

May 23, 1944.

D. F. O. WESEMEYER

2,349,643

BRUSH CONSTRUCTION

Filed Sept. 7, 1940

4 Sheets-Sheet 1

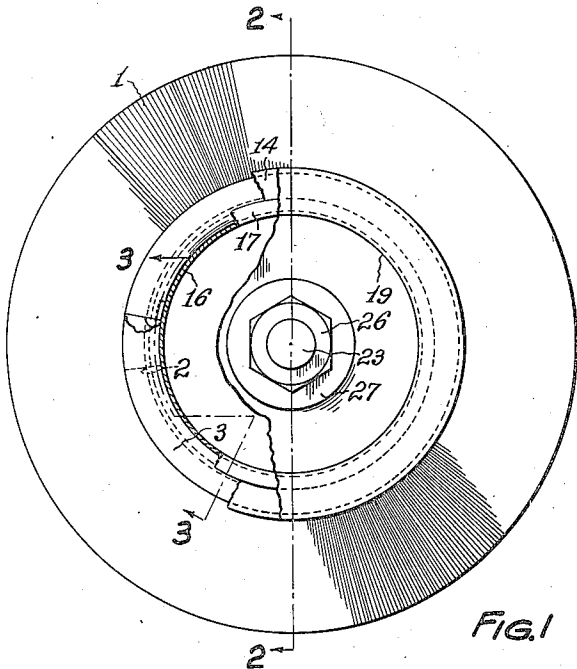


FIG. 1

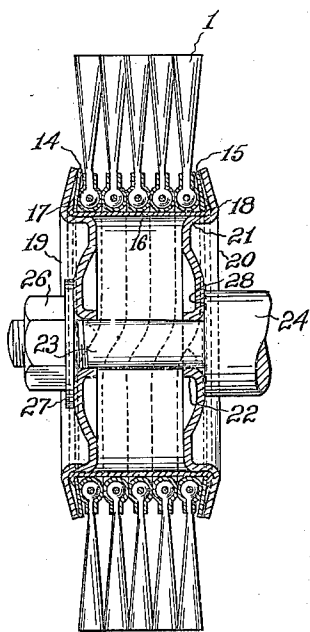


FIG. 2

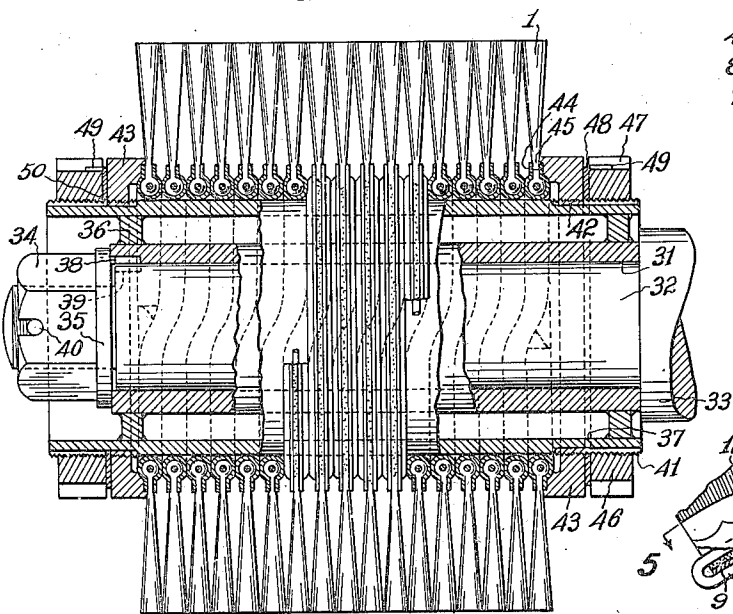


FIG. 6

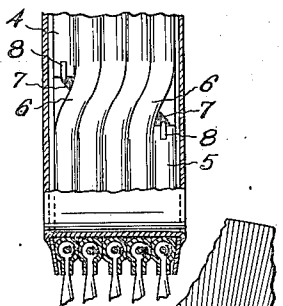


FIG. 3

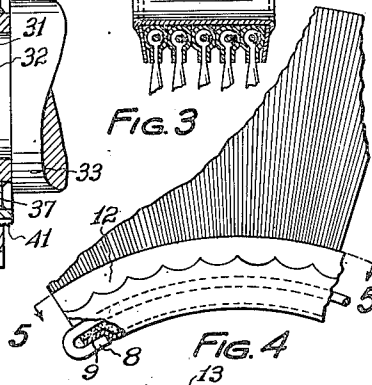


FIG. 4

FIG. 5

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4 Sheets-Sheet 2

