

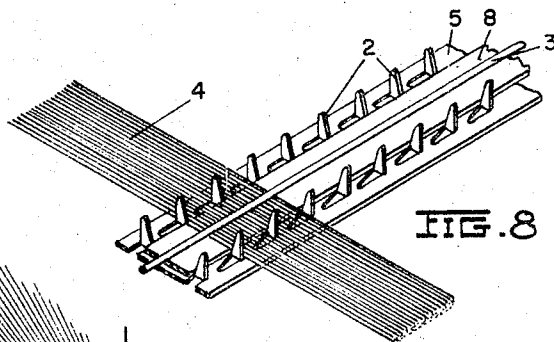
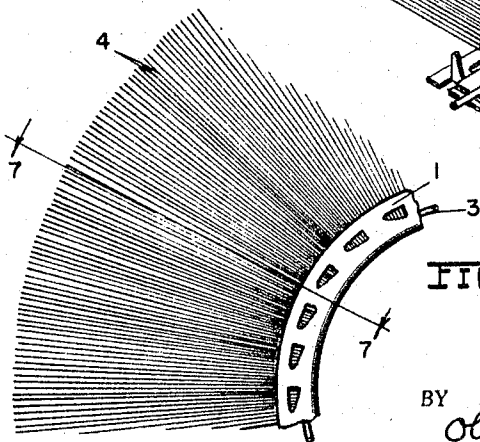
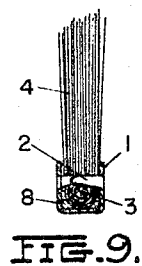
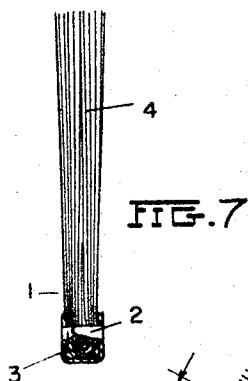
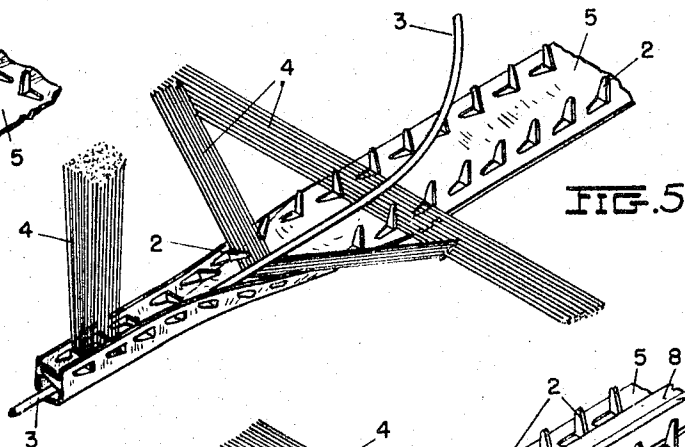
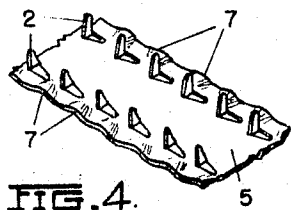
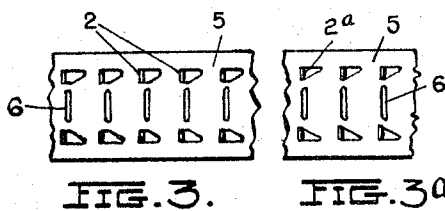
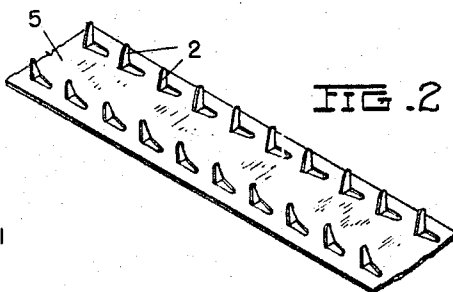
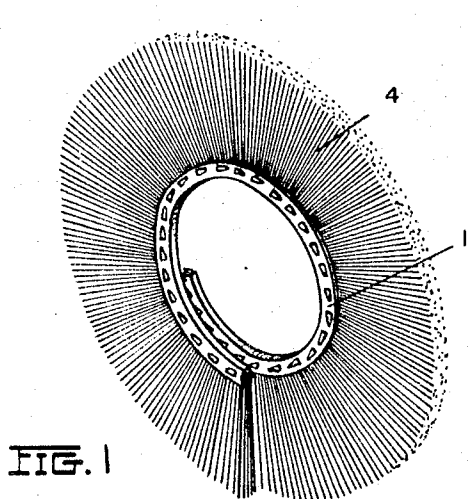
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2,303,386

BRUSH AND METHOD OF MAKING SAME

Filed May 14, 1940



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## UNITED STATES PATENT OFFICE

2,303,386

## BRUSH AND METHOD OF MAKING SAME

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8 Claims. (Cl. 300—21)

This invention relates, as indicated, to brushes and methods of manufacturing the same. More particularly, this invention relates to brush elements constructed in a special manner to obtain increased life and use.

