March 2, 1948. N. E. NIELSEN ET AL 2,436,934

BRISTLE TUFT AND HOLDING BAR

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Fig. 1

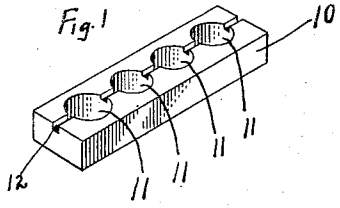


Fig. 2

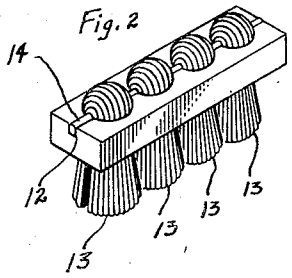


Fig. 3

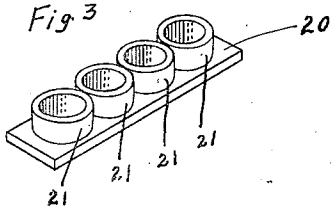


Fig. 4

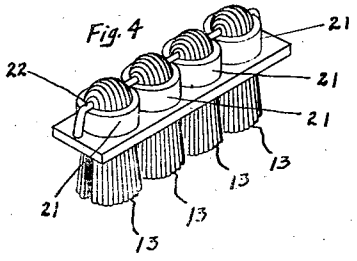


Fig. 5

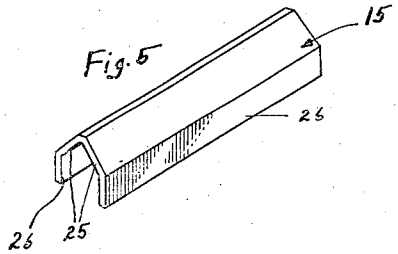


Fig. 6

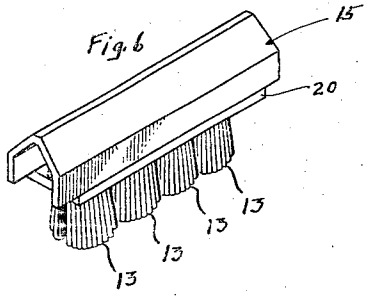


Fig. 7

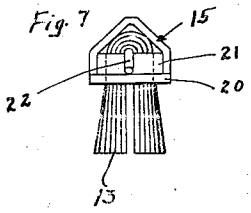
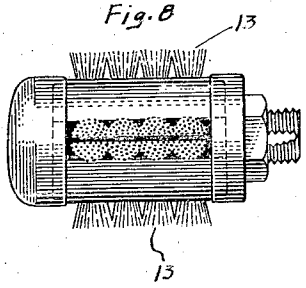


Fig. 8



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Fig. 9

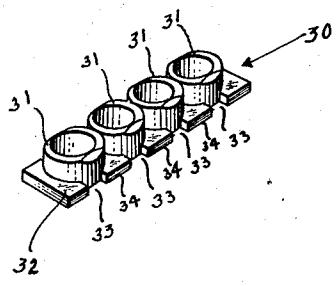


Fig. 10

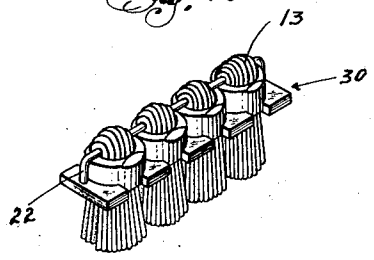


Fig. 11

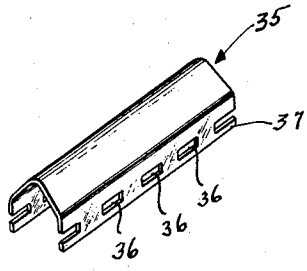


Fig. 12

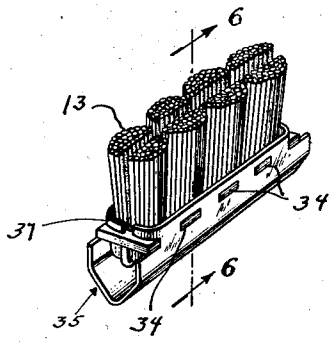


Fig. 13

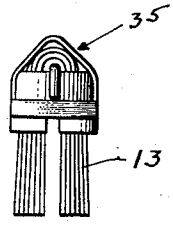
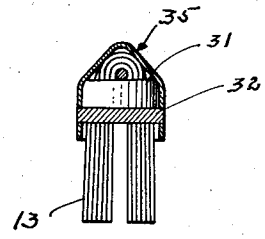


