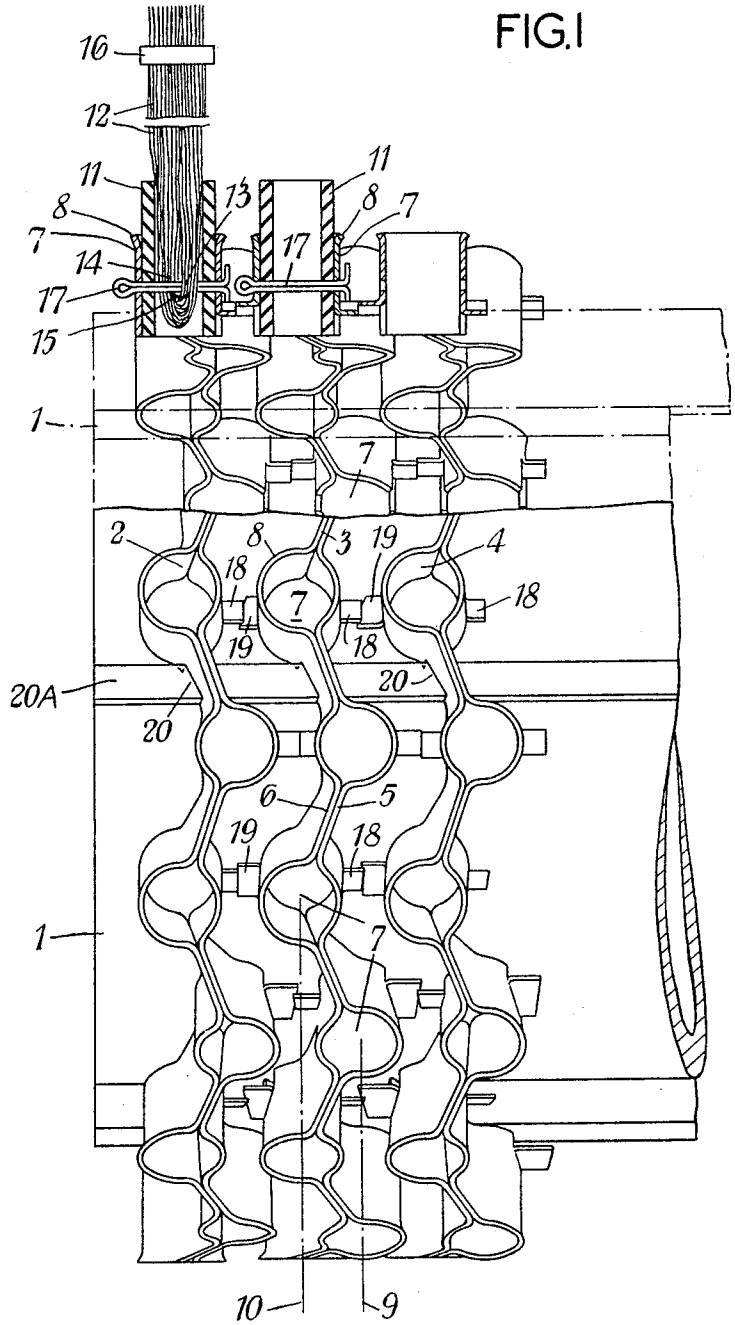
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ROTARY BRUSHES AND COMPONENTS FOR USE IN ROTARY BRUSHES

