Feb. 14, 1956 R. P. CREVIER 2,734,210

CYLINDRICAL BRUSH

Filed July 30, 1954

FIG. 1

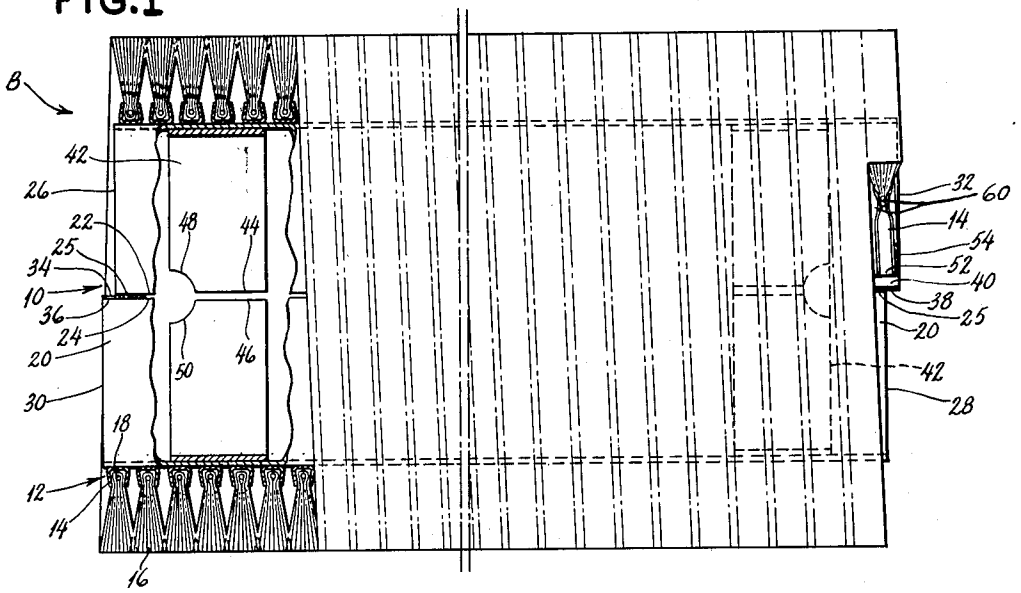


FIG. 2

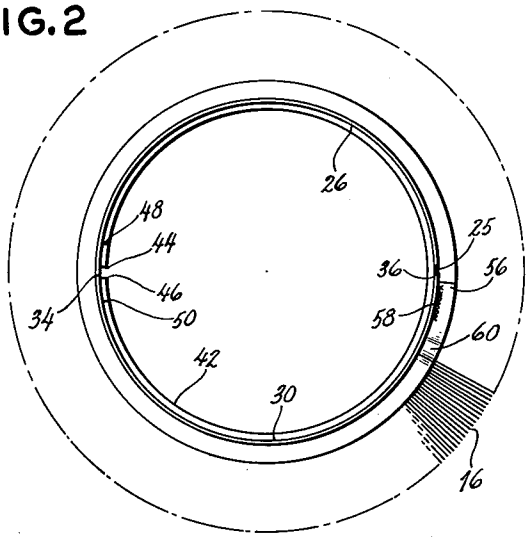


FIG. 3

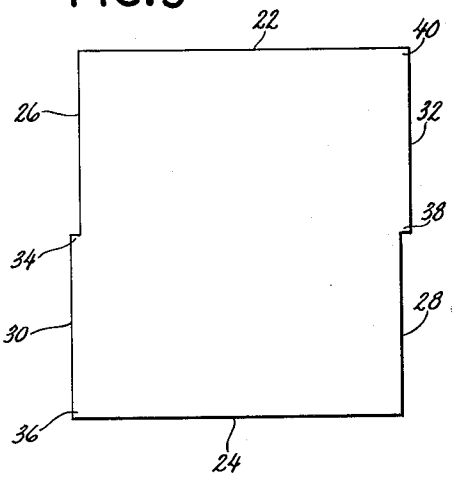
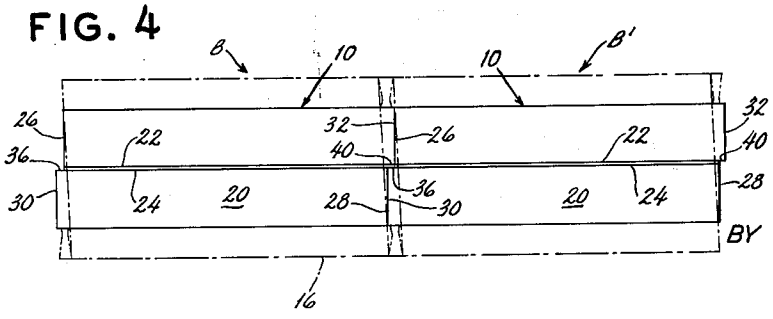


