

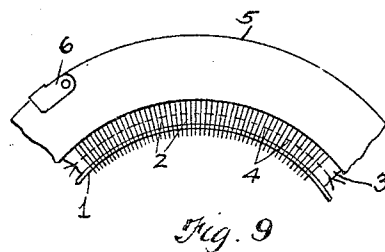
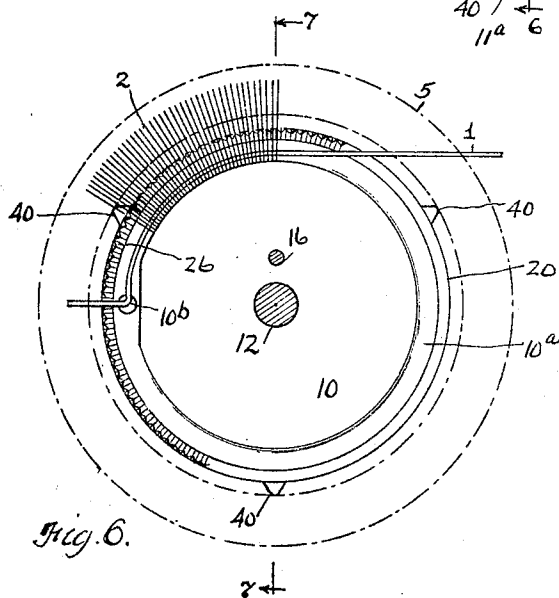
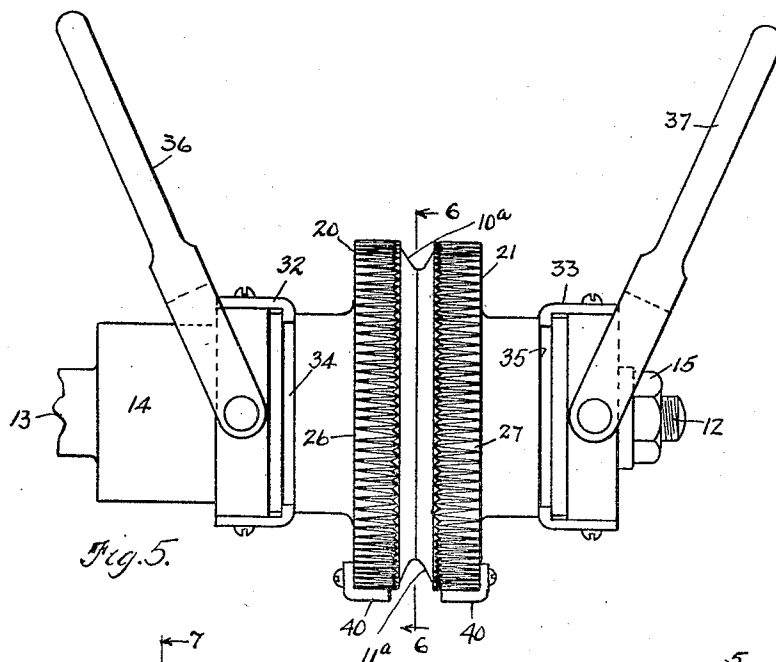
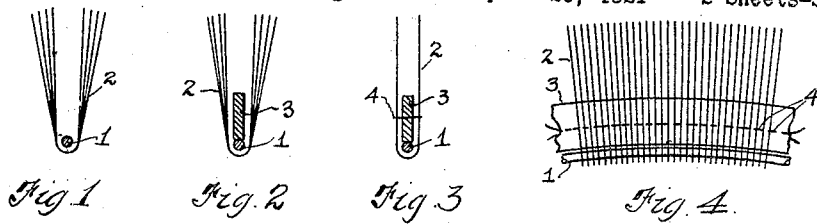
Aug. 11, 1925.

