

Dec. 11, 1928.

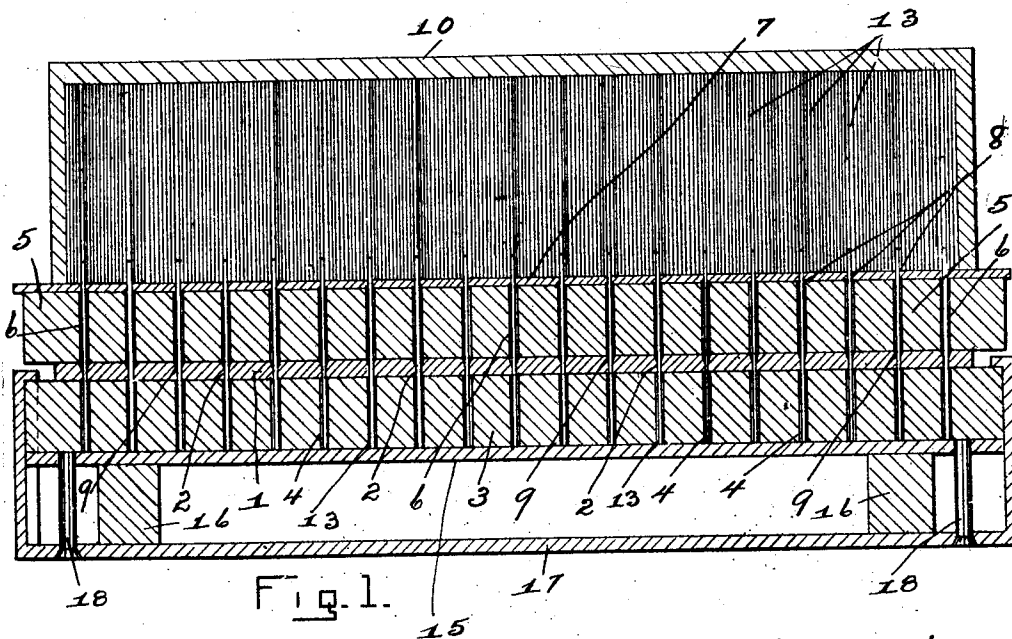
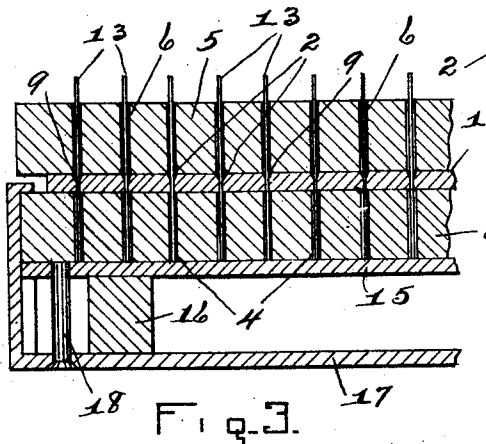
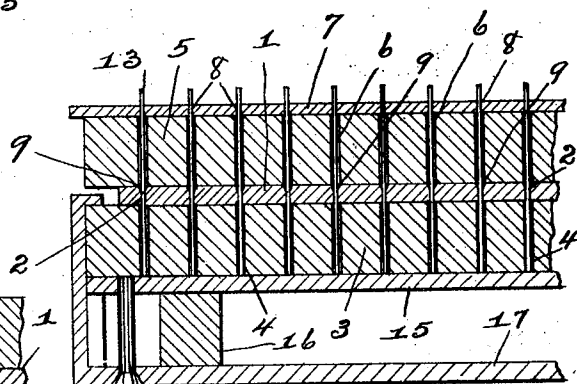
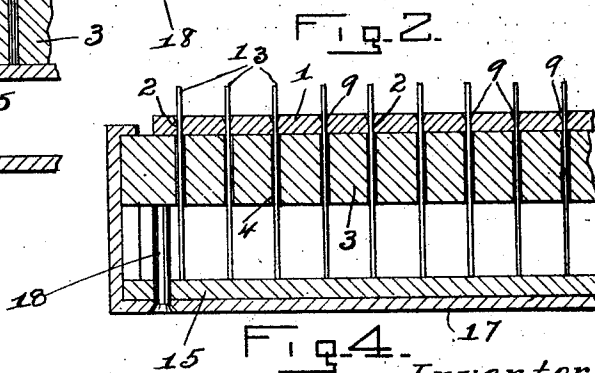
1,695,159