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FIG. 1



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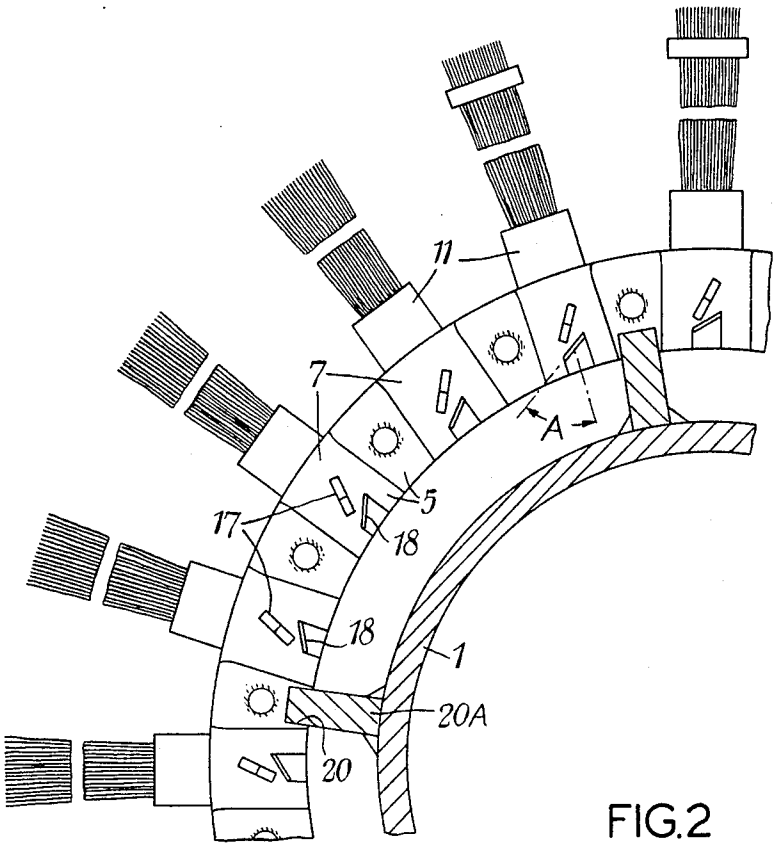


FIG.2

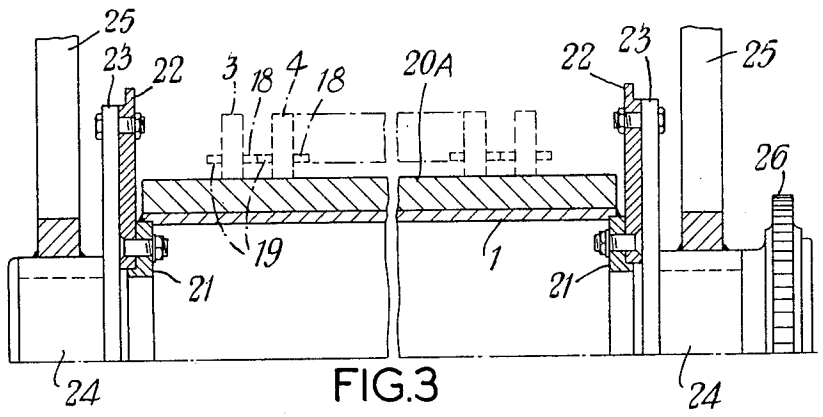


FIG.3

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ROTARY BRUSHES AND COMPONENTS FOR USE IN ROTARY BRUSHES

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This invention relates to rotary brushes, for example rotary brushes for sweepers designed for sweeping roads, aircraft runways and the like, and to components for use in rotary brushes.

According to the invention, there is provided a component for a rotary brush, comprising a tuft-holding ring of zig-zag form, tuft holders disposed at the peaks of the zig-zag and thereby arranged in two annual rows, the tuft holders all being substantially equidistant from the axis of the tuft-holding ring, and the tufts of brush filaments held by the tuft holders and extending outwardly of the tuft-holding ring.

According to the invention, there is also provided a rotary brush comprising a plurality of components, constructed as defined above, disposed in a row and a carrier member which passes through the tuft-holding rings and is coupled to them so as to transmit rotary motion to them.

For a better understanding of the invention and to show how it may be carried into effect, reference will now be made to the accompanying drawings, in which:

FIGURE 1 is a side view, partly in section, of part of a rotary brush,

FIGURE 2 is an end view, partly in section, of part of what is shown in FIGURE 1, and

FIGURE 3 is a diagrammatic sectional view of the upper half of the brush of a sweeper.