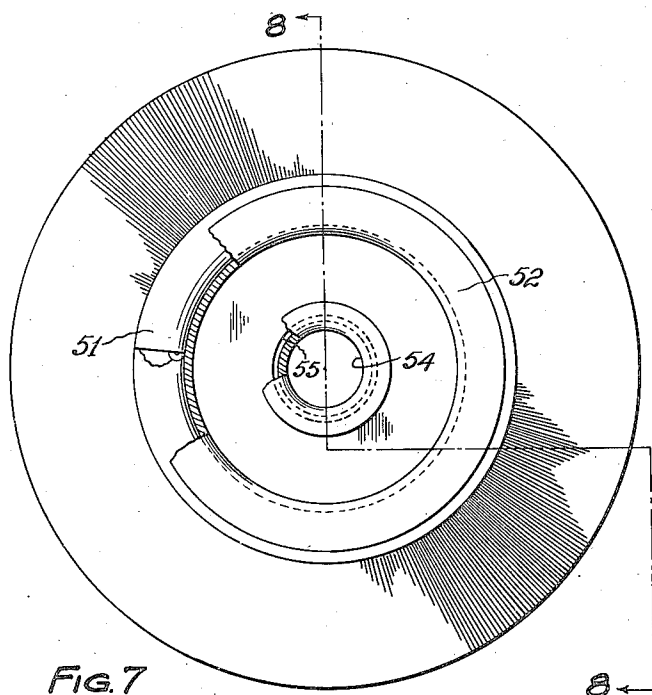


FIG. 7

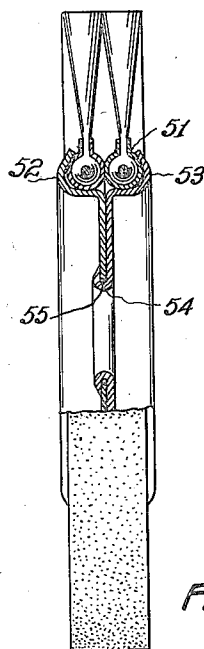


FIG. 8

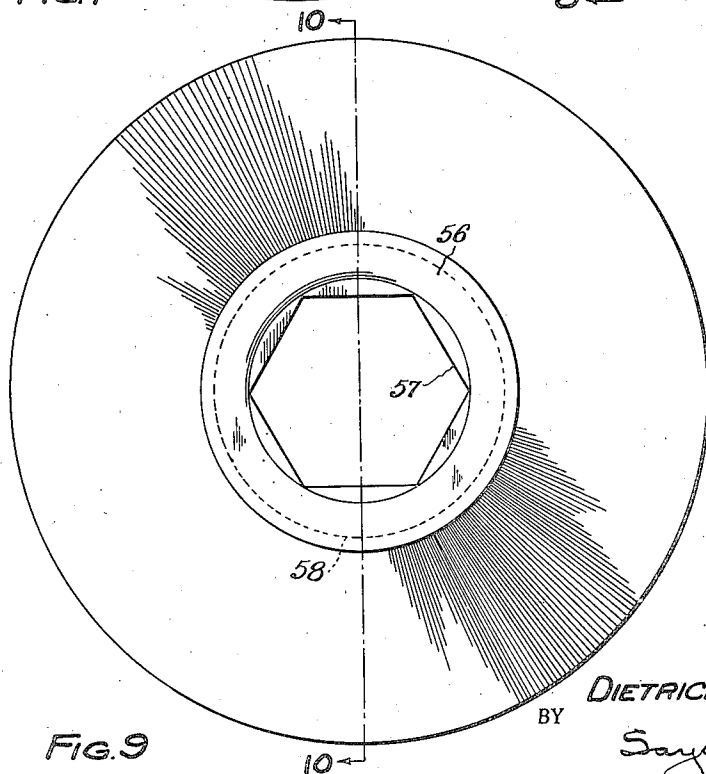


FIG. 9

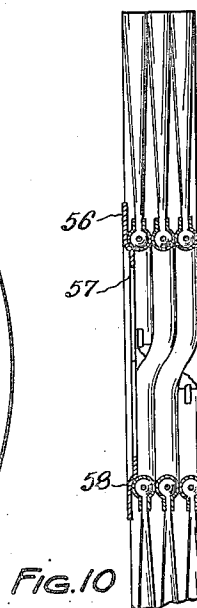


FIG. 10

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BRUSH CONSTRUCTION

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4 Sheets-Sheet 3

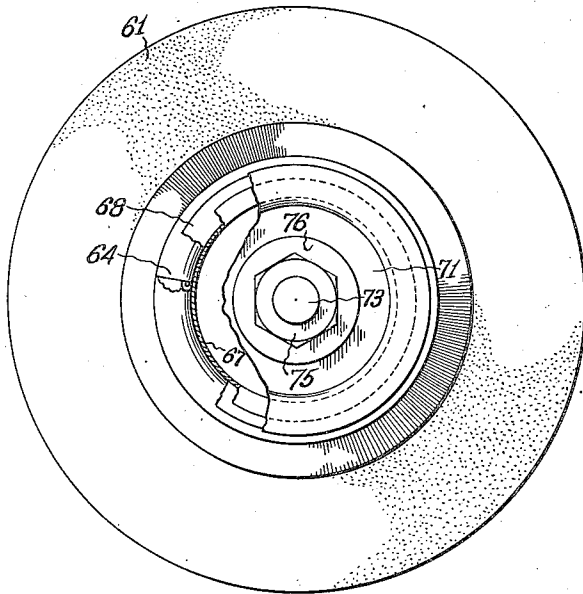


