T. F. BARRY,

MANUFACTURE OF BRUSHES.

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1,280,944. Patented Oct. 8, 1918.

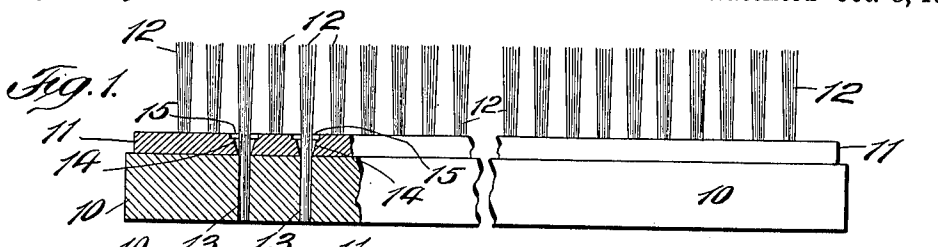


Fig. 1.

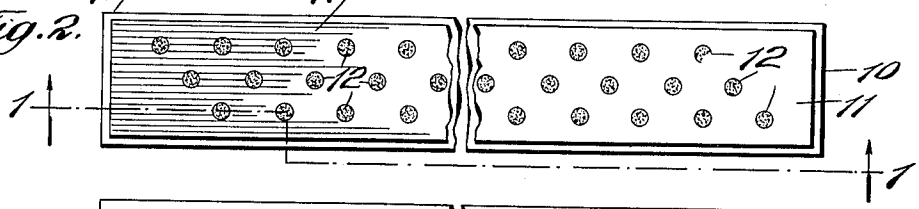


Fig. 2.

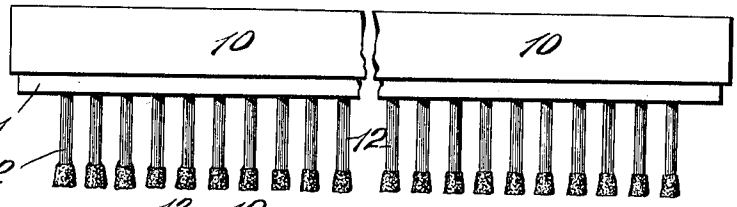


Fig. 3.

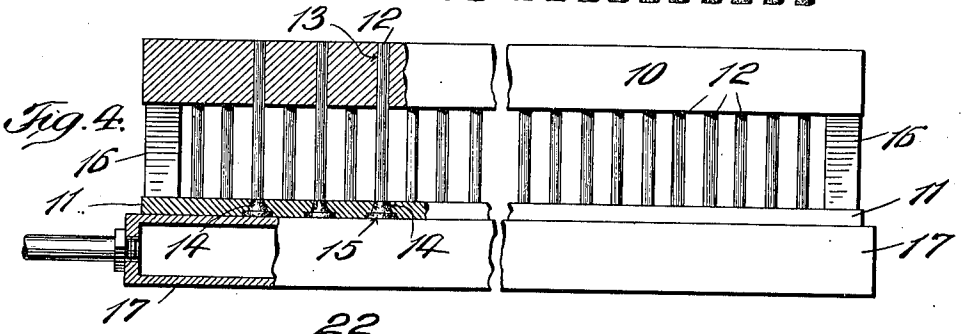


Fig. 4.

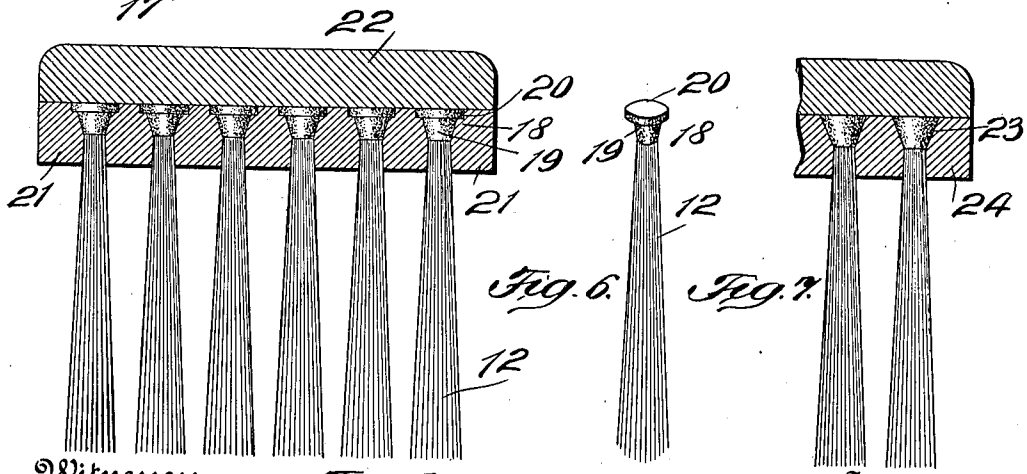


Fig. 5. Fig. 6. Fig. 7.

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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF BRUSHES.

1,280,944. Specification of Letters Patent. Patented Oct. 8, 1918.

Original application filed June 10, 1913, Serial No. 772,740. Divided and this application filed August 30, 1913. Serial No. 787,444.

