June 23, 1936. R. T. SCULLY ET AL 2,045,373

BRUSH

Filed Feb. 8, 1935 2 Sheets-Sheet 1

Fig. 1.

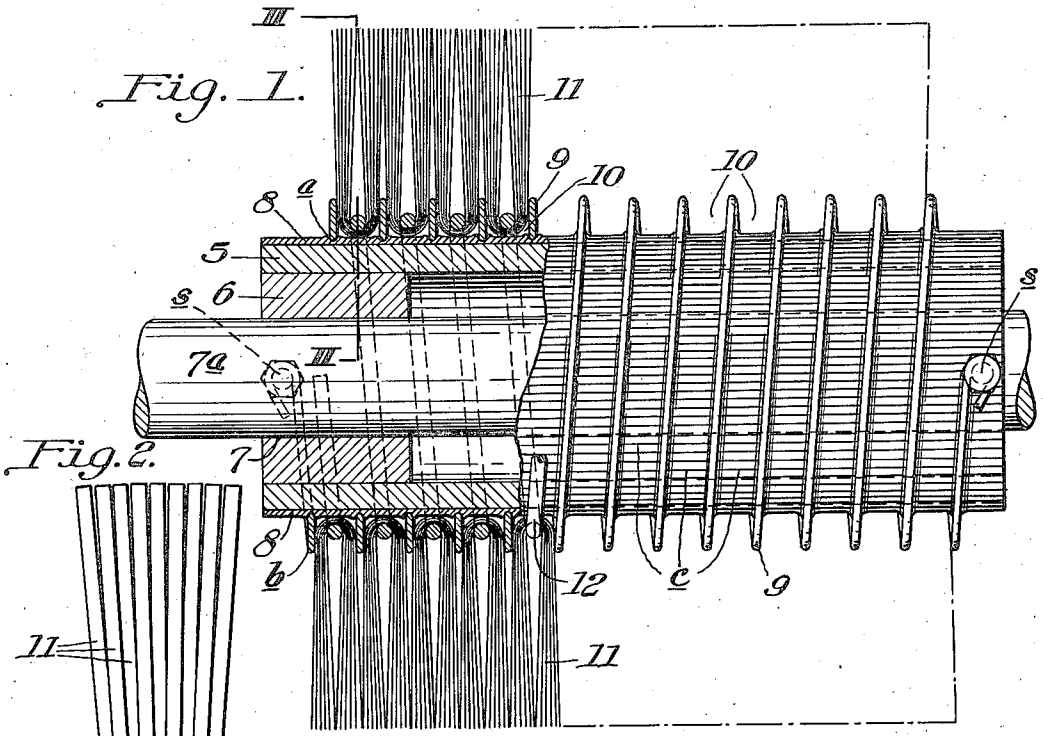


Fig. 2.

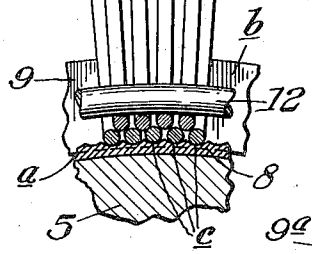
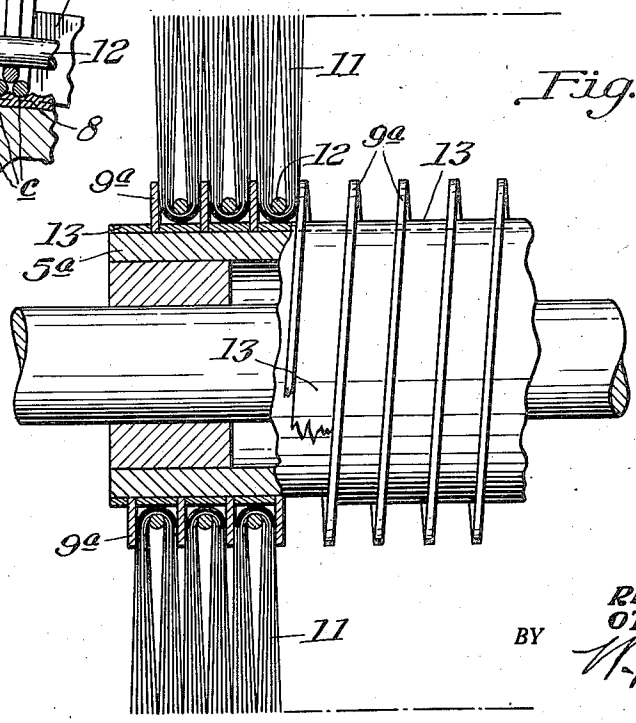


