

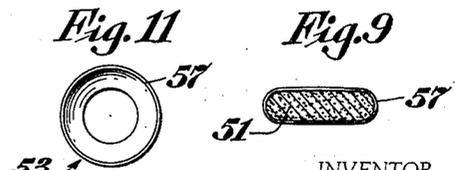
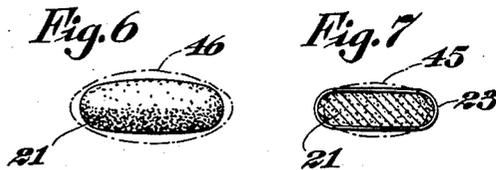
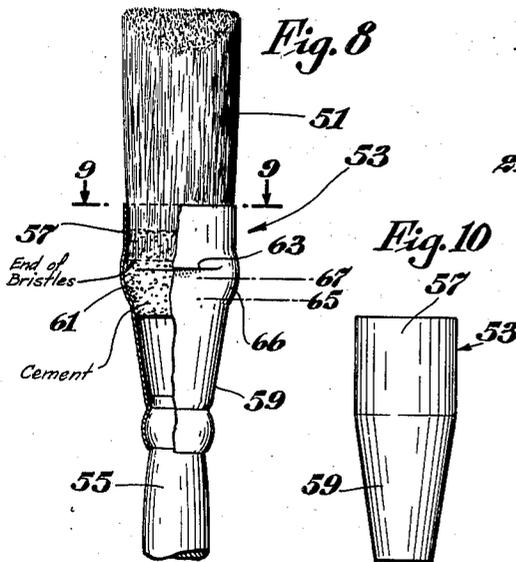
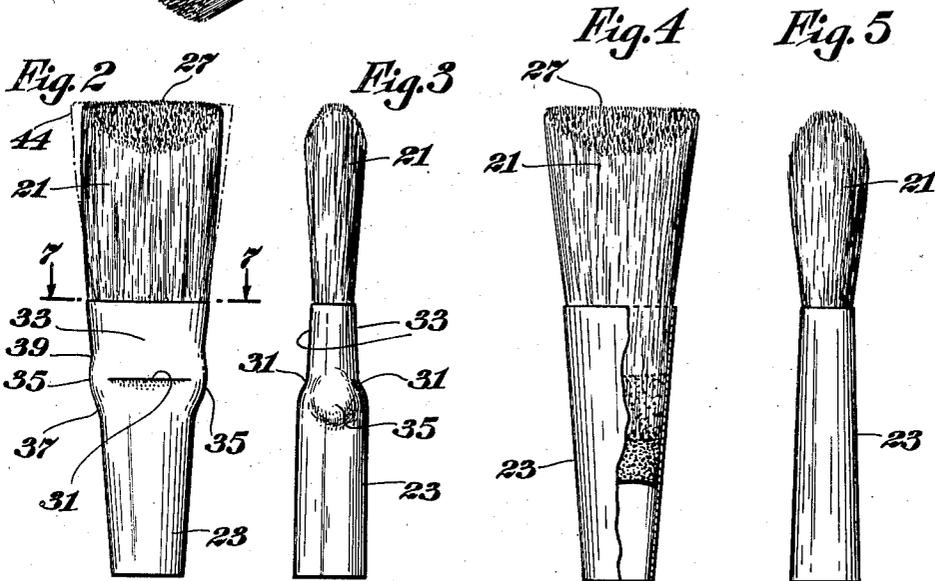
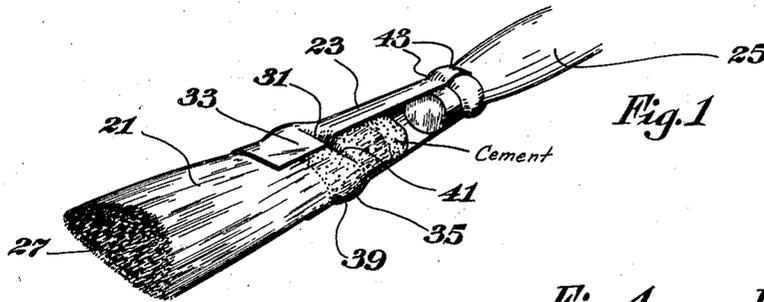
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BRUSH

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BRUSH

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6 Claims. (Cl. 15—192)

This invention relates to brushes and in particular to bristle brushes of the flat type and coordinately therewith relates to the manufacture of such brushes.

While my invention has been described in relation to such brushes it is to be understood that as to certain phases thereof, it may have other applications.