FIG. 4



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CYLINDRICAL BRUSH

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8 Claims. (Cl. 15—182)

This invention relates to brushes and, more particularly, to an improved cylindrical brush of the type having a brush strip spirally wound upon a core.

It has been found to be a highly satisfactory practice to produce a cylindrical brush by manufacture which includes the step of spirally winding and securing an elongated brush strip around a substantially cylindrical core structure. While clyindrical brushes produced in this manner have independent utility, it is often desirable to join together in end-to-end relationship a plurality of such brushes to form a composite cylindrical brush structure of desired length. There are many advantages in forming a composite cylindrical brush structure in this manner. For example, a worn or damaged brush section can be removed and replaced. In addition, in providing sections for the construction of an elongated cylindrical brush, the length of the brush to be formed can be selected by the number of sections used. There is also an advantage in being able to disassemble a cylindrical brush of extraordinary length for convenience in shipping and in storage.

However, there are certain disadvantages encountered in connecting in end-to-end relationship the presently known cylindrical brushes having spirally wound brush strips. For example, when a plurality of common spirally wound cylindrical brushes are joined together, there is no continuity of the brush strips across the abutting ends of the brush sections. As a result, there are no brush fibers in the end-abutting region for that distance which corresponds to at least one convolution of the brush strip. Obviously, it is undesirable to be without such fibers in what may be the central portion of the composite brush structure. In addition, there is generally some difficulty encountered in effecting a driving connection between adjacent cylindrical brushes or brush sections of a composite brush structure. A good driving connection is particularly desirable in the fabrication of a composite cylindrical brush which is to be rotated when in use or operation.

It is an important object of this invention to provide a cylindrical brush having a spirally wound brush strip and which is particularly adapted to be easily connected in end-to-end relationship and to effect a driving engagement with other similarly formed brushes to thereby provide a composite cylindrical brush having a substantially continuous row of fibers across the abutting ends of the cylindrical brushes or brush sections.

Another important object of the invention is to provide a cylindrical brush of the aforedescribed type which can be simply and economically manufactured.

Other objects as well as advantages of the invention will become apparent from the drawing and from the following description and claims.

In the drawing there is shown in detail a preferred embodiment of the invention but it will be understood that changes may be made from the construction shown and, therefore, the drawing is not to be construed as defining or limiting the scope of the invention, the claims forming

a part of this specification being relied upon for that purpose.

Of the drawing,

Fig. 1 is a side view of a cylindrical brush incorporating the features of this invention, a portion being broken away to show details of the core structure;

Fig. 2 is a view of the left-hand end of the brush shown in Fig. 1;

Fig. 3 is a reduced size view of a sheet metal blank from which the core sleeve is formed; and

Fig. 4 is a side view showing two core structures engaged in end-to-end relationship to form a composite brush structure having a fiber arrangement as indicated by the broken lines.

In the various figures of the drawing, the core structure is indicated generally by the reference numeral **10**, an exemplary brush strip by the numeral **12**, and the cylindrical brush which they form is indicated by the letter B.

The exemplary brush strip **12** is conventional and it should be understood that various other types of strips may be employed in the manufacture of the brush without departing from the present invention. The said strip **12** can briefly be described as including an elongated metal channel member **14** of generally U-shaped cross section wherein the side walls of the channel member grip the central portions of the brush fibers **16, 16**. The said central portions of the fibers **16, 16** are folded around a core wire **18** which extends longitudinally of the channel member **14** and helps to retain the fibers with their ends projecting from the open side of said channel member in a row extending longitudinally of the channel member. As used herein, the term "fibers" is meant to include metallic wires and any of the vegetable, animal or synthetic fibers which are commonly used in brush manufacture.

