

T. F. BARRY.
MANUFACTURE OF BRUSHES.
APPLICATION FILED JULY 11, 1911.

1,097,287.

Patented May 19, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

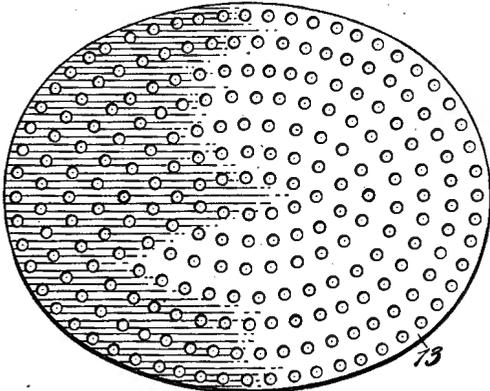


Fig. 4.

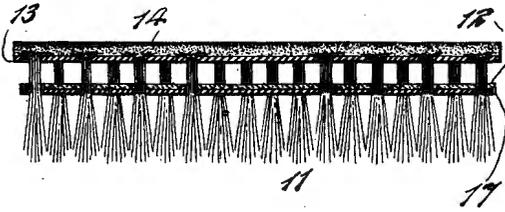


Fig. 2.

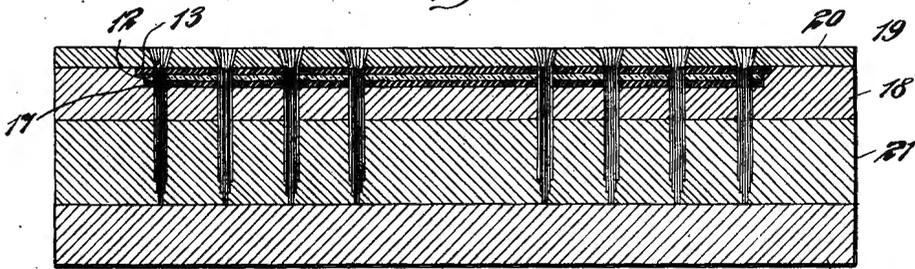
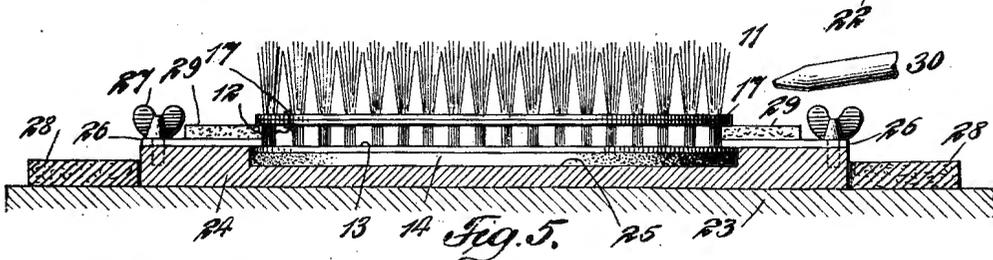
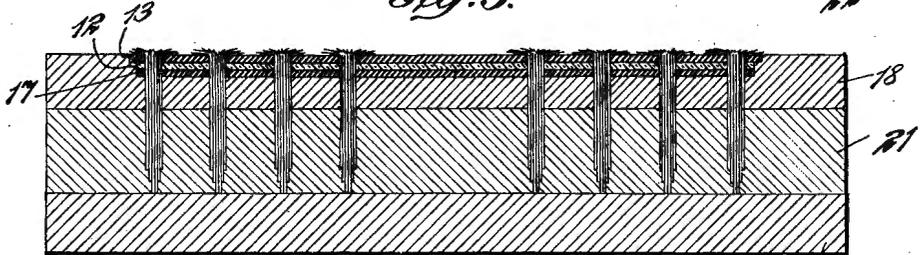


Fig. 3.



Witnesses:
Julius H. [Signature]
Arthur Marion.