Fig. 3.



INVENTORS.
REES T. SCULLY.
OTTO C. RIEGER.
BY W. P. Doolittle,
ATTORNEY.

June 23, 1936. R. T. SCULLY ET AL 2,045,373

BRUSH

Filed Feb. 8, 1935 2 Sheets-Sheet 2

Fig. 4.

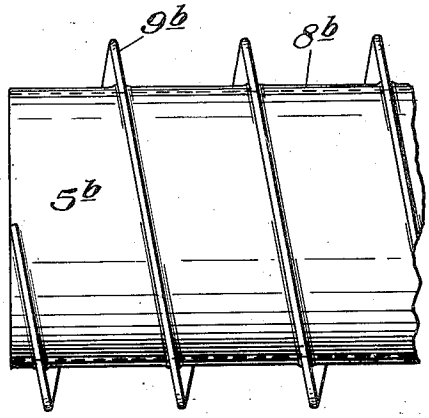


Fig. 5.

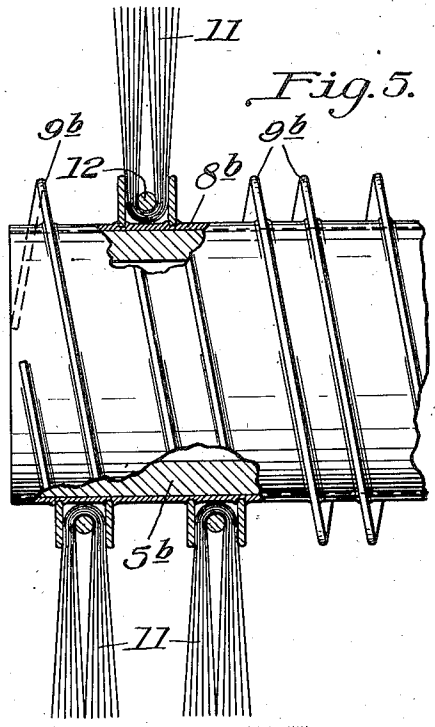


Fig. 7.

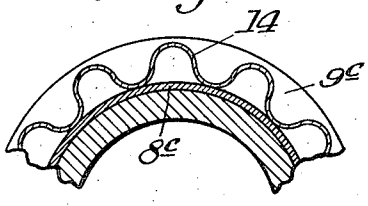


Fig. 6.

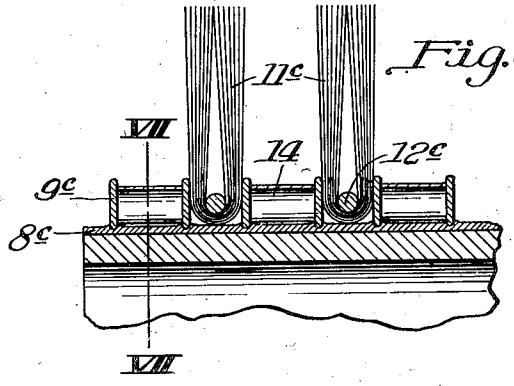


Fig. 8.