FIG. 11

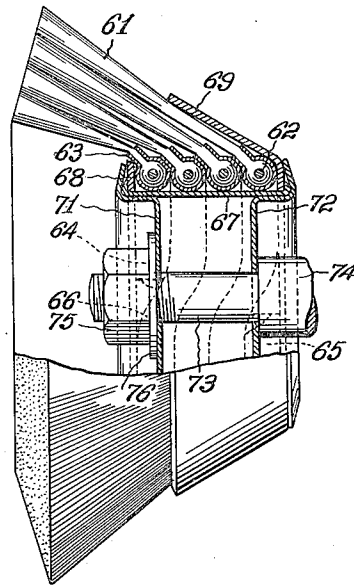


FIG. 12

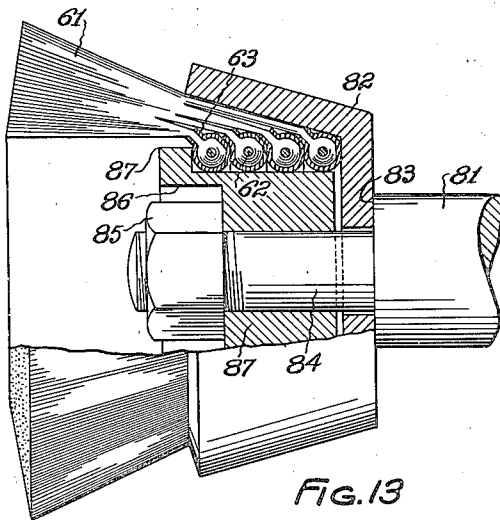


FIG. 13

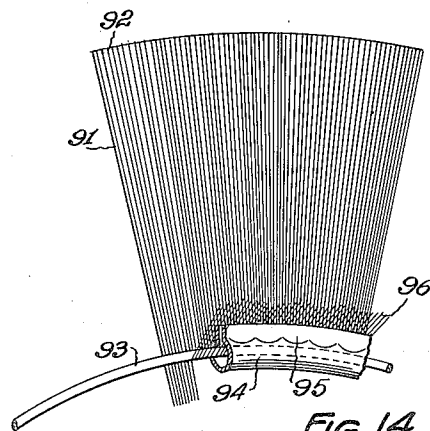


FIG. 14

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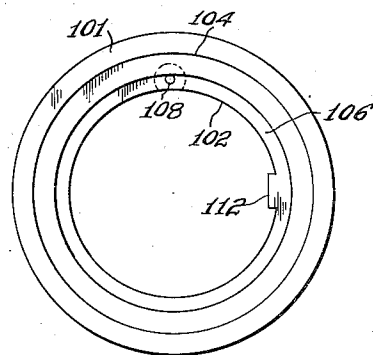
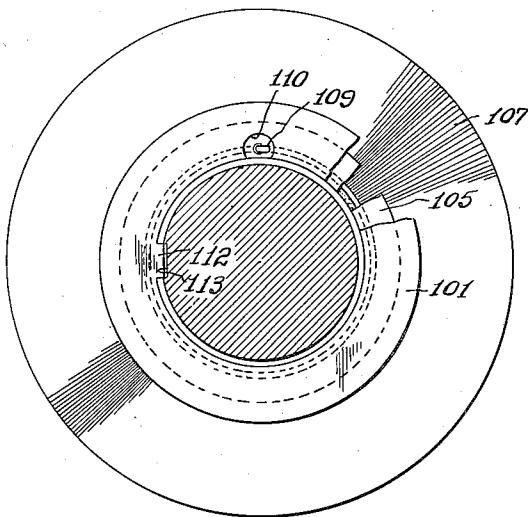
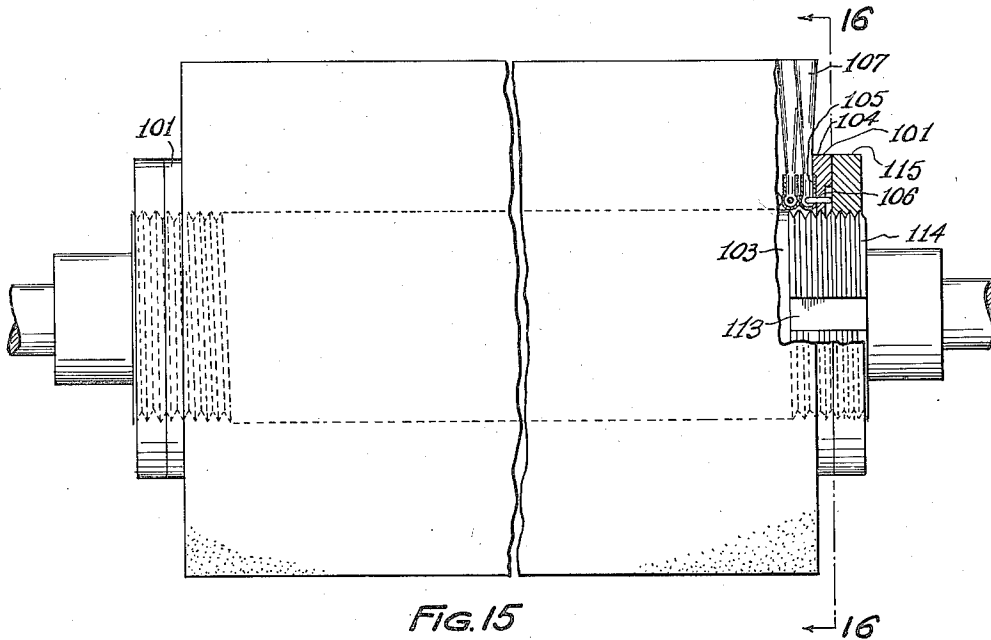
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BRUSH CONSTRUCTION