Thomas F. Barry Inventor
By his Attorney *Chas. C. Gill*

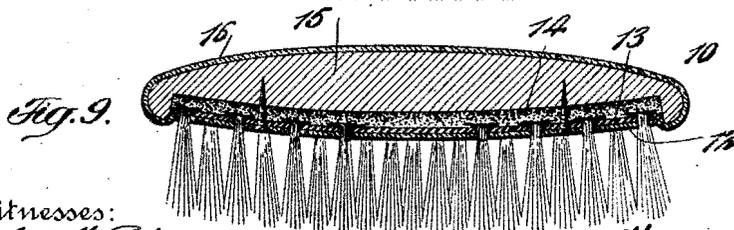
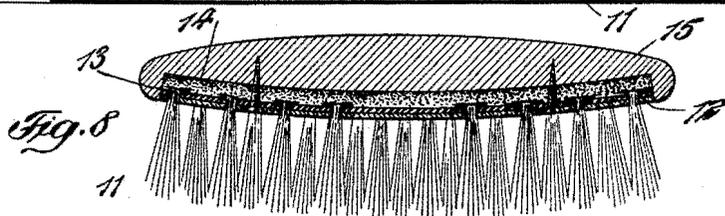
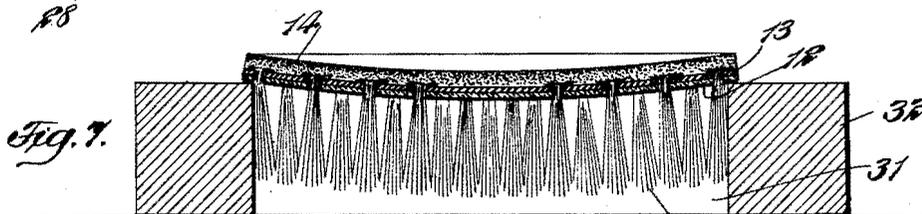
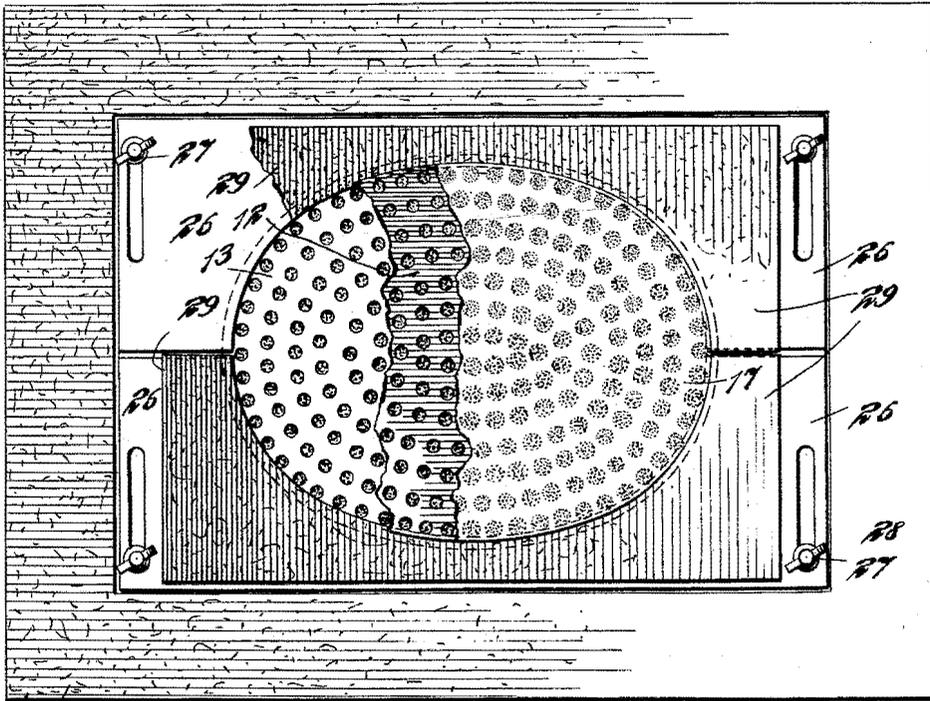
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2 SHEETS—SHEET 2.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF BRUSHES.

1,097,287.

Specification of Letters Patent.

Patented May 19, 1914.

Application filed July 11, 1911. Serial No. 637,917.

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 relates to improvements in the manufacture of brushes, such as hair brushes and the like, and it consists in the novel features, structure and method hereinafter described, and particularly pointed out in the claims.

I present my invention as embodied in the manufacture of hair brushes, to which it is particularly applicable, although not confined to brushes for brushing the hair.

