Dec. 5, 1967 S. M. PECK ET AL 3,356,419

METHOD OF MAKING A DISPOSABLE BRUSH

Filed Aug. 27, 1965 2 Sheets-Sheet 1

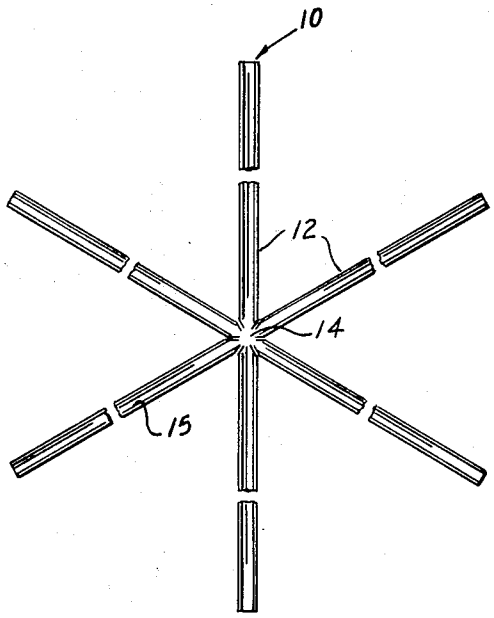

FIG.-1

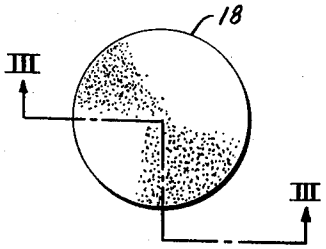

FIG.-2

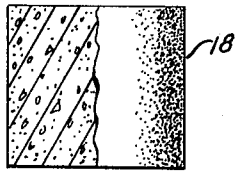

FIG.-3

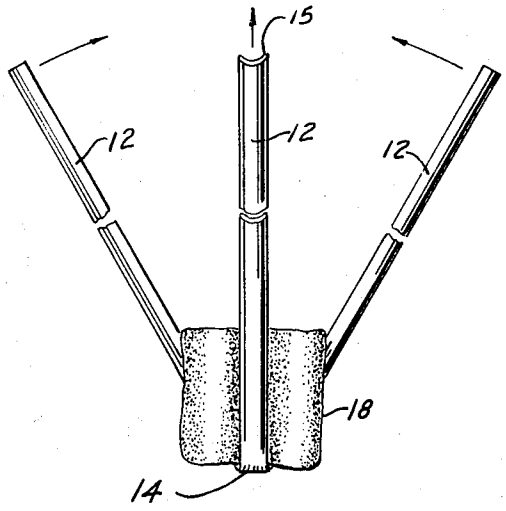

FIG.-4

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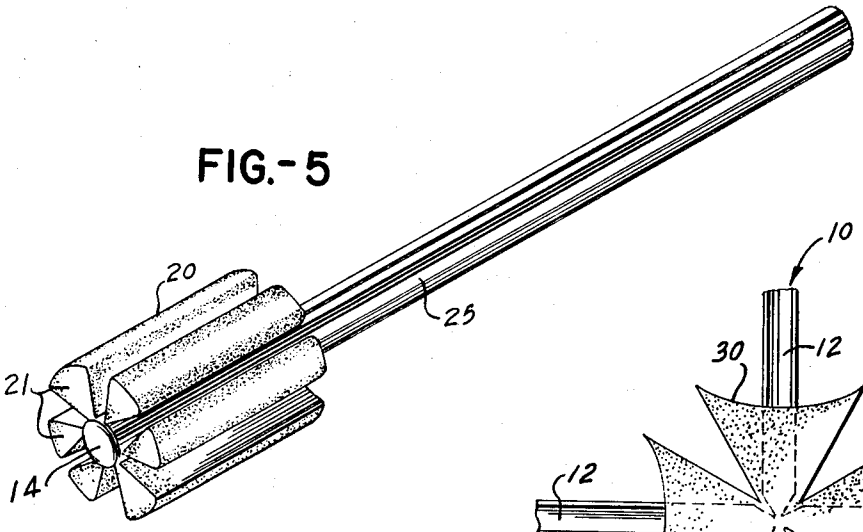
FIG.-5