The brush illustrated has an overall diameter of about 3 feet and it is designed for sweeping snow from roads and aircraft runways, but it is to be understood that the brush can be used for other purposes and that larger and smaller brushes intended for the same purpose and for other purposes can be made in accordance with the invention.

The brush illustrated has a large number of tuft-holding rings of zig-zag form disposed in a row on a tubular carrier member **1** which passes through all the rings and is coaxial with them. Only three tuft-holding rings are shown in FIGURE 1 and they are referenced **2**, **3** and **4** and in FIGURE 3 only the rings **3** and **4** are shown. The ring **3** is shown in FIGURE 2 and is described in detail below.

The ring **3** consists of two annual members **5** and **6** of sheet metal, each of which has been so bent in a press as to be of zig-zag form and to have a groove therein at each peak of the zig-zag, the grooves extending radially from the inside of the annular member to the outside and being evenly spaced about the periphery of the annular member. The grooves in the two annular members are equal in number and they face one another and co-operate to form rigid tuft holders **7** which are at the peaks of the zig-zag of the ring **3**. The tuft holders **7** are substantially in the form of thin-walled hollow cylinders of circular cross-section having flared outermost ends **8**. The tuft holders are all substantially equidistant from the axis of the ring **3** and they are in two annual rows **9** and **10** such that, progressing around the periphery of the ring **3**, there is first a tuft holder of the row **9**, then one of the row **10**, then one of the row **9** and so on. The two rows **9** and **10** are staggered in the direction of the axis of the brush, that is to say the axes of the tuft holders in the rows **9** and **10** lie in two different planes which are perpendicular to the axis of the brush. Between the tuft holders, the members **5** and **6** touch and are spot-welded together.

In each tuft holder **7** there is fitted a tubular support **11** of resilient material, for example rubber or P.V.C., in which there is inserted a tuft **12** of brush filaments which extends radially outwardly of the tuft-holding ring, this being shown only in the ring **2** in FIGURE 1. The tuft **12** is made by forming a bundle of brush filaments, which are preferably steel wires although other suitable brush filaments could be used, and folding it in half to form two limbs **13** and **14** and a tuft root **15** which consists of the centre of the bundle, there being a ring **16** of plastics material, for example P.V.C., surrounding the two limbs of the tuft at a distance from the root of the tuft equal to about one third of the length of the tuft. There is also a wire band (not shown) encircling the root of the tuft. The tuft root is enclosed by the tubular support **11** and the tuft holder **7** grips the support **11** adjacent to and radially outwardly of the tuft root. A split pin **17** extends parallel to the axis of the brush and passes through the walls of the tuft holder **7** and the tubular support **11** and between the two limbs **13** and **14** of the tuft near the root of the tuft. This provides a pivot connection between the tuft root and the tuft holder **7** whereby, in use of the brush, when the tuft is bent in a plane which is perpendicular to the axis of the brush, the tuft root is able to rock for short distances around the pivot and against the resistance provided by the tubular support.

From those parts of the annual members **5** and **6**, of each of the tuft-holding rings **3** and **4**, which form the tuft holders there are bent tabs **18** and tabs **19** which extend beyond the tuft holders in opposite directions parallel to the axis of the tuft-holding ring. The tabs **18** of the ring **3** and the tabs **19** of the ring **4** abut one another at their tips and this spaces the two rings **3** and **4** a predetermined distance apart. There are no tabs **19** on the ring **2**, which is at one end of the row of rings, and no tabs **18** on the ring which is at the other end of the row. In other respects all the rings, the tufts and the means for holding the tufts are the same. In order to ensure that the tabs of two adjacent rings do abut one another despite possible differences in the diameters of the rings due to manufacturing tolerances, each tab lies in a plane which is inclined at an acute angle to a plane which contains the axis of the brush and which also intersects the tab. This angle is shown in FIGURE 2 and is marked A.

