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TWISTED TUFT ROTARY BRUSH

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2 Sheets-Sheet 1

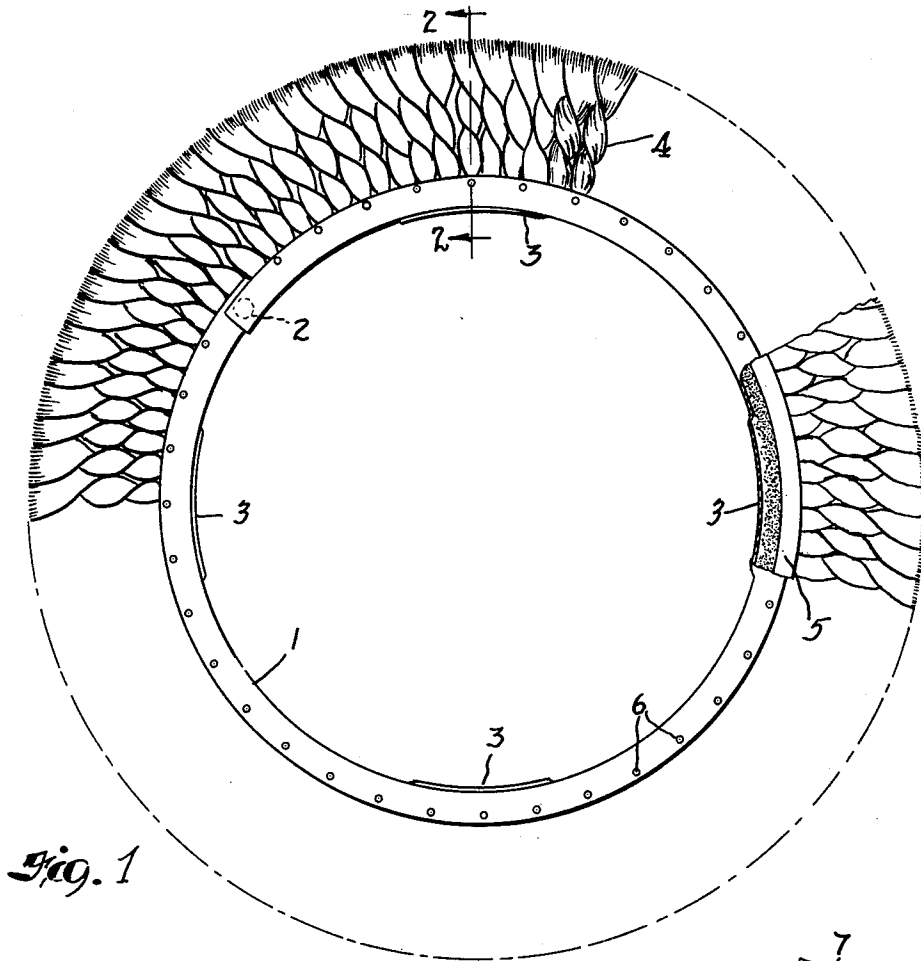


Fig. 1

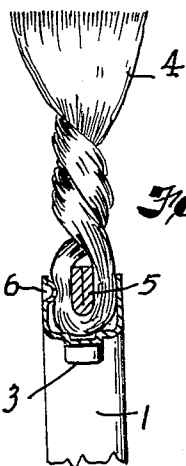


Fig. 2

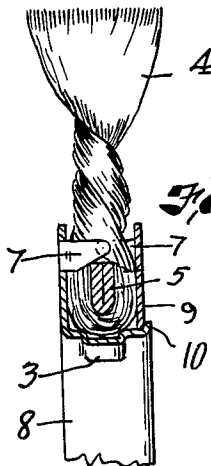


Fig. 3

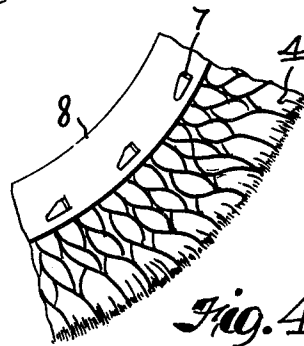


Fig. 4

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## TWISTED TUFT ROTARY BRUSH

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This invention relates as indicated to a twisted tuft rotary brush, and more particularly to a rotary brush of this type wherein adjacent tufts may be packed relatively densely together to achieve improved brushing characteristics.