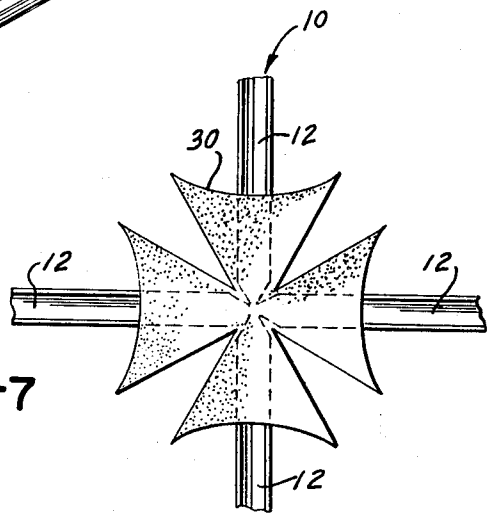


FIG.-7

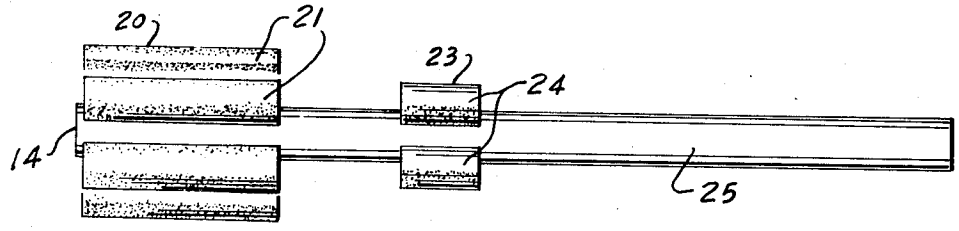


FIG.-6

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METHOD OF MAKING A DISPOSABLE BRUSH

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9 Claims. (Cl. 300—21)

This invention relates generally to brushes and relates more particularly to new and improved single-use, disposable brushes, and to a new and improved method of making such brushes.

It is therefore an object of this invention to provide a new and improved brush.

Another object of this invention is to provide a new and improved brush which may be produced simply and inexpensively, and yet is of rugged construction capable of rendering a maximum amount of service during use.

Another object of this invention is to provide a new and improved single-use, disposable brush.

Another object of this invention is to provide a new and improved single-use, disposable brush having particular utility for gum massage or as a toothbrush.

Another object of this invention is to provide a new and improved single-use, disposable brush, wherein the brush head dissolves in water.

Another object of this invention is to provide a new and improved method of making a brush.

Another object of this invention is to provide a new and improved method of making a brush which is simple and inexpensive, and yet produces a brush of rugged construction capable of rendering a maximum amount of service during use.

Another object of this invention is to provide a new and improved method of making a single-use, disposable brush.

Another object of this invention is to provide a new and improved method of making a single-use, disposable brush having particular utility for gum massage or as a toothbrush.

Another object of this invention is to provide a new and improved method of making a single-use, disposable brush wherein the brush head dissolves in water.

Objects and advantages of the invention are set forth in part herein and in part will be obvious herefrom or may be learned by practice with the invention, the same being realized and attained by means of the parts, steps, process, instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, steps, process, combinations, constructions, arrangements and improvements herein shown and described.

Briefly described, the present invention is directed towards a new and improved brush, which is preferably of the single-use, disposable type, and to a new and improved method for producing such a brush which comprises: forming a blank of sheet material with a plurality of radially spaced finger-like elements integrally connected to a common central segment, the finger elements and central segment being generally coplanar; placing a preformed piece of compressible material onto the central segment of the blank; folding the free ends of the finger elements around the compressible material and pressing them towards each other until the finger elements are substantially perpendicular to the common central segment, the finger elements thereby compressing and gripping spaced portions of the compressible material, the uncompressed portions of the compressible material extending radially from the finger elements so as to form a brush head; and sealing together the portions of the finger elements remote from the brush head, at least at their ends and preferably throughout their entire lengths so as to form a handle for the brush.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restrictive thereof. Thus, while the invention in its preferred form relates to a single-use, disposable brush, the principles underlying the invention are not limited to such usage. For example, the method of this invention could equally well produce a shoe polish applicator, a clothes brush for removing lint and other foreign particles from clothes, or a carpet brush. As another example, the method could be used to produce a brush wherein the compressible material of the brush head dissolves upon being immersed in water for a short period of time. Such a brush would be ideally suited for cleaning toilet bowls since the brush head would dissolve upon completion of the cleaning function and could be disposed of by simply flushing the toilet. Other uses will be readily apparent to those skilled in the art.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate preferred brush embodiments produced in accordance with the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

