

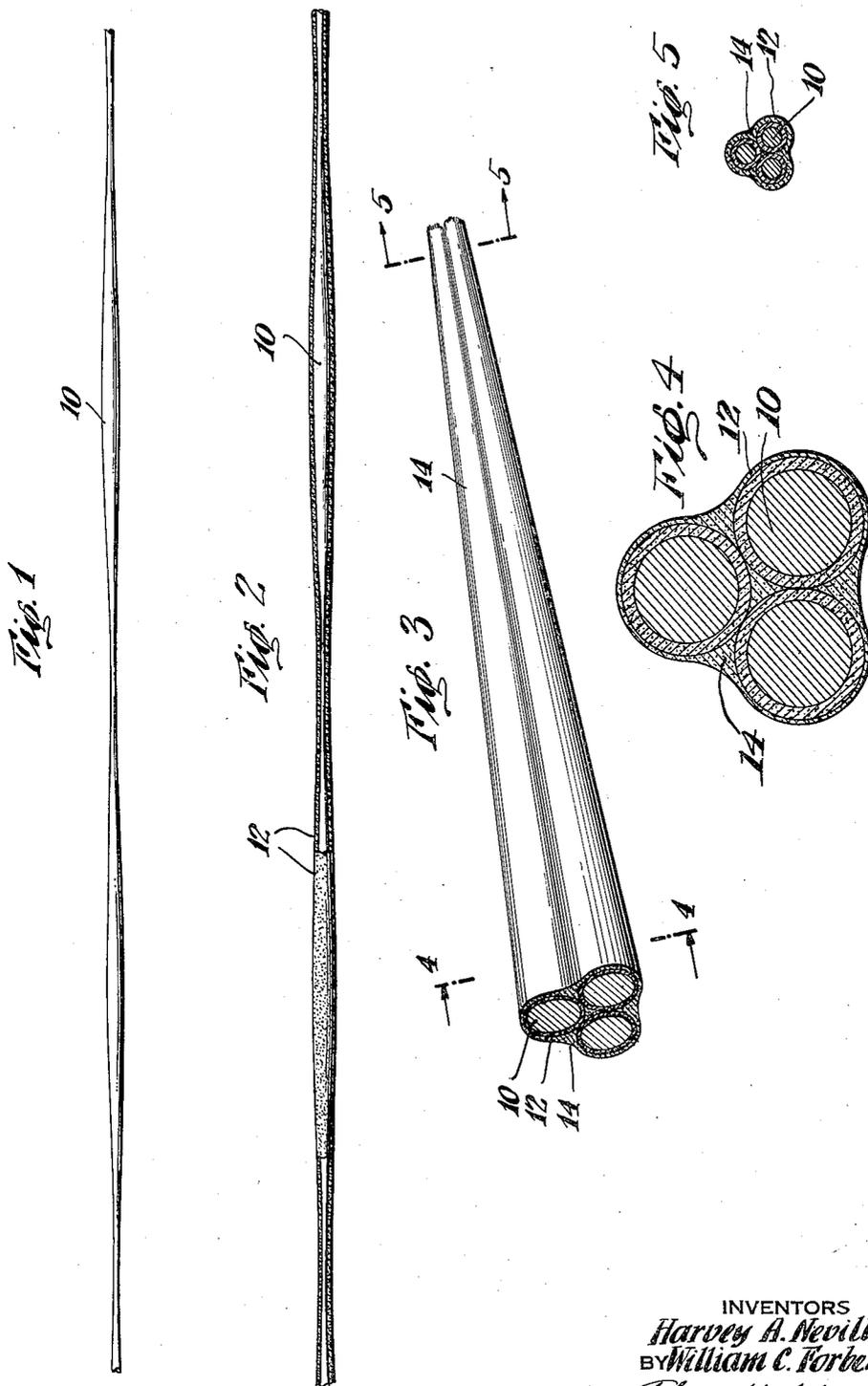
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ARTIFICIAL BRISTLE AND METHOD OF MAKING SAME

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# UNITED STATES PATENT OFFICE

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## ARTIFICIAL BRISTLE AND METHOD OF MAKING SAME

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9 Claims. (Cl. 154—2)

In our co-pending application, Ser. No. 147,312, filed June 9, 1937, we describe a process of making artificial bristles by coating several (preferably three) strands of a textile fiber with a resinous material and then aggregating such strands in parallel arrangement into a unitary bristle structure which is cut to length after the resin is dried and baked. In that application we describe a process of tapering the bristles by varying the amount of resin applied to the body.

According to the present invention, we make tapered bristles by providing a yarn or strand element which itself is tapered over a length approximately equal to the desired length of the bristles. As in the earlier application, these strands are coated with a resinous body and then a plurality (preferably three) of such strands are brought together so that the resin serves to bond them into a unitary structure, after which they are dried, baked and cut into lengths. Of course, care should be taken so that the enlarged portions of the tapered strands are brought together so that the final bristle has a taper which is a function of the sum of the tapers of the separate strands.