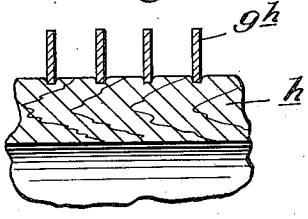
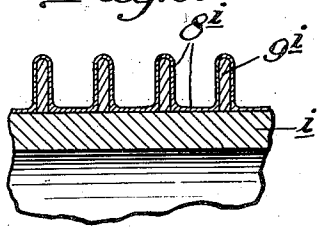


Fig. 9.



INVENTORS.
REES T. SCULLY.
OTTO C. RIEGER.
BY W. G. Doolittle
ATTORNEY.

Patented June 23, 1936 2,045,373

UNITED STATES PATENT OFFICE

2,045,373

BRUSH

Rees T. Scully and Otto C. Rieger, Pittsburgh, Pa., assignors of forty-two and one-half per cent to Walter S. Lang, forty-two and one-half per cent to said Scully, and fifteen per cent to said Rieger, Pittsburgh, Pa.

Application February 8, 1935, Serial No. 5,533

10 Claims. (Cl. 15—182)

This invention relates to brushes and more particularly to new and improved circular, cylindrical or rotary brushes of the type embodying a cylindrical core or body on which the brush material and its securing means are mounted.

In the commercial art such brushes are of two general types; first, one in which the brush material bristles, i. e., hair, wire, fibre, etc., are looped; and secondly, a type in which the bristles are employed without being looped. The present invention primarily relates to the first of the two types, namely, the looped type, but as will be hereinafter shown, certain features of the invention may be advantageously utilized in the manufacture of the second type mentioned. Thus, a characteristic and important feature of our invention resides in the employment of a covering or coating of a suitable pliant, soft, and/or yielding material on the core or cylindrical body of the brush, which feature may be employed in the manufacture of either type of brush.

Among the objects of the present invention are; to provide a simple and efficient brush construction of the rotary type embodying a body having an outer surface, coating or covering of a suitable pliant, soft, and/or yielding material, as lead; the provision of a flexible strip or strips of metal disposed in a spiral on the body to form spaced apart walls forming grooves or channels or channels for receiving therebetween the brush material; a construction in which the said strips may be partially embedded in the body and/or the coating thereof and having portions projecting therefrom to form walls for the brush material receiving spaces; and a construction in which a comparatively soft or yielding backing or seat for the brush material is provided and which backing or seat in conjunction with a binding wire provides for a hinged movement of the bristles after assemblage in the bristle receiving spaces, this is particularly advantageous in the event of the employment of wire bristles in preventing fatigue and hence crystallization of the metal. Another object of the present invention is to provide a simple construction enabling the ready replacement of new bristles for old or worn bristles and without in any manner affecting the brush body and its bristle receiving spaces.

In the accompanying drawings, which illustrate applications of our invention;

Fig. 1 is a part elevational view and a part sectional view of a brush structure embodying our invention;

Fig. 2, an enlarged sectional view taken on line II—II of Fig. 1;

Fig. 3, a view similar to Fig. 1 showing a modified form;

Fig. 4, an elevational view of a portion of a brush structure showing brush receiving spaces of greater width than the form of Fig. 1;

Fig. 5, a part elevational and a part sectional view of a structure similar to Fig. 4, showing a pair of space forming members spirally wound thereon;

Fig. 6, a detail sectional view of a still further modified form;

Fig. 7, a sectional view taken on line VII—VII of Fig. 6; and

Figs. 8 and 9 fragmentary sectional views respectively, showing modified constructions.

Referring to the drawings and first to the form of Fig. 1, 5 designates an elongated cylindrical core or body preferably made from a suitable metallic tubing and of any desired dimensions. These rotary brushes are designed to be utilized in devices of various kinds and are provided with means at the ends of the body as heads 6 having openings 7 therein for mounting the same on a rotatable shaft 7*a*.