There are recesses **20** on the inner side of the rings **2** to **4**, and the other rings on the carrier member **1**, and keys **20A** engage in these recesses. There are five keys **20A** in all. They extend along the whole length of the carrier member **1** and they are spaced equally around it and welded to it. Each key projects radially outwardly into one recess **20** in each of the rings **2** to **4**. Thus the keys serve to transmit rotational motion from the carrier member **1** to the tuf-holding rings.

FIGURE 3 shows plates **21** welded to opposite ends of the carrier member **1**. To these plates there are bolted further plates **22** which are in turn bolted to plates **23**. In practice each tuft-holding ring which is at one end of the row of such rings will abut one of the plates **22** but this is not shown on the drawing. The plates **23** are secured to drums **24** which turn in bearings in non-rotatable brush carrier arms **25** of the sweeper, one of the drums **24** having a driving sprocket **26** secured to it whereby the rotor can be driven by a chain. When the bolts joining the plates **22** and **23** together are removed, the carrier member **1**, the tuft-holding rings and the plates **21** and **22** can be removed as a unit from the sweeper and when the bolts joining one of the plates **22** to one of the plates **21** are removed the tuft-holding rings can be slid off the carrier member **1**, to be replaced by new tuft-holding rings, with new tufts, if desired. When the tufts are worn, instead of replacing the tuft-holding

rings by new rings carrying new tufts, the worn tufts can be removed and replaced by new tufts.

If desired, the two limbs **13** and **14** of each tuft could be twisted together after folding the bundle of filaments in half.

I claim:

1. A component for a rotary brush comprising a tuft-holding ring of zig-zag form consisting of first and second annular parts of sheet material each of zig-zag form with a groove therein at each peak of the zig-zag with the grooves of the first part facing the grooves of the second part and co-operating therewith to form at the peaks of the zig-zag of the tuft-holding ring a plurality of tuft holders arranged in two annular rows and all substantially equidistant from the axis of the tuft-holding ring, tabs integral with and projecting from and beyond the tuft holders, some in one direction parallel to the axis of the tuft-holding ring and some in the opposite direction, and tufts of brush filaments held by the tuft holders and extending outwardly of the tuft-holding ring.

2. A component according to claim **1**, wherein said first and second annular parts of sheet material touch one another between the grooves and are there fixed together.

3. A component according to claim **1**, wherein each tab lies in a plane which is inclined at an acute angle to a plane which contains the axis of the tuft-holding ring and which also intersects the tab.

4. A component according to claim **1**, wherein the tuft holders are substantially in the form of thin-walled hollow cylinders the ends of which that are further from the axis of the tuft-holding ring being flared.

5. A component according to claim **1**, and further comprising in each tuft holder a tubular support of resilient material which encloses the root of the tuft and is gripped by the tuft holder adjacent to and outwardly of the root of the tuft.

6. A component according to claim **5**, and further comprising pivotal connections between the tuft holders and the tuft roots, the pivots being substantially parallel to the axis of the tuft-holding ring whereby when a tuft is bent in use in a plane perpendicular to said axis the tuft root is able to rock for short distances around its pivot and against the resistance provided by its tubular support.

7. A rotary brush comprising a plurality of components according to claim **1** disposed in a row and a carrier member which passes through the tuft-holding rings and is coupled to them so as to transmit rotary motion to them, the tabs on the one tuft-holding ring engaging the tabs on another tuft-holding ring whereby the rings are spaced apart.

8. A component for a rotary brush, comprising a tuft-holding ring of zig-zag form, rigid tuft holders disposed at the peaks of the zig-zag and thereby arranged in two annular rows, the tuft holders all being substantially equidistant from the axis of the tuft-holding ring, tufts of brush filaments held by the tuft holders and extending outwardly of the tuft-holding ring, in each tuft holder a tubular support of resilient material which encloses the root of the tuft and is gripped by the tuft holder adjacent to and outwardly of the root of the tuft, and pivotal connections between the tuft holders and the tuft roots, the pivots being substantially parallel to the axis of the tuft-holding ring whereby when a tuft is bent in use in a plane perpendicular to said axis the tuft root is able to rock for short distances around its pivot and against the resistance provided by its tubular support.

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