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,349,643

BRUSH CONSTRUCTION

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Application September 7, 1940, Serial No. 355,849

19 Claims. (Cl. 15—182)

This invention, as indicated, relates to a spiral brush construction. More particularly, it comprises a brush formed of one or more units wherein a body member of spiral shape supports in radial relation a plurality of brush strands or fibres formed of any desired material, and particularly of wire, such fibres being permanently secured in the base member. Such base member may have terminal eyes, or loops, and the end loops preferably have substantially parallel end faces with intermediate looped portions of the body member conforming to such structure. The invention also comprises various features of construction adapting the unit for easy application to operative elements and for simple replacement in the event of wear. The invention also includes supporting structures modified to cooperate with spiral brush units of the character set forth to facilitate their use in a wide variety of operations and on various types of apparatus.

The principal object of the present invention is to provide a spiral brush construction having structural features permitting easy manufacture of such device, and at the same time giving such units high capacity for heavy duty service in connection with various types of apparatus.

Another object of the invention is to provide a brush unit which is simple in construction, and which lends itself to quantity production manufacture, and at the same time insures a high degree of precision in the matter of forming the elements to size and supporting the same for use in standardized machines requiring uniformity of operation.

Another object of the invention is to provide a spiral brush unit having substantially parallel end faces, and preferably having end rings, or eyes, of fixed opening, and having intermediate portions suitably conformed in shape to maintain such parallel end faces in compact unit form.

Another object of the invention is to provide a spiral brush unit of standardized dimensions and readily applicable to holding elements on various types of supports and machines so that adjustment and replacement may be carried on with a minimum of time and effort, with highest quality performance obtained from such units.

A further object of the invention is to provide a novel method of manufacture of spiral brush units wherein end portions of the same are maintained in parallelism with each other, and the intermediate portions are held in closely wound helical shape suitably conformed to provide for the parallel end faces.

Other and further objects of the present in-

vention will appear in the course of the following description.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means and method hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain means and methods embodying the invention, such disclosed means and method constituting, however, but several of various forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a front elevation partly broken away illustrating a spiral brush construction embodying the principle of the invention;

Fig. 2 is a transverse sectional view taken along the line 2—2, Fig. 1, looking in the direction of the arrows;

Fig. 3 is an enlarged fragmentary view partly in section showing the end and intermediate portions of the body member of the spiral brush unit in conformed relation to each other and engaged within a holding element;

Fig. 4 is a fragmentary side elevation of a portion of a brush unit with parts broken away and illustrating the method of securing the strand holding wire to the end of the body unit;

Fig. 5 is a fragmentary detailed view showing the margins of the body unit as clamped upon the brushing strands, as seen along the line 5—5, Fig. 4, looking in the direction of the arrows;

Fig. 6 is a side elevation partly in section showing a brush unit with supporting spider as applied to a machine for removing scale from sheet metal and the like;

Fig. 7 is a side elevation of a brushing unit of relatively narrow width and held in operative relation upon a central hub member adapted to be accurately sized for engagement on a brushing spindle;

Fig. 8 is a sectional view of the structure shown in Fig. 7 as seen along the line 8—8, looking in the direction of the arrows;

Fig. 9 is a side elevation of a brushing unit similar to Fig. 7, but having an integral hub element of polygonal outline;

Fig. 10 is a central vertical sectional view of a brushing unit shown in Fig. 9 as seen along the line 10—10 looking in the direction of the arrows;

Fig. 11 is an end elevation of a cup-shaped brushing element embodying the principles of the invention;

Fig. 12 is a side elevation partly in section of the unit shown in Fig. 11;

Fig. 13 is a view similar to Fig. 12, but showing a different type of brush clamping element;

Fig. 14 is a perspective view of a single layer strand construction intended for specialized use, such as non-abrasive brushing action in paper manufacture and the like;

Fig. 15 is a side elevation partly in section showing a modified form of brush unit and support;

Fig. 16 is an end view partly broken away taken along the line 16—16 shown in Fig. 15 looking in the direction of the arrows; and

Fig. 17 is an elevation showing the inside face of the annular terminal member.

As has been stated, the invention may be embodied in a number of different forms, all having the same basic features and being varied to adapt the same to a wide variety of uses. In the construction shown in Figures 1 to 6, inclusive, the brushing element comprises a plurality of strands 1 which may be formed of various types of material, but for heavy duty service are preferably formed of wire of suitable composition to withstand abrasive action. The strands are engaged about a holding wire 2, and at their base enclosed within a body or channel member 3, preferably formed of sheet metal channel strip coiled in helical turns of predetermined diameter. In order to have the spiral brushing units of standard uniform width and with flat parallel faces, the end portions 4, 5, of the body or channel member are secured to adjacent strands 6 of said member by means of a weld 7, or equivalent securing means.