It is highly desirable that the bristles of a brush be so secured that they will not shed and that the entire set of bristles be so connected together that the "block" may be readily applied to the back of the brush and properly secured. It is also desirable that a method of manufacture be pursued which will enable the production at reasonable expense of a very durable and attractive brush.

In accordance with my invention I arrange the entire set of tufts of bristles for a brush in a suitable plate permanently remaining thereon, said plate usually being of metal and having a rubber-coated surface to prevent rust, and apply rubber composition to the ends of the tufts projecting through the holes in said plate and then vulcanize this rubber on a steam table. I also thread the bristles through a metal templet plate having holes corresponding with the holes in the plate to remain permanently in the brush and after the vulcanization strip this templet plate from the tufts of bristles. In instances in which the "block" or set of bristles secured to the permanent plate is to form a part of a celluloid or pyroxylin brush or applied to a recess in a solid celluloid brush back or a brush back having a wooden body or the like covered with a veneering of celluloid, I also thread the bristles through a celluloid plate having holes corresponding with the permanent plate and the templet plate and interposed between the two plates, so that in the final finished brush the surface exposed around and between the tufts of bristles may have the same finish as the back of the brush. When producing what is com-

monly called celluloid brushes, I will place the permanent plate, celluloid plate and the templet plate together in face to face contact in a die having proper recesses in line with the holes in the plates and then thread the bristles through the holes in the plates to form the tufts, the then upper ends of the various tufts projecting above the permanent plate. Thereafter by means of a hot iron I iron down or flatten the upper projecting ends of the tufts against the top of the permanent plate, after which I slide the celluloid plate and templet plate downwardly upon the tufts of bristles to a suitable extent and then apply by dipping or otherwise a reasonably soft solution of rubber upon the ironed down ends of the tufts and allow the "block" to stand a reasonable length of time, preferably over night, and thereafter I apply a thicker solution of rubber over the top of the permanent plate and the knot ends of the bristles thereon to form a substantial body of rubber which is first allowed to stand a few hours or preferably over night and then placed on a steam-table and vulcanized, care being taken to protect the celluloid plate present on the tufts against injury during the vulcanization step, from the heat of the steam table. After the vulcanization has taken place the templet plate is stripped from the tufts and the celluloid plate is pushed upwardly against the permanent plate and thereupon the block may be at once inserted in the recess of the brush back or it may be given a dished shape so as to throw the ends of the tufts of bristles on a convex curvature. Upon the insertion of the block in the recess in the brush back, the celluloid veneering applied to the brush back will be cemented, along the edges of the recess in said back, to the edges of the sheet or plate of celluloid on the tufts of bristles, thus imparting to the brush back a continuous celluloid surface.

The brush produced by me is of extremely durable character and my method of manufacture is one which can with certainty be relied upon in factory practice to produce high class goods at reasonable expense.

In instances in which the "block" of tufts of bristles is not to be applied to a celluloid brush back but to a wooden or other back, the celluloid plate above referred to as being between the permanent plate and templet plate will be entirely omitted, and the

permanent plate will be secured to the back by means of screws or other suitable means.

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 top view of a metal or other plate which I permanently apply near the upper ends of the tufts of bristles, said tufts being inserted through openings in said plate to receive the rubber which is to be thereafter vulcanized thereon; Fig. 2 is a vertical longitudinal section through the die in which the plate shown in Fig. 1, a removable templet plate, and, when occasion requires, a celluloid or pyroxylin plate are held during the threading of the bristles through the holes in the same provided for the tufts, leaving the upper ends of the bristles projecting above the permanent plate which finally receives the rubber to be vulcanized thereon for securing the tufts of bristles; Fig. 3 is a like view of the same with the top plate of the die removed and the projecting ends of the tufts of bristles shown as having been ironed down or flattened with a hot iron, preparatory to receiving the rubber; Fig. 4 illustrates a further step in the process of manufacturing the brush consisting in sliding the removable plate or templet and celluloid plate downwardly upon the tufts of bristles, and applying the rubber to the top of the permanent metal plate, Fig. 4 being a vertical longitudinal section of the plates and bristles removed from the die; Fig. 5 illustrates the step in the process of manufacture which consists in vulcanizing the rubber applied upon the permanent plate at the knot ends of the tufts of bristles, Fig. 5 being a sectional view of a portion of a steam table and the devices applied thereon for enabling the vulcanization of the rubber, the "block," as it is termed, or set of tufts and plates, being illustrated in position over the steam table and held by the devices provided for that purpose; Fig. 6 is a top view, partly broken away, of the same; Fig. 7 is a vertical longitudinal section through a hollow block supporting at its edges one of the blocks of bristles after the vulcanization step of the process has been completed, and Fig. 7 is presented to illustrate that further step in the process, which consists, when desired, in convexing the outer side of the block or that from which the bristles project so that the bristles may present a convex outline at their ends instead of being left in the style shown in Fig. 5 and producing a flat brush; Fig. 8 is a vertical transverse section through a brush-back or a brush-back core having the block illustrated in Fig. 7 applied thereto, and Fig. 9 is a like view of the same but showing the back as covered with a veneer-