W. T. SHERMAN

BRUSH FILLING APPARATUS AND METHOD OF FILLING BRUSH PADS

Filed June 21, 1921

3 Sheets-Sheet 1



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BRUSH FILLING APPARATUS AND METHOD OF FILLING BRUSH PADS

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3 Sheets-Sheet 2

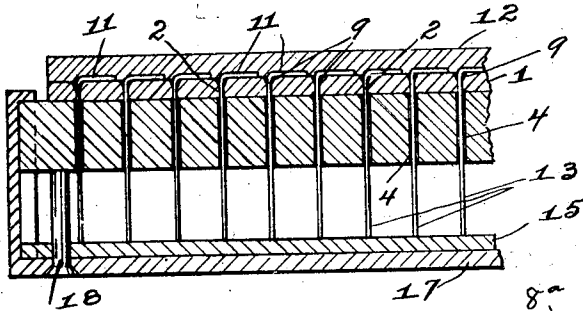


Fig. 5.

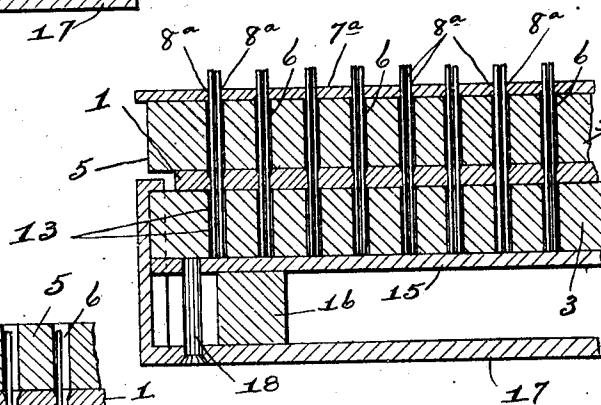


Fig. 6.

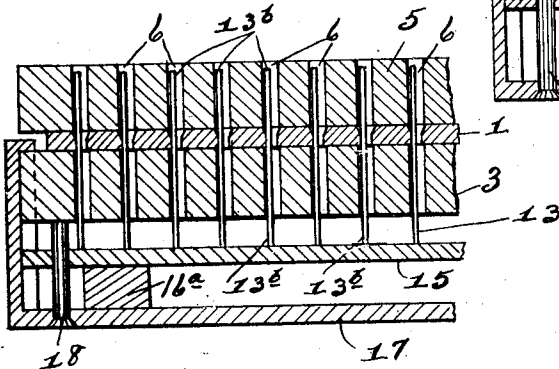


Fig. 7.

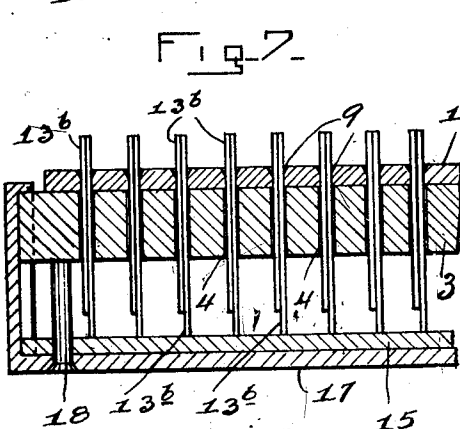


Fig. 8.