To all whom it may concern:

Be it known that I, THOMAS F. BARRY, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in the Manufacture of Brushes, of which the following is a specification.

The invention consists in a novel method of producing brushes.

The brush produced by the method of my invention comprises a back of any suitable or desirable outline, a face-plate secured thereto of substantially corresponding outline and a set of individual tufts or bunches of bristles carried by said face-plate, said face-plate holding in apertures formed therein the said tufts or bunches and said apertures at their inner ends being enlarged annularly, and said tufts each being complete in itself and having the bristles of each thereof at their inner ends secured together by vulcanized rubber or other proper material which with the bristles embedded therein form on the upper end of each tuft a head fitting the enlarged upper end of the aperture in the face-plate holding the tuft. The heads formed on the inner ends of the tufts are preferably of special outline and wholly confined within the face-plate, so that when the back and face-plate are secured together said back will firmly hold said heads within the enlarged inner ends of the apertures in the face-plate, with the result that the tufts themselves will be securely bound in position without the aid of a body of vulcanized rubber or other material in a cavity in a brush-back connecting together all the tufts of a brush.

In carrying out my invention by the preferred method, I provide a base-block having a series of apertures extending through the same, and a mold-plate having a corresponding series of apertures but annularly enlarged at their upper ends, and I place this block and this plate together in face to face contact with their respective sets of apertures in register with each other. I thereupon thread the bristles for the tufts through the apertures in said block and plate and allow the bristles to extend above the said plate, and thereupon I turn the block and plate carrying the bristles upside down and dip the then lower extremities of the projecting tufts into a rubber solution so that the same may be well impregnated therewith. After the block and plate are lifted upwardly to carry the tufts from the solution I allow the whole to stand for a suitable time, say over-night, to give the rubber an opportunity to become partly dried or cured by exposure to the atmosphere, and thereafter I slide the plate on the tufts to the outer ends thereof so that the apertures in the plate may receive the ends of the tufts and the rubber thereon, after which I insert distance or spacing blocks between the block and plate and place the whole upon a steam or other heated table, said plate with the outer ends of the tufts and the rubber thereon confined in the apertures therein, being placed directly on said table, upon which the whole is allowed to stand until the rubber, at first softened by the heat, has conformed itself snugly to the enlarged outer ends of the apertures in the plate and become properly vulcanized to form heads of definite outline on the ends of the tufts and securely bind the bristles of each tuft together. After the vulcanization of the rubber-heads on the individual tufts, the block, plate and tufts are removed from the steam table, and the block is stripped from the tufts held by the plate. The then completed tufts may be withdrawn from the plate and inserted into a face-plate of any desirable material having apertures corresponding in outline to the outline of the heads on the tufts and said face-plate then secured to a brush-back. The mold-plate on which the heads on the tufts are vulcanized should be of metal.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a side elevation, partly broken away and partly in section, of the base-block, mold-plate thereon and bristles in said block and plate, this representing one stage of my process of manufacture;

Fig. 2 is a top view of the same;

Fig. 3 is a side elevation, partly broken away, showing the base-block, mold-plate and bristles after the whole structure has been inverted from the position shown in Fig. 1 and the then lower extremities of the tufts have been dipped into a rubber solution;

Fig. 4 is a side elevation, partly broken away and partly in section, showing the base-block and mold-plate spaced apart and said plate with the rubber on the ends of the tufts of bristles inclosed therein, placed on a vulcanizing table.

Fig. 5 is a vertical transverse section through a brush produced in accordance with my invention;

Fig. 6 is a perspective view of an individual tuft of the character employed in the brush shown in Fig. 5, and

Fig. 7 is a vertical transverse section through a portion of a brush employing a modified form of tuft-head capable of being produced by my process.

In the drawings, 10 designates the base-block, 11 the mold-plate and 12 the tufts of bristles threaded through the registering openings or apertures 13 in said base-block and 14 in said mold-plate. The apertures 14 are of special outline in that they are conical and preferably have at their outer ends lateral annular enlargements, as at 15, to permit the formation of the special heads shown in Figs. 5 and 6 on the upper ends of the tufts of bristles, these heads being a special feature of the brush to be claimed but not a limiting feature of the process, which extends to the formation of conical heads of the character illustrated in Fig. 7.

In carrying out my invention I place the mold-plate 11 upon the block 10 with the respective openings in the plate and block in register and then according to usual methods thread or sift the bristles for the tufts 12 through said openings, as shown in Fig. 1. The securing of the tufts of bristles within the openings 13 in the block 10 and extending the bristles of the tufts considerably above the plate 11 results in the upper ends of the tufts being somewhat spread, as shown in Fig. 1, or of greater diameter than the diameter of those portions of the tufts within the block 10.

After the bristles for the series of tufts 12 have been located in the block 10 and plate 11, said block and plate are inverted or turned upside down, as shown in Fig. 3, and the then lower ends of the tufts of bristles are dipped into a rubber solution, which will enter in between the bristles of the tufts and thoroughly coat the same and form heads of rubber thereon, as represented at the lower portion of Fig. 3. I then allow the rubber on the ends of the tufts 12 to partly cure or oxidize by exposure to the air for a limited period, preferably allowing the block, plate and bristles to stand over night, preparatory to the vulcanizing of the rubber on the ends of the tufts.