ing of celluloid or other pyroxylin material united at its edges to the edges of the plate or sheet of celluloid originally applied in the die shown in Fig. 2 and through which the bristles were threaded.

In the drawing, referring more particularly to Fig. 9, 10 designates the back of a brush, 11 the series of tufts of bristles, 12 a celluloid plate or sheet through which said tufts are threaded, 13 a metal plate in face to face engagement with the celluloid plate or sheet 12 and having a series of apertures or holes, shown in Fig. 1, matching the holes in the said plate or sheet 12 and receiving the upper ends of the tufts of bristles, and 14 a substantial body of vulcanized hard rubber upon said plate 13 and binding all of the knot ends of the bristles in position thereon, said plates 12, 13 and body of hard rubber 14 being seated within a recess formed in the back 10 and said back in the construction presented in Fig. 8 being formed of a core 15 covered with a sheet or veneer of celluloid or other pyroxylin or suitable material 16, whose edges lap against and are cemented to the outer edges of the sheet or plate 12, whereby the core 15 becomes entirely covered with the celluloid or other pyroxylin material and the surface between the tufts of bristles 11 is caused to harmonize with the other surfaces of the back. The cementing of the edges of the veneer 16 to the edges of the sheet or plate 12 results in the tufts of bristles, plates 12, 13 and rubber 14 being securely held within the recess in the back 10, but if desired or if in any case it should be necessary to do so, said plates may be additionally secured to the back by means of screws, as shown in Fig. 8. Under all ordinary circumstances the use of screws for fastening the block of tufts to the back 10 will not be necessary when a veneering 16 is employed and cemented to the edges of a pyroxylin sheet or plate 12.

The process of manufacturing the brush constitutes a part of my invention, and this process is illustrated more particularly in Figs. 1 to 7 inclusive.

In carrying out my process in the manufacture of the brush illustrated in Fig. 9 I assemble a plate 13 preferably of metal, a pyroxylin plate or sheet 12 of plastic material, such as celluloid, and a templet plate 17, these plates being placed face to face with the celluloid sheet or plate 12 between the plates 13, 17 and all of said plates being apertured correspondingly, in accordance with the outline of the brush to be produced, to receive the tufts of bristles 11. When the three plates 12, 13, 17 have been brought together, they are placed within a recess in a plate 18 constituting a part of a die 19 comprising in addition to the plate 18 a top plate 20, a lower plate 21 and a base

plate 22. The plates 18, 20, 21 are vertically apertured in line with the tuft receiving holes in the plate 13, and the apertures or holes in the plate 20 have downwardly and inwardly converging walls, as shown in Fig. 2, directly above the plate 13. The vertical holes or apertures in the plate 18 have substantially parallel walls and the holes or apertures in the plate 21 will vary in diameter at their lower portions, presenting, say, three diameters and this being for the purpose of so controlling the bristles of the tufts that their lower ends will extend downwardly to varying distances as required in the manufacture of a properly made hair brush. After the plates 12, 13, 17 have been placed in the recess in the plate 18, the plate 20 will then be placed over the plate 18 in the position in which it is shown in Fig. 2, thus fully inclosing the said plates 12, 13, 17, and thereupon the bristles will be threaded down through the holes in the plate 20, the holes in the plates 12, 13, 17, the holes in the plate 18 and the holes in the plate 21 until tufts of the proper proportion have been produced for a brush. After the tufts of bristles have been formed the cover or top plate 20 of the die 19 is removed, and this leaves the upper ends of all of the tufts projecting above the plate 13. I thereupon by means of a hot iron flatten down the upwardly projecting ends of the tufts, while the plates 12, 13, 17 are still in the plate 18 of the die. I thereupon remove the plates 12, 13, 17 and tufts from the die sections 18, 21 and slide the plates 12, 17 downwardly on the tufts, as shown in Fig. 4, to space apart the pyroxylin plate or sheet 12 from the permanent plate 13. I then apply by dipping or otherwise a thin solution of rubber to the ironed down ends of the tufts upon the permanent plate 13, this rubber being thin enough to get in around and between the bristles and coat the same. The block should then be allowed to stand a few hours and preferably over night, so that the rubber may undergo a curing action to a limited extent, and thereupon I apply a thicker solution of rubber, usually by means of a brush, over the ironed down ends or knots of the tufts of bristles and create a substantial body of rubber at the upper side of the plate 13 as indicated at 14 in the drawings. The block should thereupon be allowed to stand for a further period, preferably over night, after which I proceed with the vulcanization step of my process. The means for vulcanizing the body of rubber applied on the knot-ends of the tufts of bristles and upon the plate 13, is illustrated in Figs. 5 and 6 in which 23 indicates a portion of a steam-table of ordinary construction, 24 a metal plate placed thereon having a recess or matrix 25 to receive the body of rubber on the knot ends

