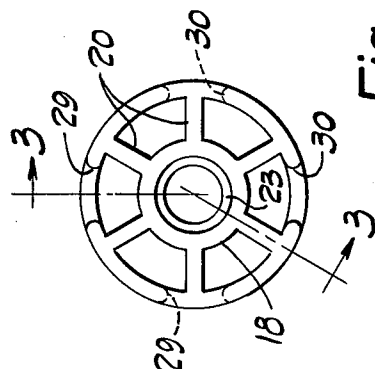


Fig. 4

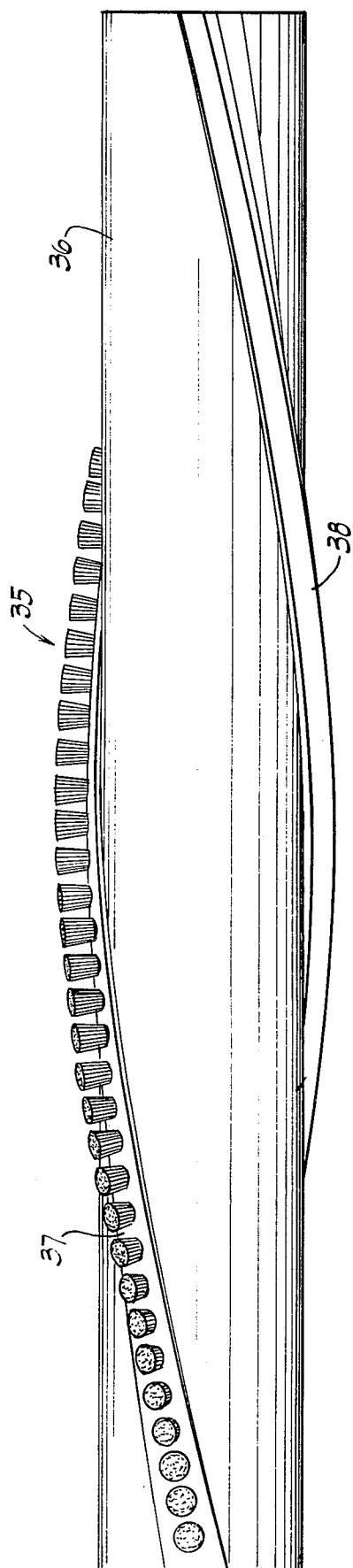


Fig. 5

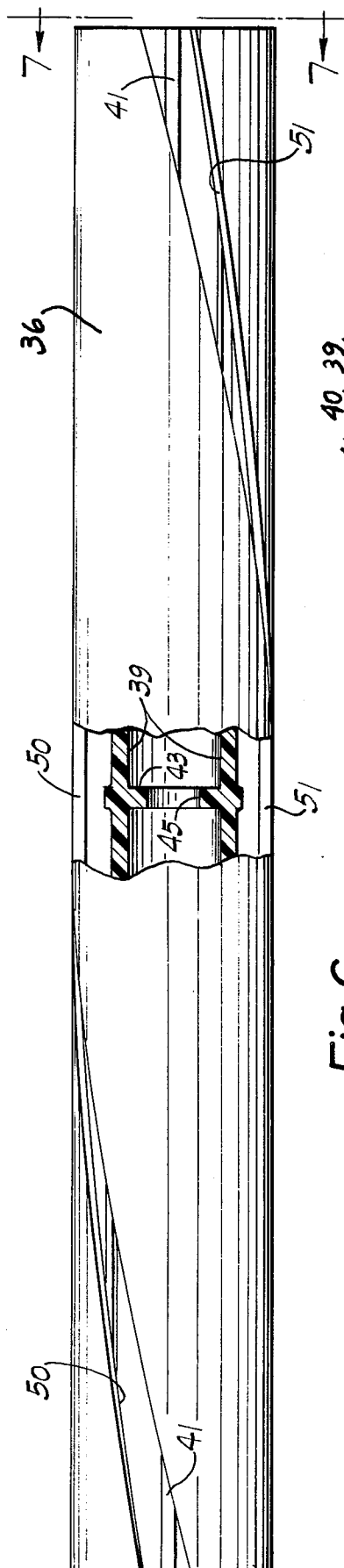


Fig. 6

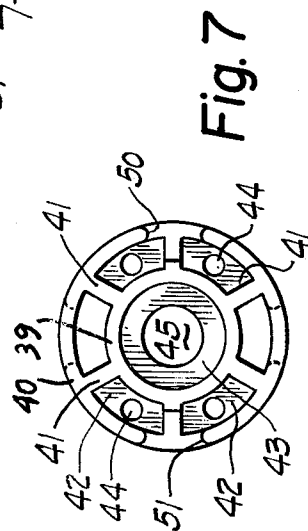


Fig. 7

ROTARY BRUSH ASSEMBLY

BACKGROUND OF THE INVENTION

This invention relates generally to rotary brush assemblies of the type used in cleaning apparatus such as vacuum or suction cleaners, and more specifically to a new and improved roll construction for a rotary brush assembly.