In accordance with conventional practice, the brush strip **12** can be supplied in any desired length for spiral or helical winding upon the core structure **10** with the convolutions of the strip **12** spaced apart on the core structure as desired. In most cases, it is desirable to have the convolutions closely spaced so that the fibers **16, 16** in adjacent rows or convolutions will overlap as shown in Fig. 1 thereby presenting a substantially uniform brush surface.

An important element of the core structure **10** is a sleeve **20** which is substantially cylindrical and which is rolled or otherwise formed from the generally rectangular sheet metal blank shown in Fig. 3. The said blank has two opposite parallel edges **22** and **24** (sometimes hereinafter referred to as the side edges) which are joined in abutting relationship or spaced a slight distance apart and welded together as indicated at **25, 25** to form the sleeve **20**. The other pair of opposite and parallel edges **26** and **28**, which comprise the end edges of the sleeve **20**, are similarly offset on a line parallel to and intermediate the edges **22** and **24**. Accordingly, an offset portion **30** is defined along the one end edge **26** and an offset portion **32** is defined along the other end edge **28**. When the cylindrical sleeve **20** is formed from the aforedescribed sheet metal blank, the projecting offset **30** along one end edge **26** defines offset corners **34** and **36** facing in opposite circumferential directions and located substantially diametrically opposite each other. The projecting offset portion **32** on the other end edge **28** defines the offset corners **38** and **40** facing opposite circumferential directions and located substantially diametrically opposite each other. It will be observed that the longitudinally projecting offset **30** on one end of the sleeve encompasses substantially half the circumference of the sleeve while the longitudinally projecting offset **32** on the other end of the sleeve **20** encompasses substantially the other half of the circumference of the said sleeve. Accordingly, when the sleeve **20** is joined in end-to-end relationship with a simi-

larly formed sleeve and with the end edges 26 and 28 of the said sleeves engaging each other in abutting relationship, the offset 30 on the edge 26 of one sleeve and the offset 32 on the edge 28 of the other sleeve will longitudinally overlap each other so that the corners 34 and 36 of the offset 30 will interlock or be engaged in driving relationship with the corners 38 and 40, respectively, of the offset 32.

The core structure 10 preferably also includes a plurality of annular bands 42, 42 which are formed from sheet metal strips having their opposite end edges 44 and 46 closely spaced or abutting each other. The said bands 42, 42, as shown in Fig. 1, are located within the sleeve 20 in axially spaced relationship and are secured to the said sleeve as by welding in circumaxially spaced locations. The bands 42, 42 are provided to reinforce and to maintain the cylindrical form of the sleeve 20. Each band 42 has an arcuate cutout 48 at one corner of its edge 44 and a similar and complementary cutout 50 at the adjacent corner of its edge 46. The cutouts 48 and 50 cooperate to provide a recess for engagement by a lug or other means when the core is placed over a mandrel or arbor for rotation in a brush forming machine. The said recesses can also be engaged by lugs or other means provided on a drive shaft or the like constituting a part of the structure utilizing the cylindrical brush B.

In addition to reinforcing and maintaining the cylindrical form of the sleeve, the bands 42, 42 also provide means for maintaining a desired inside diameter for the core structure which comprises the sleeve 20 and the said bands. While there might be some difficulty in maintaining a constant inside diameter in the sleeve 20, the plurality of bands 42, 42 overcome any such disadvantage. That is, the said bands when fitted and secured within the sleeve 20 can easily be machined or ground to an identical inside diameter so that the core structure will properly fit and be centered on a drive arbor or shaft.