of the tufts of bristles and the plate 13 and hold the same while said rubber is being vulcanized by heat from said table, and 26 plate-sections removably held on the plate 24 by means of thumb-screws 27, said plate-sections 26 corresponding with each other and being recessed in their facing edges to encompass the set of tufts 11 in the manner shown in Fig. 5, the plate sections 26 along the edges of the recesses therein being adapted to lap over upon the outer edges of the plate 13 and hold said plate firmly in position during the vulcanization of the rubber 14. The plate-sections 26 may be firmly secured over the edges of the plate 13 and around the series of tufts 11 by means of the thumb-screws 27, and, upon the loosening of said screws, the plates 26 may be slid outwardly in directions from each other so as to fully release the plate 13 with the bristles and rubber carried thereby and leave the plate 24 in condition to receive another block of bristles. I apply upon the steam-table 23 a sheet of asbestos 28 having an opening therein adapted to snugly receive the plate 24, whereby the heat of the table is prevented from affecting anything except the plate 24. It is essential that the celluloid or pyroxylin sheet or plate 12 be protected against the action of heat from the steam table 23 and those portions of the plate 24 surrounding the matrix 25, and to accomplish this purpose I provide matching sheets of asbestos 29 applied upon the plate 24 and extending between the outer edges of the plate 13 and the lower edges of the celluloid or pyroxylin plate 12, said sections being recessed at their facing edges to snugly fit around the body of bristles, as clearly represented in Figs. 5 and 6. As a further means for preventing the heat from the steam-table from injuring the pyroxylin plate or sheet 12, I provide an air nozzle 30 and connect the same with a suitable source of air under pressure, whereby and with the use of said nozzle a constant current of air may be blown over the templet plate 17 covering the pyroxylin plate or sheet 12, keeping the plate 17 cooled and enabling it to aid in saving the celluloid sheet 12 against injury from the heat arising from the steam-table 23 and plate 24. After the body of rubber 14 has become properly vulcanized, the templet plate 17 is stripped downwardly from the tufts 11 and the celluloid plate 12 is slid upwardly on said tufts and firmly against the permanent plate 13, which is preferably of metal, and thereupon the block, if a flat brush is desired, may be applied to the brush-back or brush-head, but according to my process I prefer to convex the set of bristles, and to do this I insert the tufts of bristles downwardly through an opening 31 in a metal block 32, said opening 31 conforming to the outline of the set of

tufts and being of such size that the circumferential edge portion of the plates 12, 13 rest upon the edges of the block 32 surrounding said opening, as shown in Fig. 7.

5 After the block of bristles has been applied to the opening in the block 32, a suitable blow is delivered against the vulcanized rubber 14 to permanently dish the plate 13 downwardly, whereby the tufts of bristles

10 become radial and the brush at the outer ends of the bristles is caused to have a convex outline, as shown. In carrying out my invention I do not vulcanize the rubber until it is brittle like a piece of glass or rock

15 but only to such extent as to leave it hard but yet tenacious and without pronounced brittleness, and consequently I am enabled to dish the plate 13 and the rubber 14 thereon without detriment to the holding characteristic of the rubber or injury to the tufts

20 of bristles. The block of bristles after having been convexed is removed from the block 32 and may be at once applied to the brush-head or brush-back or core 15 therefor, said core being formed with a recess to receive the rubber 14, plate 13 and plate 12.

