May 10, 1960 R. O. PETERSON 2,935,756

ROTARY BRUSH

Original Filed July 12, 1950

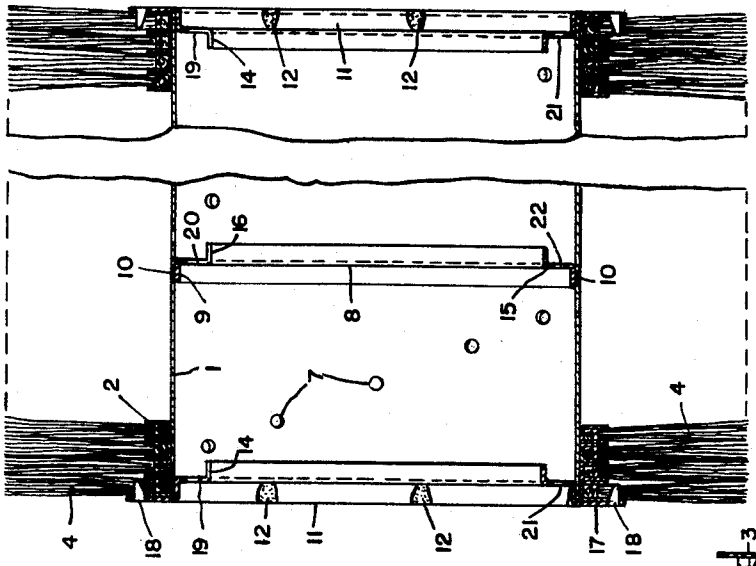


Fig. 2

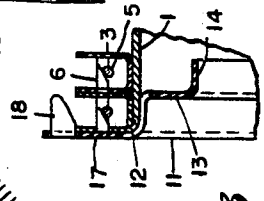


Fig. 3

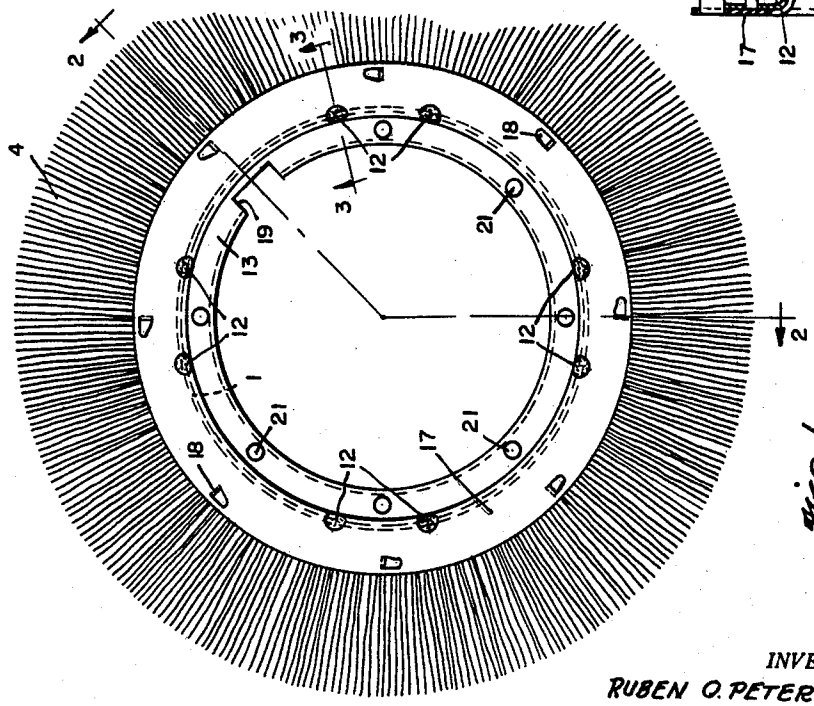


Fig. 1

INVENTOR.
RUBEN O. PETERSON
BY
Oberlin & Limbach
ATTORNEYS.

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ROTARY BRUSH

Ruben O. Peterson, University Heights, Ohio, assignor to The Osborn Manufacturing Company, Cleveland, Ohio, a corporation of Ohio

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3 Claims. (Cl. 15—182)

This invention relates as indicated to rotary brush construction, and more particularly to a pre-assembled rotary brush unit adapted to be mounted upon an arbor or mandrel and readily removed therefrom when it is desired to replace the same.

Power driven rotary brushes mounted upon shafting are commonly employed for a wide variety of purposes including the surface conditioning of metal sheets and the like and some such brushes, commonly cylindrical in form and known as "roller" brushes, are quite large and heavy. They may be comprised of a number of annular brush sections assembled in close side-by-side relationship or a relatively long length of helically wound brush strip may be utilized. In the latter case, the same may be wound upon a tubular core adapted closely to fit a relatively large diameter arbor or to be supported upon a relatively small diameter arbor by means of annular adapters. The assembly and disassembly of such brushes has always constituted something of a problem when it is desired to replace a worn-out brush with a new brush or to substitute a different size brush on the arbor. In my Patent No. 2,609,559 I disclose a novel form of rotary brush including retaining means considerably simplifying the mounting and replacement of this type of brush while at the same time providing a very strong assembly adapted to withstand high speed operation and the stresses and strains to which the same is subjected in use.