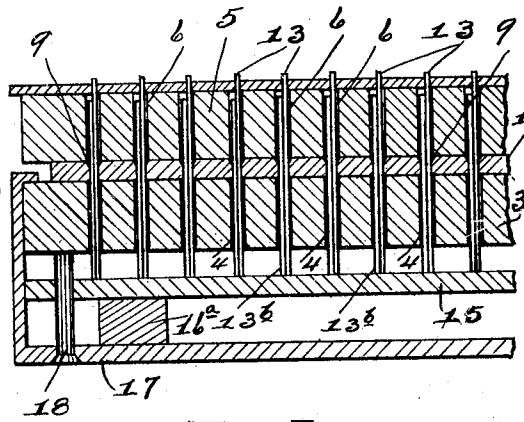


Fig. 9.

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3 Sheets-Sheet 3

Fig. 10.

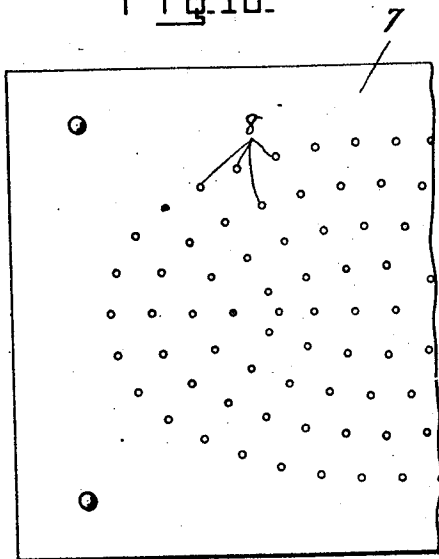


Fig. 11.

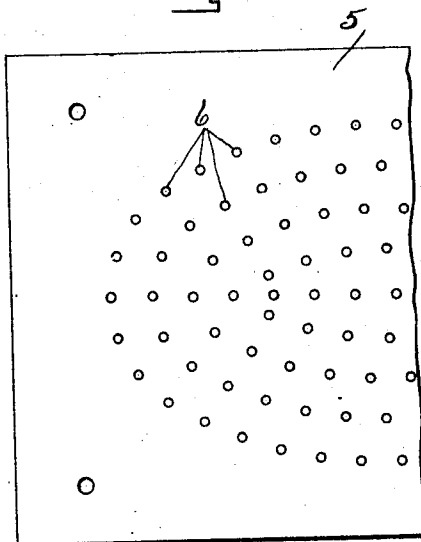
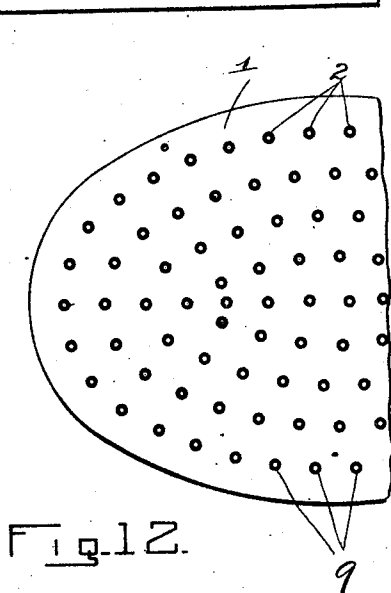


Fig. 12.

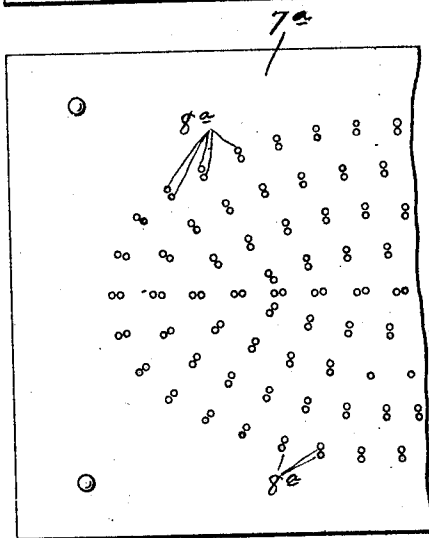


Fig. 13.

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UNITED STATES PATENT OFFICE.