Twisted tuft rotary brushes have long been known in the art and have usually comprised one form or another of metal disc having a plurality of apertures punched adjacent its outer periphery through which tufts of wire brush bristle material are inserted and then twisted on themselves. Such brushes are especially useful for harsh, rugged work such as the removal of scale and weld spatter from metal articles, for example. Obviously, however, the form of construction makes it difficult to provide a very dense brush face. When the twisted tufts are formed of relatively fine brush wire, it is important that the tufts be fairly densely compacted together in order both that they may mutually support each other and also in order that the greater amount of brush material available at the brush face may afford a much increased working life for the brush. An attempt has been made in the past to meet this problem by threading twisted tufts upon a wire retaining ring.

When brushes of the type with which I am here concerned are rotated at very high speeds, it is important that they be of a well-balanced construction and also strong enough to resist the bursting forces imposed thereon.

It is accordingly a principal object of my invention to provide a twisted tuft rotary brush in which the tufts may be relatively densely compacted together.

Another object is to provide such brush of a special reinforced construction both firmly securing the tufts in place and affording insurance against the bursting forces imposed on the brush in use.

A further object is to provide an annular brush section of modified design adapted to be mounted upon a complementary hub or adapter, and brush assemblies including my new brush element and adapter.

Other objects of my invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

FIG. 1 is a side view of an annular rotary brush section embodying the principles of my invention;

FIG. 2 is an enlarged transverse section taken on the line 2—2 on FIG. 1;

FIG. 3 is a transverse section corresponding to FIG. 2 but illustrating the modification shown in FIG. 4;

FIG. 4 is a fragmentary detail view of an annular brush section similar to that of FIG. 1 but incorporating the teeth of FIG. 3;

FIG. 5 is an end view showing the annular brush element of FIG. 1 mounted upon a hub or adapter especially designed to cooperate therewith;

FIG. 6 is a transverse section taken on the line 6—6 on FIG. 5; and

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FIG. 7 is an enlarged fragmentary view of a length of metal tape from which the channel back of my brush element may be formed.

Referring now more particularly to said drawing, the embodiment of my invention illustrated in FIGS. 1 and 2 thereof comprises an annular sheet metal channelform back 1 which has been circularized and welded at 2. At spaced intervals circumferentially of the inner periphery of the back are radially inwardly projecting elongated protuberances 3 of less width than the channel back 1 and forming corresponding indentations within the channel. Such protuberances assist in mounting the brush element upon an appropriate hub or adapter as explained in detail below.

The twisted tufts of brush material 4, ordinarily of steel or other metal wire, are retained within the channel back by means of a sheet metal annulus 5 of compressed U-shape cross-section. The radially inner periphery of such annulus will be curved as shown as a result of the forming operation and engages the tufts in a manner which will not result in undue wear or stress on the bristles. A simple flat stamping may, however, also be used, if desired.

When twisted tufts of high specific gravity material such as metal wire are employed, the brush may be subjected to very severe bursting stresses due to the centrifugal force developed when the brush is rotated at high speed and subjected to severe use. To assist in reinforcing my new brush element, I accordingly provide a large number of circumferentially spaced sharply formed inwardly protruding dimples 6 in the sides of the channel back 1 adjacent the outer peripheral edges of the same. Such dimples or protuberances engage the twisted wire tufts 4 where there is some room for the wire to spread due to the radiating lay of the tufts. Such dimples penetrating somewhat into the tufts provide an additional grip thereon and appreciably increase the bursting strength of the brush. The indentations 3 and 6 will ordinarily preferably be formed in the flat metal strip or tape as shown in FIG. 7 prior to forming such tape into the channel back 1 and circularizing the same. The dimples 6 on one side may desirably be caused to alternate with those on the other side as shown in FIG. 7.