Fig. 14



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Patented Mar. 2, 1948 2,436,934

UNITED STATES PATENT OFFICE

2,436,934

BRISTLE TUFT AND HOLDING BAR

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Application April 18, 1945, Serial No. 588,970

4 Claims. (Cl. 15—199)

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This invention relates to novel articles of manufacture. More particularly the invention is directed to novel brushes. In one of its very specific aspects, this invention is directed to brushes of the type commonly employed in the cleaning of small diameter tubes and the like.

Heretofore brushes have been employed for a wide variety of purposes in various and sundry arts. Demountable brush elements of various constructions have been used in the cleaning of small diameter tubes. The patents to Wilson, 2,221,853 of November 19, 1940, and to Anderson et al., 2,324,461 of July 13, 1943, disclose different brush construction for this purpose. Due to the number of operations and the types of operations required to manufacture the brushes disclosed in said patents, maximum production and therefore minimum cost per unit have not been fully realized.

Therefore it was in order to attain these goals, that the present invention has been made. Briefly, the novel brushes embodying this invention comprise a bristle support having a plurality of openings therethrough. Individual tufts of looped bristles extend through said openings. A retaining rod or rigid pin passes through the loops and a generally V-shaped channel extends along the support and has its lengthwise edges secured thereto and its inner face close to the looped portions of the tufts.

In the practice of this invention, the looped portions of the bristles are located in said openings through a support. The support may be a narrow rod of appreciable thickness or it may be a thin narrow element which may be punched out to provide retaining collars. After the tufts are located in said openings, a rigid retaining pin is inserted through the loops thereof. Then a separate unitary channel element is mounted on said support, or overlaps the looped portions of said tufts of bristles and is secured to said support in any desired manner, as by welding or the like.

A number of specific forms of this invention are shown in the drawings, wherein:

Figure 1 represents a perspective view of one form of support which may be employed in the practice of this invention.

Figure 2 represents a perspective view of the support shown in Figure 1 and having four tufts of bristles assembled therewith and having a retaining pin in position.

Figure 3 represents a perspective view of another form of support which may be employed in place of the support shown in Figure 1.

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Figure 4 represents a perspective view of the support shown in Figure 3 and having four tufts of bristles assembled therewith and having a retaining pin in position.

Figure 5 is a perspective view of a retaining channel which may be employed in the practice of this invention.

Figure 6 is a perspective view of a novel brush embodying this invention and employing the channel shown in Figure 5, and the assembly shown in Figure 4.

Figure 7 is an end view of the brush shown in Figure 6.

Figure 8 is an assembly view of a plurality of the novel brushes mounted in a holder.

Figure 9 is a perspective view of a support and is a modification of the support shown in Figures 1 and 3.

Figure 10 is a perspectitve view of the support shown in Figure 9 and having four tufts of bristles assembled therewith with a retaining pin in position.

Figure 11 is a perspective view of another retaining channel which may be employed in the practice of this invention.

Figure 12 is a perspective view of a novel brush embodying this invention and employing the channel shown in Figure 11 and the assembly shown in Figure 10.

Figure 13 is an end view of the brush shown in Figure 12.

Figure 14 is a cross sectional view taken on the line 6—6 of Figure 12.

According to this invention there may be provided an elongated narrow support 10 which as shown in Figure 1, may be an elongated bar of appreciable thickness. The bar 10 may have a plurality of, and as shown four aligned openings therethrough. One face of said bar 10 has a recess 12 to accommodate a retaining pin. This recess 12 may be omitted if desired. A gang drill may be employed to provide the four openings 11 in a single drilling operation. If the recess 12 is desired an additional operation, namely a milling operation is required and may be carried out either before or after the drilling operation. After the drilling operation, individual folded or looped tufts of bristles and preferably stiff metal bristles 13 are inserted into the openings 11 from the external face of bar 10. The tufts are forced through their respective apertures until the inner faces of the loops thereof clear the inner face of support 10. Then a rigid retaining pin 14 is passed through said loops and if the bar 10 has the recess 12 therein, said pin is located in

said recess. The ends of the rigid retaining pin 14 preferably terminate flush with the ends of bar 10. The tufts may then be drawn firmly against pin 14 at the looped portions thereof. The pin 14 may be welded to the bar 10 if desired to prevent accidental displacement thereof. The assembly shown in Figure 2 may have a channel 15 coupled therewith in the manner shown in Figures 6 and 7.