WILLIAM T. SHERMAN, OF TROY, NEW YORK, ASSIGNOR TO HENRY L. HUGHES CO. INC., OF TROY, NEW YORK, A CORPORATION OF NEW YORK.

BRUSH-FILLING APPARATUS AND METHOD OF FILLING BRUSH PADS.

Application filed June 21, 1921. Serial No. 479,230.

This invention relates to the insertion of bristles in brush-members of various kinds.

It is particularly adapted for inserting bristles in rubber pads suitable for use in hair-brushes and the like.

In such pads the bristles are inserted separately or in groups of two or more through small apertures in the pad, the inner ends of the bristles being provided with heads or offsets which are covered in some suitable manner with a backing-sheet, whereby the bristles are permanently mounted in the rubber pad.

The present invention relates more particularly to inserting the bristles through the apertures in the rubber pad.

Certain objects of the invention are to facilitate the insertion of the bristles separately or in any desired number in the apertures or perforations in the pad; to enable an operator to accurately locate in the several apertures or perforations in the pad a single bristle or a predetermined number of bristles each of predetermined length, material or color; and to simplify and cheapen the operation of inserting the bristles in the pads.

Other objects will appear in connection with the following description.

Fig. 1 of the drawings is a vertical longitudinal section of an apparatus for carrying out my invention, illustrating the first step in the operation of inserting the bristles in a rubber-pad.

Figs. 2, 3 and 4, are similar views of broken-away portions of the apparatus illustrating successive steps in the insertion of the bristles in the rubber-pad.

Fig. 5 is a similar view showing the ends of the bristles ironed over to form heads, and the pad completed by vulcanizing a rubber backing-sheet thereupon.

Fig. 6 is a view similar to Fig. 2, illustrating the insertion of a plurality of like bristles in each perforation in the pad.

Figs. 7, 8 and 9 are similar views, illustrating successive steps in the insertion of a plurality of bristles of different lengths in each perforation in the pad.

Fig. 10 is a plan view of the bristle-engaging plate.

Fig. 11 is a plan view of the bristle-guiding plate.

Fig. 12 is a plan view of the perforated rubber-pad.

Fig. 13 is a plan view of a bristle-gaging

plate provided with a plurality of bristle-gaging apertures for each bristle-guiding aperture in the bristle-guiding plate.

Referring to the drawings wherein is shown a preferred form of apparatus for carrying out the invention, 1 is a pad of soft vulcanized rubber or the like, provided with a series of perforations, 2, each adapted to receive and closely fit the predetermined number of bristles for which the perforation is intended.

The size of the perforations, 2, will vary in brushes of different styles, as in some brushes each perforation will contain but a single bristle while in other styles of brush each perforation will contain two, three or more bristles as may be desired.

The perforation in each case is made of a size adapted to receive and closely fit the predetermined number of bristles.

In inserting the bristles in the perforations in the rubber pad in accordance with my invention, I employ a plate, 3, to support the rubber pad, which plate is provided with an opening or openings, 4, in communication with the respective perforations, 2, in the supported rubber pad.

I prefer to employ a series of such openings, 4, in the plate, 3, corresponding in number and location with the perforations, 2, in the rubber pad.

I also employ a bristle-guiding plate, 5, provided with bristle-guiding apertures, 6, corresponding in number and location with the bristle-receiving perforations, 2, in the rubber pad, and a bristle-gaging plate, 7, provided with bristle-gaging apertures, 8, communicating with the respective bristle-guiding apertures, 6.

I also employ a removable stop-plate, 15, beneath the openings in the pad-supporting plate, 3, to limit the distance which the bristles can pass through the bristle-gaging plate, 7.

The ends of the perforations, 2, in the rubber pad are taperingly countersunk adjacent to the superimposed bristle-guiding plate, 5, as shown at 9, and the bristle-guiding apertures, 6, are of substantially the same area as the countersunk ends of the respective perforations, 2, in the rubber pad.