In forming the brush B from the core structure 10 and the brush strip 12, the sleeve 20 and attached bands 42, 42 can be engaged over an arbor in a brush forming machine and rotated while the brush strip 12 is helically wound upon the sleeve. The strip 12 should be tightly wound upon and firmly engage the sleeve 20 and it will be necessary to secure the strip to the sleeve only adjacent the ends of the strip. More specifically, the strip 12 is started upon the sleeve 20 with the leading end portion of the strip located on one of the offsets and with the adjacent end of the strip closely adjacent one of the offset corners. For example, if the end 52 of the strip 12 is considered the leading end, the portion of the channel 14 adjacent said end may be located on the offset 32 with the end 52 closely adjacent the offset corner 40 and the said end portion of the channel 14 is welded to the sleeve 20 as indicated at 54. Then, while the sleeve 20 is rotated, the strip 12 is helically wound on the sleeve until the offset 30 on the other end of the said sleeve is reached. The strip is then cut and the trailing end 56 of the brush strip is secured on the offset 30 adjacent the offset corner 36 as by welding the end portion of the channel 14 to the sleeve 20 as indicated at 58. It may be necessary to eliminate some of the brush fibers 16, 16 adjacent the leading and trailing ends 52 and 56 of the strip 12 for convenience in welding the channel member as indicated at 54 and 58. This is particularly true in brush constructions utilizing a fiber susceptible to heat and which might conceivably be burned or otherwise damaged when the channel member is welded. However, in no event, will it be necessary to eliminate a substantial amount of the fibers from the ends of the strip.

The end fibers 16, 16 adjacent the ends of the channel member 14 and at the ends of the core wire 18 should be secured against movement longitudinally of the said channel member. This may be accomplished in various ways. For example, the side walls of the channel member 14 may be bent inwardly or toward each other as

indicated at 60, 60 to close or to substantially close the channel, thus preventing the loss of brush fibers in the ends of the brush strip 12.

When two similarly formed cylindrical brushes such as the brush B and the brush B' shown in Fig. 4 are joined in end-to-end relationship with the adjacent end edges of their sleeves engaging each other in the manner previously described, the leading end of the strip 12 on brush B will be located closely adjacent the trailing end of the strip 12 on the brush B'. That is, the leading end 52 of the one strip which is closely adjacent the offset corner 49 will substantially abut the trailing end 56 of the other strip which is located closely adjacent the offset corner 36. As a result, in forming a composite cylindrical brush from the brushes B and B', it can be said that the composite brush has a substantially continuous row of brush fibers across the abutting ends of the independent cylindrical brushes or brush elements making up the said composite brush.

In addition, the overlapped offsets in the abutting ends of the sleeves in the brushes B and B' provide driving engagement between the said brushes so that the composite brush structure can be rotated in either direction by means driving only the brush B or the brush B'.

While the described form of the invention is preferred because there is provided a sleeve 20 having offset ends adapted for driving engagement with the offset ends on the sleeve of a similarly formed brush, it should be understood that the invention encompasses a cylindrical brush which includes a core sleeve having no offset ends. It will be quite apparent that the invention may be utilized in forming a simple and economical core structure from sheet metal stock whether or not the sleeve forming a part of the said core structure is provided with offset driving ends.

The invention claimed is:

1. A cylindrical brush comprising a substantially cylindrical core having similarly formed end faces respectively defining longitudinally extending offsets which face in opposite circumferential directions, and an elongated brush strip including a row of brush fibers and which is spirally wound upon the core and secured to the said core with one end of the strip located on one offset and with the other end of the strip located on the other offset, the said brush being constructed and arranged for end-to-end connection to a similar brush with the adjacent offsets of the two brushes engaged to provide a composite brush structure having a substantially continuous spiral row of brush fibers.

2. A cylindrical brush which includes a core structure comprising a substantially cylindrical sleeve having similarly formed end edges respectively defining longitudinally extending offsets which face in opposite circumferential directions, and an elongated brush strip including a row of brush fibers and which is spirally wound upon the sleeve and secured to the said sleeve with one end of the strip located on one offset and with the other end of the strip located on the other offset, the said brush being constructed and arranged for end-to-end connection to a similar brush with the adjacent offsets of the two brushes engaged to provide a composite brush structure having a substantially continuous row of brush fibers.

