Dec. 16, 1952 H. GANTZ ET AL 2,621,369

METHOD OF MAKING HAIRBRUSHES

Filed Feb. 13, 1948

2 SHEETS—SHEET 1

FIG. 1

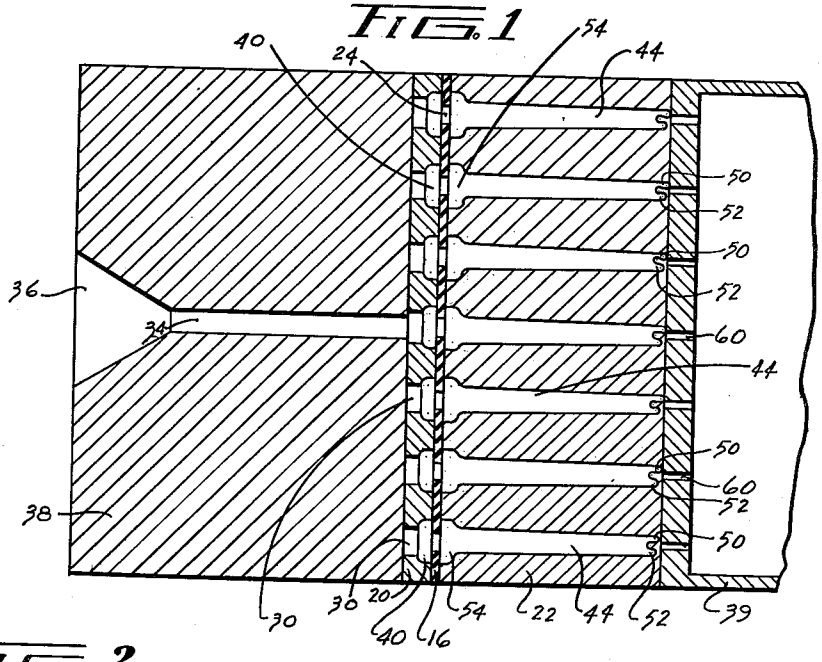


FIG. 2

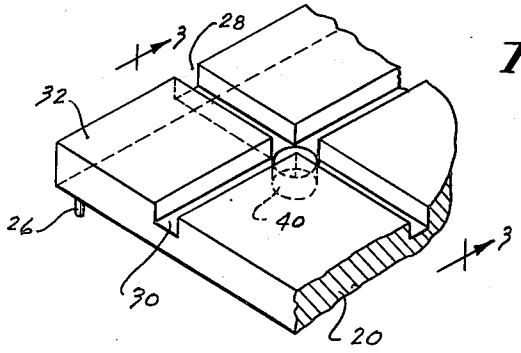


FIG. 4

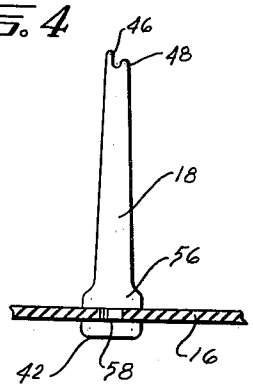
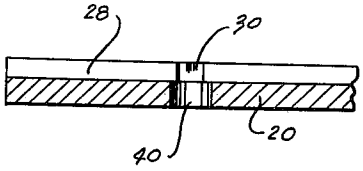


FIG. 3



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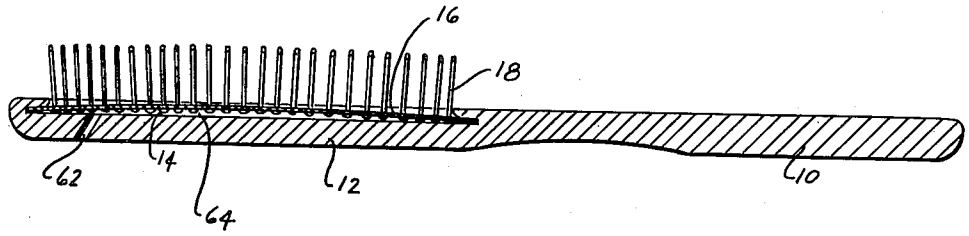
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2 SHEETS—SHEET 2

FIG. 5



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METHOD OF MAKING HAIRBRUSHES

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Application February 13, 1948, Serial No. 8,098

1 Claim. (Cl. 18—59)

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The present invention relates to hair brushes and the bristles included therewith as well as to the method of manufacturing them.

In the prior art, it was customary to make the bristles of certain hair brushes from a plurality of fibers, the lengths of which varied in the bristle which they formed. By the use of fibers having different lengths, it was sought to reach different levels of hair with each bristle when the hair was brushed, it having been found that when fibers of the same length formed the bristles of the brush, the bristles did not penetrate to the scalp and the hair was not thoroughly brushed out.