The qualities chiefly looked for in brushes of this type, aside from the quality of the bristles themselves, are a firm and permanent setting of the bristles, so that they will not readily come out of their setting, and compacting of the bristles, so that they will form a unitary mass, instead of a loose aggregation of bristles, and this applies particularly to the outer bristles, which are apt to stand out from the body and to make marks beyond the desired limits of application. These and other desirable qualities are attained to a high degree by my improved construction.

Among the objects of my invention are therefore, the provision of a brush in which the bristles are firmly held, and in which the bristles are highly compacted and directed in such a manner as to form a compact unitary brush tip and a working surface having a minimum amount of objectionable divergence of its outer bristles, and further the provision of a convenient method of manufacture for such brushes.

For the attainment of the above objects and such other objects as will hereinafter appear or be pointed out, I have shown several illustrative embodiments of my invention in the drawing, in which:

Figure 1 is a perspective view of a brush embodying my invention and showing portions of the ferrule removed so as to expose the interior thereof;

Figure 2 is a front elevation of the bristle tip and ferrule of the brush shown in Figure 1, with dotted lines to indicate, for purposes of comparison, the contour of the bristle tip of Figure 4;

Figure 3 is a side elevation of the parts shown in Figure 2;

Figure 4 is a front elevation similar to Figure 2, intended to illustrate the conformation of the parts shown in Figure 2 at an intermediate step in the manufacture; a portion of the ferrule being broken away;

Figure 5 is a side elevation of the parts shown in Figure 4;

Figure 6 is a top plan view of the bristle tip shown in Figure 2, with dotted lines to indicate the contour of the same as it would appear in

Figure 4, that is, at an intermediate stage of manufacture;

Figure 7 is a sectional view on the line 7—7, of Figure 2, looking in the direction of the arrows, with dotted lines showing the contour of the same parts during the intermediate stage of manufacture shown in Figure 4;

Figure 8 is an elevation, with portions broken away, of another embodiment of my invention;

Figure 9 is a section on the line 9—9 of Figure 8, looking in the direction of the arrows; and

Figures 10 and 11 are elevation and plan view respectively, of a ferrule adapted for use in the embodiment of Figures 8 and 9.

By referring to Figures 1 to 7 inclusive of the drawing it will be observed that I there show one embodiment of my invention in relation to a brush having the customary parts such as a bristle tip 21, a ferrule 23, and a handle 25. The brush tip is illustrated as of the flat type having a working edge 27, which is the result of arrangement of the tips of the bristles in wedge formation, as clearly appears from Figures 1, 2 and 3. At the same time it will be observed that the brush has a flattened cross-section.

As the principles of my invention as embodied in the disclosure of Figures 1 to 7 inclusive can be most conveniently explained in connection with the manufacture of brushes, as therein disclosed, I will refer first of all to Figures 4 and 5, in which an intermediate stage in the manufacture of such a brush is illustrated, and I will thereafter refer to Figures 2, 3, 6 and 7, as well as to Figure 1, in which the completed brush is shown.

By referring particularly to Figures 4 and 5 and to the other figures enumerated it will be observed that the ferrule there shown is of tubular, conoidal conformation and of elliptical section at the bristle end, (see the dotted line Figure 7), and of circular section at the handle end (see Fig. 1). The walls may be described as being generated by a straight line drawn in a plane passing through the axis of the ferrule, one end moving along an ellipse and the other end along a circle. Cross-sections intermediate the ends will therefore be ellipses of gradually decreasing eccentricity toward the handle end and merging into the circular section at the handle end. It will further be observed that the perimeter of the ellipse of the bristle end is greater than that of the circle of the handle end.

A convenient method of manufacture of the ferrule is to start with a right frusto-conical tube and deform it so as to obtain elliptical sections

of gradually decreasing eccentricity toward the handle end, which latter is left undeformed. As will be obvious to those skilled in the art, this is readily done by hand where the material of the ferrule yields readily, but where necessary or desirable it may be done by suitable dies.

The bristle tip, after being properly shaped, is inserted into the ferrule so that it extends therewithin a sufficient distance to secure a firm foundation. In the illustrative embodiment shown, it extends approximately to the middle of the ferrule. The bristle tip may be inserted into the ferrule after it has the conformation shown in Figures 4 and 5 or it may be inserted into a frusto-conical ferrule, which may then be deformed into the shape shown in Figures 4 and 5, as suggested in the preceding paragraph. The latter proceeding has the advantage that the bristles will be compacted by the deformation, since the flattening of the circular cross-section into an ellipse having the same perimeter, results in a reduction in the cross-sectional area.