L. H. NIELSEN

1,548,898

METHOD OF MAKING ROTARY BRUSHES

Original Filed April 20, 1921 2 Sheets-Sheet 1



INVENTOR.
Laurits Henrik Nielsen
BY
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ATTORNEYS

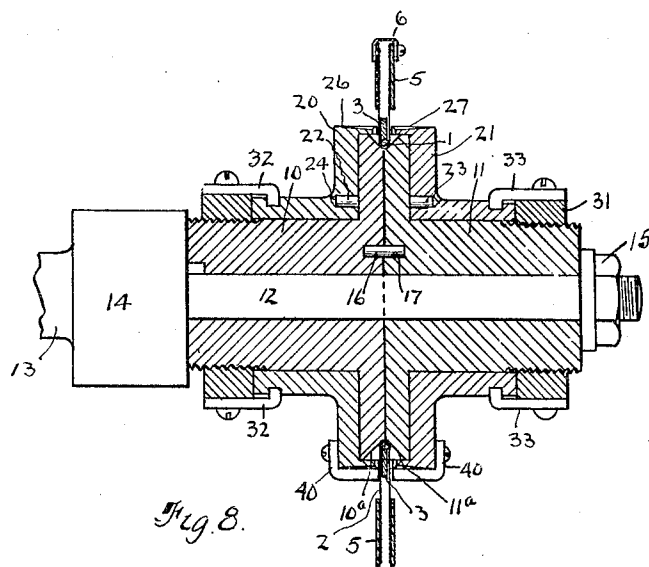
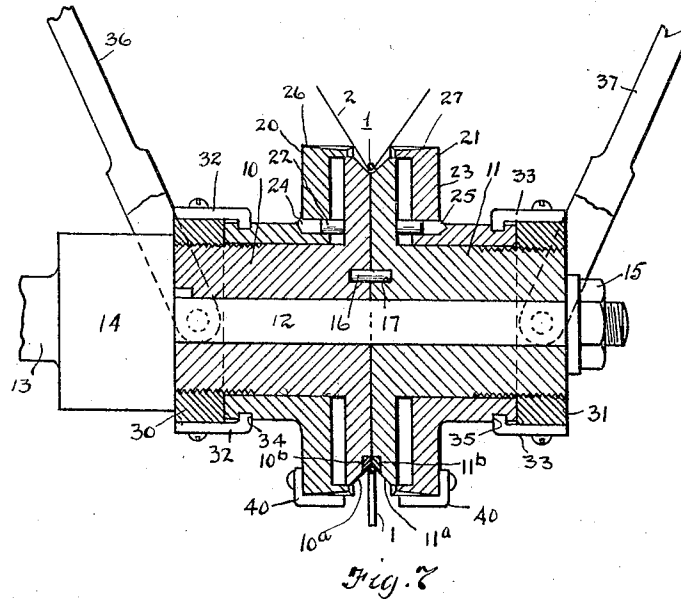
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METHOD OF MAKING ROTARY BRUSHES

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UNITED STATES PATENT OFFICE.

LAURITS HENRIK NIELSEN, OF HOLTE, DENMARK, ASSIGNOR TO THE OSBORN MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

METHOD OF MAKING ROTARY BRUSHES.

Original application filed April 20, 1921, Serial No. 462,831. Divided and this application filed October 23, 1924. Serial No. 745,431.

To all whom it may concern:

Be it known that I, LAURITS HENRIK NIELSEN, a subject of the King of Denmark, and a resident of Holte, Denmark, have invented a new and useful Improvement in Methods of Making Rotary Brushes, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present improvements relate, as indicated, to the manufacture of rotary brushes such as are widely used for industrial purposes wherein a plurality of layers or sections of brush material are assembled together to provide a brush of desired thickness, i. e., with a face of desired width. In such brushes the base of each section is usually a wire ring, about which the brush material, i. e., bristles, strands of fine wire, or the like, is doubled so as to extend therefrom in a general radial direction.

An improved form of such brush section is shown and described in my co-pending application, filed April 18, 1921, Serial No. 462,431, in which a flat spacing ring is interposed between the doubled brush material just outside of the base ring, and such material is then secured to such flat ring by stitching or equivalent means.

The object of the present invention is to provide a simple and expeditious method for assembling the materials that compose a brush section of the general character just described, and particularly one constructed in the special manner last referred to. The invention accordingly is considered to consist of the steps, the annexed drawings and the following description setting forth in detail one mode of carrying out the invention, such disclosed mode illustrating, however, but one of various ways in which the principle of the invention may be used.

In said annexed drawings:—

Figs. 1 to 3, inclusive, illustrate in cross section the appearance of an individual brush section in successive stages of manufacture; Fig. 4 is a broken side elevation of such section in the stage of manufacture illustrated in Fig. 3; Fig. 5 is a side elevation of my improved device or mechanism designed for use in making brush sections of the character shown in

the preceding figures; Fig. 6 is a transverse section thereof taken on the plane indicated by the line 6—6, Fig. 5; Fig. 7 is a central longitudinal section of the same, the plane of the section being indicated by the line 7—7, Fig. 6; Fig. 8 is a view similar to Fig. 7, but showing the parts in a different operative position; and Fig. 9 is an elevation showing part of a brush section.