It is a principal object of this present invention to provide a replaceable pre-assembled brush unit which may be quickly installed and removed without difficulty and without the necessity of employing special tools.

Another object is to provide means whereby helically wound brush strip is permanently secured to a tubular core for mounting as a unit on either a large or small diameter arbor.

Still another object is to provide such brush unit adapted to be mounted upon and driven by a variety of different types of arbors including square, polygonal and round arbors.

A further object is to provide such brush unit which is designed for passage of a fluid, either gaseous or liquid, therethrough for coooling and other purposes.

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 an end elevational view of one form of rotary brush unit assembled in accordance with my invention;

Fig. 2 is a sectional view through such unit taken along the line 2—2 on Fig. 1; and

Fig. 3 is a fragmentary sectional view taken along the line 3—3 on Fig. 1.

Referring now more particularly to said annexed drawing, the brush construction there illustrated comprises a cylindrical sheet metal core 1 having a length of helically wound brush strip 2 seated thereon. Such brush strip may desirably be of the general type illustrated and described in my Patent No. 2,303,386 having a sheet metal channelform base 3 and stranded brush material 4 doubled and retained therein beneath an elongated retaining element such as wire 5. Such wire in turn may be secured in place by means of overlapping teeth 6 punched in from the respective sides of channel 3. Other types of brush strip having brush backs similar to channel 3 are well known in the art and may likewise be employed in the construction of this invention.

The cylindrical core portion 1 will preferably be formed from a flat sheet of steel having holes 7 punched therein for a purpose to be explained below. This flat sheet is then rolled to form a tube or cylinder which may be spread apart at the longitudinal seam, and one or more axially spaced internal annular supports 8 are inserted therein with flanges 9 opposed to holes 10 in such core. Supports 9 may then be welded in place within such core through holes 10, preferably by arc welding. An end member 11 is then assembled to one end of core 1 and similarly welded in place through spaced holes 12 therein, only every other of such holes as shown in Fig. 1 being utilized for this purpose at this time. End member 11 generally resembles inner supports or adapters 8 in having a similar radially inwardly extending web portion 13 and an inner axially extending flange portion 14 corresponding to radially inwardly extending web 15 and axially extending flange 16 of such inner supporting member 8. End member 11, however, includes a radially outwardly extending flange 17 having inwardly directed teeth 18 adapted to engage and overlie the adjacent lip of the channel back of the last turn of a length of helically wound brush strip 2 mounted on core 1 (see Figs. 2 and 3). Reference may be had to my Patent No. 2,609,559 for further details of such toothed end plate members.

A helically wound length of such brush strip 2 is then slid axially on the other end of such core 1 with the brush material 4 extending radially outwardly, but for certain types of brushes it is preferred to wind such brush strip while held in tension onto such core, and then an identical end member 11 is mounted on such other end with the helically wound brush strip tightly compressed between such two opposed end members, preferably in an appropriate jig or fixture. This second end member 11 is then similarly welded to the end of tubular core 1 through holes 12 therein, it being noted that such holes are located at the first bend where radially extending flange 17 is turned inwardly to seat against the inner periphery of core 1. Accordingly, the weld metal deposited in holes 12 serves not only to tack the end member to core 1 but also secures the lower edge of the channel back of the last turn of brush strip on such core. Weld metal will, of course, similarly be deposited in those alternate holes 12 of the first end member not already employed preliminarily to secure such member to the core as above described in order likewise to join the final turn of brush strip at that end of the unit to the core and end member. It will thus be seen that the brush assembly has now been transformed into a unitary structure ready to be mounted upon an arbor, mandrel, or the like.

Flanges 14 and 16 of the end and intermediate supporting members may be annular as shown to accommodate an arbor of round cross-section or alternatively of any desired conformation to conform to an arbor of

square, hexagonal or other shape. The extent of radially inwardly extending web portions **13** and **15** will, of course, depend upon the relative diameter of the arbor on which the brush unit is to be mounted. Likewise, the number and spacing of such intermediate members **8** which serve both as adapters and as rigidifying members will depend upon the strength characteristics required.

The radially inwardly extending web portions **13** of end members **11** may be cut away to provide aligned keyways **19** aligned with similar keyways **20** in webs **15** of the intermediate supporting members **8**, such keyways being adapted to receive a key inserted in a corresponding keyway in the arbor (not shown). Of course, if such arbor is of polygonal cross-section, the provision of such keyway will not be required.