It will be noted, as disclosed in Figure 3, that the extreme end 8 of the holding wire 2 is turned backwardly over the edge portion of the end of the channel member and compressed thereinto so as to form a shallow recess 9 in the outer surface of said channel member at such point. The welding operation may be extended to unite the holding wire with the adjacent parts at the same time that it unites the end portions of the body member to the underlying portion thereof. It will be noted that the extreme ends of the body member do not overlap, but are spaced apart on opposite sides of the helical coil, and that the intermediate coiled elements are obliquely displaced at such point, as shown in Figures 3 and 6, and thus maintain the unit as a compact structure with parallel end faces. The unit when so formed and placed in clamped relation upon a support or arbor has no tendency to become separated since each of the oblique strands serve as a locking element for the intermediate coils, and the size of the eyes or ring at the ends of the body member are permanently fixed through the welding operation. Thus through a minimum of securing means a light, compact, spiral brush unit of any desired length and diameter can be provided from the same basic structural assembly, the body member holding wire and brushing strands being united in the manner set forth. While the clamping of the channel member upon the brushing strands may be varied to some extent it is preferred that an interlocking engagement be made along radial lines in the manner disclosed in Figures 4 and 5 of the drawings. This is accomplished by forming the upper edge of the U-shaped body or channel member 3 with a plurality of corrugations 11 on one side of such body member cooperating with similar corrugations 12 on the opposite side thereof and in staggered relation thereto. This provides a sinuous passageway 13

intermediate the pairs of corrugated margins of the body or channel member.

The invention as above described comprises a method of placing double strands about a holding wire within a channel strip and compressing the margins of said strip in interlocking radial relation thereto and forming the same as a helical coil with the ends of such channel member on opposite sides in spaced non-overlapping parallel elements with the intermediate portions of the channel strip in nested angular engagement with each other adjacent and intermediate the end portions of the strip and thereafter securing the end loops of said coil in permanent relation to the immediately adjacent portions of said coil. The method also includes the simultaneous securing of the ends of the holding wire to the adjacent structure by the same fastening means which, as indicated, may comprise a welding operation.

The unit as just described may be placed upon a suitably sized support or arbor and secured thereto so as to be revolved thereby for the brushing operation. The unit also may be formed as an annular member supported between annular flanges 14, 15, engaged upon a sleeve 16 and clamped between the upturned marginal portions 17, 18, thereof. In order to permit the sleeve unit to be applied to a rotating shaft a hub member formed of complementary plates 19, 20, is provided, such plates each being formed to provide a supporting shoulder 21 for the sleeve 16, and having inturned central flanges 22 to engage upon the reduced portion 23 of a shaft 24 for rotating such brushing element. The reduced portion of the shaft may be provided with a screw-threaded portion upon which a nut 25 is engaged and which bears against a washer 27 which clampingly forces the brush against the shoulder 28 of the shaft. In place of mounting the unit upon a sleeve through a crimping operation it may be engaged upon a spider hub member directly by means of clamping rings and flanges, as shown in Figure 6. The spider must be statically and dynamically balanced since the unit is to be used at high speed, and preferably comprises a sleeve 31 adapted to be snugly engaged upon the reduced section 32 of a shaft 33 by means of a nut and washer 34, 35. The tubular sleeve has a plurality of studs 36 welded, or otherwise secured to the outer surface thereof at spaced intervals adjacent their respective ends and secured at their free ends to a tubular sleeve 37 suitable for the standardized brush diameter determined upon. A keyway 38 may be provided on the inner sleeve 31 and a key 39 on the reduced portion of the shaft 32. Short keyways 41 may be provided adjacent the respective ends of the tubular member 37 within which projecting lugs or keys 42 on clamping rings 43 may be engaged. The clamping rings 43 are provided with a rim flange area 44 conforming to the shape of the body or channel member 3 holding the brushing strands 1, and at its upper edge 45 may engage over the body member and bear against the brushing strands, as shown in Figure 6. The clamping ring members 43 are each forced into locking engagement with the spiral brush unit by means of spanner rings 46 screw-threadedly engaged upon the end portions of the tubular member 37. The outer margins of the spanner rings may be provided with notches or recesses 47 at intervals about their circumference.

Through the use of thin annular members 48 having locking members 49 at their outer edges

and projections 50 at their inner edges to engage the keyways 41 and disposed intermediate the clamping rings 43 and spanner rings 46, the clamping rings may be firmly held against releasing movement. With a construction of the type just described the spider may be bodily removed from the reduced section of the shaft by releasing the securing nut 34 which may be locked in position by means of a conventional locking pin 40. The brush unit may also be removed for replacement by releasing one of the spanner rings 46 and its associated clamping ring 43. In place of the detachable spider shown in Figure 6 the brush unit may be formed with a terminal hub. One type of such hub is shown in Figures 7 and 8 comprising a brush unit 51 formed by a predetermined number of helical turns with the ends thereof secured in the manner heretofore set forth, such brush unit being engaged within the flanges of a pair of hub members 52, 53. The hub member 53 may be formed with a sleeve providing a central aperture 54, such sleeve having its free edge spun into clamping contact with the margins of the plate 52 adjacent the central aperture 55. The opening provided centrally of the pair of plates is of a predetermined size so as to fit readily upon the shaft or spindle for which the brush is designed. In the construction shown in Figures 9 and 10 there is no clamping action whatsoever centrally of the brush unit, but a plate 56 having a central aperture of suitable interlocking configuration 57 for engagement with the driving shaft is welded directly upon the flattened outer face 58 of each helical coil. If desired, the last-mentioned type of construction can also be provided with a circular aperture, and the brush unit in such event would be held in position upon the shaft through the force applied to the outer faces of the plates 56.