Instead of employing the support 10 in Figures 1 and 2, I may and prefer to employ a support 20 as shown in Figures 3, 4, 6 and 7. The support 20 may consist of a relatively thin flat bar of steel, brass or other metal. This flat bar may be punched out to provide a plurality of, and as shown four openings therein and collars 21 extending therefrom. The supports 10, 20 and 30 and the channels 15 may be composed of any other rigid material. Among some of the other materials of which supports 10 and 20 and channels 15 may be composed are the so-called plastic materials, such as the resinous organic condensation reaction products of phenolformaldehyde and the like and when said resinous organic condensation products are employed, these elements may be produced in a single molding operation, thus eliminating any machining operation.

Inserted through the collars 21 are the folded or looped tufts of bristles 13. The insertion is continued from the external face of support 20 towards the free ends of collars 21 and is stopped when the inner surface of said loops are just slightly beyond said free ends. Then a retaining pin 22 is inserted in the spaces between the inner faces of said tufts and the free ends of said collar 21 and the free ends of said pin 22 may be bent over the end collars as shown. The ends of pin 22 may be welded to the end collars or to the bar if desired. In like manner, the pin 14 may be of such length that it may be bent over the ends of support 10 and may be welded thereto if desired. Then the ends of each tuft are pulled forwardly to force firmly the looped portions of the tufts against the retaining pin 22. If desired, the collars 21 may have a recess therethrough at the free ends thereof to provide a recess similar to the recess 12 and this recess may serve the same purpose as recess 12. The channel 15 whose length is preferably greater than the corresponding dimension of the support 20 is secured thereto as shown in Figures 6 and 7.

The channel 15 preferably consists of an elongated element 25 of generally V shape having a pair of longitudinally extending side members 26 integral therewith and extending from the spaced ends of the sides thereof in substantially parallel relationship to each other. The distance between the inner face of the parallel sides 26 is preferably greater than the thickness of the looped portion of the tufts. In assembly the channel member 15 is preferably so disposed that the inner face of element 25 is contiguous with or in close proximity to the looped portions of the tufts 13 and the parallel sides 26 extend to the support, with the longitudinal edges of sides 26 extending along the inner face of the support. The channel 15 is preferably centered longitudinally to provide a short section thereof extending beyond the extremities of the support employed.

As shown in Figures 6 and 7, the inner face of channel 15 abuts or is close to the outer faces of the looped portions of the tufts and the longitudinal edges of said channel 15 abut or are close to the inner face of support 20 along the length thereof, and the outer faces of the sides of said

channel are substantially flush with the outer sides of bar 20. In this position, the channel 15 is secured to the support in any convenient manner as by welding or the like at the juncture between the longitudinal edges of channel 15 and the outer marginal portions of the inner face of support 20 close thereto.