In the FIGS. 3 and 4 embodiment of my invention, I utilize inwardly projecting teeth 7 instead of the dimples 6 and the sides of the channel back 1 may, moreover, be of greater radial extent in order that such teeth may project between the tufts and overlie the retaining ring 5. Such teeth will desirably be of the form described and claimed in my prior Patent 2,303,386. One side of the channel back 8 may be in the form of a flat annulus 9 secured to the back by the outwardly flared rim or flange 10. Such teeth 7 may be in place of or in addition to dimples 6. Brush sections of this type will generally be mounted upon adapters and one or more of such sections secured between end clamping plates on the arbor or mandrel in well-known manner. As illustrated in FIGS. 1-3 and 6, the brush material is tightly compressed between the retaining ring and the bottom of the annular brush back, the retaining ring with the twisted tufts assembled thereon being firmly seated on the cylindrical annulus 1 or 8. The dimple 6 is caused to penetrate into the brush material in the region where the latter is densely compacted between the channel side and the retaining element 5, the teeth 7 likewise penetrating such brush material or, more frequently, being interposed between adjacent twisted tufts (FIGS. 3 and 4).

Referring now more particularly to FIGS. 5 and 6, my new brush element or section is there shown mounted upon an appropriate adapter or hub of special design, such hub comprising two opposed annular sheet metal stampings 11 and 12 of general disc shape. A central

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opening 13 is provided adapted to fit on an appropriate arbor and having keyways such as 14 and 15. The two disc-like stampings 11 and 12 are dished with both their inner and outer peripheral portions projecting toward each other, thereby to seat the hub assembly upon the arbor projecting through central opening 13 and also to seat the inner periphery of the brush back 1.

At spaced intervals circumferentially of the adapters, however, the outer edge portions such as 16 extend radially outwardly to embrace the respective sides of brush back 1 and also to leave corresponding apertures in the outer periphery of the hub assembly adapted to receive and fit the radially inwardly directed elongated protuberances 3 of the brush back. The annular brush section is accordingly firmly seated on the hub assembly, secured against axial movement and keyed to such hub assembly for rotation therewith.

The discs 11 may be reinforced by radial and circumferential ribs such as 17 and also provided with a plurality of apertures 18 therethrough preferably substantially radially spaced from the central aperture 13. When a plurality of brush sections are mounted close together in side-by-side relationship upon an arbor or mandrel, such apertures 18 afford axially extending passages through which cooling air may be drawn and then passed radially outwardly through the brush material. The hub or adapter members 11 and 12 may be secured together in proper brush element clamping relationship by means of the usual nuts on the arbor or they may be riveted together as desired. The tabs or pads 16, of course, serve slightly to space apart one annular brush section from the next to facilitate flow of air therebetween, and the intervening portions of the adapters or hub members may desirably be slightly inwardly dished for the same purpose.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A rotary brush assembly comprising an annular sheet metal channel back opening radially outwardly, a retaining ring of laterally collapsed U-shape cross-section within said channel, tufts of wire brush bristle material firmly secured in said back beneath said ring and extending generally radially outwardly from said channel, said tufts being twisted on themselves, protuberances on the sides of said back projecting inwardly therefrom adjacent the outer edges of the same, hollow protuberances on the inner periphery of said back projecting radially inwardly therefrom and leaving said sheet metal back unbroken, a pair of disc-shaped annular sheet metal stampings having their inner and outer peripheral edge portions flanged to oppose those of the other stamping, the inner peripheries of said stampings including a keyway and the outer peripheries thereof seating the inner periphery of said back, portions of said outer edge portions of said stampings extending generally radially to embrace the respective sides of said back and leaving peripheral apertures therebetween receiving said protuberances on the inner periphery of said back in driving relation.