Among the difficulties encountered in the manufacture of brushes, and particularly rotary brushes, whether circular or spiral, that of fixing the brush material sufficiently securely in the brush back so as to prevent loss of such material or uneven distribution and packing in use has been one of the most serious. It is, therefore, an object of the present invention to provide a brush in which the brush material is firmly secured, especially against movement longitudinally of the brush back.

A further object of this invention is to provide an improved method of seating the brush material in the brush back whereby it is secured against loss by shedding.

Another object is to provide a method of constructing a brush element whereby a rotary brush may be obtained having the aforesaid advantages without detrimental effect to the brush back when such back is formed about the mandrel.

Other objects of this invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail one method and one product exemplifying my invention, such disclosed procedure and product constituting, however, but one of various applications of the principle of my invention.

In said annexed drawing:

Fig. 1 is a perspective view of a spiral brush element formed in accordance with the teachings of my invention;

Fig. 2 is a perspective view of the brush back element prior to its shaping to channel form;

Fig. 3 is a top view of a similar element but also showing transverse slots centrally disposed therein;

Fig. 3a is a view similar to Fig. 3 but illustrating a differently shaped hole punched therein;

Fig. 4 is a perspective view similar to Fig. 2 but showing corrugation of the edges of such brush back element;

Fig. 5 is a somewhat diagrammatic view illustrating the method of construction of the brush element of this invention;

Fig. 6 is a fragmentary side elevational view of a rotary brush element;

Fig. 7 is a view in cross section taken along the line 7—7 on Fig. 6;

Fig. 8 is a somewhat diagrammatic view showing the arrangement of elements in one form of my new brush prior to shaping the back to channel form; and

Fig. 9 is a view in cross section similar to Fig. 7 but showing a brush back in which the brush material is secured in a rubber seating.

Referring now more particularly to such drawing and especially Figs. 1, 6 and 7, a brush element formed in accordance with my invention may comprise a channel 1 having continuous i. e. uninterrupted edges, flat teeth 2 projecting inwardly from the sides of said channel and having their faces disposed transversely to the edges of said channel, a wire 3 disposed lengthwise within said channel and bristles or other brush material 4 held in said channel beneath said wire.

As illustrated in Figs. 2 to 5, said channel is preferably formed from a metal strip 5 in which a row of flat teeth 2 are punched adjacent but within each edge of said strip, the faces of such teeth being disposed transversely to the edges of said strip. When the brush element is later to be formed about a mandrel the central portion of such strip may advantageously be relieved, as shown in Bickel Patent No. 1,963,044, with slots 6 as shown in Fig. 3, to facilitate such forming. As also shown in such Bickel patent, it has been known to form teeth in the edges of a channel member for the purpose of later holding brush material in position. Teeth formed in accordance with the present invention, however, have numerous advantages. In the first place, being formed adjacent but within the edge of the metal strip, danger of such edges breaking down when the channel member is formed about a mandrel is greatly lessened. Furthermore, as shown in Fig. 3a, the teeth are so shaped that the outer edges of the holes punched in the strip at their formation are substantially parallel to the outer edges of such strip. This also tends to lessen the danger of the outer edge of the strip breaking down when such strip is shaped to channel form and circularized about a mandrel. The shape of a tooth may thus be substantially that of a right-angled blunt pointed triangle. Corrugations 7 in the edges of such strip, as shown in Fig. 4, preferably at points unopposed by the holes punched therein, further serve to prevent breakdown of such outer edges when the brush is circularized. In other words, the edges of the channel are pre-stretched between the teeth permitting circularizing without undue strain concentration. When the channel is to be circularized to a relatively small diameter it is desirable that the holes and teeth punched therein have also at least a portion of their inner edges adjacent the bases of said teeth substantially parallel to the outer

edges of the channel to eliminate any danger of tearing the metal (see Fig. 3).