The present invention therefore contemplates the provision of an artificial bristle which is made from a suitable plastic material or any other pliable material and which bristle comprises a plurality of integral elements, preferably two in number, the ends of which elements are located at different heights from the handle or back of the brush.

Thus, by the invention contemplated here, a bristle is provided having at least one element long enough to penetrate to the scalp of the user and at least one shorter element which serves to brush the top level of the hair on the user's head.

In certain brushes of the prior art, the bristles thereof (sometimes referred to as pins) were made from metal and thus were relatively rigid.

In order to obtain the necessary flexibility that is required when drawing the metal bristles of these brushes through the hair, they (the bristles) were inserted through a flexible fabric backing or pad, usually formed from a rubberized material, and this fabric backing or pad, with the pins inserted therethrough was mounted in a brush handle hollowed and grooved to form a seat wherein and whereby the fabric and metal bristles were received and held in place.

Thus, although the bristles themselves were unbendable and rigid, the fabric backing permitted the bristles to flex as the brush was drawn through the hair.

The present invention contemplates the provision of a brush having a flexible backing or pad on which plastic bristles are mounted by an injection molding process to thereby provide a brush having relatively rigid bristles formed on a comparatively flexible backing or pad and which backing or pad, as with brushes of the prior art, is mounted in the grooves provided in the handle surrounding a hollow seat formed in the handle or back of the brush.

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The present invention still further contemplates the provision of a method of inserting the material forming the plastic bristles through a flexible backing or pad and anchoring thereon the thus formed bristles by means of injection molding to thereby form the bristle and backing or pad unit here contemplated. Thus, the present invention provides a construction whereby the bristle is anchored to the backing or pad concurrently with the formation of the bristle by the injection molding process contemplated so that it (the bristle) will not be loosened or inadvertently separated therefrom.

The present invention still further contemplates the manufacture by an injection molding process, of a brush, all elements of which are integral and made from the same plastic resin and in which the handle and base are relatively rigid because of the thicker cross-section and larger dimensions whereas, the integral bristles, although made from the same material but because of the thinner cross section and relatively smaller dimensions are comparatively flexible.

The present invention still further contemplates the provision of such a brush having an air vent communicating with the grooved hollow in the handle of the brush in which is mounted a flexible backing or pad for the bristles of the brush.

To make these, other and further objects and advantages clear and to enable those skilled in the art so fully to comprehend the underlying features of our invention and the other and further objects thereof so that they may embody the same in any modifications in the structure and relative arrangement of the parts thereof and the steps of the method or either contemplated by our invention, as a part of this disclosure, drawings depicting certain forms of our invention have been annexed hereto, in which drawings

Fig. 1 is a cross section of the injecting molding dies and platens that may be used in the practice of our invention with a fabric forming backing or pad therebetween for forming thereon the plastic bristles of the brush;

Fig. 2 is a partial perspective plan view of one of the dies used in the practice of our invention;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is an elevation to an enlarged scale of a bristle according to our invention, anchored on the fabric backing or pad utilized in the practice of our invention;

Fig. 5 is a longitudinal cross section of a brush embodying our invention.

Referring now to the drawings and particularly to Figs. 1 to 3, we have schematically illustrated in only such detail as will be required for an understanding of our invention an injection molding apparatus, the details of construction of which other than the particular dies used being conventional, are not illustrated.

In that embodiment of our invention illustrated in Fig. 5, the brush comprises the handle 10, which extends into the back 12 having the hollow seat 14, in the groove surrounding which the fabric backing or pad 16, carrying the bristles 18, is mounted.

Referring to Fig. 1, the backing or pad 16, formed from a flexible material preferably a relatively thin sheet of rubber or rubberized fabric, is inserted between the bristle forming dies of an injection molding apparatus, such as the stripper plate 20 and the upper half 22 of the mold.

In order to properly position the backing or pad 16 on the stripper plate 20, so that the plastic material will be injected through the openings 24 formed in the backing or pad 16, we provide at each corner of the stripper plate 20, the upstanding locating pin 26, (see Fig. 2) which enters a corresponding hole or opening that is prepunched in the backing or pad 16.

The backing or pad 16 is prepunched with the series of spaced openings 24, through which the plastic resin is injected to form the bristles 18 (see Figs. 4 and 5). These openings 24 are spaced from each other so that the bristles 18 are formed in the number, size and relative position that is desired for the particular brush. Upon mounting the backing or pad 16 on the stripper plate 20, as by means of the locating pins 26, an opening 24 in the fabric is aligned with a nozzle-like aperture formed at the intersections of the cross grooves 28 and 30 on the under surface 32 of the stripper plate 20 and which communicate with the channel 34 communicating with the injection nozzle 36 in the base plate 38 of the injection molding apparatus.

In operation, after the fabric 16 is mounted on the stripper plate by means of the locating pins 26 and corresponding openings in the fabric of the backing or pad, the dies and abutting base plate 38 and vent platen 39 are brought together under an extremely high pressure, in practice amounting to eight thousand pounds to the square inch.