3. A cylindrical brush which includes a core structure comprising a substantially cylindrical sleeve formed of sheet metal stock having substantially parallel and offset end edges and substantially parallel side edges which sheet metal stock is rolled with the side edges adjacent one another to define a longitudinally extending offset at each end of the sleeve which offsets face in opposite circumferential directions, and an elongated brush strip including a row of brush fibers and which is spirally wound upon the sleeve and secured to the said sleeve with one end of the strip located on one offset and with the other end of the strip located on the other offset, the said brush being constructed and arranged for end-to-end connection to a similar brush with the adjacent offsets of the

two sleeves engaged in driving relationship to provide a composite brush structure having a substantially continuous spiral row of brush fibers.

4. A cylindrical brush which includes a core structure comprising a substantially cylindrical sleeve formed from a generally rectangular sheet metal blank having its opposite side edges drawn substantially into abutting relationship and having end edges which are similarly offset on a line substantially intermediate and parallel to the said side edges whereby the ends of the sleeve respectively define longitudinally extending offsets facing in opposite circumferential directions each of which offsets encompasses substantially half the circumference of the sleeve, and an elongated brush strip including a row of brush fibers and which is spirally wound upon the sleeve and secured thereto with one end of the strip located on one offset and with the other end of the strip located on the other of said offsets, the said brush being constructed and arranged for end-to-end connection to a similar brush with the adjacent offsets of the two sleeves in the brushes overlapping each other in driving relationship to provide a composite brush structure having a substantially continuous spiral row of brush fibers.

5. A cylindrical brush which includes a core structure comprising a substantially cylindrical sleeve having similarly formed end edges respectively defining longitudinally extending offsets which face in opposite circumferential directions, at least one substantially annular reinforcing band secured within the said sleeve, and an elongated brush strip including a row of brush fibers and which is spirally wound upon the sleeve and secured to the said sleeve with one end of the strip located on one offset and with the other end of the strip located on the other offset, the said brush being constructed and arranged for end-to-end connection to a similar brush with the adjacent offsets of the two brushes engaged to provide a composite brush structure having a substantailly continuous spiral row of brush fibers.

6. A cylindrical brush which includes a core structure comprising a substantially cylindrical sleeve formed of sheet metal stock having substantially parallel and similarly offset end edges and substantially parallel side edges which sheet metal stock is rolled in forming the sleeve with the side edges adjacent one another to define a longitudinally extending offset at each end of the sleeve which offsets face in opposite circumferential directions, a plurality of substantially annular reinforcing bands secured in axially spaced relationship within the said sleeve, means associated with at least one of said bands for driving connection to a shaft, and an elongated brush strip including a row of brush fibers and which is spirally wound upon

the sleeve and secured to the said sleeve with one end of the strip located on one offset and with the other end of the strip located on the other offset, the said brush being constructed and arranged for end-to-end connection to a similar brush with the adjacent offsets of the two sleeves engaged to provide a composite brush structure having a substantially continuous spiral row of brush fibers.

7. A composite cylindrical brush structure comprising two cylindrical brushes connected in end-to-end relationship, each of said brushes including a substantially cylindrical core having similarly formed end faces respectively defining longitudinally extending offsets which face in opposite circumferential directions, and each said brush also including an elongated brush strip including a row of brush fibers and which is spirally wound upon its core and secured to the said core with one end of the strip located on one offset and with the other end of the strip located on the other offset, the adjacent offsets of said brushes having a driving connection which provides the composite brush structure with a substantially continuous spiral row of brush fibers.

8. A composite cylindrical brush structure comprising at least two similar cylindrical brushes connected in end-to-end relationship, each of said brushes including a core structure comprising a substantially cylindrical sleeve having similarly formed end edges respectively defining longitudinally extending offsets which face in opposite circumferential directions, a plurality of substantially annular reinforcing bands secured within each sleeve in axially spaced relationship, means associated with at least one of said reinforcing bands forming a driving connection with a shaft, and each of said brushes also including on elongated brush strip having a row of brush fibers which strip is spirally wound upon its respective sleeve and secured to the said sleeve with one end of the strip located on one offset and with the other end of the strip located on the other offset, the said brushes being connected by engagement of their adjacent offsets to provide a driving connection therebetween and to provide the composite brush structure with a substantially continuous row of brush fibers.

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