The bristle tip having been placed in the ferrule, shaped as in Figures 4 and 5, a binder, such as glue or cement, is next poured into the handle end. The binder must have the properties of being sufficiently fluid, when applied, to impregnate the base of bristle tip, and it is desirable also that it adhere to the walls of the ferrule, although this is not strictly necessary, since my improved construction provides for the prevention of separation between bristle tip and ferrule in other ways, as will appear later. The binder should further be one that hardens or sets sufficiently to insure a permanent union of the ferrule and the brush tip. Where a rubber composition is used, this hardening may be obtained by a subsequent vulcanizing process.

It will of course be understood that both binder and ferrule should be of a material that is reasonably adapted to withstand the chemical action of the substance with which the brush is to be used.

While the cement is still plastic the ferrule is deformed, as shown in Figures 1, 2 and 3, by flattening a portion of the bristle end thereof, so that the shoulders 31 are formed in the ferrule at a point intermediate the ends of the inserted portion of the bristles. This deformation is accomplished by squeezing together the sides of the ferrule so as to form substantially parallel side walls 33, and as a result of this deformation the end walls are bulged out laterally as shown at 35, due to the reduction in cross sectional area, which causes a lateral flow of the cement under sufficient pressure to stretch the metal of the ferrule so that the walls of the ferrule expand at these points. As a further consequence of this bulging it will be observed that rounded shoulders 37 and 39 are also formed in the walls of the ferrule. The bristle portions imbedded in the cement naturally are distorted as the cement flows.

In Figures 6 and 7 I have attempted to show the effects of the deformation just described. Figure 7 shows the conformation of the bristle end of the ferrule in its final form, while the dotted curve 45 indicates its contour before deformation. While the perimeter remains the same it will be observed that the cross-section is flattened and its width increased.

Figure 6 shows an end view of the bristle tip, in its final form in full lines, and its contour in its initial form, as it would appear in Figures 4 and 5, in dotted lines at 46. In this case the

dotted area is of considerably greater extent than the full line area, indicating that the bristles have been compacted and it will further be noted that both the width and the thickness of the bristle tip have been reduced. The reduction in thickness follows as a result of the squeezing together of the sides of the ferrule.

The same squeezing widens the ferrule and makes its ends substantially parallel, so that the bristle ends within the ferrule are displaced from their outwardly diverging directions into substantial parallelism, and this tendency is transmitted to the external portions of the bristles, so that they become more nearly parallel, and so that the width of the brush tip at 27 more nearly approaches the width of the ferrule. This will be readily understood by the further aid of a comparison of Figure 4 with Figure 2. The dotted line 44 in the latter figure is intended to show the conformation of the brush tip of Figure 4.

The resulting compacting of the bristles of the tip gives body and resilience to the tip, and the outer bristles are caused to adhere closely to the inner bristles, resulting in a unification and integration of the protruding bristles that are absent in the undeformed ferrule of Figure 4.

As a consequence of the deformation of the ferrule not only are the character and the conformation of the bristle tip changed, but the effectiveness of its setting in the ferrule is greatly increased. As clearly appears from Figure 1 the shoulders 31 form an abutment that will prevent the bristle tips from being pulled out of the ferrule after the binder hardens, because the hardened binder and the bristles within the ferrule have been similarly deformed so as to present a complementary shoulder 41 abutting the shoulder 31 of the ferrule. Similarly the shoulders 37 and 39 also prevent motion of the bristle tip both inwardly and outwardly.

The binder is now allowed to harden, or, if the character of the binder requires a special hardening process such as vulcanizing, it is now subjected to such process, which will set the bristle tip permanently in place.

A second embodiment of my invention is shown in Figures 9 to 11 inclusive. In Figure 8 is shown a brush having a bristle tip 51, a ferrule 53 and a handle 55. The ferrule in its original form may have the conformation shown in Figures 10 and 11, in which it is shown as having a cylindrical portion 57 and a conical portion 59. The bristle tip 51 may be inserted into the cylindrical portion and the latter then flattened preliminarily, as explained in connection with the outer embodiment of my invention. Cement is then introduced so as to impregnate the bristles, which as shown in Figure 8 extend only half-way into the section 57 of the ferrule. An additional amount of cement is then added which fills the portion 57 and extends therebeyond into the conical section 59. The ferrule is then additionally deformed by squeezing it so as to further flatten it, and so as to form the bulged portions 61, and the shoulders 63, having effects similar to those already described in connection with the other embodiment of my invention.