2. The brush assembly of claim 1 wherein said protuberances on said channel sides and said protuberances on the inner periphery of said channel back constitute dimples formed therein.

3. The brush assembly of claim 1 wherein said protuberances on said channel sides constitute teeth punched therein and overlying said ring, and said protuberances on the inner periphery of said channel back constitute dimples formed therein.

4. A rotary brush assembly comprising an annular sheet metal channel back opening radially outwardly, a retaining ring within said channel of laterally collapsed

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U-shaped cross-section, tufts of wire brush bristle material firmly secured in said back beneath said ring and extending generally radially outwardly from said channel, said tufts being twisted on themselves, protuberances on the sides of said back projecting inwardly therefrom adjacent the outer edges of the same, a protuberance on the inner periphery of said back projecting radially inwardly therefrom, a pair of disc-shaped annular sheet metal stampings having their inner and outer peripheral edge portions flanged to oppose those of the other stamping, the outer peripheries thereof seating the inner periphery of said back, portions of said outer edge portions of said stampings extending generally radially to embrace the respective sides of said back and leaving a peripheral aperture receiving said protuberance on the inner periphery of said back in driving relation.

5. A brush assembly comprising an annular rotary brush element having a radially inwardly projecting protuberance mounted upon a hub, said hub comprising a pair of disc-shaped annular sheet metal stampings having their inner and outer peripheral edge portions flanged to oppose those of the other stamping, the outer peripheries thereof seating the inner periphery of said brush element, portions only of said outer edge portions of said stampings extending generally radially to embrace the respective sides of said element and leaving a peripheral aperture therebetween receiving said protuberance on the inner periphery of said brush element in driving relation.

6. A rotary brush assembly comprising an annular rotary brush element having a plurality of uniformly circumferentially spaced, radially inwardly projecting protuberances on its inner periphery, and a hollow rotatable hub firmly seating said inner periphery and having recesses receiving said protuberances in driving engagement, said hub also having radially outwardly projecting portions embracing the respective sides of said brush element.

7. The rotary brush assembly of claim 6 wherein said hub is split into two parts in a plane normal to its axis.

8. An annular rotary brush element adapted to be mounted upon a rotatable hub or the like, comprising an annular sheet metal channel back opening radially outwardly, a retaining ring within said channel of laterally collapsed U-shape cross-section, tufts of wire brush bristle material firmly secured in said back beneath said ring and extending generally radially outwardly from said channel, said tufts being twisted on themselves, dimples in the sides of said back adjacent but spaced from the outer edges of the same projecting inwardly therefrom and opposed to said retaining ring to assist in further securing said brush material therebetween, and a plurality of uniformly circumferentially spaced hollow bulges in the inner periphery of said back projecting radially inwardly therefrom and leaving said sheet metal back unbroken.

9. An annular rotary brush element adapted to be mounted upon a rotatable hub or the like, comprising an annular sheet metal channel back opening radially outwardly, a retaining ring within said channel, brush material retained beneath said ring and extending generally radially outwardly from said back, and a radially inwardly projecting bulge in the inner periphery of said back adapted to interengage with a recessed hub, the portion of said sheet metal back forming said bulge being unbroken thereby.

10. In an annular rotary brush element adapted to be mounted upon a rotatable hub or the like, said brush element comprising an annular sheet metal channel back opening generally radially outwardly, and brush material retained therein and extending generally radially outwardly from said back; a radially inwardly projecting hollow bulge in the inner periphery of said back adapted to interengage such hub to drive said brush therewith, the portion of said sheet metal back forming said bulge being unbroken thereby.

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11. The brush element of claim 10, wherein a plurality of said bulges are provided in uniform circumferential distribution.

12. The brush element of claim 10, wherein said bulge is elongated circumferentially of said brush element.

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