After the teeth 2 have been punched in said strip, brush material 4 is laid between said teeth transversely of said strip and the wire 3 laid upon said material and lengthwise of said strip between said rows of teeth. This strip is then formed into channel about said wire as shown in Fig. 5, and the brush tufts trimmed to a uniform length. The teeth 2 will preferably overlap so as to more securely hold the wire and brush material in place. Said teeth may be punched out not quite opposite each other in the two rows to facilitate such overlapping. Reference may be had to Bickel Patent 1,963,045 for further details as to the method of forming such channel.

To still more securely seat the brush material in the channel member, it is within the purview of this invention to imbed such brush material in a layer of vulcanized rubber within the channel member. One convenient way of obtaining this end is illustrated in Fig. 8 where a band of unvulcanized rubber 8 such as electrician's tape, containing vulcanizing ingredients, is shown in place between the rows of teeth 2 of the metal strip 5. The brush material 4 is then placed transversely of the strip, wire 3 laid in position and the strip shaped to channel form, as illustrated in Fig. 5, whereupon it may be heated to vulcanize the rubber as by circularizing the same about a heated mandrel. When shaping said strip to channel form the unvulcanized rubber is forced into all interstices and the brush material becomes firmly imbedded therein as shown in Fig. 9. Upon subsequent vulcanization a tough, resilient and protective seating is formed for the brush material which adds greatly to the life of the brush in use.

It is apparent that while the brush elements of this invention are especially suited for use in the formation of spiral rotary brushes they may also be advantageously employed in the form of straight or circular sections. Instead of the wire retaining element, equivalents such as stamped rings in the case of circular brushes and twine may be employed in manners well known to the art. Also, any of the usual brush materials such as bristles, tampico fibre, and buffing cloth may be employed.

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

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

1. The method of constructing a brush element which comprises corrugating the edges of a metal strip, punching a row of flat teeth adjacent but within each edge of said strip, the faces of such teeth being disposed transversely to the edges of said strip, placing brush material between said teeth and transversely of said strip, placing a wire upon said brush material and lengthwise of said strip between said rows of teeth, shaping said strip to channel form about said wire, and forming such channel into circular section about a mandrel.

2. The method of constructing a brush element

which comprises placing a plastic material along a strip of metal, placing brush material transversely of said strip, placing a wire centrally and lengthwise of said strip, shaping said strip to channel form about said wire and treating to harden said plastic material.

3. The method of constructing a brush element which comprises punching a row of flat teeth adjacent but within each edge of a metal strip, the faces of such teeth being disposed transversely to the edges of said strip, placing unvulcanized rubber containing vulcanizing ingredients between said rows of teeth, placing brush material between said teeth and transversely of said strip, placing a wire upon said brush material and lengthwise of said strip between said rows of teeth, forming said strip into channel form about said wire and applying heat to effect the vulcanization of said rubber.

4. The method of constructing a brush element which comprises corrugating the edges of a metal strip, placing brush material transversely of said strip, placing a wire upon said brush material centrally of said strip, shaping said strip to channel form about said wire, and circularizing said channel to stretch such corrugated edges.

5. In a method of constructing a rotary brush, the steps comprising corrugating the edges of a flat strip, punching a row of flat teeth adjacent but within each such edge and spaced between such corrugations, the faces of such teeth being disposed transversely to the edges of such strip, placing brush material between said teeth and transversely of said strip, placing a wire upon said brush material and lengthwise of said strip, forming said strip into channel form about said wire, and circularizing such channel to stretch such corrugated edges.

6. In a method of constructing a rotary brush, the steps comprising assembling a brush element having a metal channelform back with corrugated edge portions and then circularizing such element with resultant stretching of such corrugated edges of such metal back.

7. A brush element of the character described comprising a channel having uninterrupted edges, teeth punched inwardly from the respective sides of said channel and having their faces disposed transversely to the edges of said channel, a retaining member disposed lengthwise within said channel and held in place beneath said teeth, and brush material held in said channel by said retaining member, the holes left in the sides of said channel after forming said teeth having their outer edges parallel to the edges of said channel.

8. A brush element of the character described comprising a channel having uninterrupted edges, teeth punched inwardly from the respective sides of said channel and having their faces disposed transversely to the edges of said channel, a retaining member disposed lengthwise within said channel and pressed down by inclined edges of said teeth, and brush material held in said channel by said retaining member, the holes left in the sides of said channel after forming said teeth having their outer edges and a portion of their inner edges adjacent the bases of said teeth parallel to the edges of said channel.

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