It will be observed that in the showing of Figure 8, the bristles terminate short of the shoulder 63, so that in the process of squeezing they are not deformed by flowing into the bulged portions 61. The engagement with the shoulders 63 and the shoulders 61 due to the bulges is effected exclusively by the cement. Since the bristles are imbedded in the cement they are held in place

thereby. It will be understood, of course that the bristles need not necessarily terminate at the point shown but that they may extend to other places, such as the line 65 at the beginning of the conical portion 65, or the intermediate line 67.

It will further be observed that since the portion 57 is cylindrical the bristles held therewithin are disposed in substantial parallelism, and so are the protruding portions of said bristles. This parallel relation is undisturbed by the deformation of portion 57, but the bristle tip is compacted due to the resulting diminution in cross-sectional area. In its final form it will be wider, but thinner, than in its undeformed condition.

The lower end of the conical portion 69 serves conveniently for the insertion of a round handle, such as 55, and therefore is shown as left undeformed.

This second embodiment of my invention is particularly useful in the manufacture of large brushes, and permits the joining thereto of a round handle of small diameter.

In the first embodiment of my invention, I have described the ferrule of my brush as having a greater wall surface at the bristle receiving end. However, and especially in the case of smaller brushes ferrules may be used in which this is not so, that is ferrules that are originally of cylindrical conformation, so that the wall area is uniform throughout, and I have found that satisfactory results may also be obtained therefrom.

While I have disclosed a few illustrative embodiments of my invention and the manner of practicing the same, it will be obvious that the same may be embodied and practiced in many other ways and that I do not limit myself in respect thereto other than as defined in the appended claims.

Having thus described my invention and illustrated its use what I claim as new and desire to secure by Letters Patent is—

1. A brush having a bristle tip and a ferrule, said ferrule being generally tubular, and having a portion of the bristle tip inserted into one end thereof, together with a cementitious binder serving to integrate the bristle tip and the ferrule, said bristle tip receiving end of the ferrule being of substantially uniform flattened cross-section at its end, and then changing to a different cross-section so as to form shoulders therein, and parts of said flattened portion of the ferrule being bulged outwardly so as to form additional shoulders, said inserted portions of the bristles and binder being of complementary conformation, whereby said shoulders will resist withdrawal of said bristle tip from the ferrule.

2. A brush having a tubular ferrule, and a bristle tip inserted into one end thereof together with a cementitious binder serving to integrate the bristles and to hold them in the ferrule, and

a portion of said end of the ferrule surrounding the bristle tip and binder being flattened so as to form shoulders, and also being bulged out laterally so as to form shoulders flanking said first-mentioned shoulders, said inserted portions of the bristle tip and binder being of complementary conformation, whereby said shoulders will resist withdrawal of said bristle tip from the ferrule.

3. A brush having a tubular ferrule, and a bristle tip inserted into one end thereof, and a portion of said end of the ferrule surrounding the bristle tip being flattened so as to form shoulders, and also being bulged out laterally so as to form shoulders facing toward the bristle tip and shoulders facing toward the handle, said inserted portions of the bristle tip being of complementary conformation, whereby said shoulders will resist withdrawal of said bristle tip from the ferrule, and said inserted portion of the bristle tip being impregnated with a solid binder so as to retain its conformation.

4. In a brush, a bristle tip, and a ferrule, said ferrule being generally tubular, and having one end of the bristle tip inserted therein, the bases of said bristles being imbedded in a substantially rigid binder, and a portion of said end of the ferrule surrounding the binder in which the bristle tips are imbedded having one diameter thereof reduced and another diameter thereof increased in relation to the adjacent portions of the ferrule, so as to form shoulders, said inserted portions of the binder being of complementary conformation, whereby said shoulders will resist withdrawal of said bristle tip from the ferrule.

5. A brush comprising a tubular ferrule, said ferrule at its handle receiving end being of tapering conformation and of decreasing cross sectional area toward its handle end, and its bristle receiving end being of flattened cross section and with a pair of abruptly rising convex shoulders disposed transversely intermediate the handle end and said flattened end and the lateral walls of said flattened portion being disposed at an angle less than that of the corresponding walls of the tapering handle end of said ferrule, and said brush also comprising a bristle tip extending beyond said shoulders, and said bristle tip being impregnated with a cementitious binder.

6. A brush having a tubular ferrule, a portion of the bristle receiving end of which is of substantially flattened cross section and terminated by a pair of shoulders, and the walls of said ferrule converging toward the handle end, and being less convergent at said flattened bristle-receiving portion, and a bristle tip inserted into said ferrule so that the bristles extend beyond said shoulders, portions of the bristles within the ferrule and at and adjacent said shoulders being impregnated with a cementitious binder.

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