In the section or layer as illustrated in Figs. 1 to 4, inclusive, it will be noted that the fibrous material 2 is bent around a ring formed wire 1 into open U-shape, the free ends of the material extending radially outwardly from such ring. Between the respective outwardly bent ends of the brush material there is placed a flat ring 3 of pasteboard or equivalent material of approximately the same thickness as said wire 1, such brush material being thereupon pressed against such flat ring and held firmly in place by means of one or more rows of stitching 4.

As shown in Figs. 8 and 9, a pair of annular plates 5 are temporarily applied to the respective sides of the brush material after the latter has been preliminarily distributed upon the base ring, and the flat spacing ring has been inserted. The inner diameter of said plates 5 is large enough to clear the greater portion of such flat spacing ring so that the stitching may be readily accomplished while the material is held in proper place by the plates. In order to facilitate the handling of the brush section when thus held between the plates 5, pivotal fasteners 6 adjacent the edges thereof are provided, such fasteners being formed to overlap and clamp the two sections together when pressed against the edge of the plates.

For the purpose of distributing the brush material on the base ring or wire 1, and at the same time bend such wire into desired circular shape, the specially constructed mandrel illustrated in Figs. 5 to 8, inclusive, has been devised. This mandrel comprises two complementary sections 10 and 11, that, in the illustrative construction shown, are designed to be mounted on the end 12 of a rotating shaft or arbor 13. Such end is of somewhat reduced diameter compared with the arbor, and a shoulder 14 surrounds the arbor adjacent such reduced end and forms

an abutment, against which mandrel section 10 is forced when the two sections are drawn together by means of the nut 15 on the threaded extremity of such reduced end 12.

5 One or more pins or dowels 16 and corresponding holes 17 on the juxtaposed faces of the two mandrel sections serve non-rotatably to secure said sections together, i. e., prevent individual turning movement there-
10 of about the arbor when they are secured thereon in the fashion just described.

The mandrel sections are formed with complementary inwardly beveled edges 10^a and 11^a, whereby a peripheral groove is provided when said sections are brought to-
15 gether in the fashion just described. At corresponding points in the juxtaposed faces of the sections, adjacent the bottom of such groove, are small inset plates 10^b and 11^b of
20 hardened steel adapted to firmly grip or "bite" the end of the wire introduced therebetween so as to carry the same around with the mandrel as it is rotated, in the operation of the machine, as will be pres-
25 ently described. Longitudinally slidably mounted on the respective mandrel sections 10 and 11 are two corresponding flanged sleeves 20 and 21 that are secured to said sections, respectively, so as to rotate there-
30 with by dowels 22 and 23 on the latter, respectively engaging apertures 24 and 25 in said sleeves. The flanges on such sleeves are disposed adjacent the outer faces of the disk-like portions of the mandrel sections
35 which form the aforementioned groove, and said flanges furthermore extend a trifle beyond such portions and are undercut so as to peripherally overlie the latter when brought closely against the portions in question,
40 thereby more or less closing the groove, (see Fig. 8). The edges of such overlying portions 26 and 27 of the flanges are serrated, as best shown in Fig. 5, so that the brush material is maintained in evenly dis-
45 tributed condition about the entire periphery of the mandrel when the sleeves are closed in the fashion just described. Such serrations are also preferably continued across the outer cylindrical faces of such flanges.

50 Movement of the sleeves 20 and 21 upon the respective mandrel sections is effected by means of nuts 30 and 31 threaded upon the ends of said sections and provided with small clamps 32 and 33 that engage circum-
55 ferential grooves 34 and 35 in said mandrel sections. The nuts are provided with handles 36 and 37 whereby they may be conveniently rotated, such rotation in one direction obviously serving to withdraw the corresponding sleeve into the position shown
60 in Fig. 7 while rotation in the opposite direction moves such sleeves together to more or less close the groove, as shown in Fig. 8.