If the several perforations, 2, in the rubber pad are to receive but a single bristle, the bristle-gaging plate will be provided with a single aperture, 8, for each bristle-guiding

aperture, 6, in the bristle-guiding plate, 5, in which case the area of the bristle-guiding aperture, 6, will be greater than the area of the corresponding bristle-gaging aperture, 8.

5 The cross sectional area of the guiding aperture 6 is larger than that of the bristle gaging aperture 8 of the plate 7 to reduce frictional contact with the bristles while they are being inserted in the openings of the
10 brush back. By this construction, the walls of the guiding aperture 6 are spaced from the lower ends of bristles being inserted so that the bristles will not engage and become flexed by the walls of the guiding aperture as frequently happens in prior devices, but will
15 permit the bristles to move unobstructedly and without frictional resistance through the guiding aperture to greatly facilitate their assemblage with the back.

20 If the several perforations, 2, in the rubber pad are to receive a plurality of like bristles, the bristle-gaging plate, 7^a, will be provided with a plurality of apertures, 8^a, communicating with each of the bristle-guiding apertures, 6, in the plate, 5, in which
25 case the area of each bristle-guiding aperture, 6, will be at least equal to the combined areas of the plurality of bristle-gaging apertures, 8^a, communicating therewith.

30 In Figs. 2 and 10, I have shown the bristle-gaging plate, 7, provided with a single aperture, 8, communicating with each bristle-guiding aperture, 6, in the bristle-guiding plate, 5.

35 In Figs. 6 and 13, I have shown the bristle-gaging plate, 7^a, provided with two bristle-gaging apertures, 8^a, communicating with each bristle-guiding aperture, 6, in the bristle-guiding plate, 5.

40 The operation of the apparatus and the manner of carrying out my novel method of inserting bristles is as follows.

45 The rubber pad, 1, is superimposed upon the supporting-plate, 3, with the perforations in the rubber pad registering with the respective openings, 4, in the supporting plate.

50 The bristle-guiding plate, 5, is then superimposed upon the rubber pad with its bristle-guiding apertures, 6, registering with the countersunk ends of the respective perforations, 2, in the rubber pad.

For inserting a single bristle in each perforation in the brush-pad, a bristle-gaging plate, 7, is then superimposed upon the
55 bristle-guiding plate with its single apertures, 8, registering with the respective bristle-guiding apertures, 6, in the bristle-guiding plate. Bristles, 13, are then presented endwise to the upper side of the
60 bristle-gaging plate and shaken or agitated until a single bristle has passed partly through each aperture in the bristle-gaging plate, 7, into the corresponding or registering aperture, 6, in the bristle-guiding plate.

65 For this purpose the bristles are selected as

to diameter with respect to the areas of the bristle-gaging apertures, 8, so that but a single bristle can at any one time occupy one of said apertures, 8.

70 The bristles may be thus inserted directly by hand, or as I prefer, by packing the bristles in parallel relation within a box, 10, which box is inverted upon the bristle-gaging plate, 7, as shown in Fig. 1.

75 While by the employment of the bristle-gaging plate with apertures of less area than the respective apertures in the bristle-guiding plate the insertion of the bristles is greatly facilitated, I prefer to limit the distance which the bristles can pass in the first
80 instance through the bristle-gaging plate, so that when the apertures in the bristle-gaging plate have been filled, each with the proper number of bristles, the ends of the bristles will remain projecting above the
85 bristle-gaging plate, as shown in Fig. 2, in order to prevent the insertion into the bristle-guiding apertures of an undesired number of bristles.

90 For this purpose, I employ a stop-plate, 15, supported by means of removable blocks, 16, beneath the openings in the pad-supporting plate, 3.

95 The blocks, 16, are removably inserted between the stop-plate, 15, and the bottom, 17, of a frame within which the pad-supporting plate, 3, is removably mounted resting upon posts, 18, the stop-plate, 15, being provided with apertures which freely receive said posts. 100

After bristles have thus been inserted or partly inserted through the several apertures in the bristle-gaging plate, 7, into each aperture, 6, in the bristle-guiding plate, the surplus bristles are removed from the top
105 of the bristle-gaging plate and the bristle-gaging plate is then carefully raised from the bristle-guiding plate, 5, the operator taking care that bristles occupying the apertures in the bristle-gaging plate are not withdrawn
110 from the bristle-guiding plate as the bristle-gaging plate is removed.