Instead of employing the support shown in Figures 1 and 3, I may and prefer to employ a support 30 shown in Figures 9, 10 and 12–14. Support 30 may consist of a relatively thin flat bar or plate of steel, brass or other rigid material and preferably a metal. This flat bar may be punched out to provide a plurality of and as shown, four openings therein, and collars 31 extending perpendicularly from a cross plate 32 which in said punching operation has been provided with inwardly extending slots or cut-outs 33, thus providing a plurality of tabs 34. Inserted through the collars 31 are the folded or looped tufts of bristles 13. The insertion continues from the external face of support 30 towards the free ends of collars 31 and is stopped when the inner surface of said tufts are just slightly above said free ends. Then a retaining pin 22 is inserted in the space between the inner face of said tufts and the free ends of collars 31, and the free ends of the pin 22 may be bent over the end collars as shown. If desired, the ends of pins 21 may be welded to the end collars or to the cross piece 32. If desired, the collars 31 may have an aligned recess therewith in the inner ends thereof to provide a recess similar to the recess 12 shown in Figures 1 and 2 and these recesses may serve the same purpose as do the recess 12. The retaining channel shown in Figure 11 is similar to the channel 15 and differs therefrom in that its substantially parallel sides are wider than the corresponding parts of channel 15 and also have a plurality of openings 36 therethrough adapted to accommodate the tabs 34 and with a slot at each end of each of the said parallel sides adapted to accommodate the end portions of said cross piece 32 and to provide clamping and hold fingers 31. This channel 35 shown in perspective in Figure 11, like channel 15, preferably consists of an elongated element of generally V-shape having a pair of longitudinally extending side members integral therewith and extending from the spaced ends of the sides thereof in substantially parallel relationship to each other. In assembly the retaining member 35 is preferably so disposed that the inner face of the V-shaped channel thereof is approximately contiguous with or in close proximity to the looped portions of the tufts 15. The parallel sides thereof extend towards and beyond the cross piece 32 with the tabs 34 extending into the slots 36 and making a snug frictional connection therewith whereby the channel 35 is frictionally locked to the assembly shown in Figure 10. In order to further assure said locking and to provide a more rigid assembly, fingers 37 are bent over toward each other and across a face of the cross piece 32 until they are contiguous or in close proximity with the end tufts. In providing the brush shown in Figures 12 to 14, I prefer that the channel be composed of a spring metal so that the sides thereof may be sprung in order to frictionally lock the same on to the cross piece 32. For this purpose, I prefer that the distance between the parallel sides of channel 35 be somewhat less than the width of the cross piece 32.

These novel brushes may be mounted in any desired brush holder and preferably in a brush

holder of the type disclosed in U. S. Patent 2,324,461 and Figure 8 illustrates these brushes in a holder of the type shown in that patent.

While this invention has been described in detail it is not to be limited thereby because various changes and modifications may be made without departing from the spirit thereof.

We claim:

1. A brush comprising a support bar, said bar having a plurality of openings therethrough, a collar extending from said support at each of said openings, looped tufts of bristles arranged in said collars and extending through said openings, a retaining pin extending through the looped portions of said tufts and along the free ends of said collars and a channel member overlapping said looped portions and said collars, the effective length of said retaining pin located entirely inside of said channel member, said channel member located entirely outside of said collars, and means for securing said channel member to said bar.

2. A brush comprising a support bar, said bar having a plurality of openings therethrough, a collar extending from said support at each of said openings, looped tufts of bristles arranged in said collars and extending through said openings, a retaining pin extending through the looped portions of said tufts and along the free ends of said collars and a channel member overlapping said looped portions and said collars, the effective length of said retaining pin located entirely inside of said channel member, said channel member located entirely outside of said collars, said bar having a plurality of slots therein defining retaining tabs, said channel member having a plurality of openings therethrough, said tabs located in said openings.

3. A brush comprising a support bar, said bar having a plurality of openings therethrough, a collar extending from said support at each of said openings, said bar having a plurality of spaced slots in each side thereof defining a plurality of oppositely extending tabs, looped tufts of bristles arranged in said collars and extending through said openings, a retaining pin extending through the looped portions of said tufts and

along the free ends of said collars and a channel member overlapping said looped portions and said collars, said channel member having a portion of generally V-shape in cross section and a pair of generally parallel sides extending therefrom and having a plurality of openings therein, said generally parallel sides of said channel extending beyond said bar, said tabs located in said openings, said portion being located in close proximity to the looped ends of said tufts.

4. A brush comprising a support bar, said bar having a plurality of openings therethrough, a collar extending from said support at each of said openings, said bar having a plurality of spaced slots in each side thereof defining a plurality of oppositely extending tabs, looped tufts of bristles arranged in said collars and extending through said openings, a retaining pin extending through the looped portions of said tufts and along the free ends of said collars and a channel member overlapping said looped portions and said collars, said channel member having a portion of generally V-shape in cross section and a pair of generally parallel sides extending therefrom and having a slot through each end thereof defining a finger and a plurality of openings therethrough, said openings being in alignment with said slots and located therebetween, said sides of said channel extending beyond said bar, said tabs located in said openings, said fingers extending over said bar and being close to said tufts, said portion being located in close proximity to the looped ends of said tufts.

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FRED G. STIRLING.

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