We have also found it desirable in the manufacture of such bristles to apply a thin protective coating to the bristle after the resin is dried and prior to the final baking operation. By the use of such protective coating, the bristles can be dried in large bundles or aggregates without danger of the resin of one bristle adhering to the resin of the next. For such purpose, various water-soluble, non-thermoplastic bodies may be employed, such for example, as gelatin or glue or it may be possible to use a flaxseed mucilage for this purpose. Such coating should be dried before the bristles are given their final baking.

For the purpose of illustration, a strand of fiber for use in connection with this invention may, for example, be a cellulose acetate yarn which may have an average diameter equal to that of a 150 denier yarn and ranging from a maximum diameter approximately that of a 225 denier yarn down to a minimum diameter equal to that of a 75 denier yarn. The distance from one point of maximum diameter to the next point of maximum diameter may for example be 10 inches so that the bristles when cut apart will each have a length of approximately 5 inches. As is usual with such yarns, the yarn which we employ is ordinarily made up of a number of acetate filaments.

An example of the resin varnish which can be used for coating this material is one prepared

from 100 pounds of oil-soluble phenolic resin and having a China wood content which may range from approximately 12 gallons up to approximately 25 gallons and this range may be further modified if desired. The oil and resin are cooked together to produce a very quick-drying varnish and some pigment such as carbon black may be included. As is usual with such products, the varnish is thinned with any usual type of thinner, for example to the point where the resulting product contains between 50% and 85% of solids. The thinner solutions can ordinarily be used for batch dipping processes, whereas, the thicker solutions are needed for continuous drawing.

In the drawing, we show a strand of artificial bristle. The drawing is very much enlarged and possesses, for clarity, a precision of line which does not obtain in the actual bristle.

Fig. 1 is a front view showing a single strand of uncoated tapered textile fiber; Fig. 2 is a front view partly in section showing a single strand of the tapered textile fiber with a preliminary coating; Fig. 3 shows a perspective view showing a group of three coated tapered strands and an end view showing the trefoil cross section of the bristles, and Figs. 4 and 5 are sections taken along the lines 4—4 and 5—5 of Fig. 3.

Ordinarily, the distance along the strand between the points of maximum diameter is approximately 10 inches. Bristles cut from such strands, therefore, generally run to about 5 inches in length.

The basic tapered strand of textile fiber is indicated in the drawing by the numeral 10. This tapered strand is coated with a preliminary resinous coating 12. Groups of strands coated as shown in Fig. 2 are then brought together, preferably in the trefoil cross sectional pattern shown in Fig. 3 and are dipped in another coating 14 of a resinous composition. Care must be taken to have the tapered strands grouped together so that the taper of the final bristle is a function of the tapers of the several strands.

As stated, we prefer to use three strands of the yarn so that the resulting bristle will have a trefoil cross-section as we have found that this shape of bristle has particular advantages. Further details in regard to the various types of resin that may be employed and the detailed steps of operation are set forth in our earlier application above referred to.

What we claim is:

1. An artificial bristle comprising a plurality

of strands of tapered textile fiber running approximately parallel to one another and bonded together by a coating of resinous substance to form a bristle-like aggregate having a taper  
5 which is a composite of the tapers of the several strands.

2. An artificial bristle as specified in claim 1 wherein the textile fiber is in the form of substantially continuous strands tapering toward  
10 one end.

3. An artificial bristle as specified in claim 1 wherein the textile fiber consists essentially of a tapered strand of cellulose acetate.

4. An artificial bristle of trefoil cross section  
15 comprising three tapered strands of cellulose acetate, said strands being in substantially parallel arrangement with their large ends together and being bonded together by means of a resinous substance to form a unitary structure having  
20 a taper which is a function of the sum of the tapers of the three tapered strands.

5. A process for forming artificial bristles which comprises coating tapered strands of a textile fiber with a resinous solution, bringing  
25 such strands together so that the resinous substance binds them into an aggregate having a taper which is a composite of the tapers of the

several strands, drying the strands, coating the aggregated strands with a water-soluble, non-thermoplastic substance, drying and baking the coated aggregate and cutting the aggregate at approximately the places of maximum and minimum diameter to form bristles of desired lengths. 5

6. A process as specified in claim 5 wherein the water-soluble, non-thermoplastic liquid comprises gelatin.

7. A process as specified in claim 5 wherein  
10 the water-soluble, non-thermoplastic liquid comprises glue.

8. A process as specified in claim 5 wherein the water-soluble, non-thermoplastic liquid comprises flaxseed mucilage. 15

9. A process for forming artificial bristles which comprises coating tapering strands of a textile fiber with a resinous solution, bringing such strands together so that the resinous substance binds them into an aggregate having a  
20 taper which is a composite of the tapers of the several strands, drying and baking the coated aggregate and cutting the strands at approximately their widest and narrowest portions.

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