As has already been indicated, the form of construction shown in Figures 11 to 13 is a cup-shaped brushing unit adapted to be used for endwise contact with the surface. In said unit brushing strands 61 are in double layers about a holding wire 62 clamped within a body or channel strip 63 similar to the construction heretofore described in connection with Figures 1 to 5, inclusive. The body member in place of being wound in helical relation in the plane of the brushing strands or bristles, is wound with the strand elements directed at an angle to one side. The brushing strands may be trimmed as desired, but in place of each convolution or turn of the brush having brushing strands of equal length, will differ from the prior construction, and have brushing strands of increasing length progressively throughout the unit, as shown in Figures 12 and 13. The conical brushing unit may be made up in various forms and correspond in some respects to the unit heretofore described in connection with Figures 1 to 10, inclusive. It will be noted that the brush unit as shown in Figure 12 has the ends 64, 65, of the channel member secured by welding to the adjacent turns 66 of said body member, and that said adjacent turns are in nested curved relation centrally of the area between the ends of said unit which provide flattened end faces as heretofore described. A sleeve 67 may be provided within which the brush unit is held by means of an annular ring 68, and an annular frusto-conical shell 69 clamped within the marginal flanges of the sleeve 67. Hub plate members 71, 72, similar to the hub plate members shown in Figure 2 may be provided, such members being centrally apertured

to engage over a reduced portion 73 upon the shaft 74. The unit is held engaged upon said shaft by means of a nut 75 and washer 76.

The form of construction shown in Figure 13 is substantially identical as to the strand elements 81, holding wire 82 and body or channel member 83 and its end portions may be permanently fastened by welding, as illustrated in Figure 12. The unit as thus assembled is held in operative relation to a shaft 81 by means of a cup-shaped element 82 of a size to receive the brushing unit within the same, such cup-shaped member being centrally apertured and bearing against shoulders 83 formed on the shaft 81, the reduced portion of the shaft 84 having a screw-threaded portion upon which a securing nut 85 is engaged. The nut 85 is adapted to be received in a recess 86 formed in the outer face of a central hub block 87. The hub block is shown as having a central aperture to engage over the reduced portion of the shaft and adjacent its outer face has a marginal flange 87 adapted to bear against the outer face of the brushing unit.

When the brushing unit in the form of construction shown in Figure 13 is worn to too great an extent it is readily replaceable by unscrewing the nut 85 and engaging a new unit upon the respective parts in place of the units shown, and thereafter tightening up the parts into firm operative engagement with the shaft. When it is desired to use the brush construction upon surfaces requiring delicate brushing action, such as in certain types of paper making machines, then, if desired, the brush construction may be carried out along the lines as illustrated in Figure 14, wherein long bristles 91 have their natural tapered free end portions 92 and their inner ends wrapped about the holding wire 93 and clamped thereon through the clamping action of the margins of the body member 94 engaging such bristles firmly at a point adjacent the holding wire 93. The usual corrugations 95, heretofore described in connection with Figures 4 and 5, may be formed on the outer circumferential edges of the body or channel member 94. The second layer of bristles 96 terminates closely adjacent the point of folding such bristles about the holding wire, and thus brushing action is accomplished by means of a single layer of bristles on each turn of the body member throughout the length of the unit.

In the form of construction shown in Figures 15 to 17, inclusive, in place of providing terminal rings as part of the respective ends of the helical body or channel member formed by welding the overlapping parts adjacent the ends, there is used an annular terminal unit 101 having a central opening 102 to engage freely over the supporting shaft 103, and having on its inner face an inwardly projecting flange 104 providing a shoulder to engage over the upper edge of the helical channel member 105, and having a reduced inner marginal area 106 to accommodate the enlarged base portion of said channel member 105. The holding wire 109 is similar to the holding wires heretofore described and secures the brushing strands 107 in a similar manner. The extreme end portion of the holding wire, as shown more particularly in Figures 15 and 16, is engaged through an aperture 108 formed in the reduced portion of the annular terminal unit and is bent into hook shape with its free end 109 received within a recess 110 formed in the outer face of said annular unit. An annular unit of the type described is provided at each end of the helical channel mem-

ber, and thus provides a fixed ring member adapted to be slidably engaged over the supporting shaft. Each of the annular disc units is provided with a key 112 adapted to engage a keyway 113 formed in the shaft adjacent each end portion which likewise is provided with screw threads 114 adapted to be engaged by the screw-threaded locking ring 115.