FIGURE 1 is a fragmentary top plan view of a blank of sheet material, formed into six finger elements preferably curved along their longitudinal edges, which constitute the brush head gripping means and handle means of a brush produced in accordance with this invention;

FIGURE 2 is a plan view of a suitable compressible material which constitutes the brush head of a brush to be produced in accordance with this invention;

FIGURE 3 is a view taken along line III—III of FIGURE 2, partly sectional and partly in elevation;

FIGURE 4 is a fragmentary elevation illustrating the compressible material shown in FIGURES 2–3 positioned on the central segment of the blank shown in FIGURE 1 and the free ends of the finger elements of the blank being folded about the compressible material, so as to compress and grip spaced portions of the material, the remaining uncompressed portions extending radially from between the finger elements;

FIGURE 5 is a perspective view illustrating a brush embodying this invention, and made in accordance with the method illustrated in FIGURES 1–4;

FIGURE 6 is an elevation of a modified brush produced in accordance with this invention, having two separate brush heads gripped by the finger elements; and

FIGURE 7 is a fragmentary plan view illustrating modified configurations for the blank of sheet material and for the compressible material, for use in constructing a brush in accordance with the invention.

Referring now in greater detail to the method of this invention, the practice of which is illustrated in the accompanying drawings, a blank of sheet material, preferably of a substantially rigid plastic, or other suitable material, designated generally by reference numeral **10**, is formed, by a suitable stamping, die-cut or molding operation, into a plurality of finger-like elements **12** integrally connected to and extending from a common central segment **14**, and being geerally co-planar therewith. Fingers **12** are preferably curved, as by scoring or other suitable means, along their longitudinal edges **15** so that when folded together (as more fully described hereinafter) the fingers will form an elongated handle member having a curvilinear transverse section, preferably circular in shape.

A preformed piece of suitable material, which is to form a brush head, is placed onto the central segment **14** of the blank **10**. As here preferably embodied, this material comprises a cellular, fibrous or foam sponge or sponge-like, compressible material **18**, preformed into a cylindrical shape, as illustrated in FIGURES 2 and 3.

The free ends of fingers **12** are thereafter folded around the material **18** and are pressed towards each other until the finger elements are substantially perpendicular to the central segment **14**. The compressive pressure exerted by the fingers during the folding operation compresses and grips spaced portions of the material **18**, the uncompressed portions being thereby caused to radiate in star-like fashion outwardly from between the fingers, thereby forming a brush head **20**, comprising a series of longitudinal sectors **21**.

Fingers **12** serve to firmly grip the compressible material forming the brush head and, when they are brought together and are thereafter bonded, or otherwise suitably sealed together, preferably form an elongated, generally cylindrical, handle member **25**. When fingers **12** are thus brought together, the segment **14** of the blank **10** forms the end of the brush head, as illustrated in FIGURES 5 and 6. It will be understood that fingers **12** may be suitably sealed together along their entire length, or may be spot sealed at the ends only.

FIGURE 6 illustrates a modified brush constructed in accordance with the invention wherein a second piece of compressible material is also gripped by the fingers **12** in the manner previously described to form a second brush head **23** comprised of a series of longitudinal sectors **24**.

It will be understood to those of ordinary skill in the art that a variety of brush shapes can be obtained in accordance with the method of this invention by varying the design and shape of the blank **10**; or by varying the number of finger elements **12**; or by varying the configuration of the piece of compressible material **18**. Also, material **18** may be preformed with longitudinal pie-shaped sectors cut out for receiving the fingers **12**, thereby facilitating the closing action of fingers **12** whereby the free ends thereof are brought together so as to form handle **25**.