Disposed on and covering or partially covering the outer surface of the hollow body 5 is a coating or covering of some suitable pliant material, as lead, tin, or a rubber composition, this material being shown at 8. As illustrated and as preferred, the brush embodies a spirally wound strip or strips 9, having portions *a* embedded in the pliant covering and portions *b* projecting therefrom. The strip is preferably formed from flat, thin, flexible metal having rounded edges and when wound edgewise on the coated body the convolutions provide spaced apart walls and the walls form brush material receiving grooves or spaces 10. The pliant coating functions to maintain the walls in the desired spaced positions. The cross-section of these strips may vary from that shown by Fig. 1 and the ends thereof are suitably attached to the core by headed screws *s* or may be welded or otherwise attached.

11 designates looped bristles having their looped portions inserted in the grooves or spaces 10; and 12 designates a severable binding wire engaging the looped portions of the bristles and designed for maintaining the bristles on the body by drawing said portions into close engagement with the body or with the coating, the latter constituting a backing or soft seat for the bristles. The combination of the soft seat and the binding wire provides a yielding anchorage for the

looped inserted ends of the bristles and cooperate to permit what may be termed a hinged movement of the bristles. In some instances it has been found desirable to corrugate or knurl the surface of the coating 8 and this knurled surface is shown at *c*.

In the form of Fig. 3, as illustrated, we have omitted the pliant covering 8, shown in the form of Fig. 1, but, if desired, this covering may be employed.

In addition to the strip 9*a*, which corresponds with strip 9, we employ a strip or element 13 applied flatwise to the outer surface of the body; this strip 13 functions as a spacing element for the radially projecting spirally wound strip 9*a* and also serves to retain the assembled bristles or the complete assembly in fixed position on the cylindrical body 5*a*.

It is highly desirable to provide a construction in which the spacing of the helically wound strips employed for forming the brush material receiving spaces or grooves, may be positioned on the body so as to form differently spaced channels; that is to say, in some cases it is desirable to form the brush material receiving channels relatively close together in order to produce a relatively stiff brush and in other cases where a relatively soft brush is to be produced the grooves are spaced farther apart.

In Figs. 4 and 5 of the drawings, we have illustrated a construction of the character specified. Referring to these views, 5*b* designates the hollow brush body and 8*b* the pliant coating or covering for the body. In making up this form of our invention, a single strip 9*b* having one end attached to the body in any suitable manner is spirally wound on the coated body as shown by Fig. 4 with the convolutions thereof spaced a considerable distance apart. With this construction it will be evident that one or more additional groove forming strips 9*b* may be wound on the coated body between the convolutions of the first wound strip 9*b*, thus enabling us to provide variously spaced channels.

In the form of Figs. 6 and 7, which show another modified construction, the principal difference, over the other forms shown, resides in the corrugated spacing strip 14, interposed between adjacent channels formed by the spirally wound strip 9*c*. In this form we preferably employ the pliant coating designated by 8*c* and provide the looped bristles 11*c* together with the binding wire 12*c*.

In the form of Fig. 8, we have shown the core or body *h* as made from wood and the strip 9*h* spirally wound thereon in such a manner as to have portions thereof embedded in the surface of the wood and portions projecting therefrom to form brush material receiving channels, as in the forms above described. It will be noted that the wood material functions to maintain the strip 9*h* in the desired position on the body.

The form of Fig. 9 embodies a metal body *i*, a coiled strip 9*i* wound thereon and a coating of some suitable pliant material 8*i*, which material in this instance, covers the strip as well as the surface of the body. This construction produces a brush embodying the specified advantages of the form of Fig. 1, and in addition, due to the metal strip being covered, protects said strip against oxidation.

Attention is called to the fact that in all of the embodiments of our invention the bristles or brush material is maintained in operative position on the body and between the grooves primarily, if not solely, by the binding element 12 and that the brush material may be readily removed from the brush structure, body or core, without in any manner harming or altering the core or body, grooves, etc., by simply cutting the binding wire 12 and moving the bristles free of the body. We have thus provided for a refillable brush that may be manipulated for the removal of worn bristles and the replacement of bristles with a minimum of labor and expense.