Brush assemblies of the type described are typically comprised of a cylindrical roll body which carries a helical brush strip and a beater bar insert. A conventional practice is to make the rolls from wooden dowels which are provided at their ends with bearing inserts and metal caps. This conventional practice has a number of disadvantages which to a large extent are due to the effects of humidity on the wood. In general, changes in humidity can cause the wooden dowels to crack, split and/or warp and can cause difficult production problems. For example, if the dowels expand or go out of round because of humidity changes, it may be impossible to assemble the metal end caps. Conversely, if the wood shrinks, the end caps may fall off and/or the dowels may be split by the bearing inserts. Shrinkage and expansion of the wood can also make it difficult to securely attach the brush bristles and beater bars to the dowels.

Additional disadvantages of brush assemblies made with wooden dowels include the necessity of weighting the beater bar inserts which are normally lighter than the brush strips in order to achieve dynamic balance, and the fact that such assemblies are not suitable for wet applications because of the danger of warpage.

Attempts have been made to avoid the foregoing problems by making the brush rolls from metal or plastic. A defect of many of the prior art metal and plastic designs is that the constructions do not have sufficient strength and rigidity to resist deformation under the forces applied to the rolls during rotation. Another defect of many of the prior art designs is that the metal or plastic rolls are formed in sections which must be accurately aligned and securely fastened together. These assembly operations required in the manufacture of multi-section rolls are often complicated and unduly add to the cost of the rolls.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a rotary brush assembly characterized by a new and improved roll construction which can be used to advantage in place of the wooden rolls or dowels of the prior art.

Another object of the present invention is to provide a rotary brush assembly characterized by a new and improved roll construction which can be economically produced as a one-piece member.

Still another object of the present invention is to provide a rotary brush assembly including a new and improved roll construction having the features described above and which is additionally characterized by good strength and rigidity.

The foregoing objects are attained and the disadvantages of the prior art are overcome by a preferred brush roll construction comprising a one-piece member having inner and outer, radially spaced, coaxial walls separated by ribs along the length of the roll. The new roll construction may further include centrally located radial walls which serve to reinforce the roll against twist-

ing and/or deflection. Slots are provided in the outer wall of the roll, and these slots form seats for mounting the usual brush strips and beater bars.

The new brush roll construction contemplated by this invention has the further important advantage that it can be produced as a one-piece member as by extruding, molding or die casting. Because of its unique one-piece structure, the brush roll of the invention is economical to manufacture. Another advantage is that the walls and/or ribs of the brush roll can be made with selected heavy sections in order to achieve dynamic balance, thereby avoiding the necessity of weighting the beater elements as has been customary in the past.

Other objects, advantages and a fuller understanding of the invention will be had from the following detailed description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view of a brush assembly comprising one embodiment of this invention;

FIG. 2 is an end elevational view taken on the line 2—2 of FIG. 1;

FIG. 3 is a view partially in cross-section and partially in elevation taken substantially on the line 3—3 of FIG. 4;

FIG. 4 is an end elevational view taken on the line 4—4 of FIG. 3;

FIG. 5 is an elevational view of a brush assembly comprising another embodiment of the invention;

FIG. 6 is an elevational view partially in section of the roll shown in FIG. 5; and

FIG. 7 is an end elevational view taken on the line 7—7 of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and to FIGS. 1 and 2 in particular, there is shown one embodiment of a rotary brush assembly 10 of the type intended for use in a suction or vacuum cleaner. The brush assembly 10 is generally comprised of a roll 11 which carries brush strips 12 and beater elements 13.

In the embodiment of the invention illustrated in FIGS. 1—4, the roll 11 is a one-piece member having a construction which can be molded from any suitable plastic material, such as ABS resin, polystyrene, polyethylene and the like, or produced as a die casting. The one-piece roll 11 is generally cylindrical in shape and includes inner and outer walls 18, 19, respectively, which are coaxial and radially spaced apart. A plurality of circularly spaced ribs 20 are located between the walls 18, 19, and each of these ribs may extend substantially the full length of the roll 11.

The outer wall 19 of the roll 11 has portions 21 which converge radially inwardly to define a belt pulley 22 located centrally between the ends of the roll. In order to provide a strong roll structure to which power can be transmitted by a belt seated in the pulley 22, the wall portions 21 are made integral with the inner cylindrical wall 18. The roll 11 is further reinforced by a centrally located wall 23 which extends radially inwardly from the wall 18 adjacent the pulley 22. The wall 23 has a central opening 24 for receiving a shaft (not shown) on which the roll 11 may be rotatably mounted.