It will be obvious from what has been above set forth that the helical brushing unit has end members of predetermined diameter similar to the unit shown in Figures 1 to 6, inclusive, but that the terminal members are separate from the unit proper and are provided with keys to engage a keyway so that the ends are held against displacement. By means of the threaded terminal members 115 any desired degree of pressure may be placed against the helically coiled body member so as to hold the helical coils in close contact with adjacent coiled portions. This construction further provides for a unit free of any welding operation and adapted for rapid assembly. The terminal units in addition provide flange engagement over the end portion of the channel member and thus forms a rigid support for the unit adjacent the point where the locking pressure is applied.

From what has been above set forth it will be noted that the brushing unit when constructed in the manner described provides a firm, durable construction, with a minimum of parts. It also provides a unit which is itself a complete operative structure independent of its support, but which in conjunction with certain specialized supporting elements has a range of adaptability to various types and sizes of machines without involving undue cost. Where small hub plates are used and long brushing strands, the desired brushing action may not be brought about because of the too great resiliency incorporated into the bristles. Thus, more firm support of the brushing strands, as well as economy of materials in the manufacture of same can be brought about through the provision of shorter brushing strands and a larger central supporting member or hub member. When the auxiliary supporting elements, such as the annular plates and sleeves secured thereto, are provided, the desired action of the brushing unit on the work to be treated is controllable to a high degree of accuracy, and the effect attained may be brought about without undue cost in the brushing operation.

Other modes of applying the principle of my invention may be employed instead of those explained, change being made as regards the means and steps herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

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

1. A brushing unit having in combination a helically coiled base member formed of a rigid metal channel strip having clampingly engaged therein a plurality of brushing strands extending around a binding and holding wire, the respective ends of said channel body being positioned on opposite sides of said brushing unit in spaced apart relation to each other with the intermediate portions of said coil permanently displaced angularly along a line parallel to the axis of said coil to provide substantially flat parallel end faces for said brushing unit.

2. A brushing unit having in combination a helically coiled base member formed of a rigid metal channel strip having clampingly engaged

therein a plurality of brushing strands extending around a binding and holding wire, the respective ends of said channel body being positioned on opposite sides of said brushing unit in spaced apart relation to each other with the intermediate portions of said coil permanently displaced angularly along a line parallel to the axis of said coil to provide substantially flat parallel end faces for said brushing unit, and fastening means securing each end of said body channel strip to the adjacent portion of said coil to provide a shaft-engaging ring of fixed size.

3. A brushing unit having in combination a helically coiled base member formed of a rigid metal channel strip having clampingly engaged therein a plurality of brushing strands extending around a binding and holding wire, the respective ends of said channel body being positioned on opposite sides of said brushing unit in spaced apart relation to each other with the intermediate portions of said coil permanently displaced angularly along a line parallel to the axis of said coil to provide substantially flat parallel end faces for said brushing unit, and fastening means securing each end of said body channel strip to the adjacent portion of said coil, and also securing the ends of said binding and holding wire to said channel strip.

4. A brushing unit having in combination a helically coiled base member formed of a rigid metal channel strip having clampingly engaged therein a plurality of brushing strands extending around a binding and holding wire, the respective ends of said channel body being positioned on opposite sides of said brushing unit in spaced apart relation to each other with the intermediate portions of said coil permanently displaced angularly along a line parallel to the axis of said coil to provide substantially flat parallel end faces for said brushing unit, and a short seam of welding metal securing each end of said channel body to the adjacent portion of said coil.

5. A brushing unit having in combination a helically coiled base member formed of a rigid metal channel strip having clampingly engaged therein a plurality of brushing strands extending around a binding and holding wire, the respective ends of said channel body being positioned on opposite sides of said brushing unit in spaced apart relation to each other with the intermediate portions of said coil permanently displaced angularly along a line parallel to the axis of said coil to provide substantially flat parallel end faces for said brushing unit, and a short seam of welding metal securing each end of said channel body to the adjacent portion of said coil, and such welding metal also engaging the respective ends of the binding and holding wire.

6. A brushing unit having in combination a helically coiled base member formed of a rigid metal channel strip having clampingly engaged therein a plurality of brushing strands extending around a binding and holding wire, the respective ends of said body channel being positioned on opposite sides of said brushing unit in spaced apart relation to each other with the intermediate portions of said coil permanently displaced angularly along a line parallel to the axis of said coil to provide substantially flat parallel end faces for said brushing unit, and a short seam of welding metal securing each end of said channel body to the adjacent portion of said coil, and such welding metal also engaging the respective ends of the binding and holding wire, the weight of the welding metal at each end of the coiled strip

being substantially equal to the coil area omitted intermediate the ends of said strip to dynamically balance said unit when rotated at high speed.

7. A brushing unit having in combination strands clampingly engaged about a holding wire secured in a helically coiled rigid metal channel strip, end rings on said channel strip formed of the terminal portions of said channel strip shaped to predetermined diameter and secured by welding to adjacent portions thereof, said end rings being offset at the point of juncture in alignment transversely with permanently obliquely displaced intermediate portions of said channel strip.