A suitable plastic material is injected through the nozzle 36 and flows through the aperture formed by the cross grooves 28 and 30 into the cavity 40, which forms the lower anchoring lug or bead 42 integral with the bristle 18 (see Fig. 4). The plastic is forced from the cavity 40 through a corresponding opening 24 in the backing or pad 16 into the elongated shaped cavity 44 in the upper half of the die 22.

Any suitable thermoplastic material such as polystyrene, acrylics or methacrylates, cellulose acetates or polyamides ("nylon") may be used to form the bristles 18 of the brush.

The upper end of each bristle is formed in the shape of preferably two spaced fingers, one 46 of which is longer than the other 48. We have found that satisfactory results are obtained when the finger 46 is made approximately one eighth of an inch longer than the other finger 48.

The cavity 44, at its upper end is correspondingly shaped at 50 and 52 to form the fingers 46 and 48 and is enlarged at the bottom thereof to form the cavity 54 by means of which the integral upper anchoring lug or bead 56 is formed to, hold the backing or pad 16 between it and the bead 42 (see Fig. 4).

The integral element 58 that connects the beads 42 and 56 is formed by the opening 24 in the backing or pad 16.

The thus formed bristle 18 is securely held on the pad or backing 16 by means of the beads 42 and 56 and connecting element 58.

The platen 39 is provided with a series of vents 60, each of which communicates with a cavity 44 when the platen 39 is brought against the upper half of the mold 22 when the two are lowered as a unit against the stripper plate 20 with the fabric 16 between them.

When the plastic material is injected into the dies 20 and 22 and through the fabric 16, a suction force is automatically provided by a conventional means, such as a compressor (which need not be shown) through the vents 60.

This suction serves to draw the plastic material through the cavity 44 and completely fill it. These vents are comparatively very small and narrow and form very small tails which may be broken off from the bristles when the dies are removed after the formation of the pad and bristle unit, although it will be understood that the bristles may be molded without these tails.

After the formation of this unit, the upper half of the mold 22 is raised to remove it and the backing or pad and formed bristles from the stripper plate 20, the enlarged cavity 40 and relatively small opening 30 permitting this.

The combined backing or pad and bristle unit is then manually removed from the upper half 22 of the mold, it being recognized that the bristles 18 are comparatively narrow or thin thus permitting this operation. In order to further assist such operation, the cavity 44 is formed with an outward taper from the upper cavities 50 and 52 to the lower enlarged cavity 54.

It will of course be understood that the plastic tails where formed by the vents 60 are removed from the bristles and if desired any plastic material on the underside of the fabric 16, that may be formed by the cross grooves 28 and 30 may also be cleaned from the fabric.

The cross grooves 28 and 30 are comparatively thin and narrow and communicate at the center of the stripper plate 20 with the channel 34 so that the plastic material may be injected through them from the nozzle 36 into the injection molding die, formed by the stripper plate 20 and the upper half 22 of the mold as heretofore described.

Because of the tightness with which all of the members of the injection molding apparatus are held together with the fabric properly alinged therebetween, none of the plastic material will escape but must flow into and fill the cavities in the dies.

When the platen 39, mold 22 and stripper plate 20 are returned against the base platen 38 to repeat the injection molding process for the succeeding bristle unit forming operation and before the plastic material is injected, by satisfactory valves air is blown through the vents 60 to clean out all cavities, grooves and channels of any plastic material that may remain in them from a preceding operation.

The size of the backing or pad 16 is chosen somewhat larger than the size of the hollow seat 14 so that when the bristle unit is mounted therein, it will assume a slight concave shape, as illustrated in Fig. 6. There is thus provided a space between the back 12 of the brush and the

backing or pad 14 that permits the latter to adequately flex when the brush is passed through the hair.

In order to assist this flexing property, we prefer to provide in the back 12 the vent hole 62 which leads from the outside of the back of the brush to the hollow or space 64, thus permitting air to be expelled from and drawn into the hollow when the backing or pad is correspondingly flexed.

It will now be recognized that we have provided a novel method of forming a bristle and backing or pad unit from a flexible sheet and plastic material.

While we have described in detail specific embodiment of my invention, we do not intend to be limited thereto but intend to claim the invention as broadly as the following claim and the state of the prior art will permit since further modifications thereof will now readily occur to those skilled in the art.

We claim:

The method of forming a brush which consists in puncturing a pad member of non-porous material to provide a series of spaced openings, positioning the apertured pad member over an apertured stripper plate, placing a bristle forming mold member against the opposite face of the pad member, injecting thermoplastic material through the apertured stripper plate to flow through the openings in the pad member and into the mold member, whereby bristles will be formed and secured to said pad member, removing the pad member with the bristles attached thereto from the mold member and stripper plate, and finally mounting the pad member with the attached bristles in a brush head.

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