FIGURE 7 illustrates a piece of compressible material **30** having a plurality of edges and the blank of sheet material **10** is formed with only four fingers **12**. In this modified embodiment, upon folding the fingers **12** together, the material **30** will be deformed and caused to radiate similar to the brush of FIGURE 5, except that the longitudinal edges of the brush head thus formed would be pointed rather than rounded.

While a cellular, fibrous or foam sponge material is preferred for forming the brush head, it will be understood that other equivalent compressible materials may be used, the particular material selected and its degree of compressibility or resiliency depending upon the application intended for the brush.

When the brush to be produced in accordance with the invention is to be used as a toothbrush, gum massaging brush, or the like, a particularly suitable material is an expandable polystyrene foam, such as that sold under the trademark Styrofoam by the Dow Chemical Co., or an expandable cellular acetate material. Examples of cellular acetate are sold under the trademarks Strux (Aircraft Specifications Co.) and Dylite (Koppers Co.). These materials when wetted expand to more than double their original size and yield a cellular, porous, resilient material which is ideally suited for massaging the user's gums. Also, the material of the brush head may be impregnated with a suitable liquid or paste dentrifrice for cleaning the user's teeth.

Alternatively, the brush head may be formed of water-soluble foam material, such as hydroxyethyl cellulose, polyvinyl alcohol or other equivalent water soluble foams. Examples of these foams are sold under the trademarks Cellosize (Union Carbide Co.) and Vinol (Air Reduction Co.), respectively. It has been found that use of these materials in the brush head provides a brush ideally suited for use in cleaning toilet bowls. After usage for a short period of time, the head dissolves into a gelatinous mass and may be disposed of by simply flushing the toilet. For added cleaning power, the material may be impregnated or coated with a suitable detergent. For other applications, non-water-soluble foams would be suitable, such as, for example, polyurethane foams, expandable polystyrene foams, cellular acetate, and other equivalent foams. Some examples of these foams have previously been stated.

It will thus be seen that the method of the present invention produces a brush or rugged construction and yet does so simply and inexpensively, whereby the concept of a single-use, disposable brush becomes economically feasible.

The invention in its broader aspects is not limited to the specific steps, process, or constructions herein shown and described but departures may be made therefrom within the scope of the accompanying claims, without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. A method for producing a brush which comprises: forming a blank of sheet material with a plurality of radially spaced finger-like elements integrally connected to a common central segment; placing a preformed piece of compressible material onto said central segment of said blank; folding the free ends of said finger elements around said material and pressing said finger elements towards each other so as to grip said material and form it into a brush head; and sealing said finger elements together so that the portions thereof remote from the brush head form a handle for said brush.

2. A method for producing a single-use, disposable brush, comprising the steps of: forming a blank of sheet material with a plurality of radially spaced finger-like elements integrally connected to a common central segment, said finger elements and said central segment being substantially co-planar; placing a pre-formed piece of compressible material onto said central segment of said blank; folding the free ends of said finger elements about said compressible material and pressing said free ends towards each other until said finger elements are substantially perpendicular to said central segment, said finger elements thereby compressing and gripping spaced portions of said compressible material, the uncompressed portions of said compressible material extending radially outwardly from between said finger elements so as to form a brush head; and bonding together the portions of said finger elements remote from the brush head to thereby form a handle for said brush.

3. A method as claimed in claim **2**, wherein said finger elements are curved along their longitudinal edges so as to form a generally cylindrical brush handle.

4. A method as claimed in claim **2** wherein said compressible material is pre-formed into a generally cylindrical shape and the spaced compressive pressure exerted by said finger elements forms a brush head of spaced longitudinal sectors extending radially outwardly from between said finger elements.

5. A method as claimed in claim **2** wherein said compressible material comprises a water-soluble foam.

6. A method as claimed in claim **2** wherein said compressible material comprises a non-water-soluble foam.

7. A method as claimed in claim **2** wherein said compressible material comprises an expandable non-water-soluble foam.

8. A method as claimed in claim **2** wherein said compressible material comprises expandable cellular acetate.

9. A method as claimed in claim **2** wherein said compressible material comprises an expandable polystyrene foam.

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