115 After the bristle-gaging plate has been removed, the stop-plate, 15, is dropped by removing the blocks, 16, and the bristles which were left projecting slightly above the bristle-guiding plate, as shown in Fig. 3, are patted or forced through the bristle-guiding plate and the pad, after which the bristle-guiding
120 plate, 5, is removed leaving the ends of the bristles projecting above the pad, 1, as shown in Fig. 4, a sufficient distance to form heads, 11, whereby the bristles are anchored in the finished pad.

125 These heads are formed by ironing over the ends of the bristles in the usual manner; and the manufacture of the pad is completed by applying to the back of the rubber pad, 1, a backing-sheet in any known manner, as shown in Fig. 5. 130

The backing-sheet, 12, is preferably vulcanized upon the rubber pad, 1, in the manner set forth in U. S. Letters Patent No. 1,363,971, dated January 11, 1921, granted to Milton W.

Alexander, for brush.

The bristle-gaging plate, 7, is preferably made substantially thinner than the bristle-guiding plate, 5, and by having the apertures in the bristle-gaging plate smaller in area than the corresponding apertures in the bristle-guiding plate, no bristle can pass into one of the bristle-guiding apertures if of sufficiently large diameter to pass with difficulty therethrough.

No bristle can thus enter or pass through the bristle-gaging plate which would be likely to have any difficulty in passing through an aperture in the bristle-guiding plate.

By having the ends of the perforations, 2, in the rubber pad taperingly countersunk adjacent to the bristle-guiding plate, and the area of the bristle-guiding apertures not greater than the areas of the neighboring countersunk ends of the respective perforations, 2, the inner ends of the bristles can be readily forced into the respective perforations, 2, by jarring, or pressing down upon the outer ends of, the bristles.

When it is desired to insert in each perforation in the brush-pad a plurality of like bristles, the operation is the same as above described except that I employ a bristle-gaging plate, 7^a, provided with a plurality of bristle-gaging apertures, 8^a, communicating with each bristle-guiding aperture, 6, in the bristle-guiding plate, 5.

As shown in Fig. 6 the plate, 7^a, is thus provided with two similar apertures, 8^a, communicating with each aperture, 6, in the bristle-guiding plate, 5, but the plate 7^a may be thus provided with any desired number of bristle-gaging apertures, 8^a, for each bristle-guiding aperture, 6, in accordance with the number of like bristles which it is desired to insert in each perforation in the rubber pad, provided that the area of each bristle-guiding aperture, 6, in the plate, 5, shall be at least as great as the combined areas of the apertures, 8^a, communicating therewith.

In filling the pad by the use of the plate, 7^a, each of the gaging apertures, 8^a, is of a size to receive but a single bristle at a time, and as many, and only as many, bristles will pass through the gaging-plate, 7^a, into each bristle-guiding aperture, 6, in the plate, 5, as there are apertures, 8^a, communicating with said aperture, 6.

This method of inserting a desired plurality of like bristles in each perforation in the brush-pad is illustrated in Fig. 6.

A plurality of bristles of different lengths may in a similar manner be inserted in each perforation in the brush-pad by employing the bristle-gaging plate, 7, with the single apertures, 8. In this case a shorter bristle,

13^b, is first inserted in each bristle-guiding aperture, 6, in the manner first above described, and as shown in Fig. 3.

The stop-plate, 15, is then dropped and supported by blocks, 16^a, of less height than the blocks, 16, permitting these short bristles to be patted or shaken down fully within the apertures, 6, in the bristle-guiding plate, 5, as shown in Fig. 7.