8. A brushing unit having in combination strands clampingly engaged about a holding wire secured in a helically coiled channel strip, end rings on said channel strip formed of the terminal portions of said channel strip shaped to predetermined diameter secured by welding to adjacent portions thereof, such terminal welding ends lying in transverse planes spaced from each other, and oblique strands formed in the intermediate portions of said unit to maintain the same of a working size corresponding to the terminal ring portions.

9. A brushing unit having in combination strands clampingly engaged about a holding wire secured in a helically coiled channel strip, end rings on said channel strip formed of the terminal portions of said channel strip shaped to predetermined diameter secured by welding to adjacent portions thereof, such terminal welding ends lying in transverse planes spaced from each other, oblique strands formed in the intermediate portions of said unit to maintain the same of a working size corresponding to the terminal ring portions, and the terminal ring portions of said unit comprising parallel end faces with balanced weight of metal at the fastening points.

10. A brushing apparatus comprising brushing strands clampingly engaged in a helically wound body member formed of a rigid metal channel strip with the end and intermediate portions thereof having permanently angularly offset portions to prevent radial displacement of the adjacent strands, said offset portions extending in a plane parallel to the axis of said helically wound body member, a support and clamping member engaged within said body member and a cup-shaped clamping means overlying the outer face of said member and acting in compressing relation to said first-named clamping member, and means for maintaining pressure upon said clamping members.

11. A brushing apparatus having in combination a brushing unit having a rigid metal channel strip formed in helical strands carrying brushing strands of suitable material, means for receiving said unit to compressively engage the end faces of said unit, and oblique permanently offset strand portions at an intermediate position transversely of said unit said offset portions extending in a plane parallel to the axis of said brushing unit to hold the end and central portions thereof in interlocking cooperation with adjacent strands of said helical member.

12. A brushing apparatus having in combination a brushing unit having a rigid metal channel strip formed in helical strands carrying brushing strands of suitable material, means for receiving said unit to compressively engage the end faces of said unit and to overlap the circumferential margins thereof, and oblique permanently offset strand portions at an intermediate position transversely of said unit said offset portions extending

in a plane parallel to the axis of said brushing unit to hold the end and central portions thereof in interlocking cooperation with adjacent strands of said helical member.

13. A brushing apparatus having in combination a helically wound brushing unit carrying radially positioned brushing strands and having substantially parallel end faces throughout substantially their entire extent, a supporting shell centrally of said helical unit, washer-like elements bearing against the respective end faces of said unit, said shell having clamping flanges bearing thereagainst, and a pair of disc-like supporting members clampingly engaged against the respective margins of said shell and providing a central aperture of predetermined size to engage a support for operating said brushing unit.

14. A brush composed of a trough-shaped base strip with brush material secured therein and projecting from the mouth thereof, the strip being disposed in a hollow formation including a number of turns, each of which is offset a distance substantially equal to the width of said base to receive adjacent turns of similar shape and thereby square the plane of each turn to the axis of the brush.

15. A brush composed of a trough-shaped base strip with brush material secured therein and projecting from the mouth thereof, the strip being disposed in a hollow formation and including a number of turns, each of which is offset a distance substantially equal to the width of said base to receive an adjacent turn of similar shape and the opposite ends of the strip being seated in the space created by the jogged portions of an adjacent turn and thereby squaring the plane of each turn to the axis of the brush.

16. A substantially cylindrical brush composed of a trough-shaped base strip with brush material secured therein and projecting from the mouth thereof, the strip extending circumferentially of said brush, thereby being disposed in a hollow formation including at least one full circumferential turn and a terminal portion, with a transverse offset to a distance substantially equal to the width of said base and receiving an adjacent terminal portion of said strip and thereby squaring the general plane of said full turn of said hollow formation and said adjacent portions thereof to the axis of said cylindrical brush.

17. A substantially cylindrical brush composed of a trough-shaped base strip with brush material secured therein and projecting from the mouth thereof, the strip extending circumferentially of said brush, thereby being disposed in a hollow formation including at least one full circumferential turn and with terminal portions, a transverse offset to a distance substantially equal to the width of said base adjacent the opposite ends of said strip and receiving and seating said ends in the space created by said offset and thereby squaring the plane of each turn to the axis of the brush.

18. A substantially cylindrical brush composed of a trough-shaped base strip with brush material secured therein and projecting from the mouth thereof, the strip extending circumferentially of said brush, thereby being disposed in a hollow formation including a number of turns, at least each of said turns adjacent the ends of the hollow formation having a transverse offset to a distance substantially equal to the width of said base to receive adjacent portions of said hollow formation and thereby square the plane

of each turn adjacent the ends to the axis of the brush.

19. A substantially cylindrical brush composed of a trough-shaped base strip with brush material secured therein and projecting from the mouth thereof, the strip extending circumferentially of said brush, thereby being disposed in a hollow formation including a number of turns, at least each of said turns adjacent the ends of

the hollow formation having a transverse offset to a distance substantially equal to the width of said base to receive adjacent portions of said hollow formation and the opposite ends of the strip seated in the space created by the offset portions of the final turns and thereby square the plane of each turn adjacent the ends to the axis of the brush.

DIETRICH F. O. WESEMEYER.