In the embodiment of FIGS. 1—4, the outer wall 19 of the roll 11 has two pairs of slots 29, 30 which may extend helically from the ends of the roll toward its center

and terminate adjacent the pulley 22. The slots 29, 30 of each pair are displaced 180° from each other about the circumference of the roll. As shown in FIGS. 3 and 4, the ribs 20 may extend straight and parallel to the axis of the roll 11 and the slots 29, 30 may be machined in the wall 19 so as to extend across the ribs. Alternatively, the slots 29, 30 may be molded in the wall 19 and the ribs 20 may extend helically along the length of the roll on the same helix angle as the slots.

The slots 29 cooperate to provide a helical seat for mounting the brush strips 12. The brush strips 12 will be recognized as being of a conventional construction comprising bristles 31 carried by a flexible backing member 32 which can be curved to conform with the curvature of the slots 29. The brush strips are initially formed as straight members and are connected to the roll 11 by being wedged between the sides of the slots 29. The slots 30 cooperate in a similar manner to provide a helical seat for the beater elements 13. Each beater element is a strip of flexible material such as plastic which is grooved along opposite sides so that the strip can be retained between the sides of the slots 30 by a wedging action.

A modified brush roll assembly 35 is illustrated in FIGS. 5-7 and will be seen to comprise a roll 36 which is provided with a brush strip 37 and a beater element 38. In this embodiment of the invention, the brush strip 37 and the beater element 38 extend the full length of the roll 36 which is adapted to be mounted on a rotatable shaft driven at one end by a suitable drive connection (not shown).

The roll 36 is a one-piece member similar to the roll 11 described above in connection with FIGS. 1-4, and includes radially spaced, coaxial inner and outer walls 39, 40, respectively. The walls 39, 40 are separated by circularly spaced ribs 41 which may extend the full length of the roll. The roll 36 may be strengthened at its center by radial wall portions 42 formed integral with the ribs 41 between the cylindrical walls 39, 40 and by another wall portion 43 which extends radially inwardly from the wall 39. The wall portions 42 are formed with holes 44 and the wall portion 43 is formed with a shaft opening 45. In its illustrated form, the roll 36 can be produced as a die casting or it can be molded from a suitable plastic material. Alternatively, the walls 42, 43 can be eliminated and the roll produced as an extrusion.

As shown in FIGS. 6 and 7, a pair of helical slots 50, 51 are formed in the outer wall 40 and extend continuously from one end of the roll 36 to the other end. The slots 50, 51 may be machined in the wall 40 with the ribs 41 extending straight and parallel to the longitudinal axis of the roll 36 or the slots may be molded in the wall with the ribs 41 extending helically to conform with the curvature of the slots.

The slot 50 defines a seat for mounting the brush strip 37 and the slot 51 defines a seat for mounting the beater element 38. The brush strip 37 and the beater element 38 are constructed similarly to the corresponding members 12, 13 described above in connection with FIG. 1 and may be secured in the slots by a wedging action.

It will be seen that each embodiment of the invention provides a new brush roll structure which avoids all of the disadvantages associated with the conventionally used wooden rolls or dowels of the prior art. It will also be seen that the new brush roll is uniquely constructed so that it can be made as a one-piece member having good strength and rigidity.

Many other variations and modifications of the invention will be apparent to those skilled in the art in view of the foregoing detailed disclosure. Therefore, it is to be understood that, within the scope of the appended claims, the invention can be practiced otherwise than is specifically shown and described.

What is claimed is:

1. A rotary brush assembly comprising a rigid, one-piece extruded, molded, or cast roll including as an integral structure inner and outer radially spaced coaxial walls and a plurality of circularly spaced ribs extending lengthwise of said roll between said walls, said outer wall having slot means formed therein, and brush strip means carried in said slot means.

2. A brush assembly as claimed in claim 1 in which portions of said outer wall converge radially inwardly to form a belt pulley located between the ends of said roll, said outer wall portions being integral with said inner wall.

3. A brush assembly as claimed in claim 1 in which said outer wall has at least one slot, and in which said brush means comprises a brush strip seated in said slot.

4. A brush assembly as claimed in claim 1 wherein said slots extend uninterrupted from one end of said roll to the other.

5. A rotary brush assembly comprising a rigid, one-piece roll including as an integral structure inner and outer radially spaced coaxial walls, a plurality of circularly spaced ribs extending lengthwise of said roll between said walls, said outer wall having portions converging radially inwardly to form a belt pulley between the ends of said roll, said outer wall portions being integral with said inner wall, a first pair of helical slots in said outer wall extending from one end of said roll and terminating adjacent said belt pulley, and a second pair of helical slots in said outer wall extending from the other end of said roll and terminating adjacent said belt pulley; and brush strip means and beater element means carried in said slots.

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