The bristle-gaging plate is then reapplied and a second bristle, 13^b, is inserted through each aperture in the bristle-gaging plate into the respective apertures in the bristle-guiding plate each of which already contains the shorter bristle, the longer bristles being left projecting above the bristle-gaging plate as shown in Fig. 8.

The bristle-gaging plate is again removed and the stop-plate, 15, is further dropped by removing the blocks, 16^a, permitting the longer bristles to be forced down through the pad to project a greater distance therefrom than do the shorter bristles, as shown in Fig. 9.

As the longer bristles are thus forced down through the pad the shorter bristles are sufficiently held by frictional engagement with the walls of the perforations in the pad to prevent them from following the longer bristles.

For certain purposes of the invention any of the usual bristle substitutes may be employed instead of bristles in filling brushes in accordance with my invention.

While I have described the invention in its preferred application to the manufacture of soft rubber brush-pads, the invention is also applicable to the filling with bristles of brush-members of various kinds in which the bristles are to be secured either singly or in groups of two or more, whether said member be of hard or soft rubber or other material.

While I have shown a bristle-gaging plate, 7, separate from the bristle-guiding plate, 5, I do not wish to be limited to the employment of separate plates for performing the functions above set forth, as for certain purposes of the invention any known means may be employed for performing these functions by the employment of a passageway leading to the perforation in the brush-pad which passageway has a restricted gaging inlet at one end and an outlet at its other end, which outlet is of approximately the same area as the entrance to said perforation in the brush pad.

For certain purposes of the invention the bristle-gaging apertures, 8, in the bristle-gaging plate, 7, may be made of sufficient area to simultaneously receive a plurality of bristles where it is desired to insert in each perforation in the brush-pad a plurality of bristles the exact number of which is immaterial.

In such case whatever number of bristles passes partly through a bristle-gaging aper-

ture, 8, will be readily received by the larger area of the corresponding bristle-guiding aperture, 6.

What I claim as new and desire to secure by Letters Patent is:

1. In brush making, the process of fitting bristles into apertured brush backs consisting in passing the bristles into a gaging aperture disposed above the brush back, allowing the gaged bristle to drop with its lower end free of any substantial frictional resistance, and guiding the free lower end of the bristle into an aperture of said brush head.

2. That improvement in the art of inserting bristles into an apertured brush-member which consists in passing a bristle or bristles through a passageway having a restricted gaging inlet leading to said brush aperture whereat said passageway is of approximately the same area as the entrance to said aperture, said brush-member aperture and said passageway being alined before the forward end of the bristle is passed entirely through the passageway and projected therefrom.

3. That improvement in the art of inserting bristles into a counter-sunk aperture of a brush-member which consists in passing a bristle or bristles into said counter-sunk aperture through a guiding aperture aligned therewith and having a restricted gaging inlet, and an outlet of substantially the same area as said counter-sunk aperture, said brush-member aperture and said guiding aperture being positioned to register with one another before the forward end of the bristle is passed entirely through and projected from said guiding aperture.

4. That improvement in the art of inserting bristles into an apertured brush-member which consists in applying to the brush-member a bristle-guide provided with a bristle-guiding aperture leading to an aperture in said brush-member, applying to said bristle-guide a bristle-gage provided with a bristle-gaging aperture communicating with, and of less area than, said bristle-guiding aperture, inserting a bristle or bristles partly through said bristle-gaging aperture into said bristle-guiding aperture, removing said bristle-gage, and forcing said inserted bristle through said bristle-guiding aperture into said aperture in said brush-member.

5. That improvement in the art of inserting bristles into an apertured brush-member which consists in applying to the brush-member a bristle-guide provided with a bristle-guiding aperture leading to, and of substantially the same area as, the entrance to an aperture in said brush-member, applying to said bristle-guide a bristle-gage provided with a bristle-gaging aperture communicating with, and of less area than, said bristle-guiding aperture, inserting a bristle or bristles partly through said bristle-gaging aperture into said bristle-guiding aperture,

removing said bristle-gage, forcing said inserted bristle fully into said bristle-guiding aperture, replacing said bristle-gage, and inserting another bristle through said bristle-gaging aperture into said bristle-guiding aperture.