65 Having thus described the construction of my improved device, its mode of operation

may be readily set forth. Referring to Fig. 6 more particularly, the end of the wire from which the base ring 1 of the brush section is to be formed is brought between the plates 10^b and 11^b inset in the juxtaposed
70 faces of the two mandrel sections, and by tightening nut 15 on the end of the arbor such wire is there firmly gripped. The sleeves 20 and 21 are at this stage of operation in their outermost position, as shown in
75 Figs. 5 and 7. Thereupon the operator takes a quantity of loose brush material in his hand and simultaneously, with the rotation of the mandrel, distributes such material between the groove and the wire to form
80 a layer of desired thickness. As the rotation of the mandrel continues such layer of material is carried along and bent into the open V-shape shown in Fig. 7 until a complete circle of the material is formed. The
85 wire is then cut off and the ends twisted or otherwise joined together. It is at this stage that the flat spacing ring 3 of pasteboard or like material, where such a ring is utilized, is inserted, such ring of course re-
90 quiring to be transversely broken at one point in its circumference to permit such insertion. Next the sleeves 20 and 21 are moved together by turning the handles 36
95 and 37, thus doubling the brush material so that the respective portions thereof lie substantially parallel, as shown in Fig. 8. Thereupon a pair of annular plates 5 are applied to the respective sides of the circle of such material and such plates locked to-
100 gether by means of fasteners 6. Upon now unscrewing nut 15, the outermost of the two mandrel sections, with the parts carried thereby, is removed from the end of the ar-
105 bor and the brush section can be taken off. Such brush section at this stage of manufacture is complete, save for the stitching which is accomplished on a suitable sewing ma-
110 chine or any other means for attaching the bristles or other brush material in their doubled over condition to the base ring and flat spacing ring, where the latter is utilized, may of course be employed. The annular clamping plates 5 are then removed and the
115 brush section is ready for assembly into a complete brush.

After the brush section has been thus removed, the outer section of the mandrel may then be replaced on the arbor and the device
120 is ready for another operation. It will be understood of course that the annular clamping plates 5 are used over and over again. It will also be noted that, as previously pointed out, the brush material is held in proper
125 radial position and equally distributed about the base ring or wire pending the application of such plates 5 by the serrated edges of the flanges 26 and 27 on the respective sleeves 20 and 21. The brush section produced on
130 the foregoing device is accordingly of uni-

form thickness throughout and the tangling of the material is substantially entirely eliminated even where such material consists of fine hairs or light gauge brass wire.

5 The even distribution of the brush material is facilitated by the serrations on the flanges of sleeves 20 and 21, inasmuch as these tend to feed such material at a uniform rate between the wire and the groove
10 in the mandrel. To assist in regulating the feeding of the material, a plurality of pairs of markers 40 equidistantly spaced about the flanges are provided. The operator being
15 instructed to distribute between successive markers a measured quantity of material, finds it relatively easy to avoid over thick and over thin places. These markers moreover, preferably take the form of transverse
20 projections or ribs, as shown, whereby they serve the further purpose of supporting the annular clamping plates concentrically upon the mandrel, while still allowing the internal
25 diameter of such plates to be sufficient to clear the required space about the inner edge of the brush section (see Fig. 6) for stitching.

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

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

1. In the manufacture of a rotary brush section, the steps which consist in distributing and doubling brush material upon a wire
40 or like base element, simultaneously winding the latter upon a suitable mandrel with

such material extending radially outward, temporarily clamping such material together from opposite sides, thereupon removing from the mandrel the partially formed section with the material thus clamped, and
45 then permanently securing such material upon the base element.

2. In the manufacture of a rotary brush section, the steps which consist in distributing and doubling brush material upon a wire
50 or like base element, simultaneously winding the latter upon a suitable mandrel with such material extending radially outward, temporarily clamping such material together from opposite sides, thereupon removing
55 from the mandrel the partially formed section with the material thus clamped, and passing stitching through such material adjacent the base element so as to permanently
60 secure same thereto.

3 In the manufacture of a rotary brush section, the steps which consist in distributing and doubling brush material upon a wire
65 or like base element, simultaneously winding the latter upon a suitable mandrel with such material extending radially outward, inserting a flat spacing ring between the doubled over layers of such material and
70 adjacent such base element, temporarily clamping such material together from opposite sides, thereupon removing from the mandrel and partially formed section with the material thus clamped, and then passing
75 stitching through such material and spacing ring, whereby such material is secured in place on such base element.

Signed by me this 29th day of September, 1924.

LAURITS HENRIK NIELSEN.