25 The core 15 will then be covered by a sheet or veneering of celluloid 16 or other suitable material whose edges will be lapped against the outer edges of the sheet 12 of plastic material and be cemented thereto so as to become integral therewith, thus fully covering the core 15 and imparting to the brush

30 finished surfaces, both at the back thereof and around and between the tufts 11. I may also additionally secure the plates 12, 13 to the core 11 by means of screws, as shown in Figs. 8 and 9, but ordinarily these screws will not be necessary when the plate

35 12 and veneering 16 are made use of.

My invention enables the production in an efficient manner of a hair brush whose back is formed of a core coated or veneered with either celluloid or other plastic material and whose surface between the tufts

45 of bristles is covered by like plastic material, and this is a feature of advantage which has not been accomplished heretofore in the manufacture of any hair or equivalent

50 brush in which the knot ends of the tufts of bristles have been secured by heat vulcanized hard rubber, so far as I am aware.

I do not desire to limit my invention in every instance to the production of a brush

55 employing the celluloid or pyroxylin plate 12 and veneering 16 of corresponding material, since in many instances the veneering 16 will be omitted and likewise the sheet or plate 12. In all cases in which I do not

60 use the sheet 12 and veneering 16 I will carry on the process of manufacture just as has been hereinbefore described, except that the plate 12 will not be present, and finally the block of bristles will be secured to the

65 back or brush head by means of screws or

other suitable means in lieu of in the manner described with respect to Fig. 9. The plate 13 is a permanent metal plate, and when the celluloid sheet 12 is not made use of it will constitute the exposed surface

70 around and between the tufts of bristles. I preferably bake a thin coat of rubber over the plate 13, and hence it will have a suitable appearance for use in a rubber back or rubber coated back brush, with the sheet

75 12 absent. When using a white metal or silver or the like for the plate 13, said plate need not necessarily be protected by a coating on its surface.

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

1. The improvement in the manufacture of brushes which consists in providing a brush-head having a recess therein, providing a base-plate having a series of holes

85 therein for the series of individual tufts of bristles, providing a templet plate having a corresponding series of holes, providing a plate of plastic material, having a corresponding series of holes, placing these plates

90 in a sectional die having holes above and below the said plates, introducing the bristles for the individual tufts into the holes in said die and through the holes in

95 said plates with the upper ends of the bristles projecting above said base-plate, removing the top plate-section of the die to expose the upper projecting ends of the tufts of bristles, ironing said projecting ends

100 down against said base-plate, removing the base-plate, templet-plate, plastic material plate and tufts from the die, separating the plastic material and templet plates from said base-plate, applying soft rubber to the knot

105 ends of said tufts, vulcanizing said rubber by externally applied heat to form a substantial body binding all of said tufts together on said base-plate and at the same time protecting said plastic material plate

110 against the action of said heat, stripping the templet-plate from the tufts and moving said plastic material plate against said base-plate, applying said body of rubber and base-plate to the recess in said brush-head, applying a veneering of plastic material to

115 the exterior of said brush-head, and securing said veneering to the edges of said plastic material plate.

2. The improvement in the manufacture of brushes which consists in providing a

120 brush-head having a recess therein, providing a base-plate having a series of holes therein for the series of individual tufts of bristles, providing a templet plate having a corresponding series of holes, placing these

125 plates in a sectional die having holes above and below the said plates, introducing the bristles for the individual tufts into the holes in said die and through the holes in said plates with the upper ends of the bristles

130

projecting above said base-plate, removing the top plate-section of the die to expose the upper projecting ends of the tufts of bristles, removing the base-plate, templet-plate and tufts from the die, applying soft rubber to the knot ends of the tufts, vulcanizing said rubber to form a substantial body binding all of said tufts together on said base-plate, stripping the templet-plate from the tufts, and applying said body of rubber

and base-plate carrying the tufts to the recess in said brush-head and securing the same firmly to said head.

Signed at New York city, in the county of New York, and State of New York, this 15 10th day of July A. D. 1911.

THOMAS F. BARRY.

Witnesses:

CHAS. C. GILL,
ARTHUR MARION.

RUBBERSET

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