6. In an apparatus for inserting bristles into an apertured brush-member, perforated means for supporting the apertured brush member, bristle-guiding means positioned with a bristle-guiding passageway in alignment with the aperture in said brush-member, the outlet end of said passageway being of substantially the same area as the inlet to the aperture in the brush-member, and the inlet end of said passageway being of less area than its outlet end to gage the bristles entering said passageway.

7. In a bristle-inserting apparatus and in combination, a bristle-guiding plate provided with a bristle-guiding aperture; and a bristle-gaging plate above said bristle-guiding plate provided with a bristle-gaging aperture communicating with, and of less area than, said bristle-guiding aperture, and said bristle guiding aperture being longer than said bristle gaging aperture.

8. In a bristle-inserting apparatus and in combination, a bristle-guiding plate provided with a bristle-guiding aperture; and a bristle-gaging plate above said bristle-guiding plate provided with a plurality of bristle-gaging apertures leading to said bristle-guiding aperture in the bristle-guiding plate, the area of said bristle-guiding aperture being at least equal to the combined areas of the said plurality of bristle-gaging apertures.

9. In a bristle-inserting apparatus and in combination, a support for a perforated brush-member, said support being provided with an opening; a bristle-guiding plate provided with a bristle-guiding aperture adapted to aline with said opening in the support and with a perforation in the brush-member when the brush-member is interposed between said support and said plate; and a bristle-gaging plate adjacent to the outer side of said bristle-guiding plate, and provided with a bristle-gaging aperture communicating with, and of less area than, said bristle-guiding aperture.

10. In a bristle-inserting apparatus and in combination, a support for a perforated brush-member, said support being provided with an opening; a bristle-guiding plate provided with a bristle-guiding aperture adapted to aline with said opening in the support and with a perforation in the brush-member when the brush-member is interposed between said support and said plate; and a bristle-gaging plate adjacent to the outer side of said bristle-guiding plate, and provided with a plurality of bristle-gaging apertures communicating with said bristle-

guiding aperture, the area of said bristle-guiding aperture being at least equal to the combined areas of said bristle-gaging apertures.

5 11. In a bristle-inserting apparatus and in combination, a perforated support for a perforated brush-member; a bristle-guiding plate provided with a bristle-guiding aperture adapted to aline with a perforation in
10 said support and with a perforation in the brush-member when the brush-member is interposed between said support and said plate; a bristle-gaging plate adjacent to the outer side of said bristle-guiding plate and
15 provided with a bristle-gaging aperture communicating with, and of less area than, said bristle-guiding aperture; and a removable stop-plate beneath the perforation in said support.

20 12. A brush filling device comprising a member adapted to be positioned upon a back having a bristle opening, said member having a bristle guiding passage with a restricted bristle gaging inlet, said passage below said inlet being of larger cross sectional
25 area, and the outlet of said passage being of substantially the same area as said bristle opening to guide said bristle or bristles into said opening of said back.

30 13. A bristle inserting apparatus comprising means having a bristle guiding bore with

a restricted inlet gaging portion to admit a predetermined number of bristles, and said bore below said inlet being longer than said inlet portion and of a cross sectional area
35 greater than that of said inlet gaging portion.

14. A brush filling device comprising a perforated supporting member adapted to support a perforated brush member with the
40 perforations thereof aligned with the perforations of said supporting member, and means adapted to be disposed in at least two different elevations with respect to said supporting member for controlling the extent
45 of the insertion of bristles into said perforations of said brush member and brush supporting member.

15. A brush filling device comprising a perforated supporting member adapted to support a perforated brush member thereon
50 with the perforations thereof aligned with the perforations of said supporting member, and a vertically movable stop-plate beneath said supporting member and adapted to be
55 disposed at at least two different elevations for controlling the extent of insertion of bristles into said brush member.

In testimony whereof, I have hereunto set my hand this 17th day of June, 1921.

WILLIAM T. SHERMAN.