The next step in my process is to slide the mold plate 11 outwardly on the tufts 12 until the outer ends of the tufts carrying the rubber are within the openings 14 of said plate, and thereupon I insert spacing or distance pieces 16 between the block and plate 11 so as to hold them properly apart and maintain the tufts in proper condition and relation to each other and to said block and plate. Thereafter the structure is placed upon a steam or other heated table 17, as shown in Fig. 4, the plate 11 being directly on the table, and the then lower ends of the heads of rubber on the tufts being in contact with said table. The heat of the table 17 will be imparted to the plate 11, which is preferably of metal, and at first the heads of rubber on the ends of the tufts will become softened and conform to the shape of the holes in the plate 11, and thereafter the continued action of the heat will result in the rubber of the heads becoming vulcanized and in said heads taking the form of the holes or openings in the plate 11 and firmly binding the bristles of each tuft together. In Fig. 6 I illustrate one of the completed tufts detached from the holding and vulcanizing apparatus and ready for use in a brush, and in Fig. 6 the hard or vulcanized head is numbered 18, and comprises a lower conical portion 19 and a flat disk-like upper portion 20 whose edges extend laterally beyond the conical portion 19. After the rubber on the ends of the tufts has become properly vulcanized, the block 10 may be stripped from the tufts, leaving them all held by the plate 11, and said tufts are then removed from the plate 11 and applied when desired to a block or face-plate 21 of some lighter material, such as wood or celluloid, and having apertures or openings therein conforming to the outline of the openings in the plate 11, as I represent in Fig. 5 in which I illustrate the tufts as applied to a face-plate 21 and the latter as secured to a brush back 22 of any suitable material and outline. The back 22 has a plain inner or lower surface fitting firmly and uniformly upon the upper surface of the face-plate 21 and the upper faces of the disks 20 of the heads 18 on the tufts. It will be seen that the back 22 will prevent the removal of the tufts 12 from the face-plate 21 in one direction and that the heads 18 on the tufts will effectually prevent the withdrawal of the tufts from the face plate 21 in the other direction. The bristles of each tuft are independently secured together by a head 18 and the tufts themselves are each independently held in the face-plate 21.

I prefer the formation of heads 18, shown in Figs. 5 and 6, since I regard the said heads as of marked advantage in producing a brush of very durable and lasting character, but I do not wish to limit my invention so far as the process of manufacture is concerned, to the special form of head shown in Figs. 5 and 6. I therefore in Fig. 7 illustrate a modified construction in which

the vulcanized rubber heads on the upper ends of the tufts are of conical formation, as at 23, the face-plate 24 having openings therein conforming to the outline of said heads. The heads 23 constitute a modification in the form of the heads shown in Figs. 5 and 6, but not in the process embodying my invention.

The mold plate may be of considerable length and width so that several hundred tufts may be formed with the use thereof at a single operation, said tufts being thereafter detached from the mold plate and used as required in the face plates of brushes.

This application is a division of my application for Letters Patent filed June 10, 1913, Serial Number 772,740.

What I claim as my invention and desire to secure by Letters Patent, is:

1. The improvement in the art of brush-making which consists in placing together in face-to-face relation an apertured base-block and a correspondingly apertured mold-plate the upper ends of whose apertures are enlarged, threading the bristles for the individual tufts into the apertures of said plate and block, said bristles being first entered through the enlarged ends of the apertures in said plate and finally extending outwardly beyond said plate, inverting the block, plate and tufts and dipping the then lower ends of the tufts into a rubber solution, spacing the said plate from the said block for positioning the outer ends of the tufts with the rubber thereon in the enlarged outer ends of the apertures in said plate while the free ends of said tufts are in the apertures in said block, vulcanizing the rubber on said tufts while in said plate and the tufts are held by said plate and block to form hard heads securing the bristles of the individual tufts together, and then removing the tufts and applying them to a brush structure.

2. The improvement in the art of brush-making which consists in placing together in face-to-face relation an apertured base-block and a correspondingly apertured mold-plate the upper ends of whose apertures are enlarged, threading the bristles for the individual tufts into the apertures of said plate and block, said bristles being first entered through the enlarged ends of the apertures in said plate and finally extending outwardly beyond said plate, inverting the block, plate and tufts and dipping the then lower ends of the tufts into a rubber solution, allowing the rubber on the tufts to become partly cured by exposure to the atmosphere, spacing the said plate from the said block for positioning the outer ends of the tufts with the rubber thereon in the enlarged outer ends of the apertures in said plate while the free ends of said tufts are in the apertures in said block, vulcanizing the rubber on said tufts while in said plate and the tufts are held by said plate and block to form hard heads securing the bristles of the individual tufts together, and then removing the tufts and applying them to a brush structure.

Signed at New York, in the county of New York, and State of New York, this 26th day of August A. D. 1913.

THOMAS F. BARRY.

Witnesses:

ARTHUR MARION,

CHAS. C. GILL.