The pliant coating 8, in addition to providing a soft seat for the brush material and spacing the convolutions of the spiral strip or strips, has further advantage in functioning as a protector. For example, in the use of a lead coating, the same constitutes an efficient protector for the core 5 against oxidation by water, acids, etc. Other pliant coatings may be employed on brushes subjected to other injurious substances.

All of the forms shown and described are such that they may be readily made by the employment of simple brush making apparatus and are of a character that enables the making of brushes of various requirements and the manufacture of brush cores or bodies per se capable of use in the making of various styles of brushes.

We claim:

1. A rotary brush including a brush body, a separable strip wound in a spiral on the body for preforming permanent grooves for receiving brush material therein, independent means on the surface of the body cooperating with the strip for fixedly maintaining the convolutions of the spirally wound strip in spaced relation, brush material disposed between the convolutions of said strip, and means for detachably securing the brush material in said grooves whereby the material is removable without affecting the wound strip.

2. A rotary brush including a cylindrical brush body, a separable flat strip wound edgewise in a spiral on the body for preforming permanent grooves for receiving brush material therein, independent means on the surface of the body cooperating with the strip for fixedly maintaining the convolutions of the spirally wound strip in spaced relation, looped bristles disposed between the convolutions of said strip, and a wire wound on the body in said grooves for detachably securing the bristles to the body and permitting a removal thereof without affecting the wound strip.

3. A brush including a body having a coating of pliant material, a strip wound on the body and having portions embedded in the coating and portions forming spaced apart means to receive brush material therebetween, brush material positioned on the coating between said means, and a wire wound on the body for securing the brush material to the body.

4. In a rotary brush structure, a brush body, a coating of relatively thick pliant material substantially covering the brush receiving portion of the body, and brush material receiving means including a spirally wound flat strip having portions embedded in the coating and portions projecting therefrom whereby to form permanent grooves having a surface of pliant material.

5. In a rotary brush structure, a body, a plurality of parallel spirally wound independent strips on the body forming brush material receiving channels, and a coating of pliant material on the body for maintaining the strips in fixed spaced relation, said strips having portions embedded in the pliant material and portions pro-

jecting therefrom whereby to form grooves having a surface of pliant material.

6. In a rotary brush structure, a brush body, a pliant material on the surface of the body, a separable flat strip wound on the body to form brush receiving grooves, brush material disposed in said grooves in contact with the pliant material, means for detachably securing the brush material to the body, said means exerting pressure on and cooperating with the pliant material to provide a yielding anchorage for the brush material.

7. A rotary brush including a brush body, a separable flat strip wound edgewise in a spiral on the body and having portions embedded in the surface thereof for maintaining the convolutions of the spirally wound strip in fixed spaced relation and portions projecting from the body forming spaced apart means for receiving brush material therebetween, looped bristles positioned between said means, and means for detachably securing the bristles to the body.

8. A brush including a body having a coating of pliant material, a separable flat strip wound in a spiral on the body and having portions embedded in the pliant material and portions projecting therefrom for forming permanent grooves, said grooves having a surface of pliant material, looped bristles disposed in said grooves in contact with the pliant surfaces thereof, and means for detachably securing the bristles within the grooves and permitting a removal therefrom without affecting the wound strip.

9. A brush core of the character described, including a hollow body, a separable flat strip wound edgewise in a spiral on the body, said strip being partially embedded in the outer surface of the body whereby to maintain the convolutions of the strip in spaced relation.

10. A brush core of the character described, including a hollow body having the outer surface thereof coated with a layer of pliant material, a separable flat strip wound edgewise in a spiral on the body and partially embedded by an edge thereof in said coating whereby to maintain the convolutions of said strip in spaced relation.

REES T. SCULLY.
OTTO C. RIEGER.