Webs **13** of end members **11** will desirably also be provided with apertures **21** therein and webs **15** of members **8** with similar apertures **22** to provide for the entrance of a fluid medium into the space between the outer periphery of the arbor and the inner periphery of core **1**. The holes **7** in such core then provide for the radially outward escape of such fluid medium from this space through the action of centrifugal force. To facilitate further radially outward escape of the fluid medium between the turns of brush strip **2**, the channel back **3** of such strip may desirably be deformed in the manner described in detail in my Patent No. 2,409,309. In ordinary operation, air will thus be drawn inwardly through openings **21** by the rapidly rotating brush and expelled through holes **7** between the turns of brush strip, thereby obtaining an important cooling effect. If desired, other gaseous or liquid cooling media may be supplied to the end of the brush unit for passage therethrough in the manner indicated, and for some operations fine abrasive may be transported to the brush surface in this manner.

The above-described embodiment of my invention is particularly advantageous where it is desired to mount an annular rotary brush unit of large inner diameter on an arbor which may be of a relatively small diameter.

It will be seen from the foregoing that I have provided an improved brush construction whereby a helically wound length of brush strip may be mounted on a generally cylindrical core and made integral therewith so that the brush may be handled as a unit even when of very large size. The advantages of this arrangement, particularly over that usually employed where the helically wound brush strip is mounted directly on the arbor, have been explained above. From a practical operating point of view, the fact that brushes of this type may be removed and replaced upon their arbors with a minimum of down time has been found to be of very great value.

It will, of course, be understood that the term "brush" as used herein and in the claims is intended to include closely related articles such as rotary buffs, the particular filler material not constituting any part of the present invention. Helically wound brush strip manufactured in accordance with my prior Patent 2,303,386, for example, is relatively inexpensive of manufacture, as are also the stampings such as core members **1** and end members **11**. When rigidly assembled, as by welding, a complete brush unit is produced at low cost which nevertheless will withstand difficult operating conditions. Intermediate turns of the helical brush strip may be welded to the generally cylindrical core through holes such as **7** in such core **1**. This is often desirable in the case of relatively long "roller" brushes.

This application is a division of my co-pending application Serial No. 173,464, filed July 12, 1950, for "Rotary Brush Construction," now Patent No. 2,757,401, dated August 7, 1956.

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 unit comprising a cylindrical sheet metal core, helically wound brush strip having a metal channelform back seated on said core with brush material retained therein and extending radially therefrom, annular end members having generally cylindrical portions seated within the respective ends of said core with peripheral flanges extending radially outwardly therefrom adjacent the final turns of said brush strip and annular flanges extending radially inwardly therefrom having central openings adapted to fit a corresponding arbor, teeth on such outwardly extending flanges overlying and engaging the outer periphery of such final turns of such channelform back of said brush strip, holes through said end members adjacent the ends of said cylindrical core, weld metal in such holes securing said core to said end members and such final turns of brush strip, and an intermediate annular supporting member seated within said cylindrical core and welded thereto, said intermediate member having a central opening of the same dimensions as such openings in said end members, said end members and said intermediate member having openings therethrough intermediate such central openings and said core to permit entry and axial flow of air in the space between said core and such arbor, and said core having a plurality of openings therein to permit radially outward escape of air from such space.

2. A rotary brush unit comprising a cylindrical metal core, helically wound brush strip having a metal back seated on said core with brush material extending radially therefrom, annular end members seated in the respective ends of said core with peripheral flanges extending radially outwardly adjacent the final turns of said brush strip and annular flanges extending radially inwardly having central openings adapted to fit a corresponding arbor, teeth on such outwardly extending flanges closely overlying such back of such respective final turns of said brush strip, holes through said end members adjacent the ends of said cylindrical core, weld metal in such holes securing said core to said end members and such final turns of brush strip, and an intermediate annular supporting member seated within said cylindrical core and welded thereto, said intermediate member having a central opening of the same dimensions as such openings in said end members, said end members and said intermediate member having openings therethrough intermediate such central openings and said core to permit entry and axial flow of air in the space between said core and such arbor, and said core having a plurality of openings therein to permit radially outward escape of air from such space.

3. A rotary brush unit comprising a cylindrical sheet metal core, helically formed brush strip having a metal channelform back seated on said core with brush material retained therein and extending radially therefrom, the end portions of said back being welded to said core to hold said helically wound brush strip firmly seated thereon, annular end members welded to said core having radially outwardly extending flanges laterally supporting such end turns of brush strip and inwardly extending flanges having aligned central openings adapted to fit a corresponding arbor, and an annular supporting member seating the inner periphery of said core intermediate said end members and provided with a central opening of the same dimensions as such central openings in said end members and aligned therewith.

(References on following page)

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References Cited in the file of this patent

UNITED STATES PATENTS

1,199,780	Goodrich	Oct. 3, 1916
1,402,990	Adams	Jan. 10, 1922
2,343,310	Lohmann	Mar. 7, 1944
2,349,643	Wesemeyer	May 23, 1944
2,380,332	Scheer	July 10, 1945
2,609,559	Peterson	Sept. 9, 1952
2,734,210	Crevier	Feb. 14, 1956

FOREIGN PATENTS

20,847	Great Britain	1901

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