May 13, 1941. E. COHEN 2,241,876

FLEXIBLE BACKED BRUSH

Filed May 6, 1940

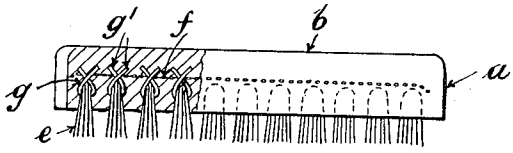


Fig.1.

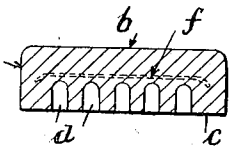


Fig.3.

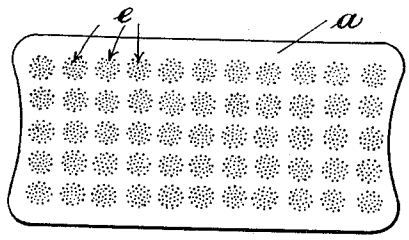


Fig.2.

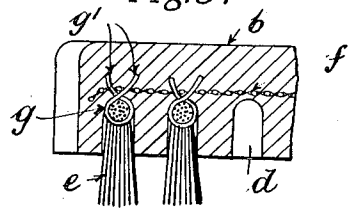


Fig.4.

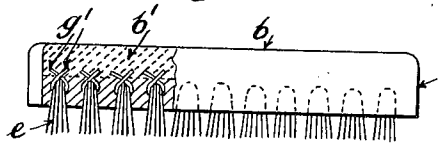


Fig.6.

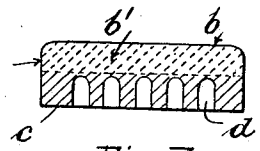


Fig.7.

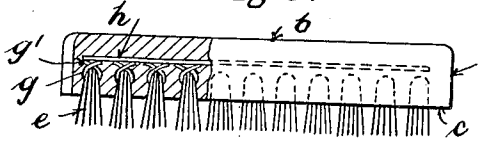


Fig.9.

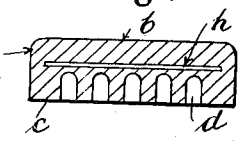


Fig.10.

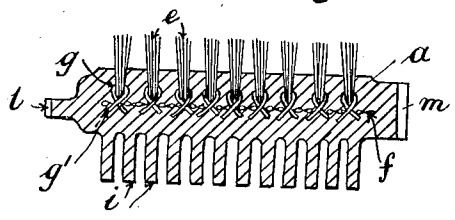


Fig.11.

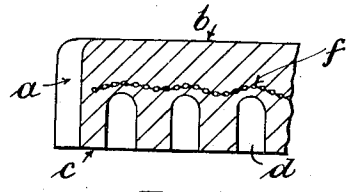


Fig.5.

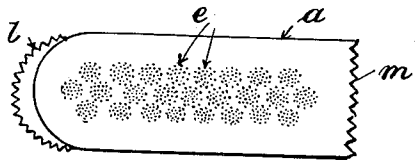


Fig.12.

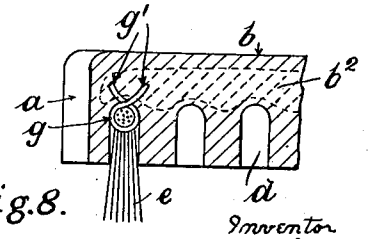


Fig.8.

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UNITED STATES PATENT OFFICE

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FLEXIBLE BACKED BRUSH

Ernst Cohen, Manchester, England

Application May 6, 1940, Serial No. 333,673
In Great Britain April 6, 1939

8 Claims. (Cl. 15—191)

Flexible brush backs composed of elastic material such as rubber are known wherein holes for the bristles are formed, the bunches of bristles being secured in position by hand, either by stitching through the back with wire or twine, or by the aid of non-water soluble gum or the like.

The principal object of the present invention is to form such elastic backed brushes of rubber and the like, wherein the bunches of bristles can be placed and secured in position by machinery as is the case with wooden backed brushes.

Experiments have shown that when the bunches of bristles are inserted by machinery into elastic backed brushes, the wire staples used for securing the bristles in position, whilst being capable of being driven into wood and the like rigid material and forming a positive connection are ineffective with rubber backed brushes due to the elasticity of the rubber or the like which stretches or yields and allows the staples to be drawn out by the flexing of the bristles when the brush is in use.

According to the present invention backs for brushes are formed from rubber or like elastic material having holes formed therein, usually by moulding, to receive the bunches of bristles, but during the moulding process inelastic material is incorporated in the mass in a manner so as not to affect or materially affect the flexibility of the back and into or below which the staples or anchors can be driven when inserting the bunches of bristles so as to form an inelastic hold for the ends or tangs of the anchoring means and prevent withdrawal.

The invention will be more particularly described by the aid of the accompanying drawing in which the same reference letters or characters are used throughout the several views to indicate the same thing or part and wherein—

Figure 1 is a side elevation of a nail brush constructed according to the invention shown partly in section.

Figure 2 is an inverted plan view of Figure 1 and

Figure 3 is a cross-sectional view of the brush body before the bristles are inserted, whilst

Figure 4 is a detail view of the left-hand side of Figure 1 drawn to an enlarged scale.

Figure 5 is a detail view corresponding to Figure 4 showing depressions formed in the canvas.

Figure 6 is a view also corresponding to Figure 1 showing a modified method of constructing rubber backed brushes in accordance with the invention wherein the brush body is formed of rubber of different degrees of hardness,

Figure 7 being a cross-sectional view of Figure 6 before the bristles are inserted in position, while

Figure 8 is a detail view corresponding to Figure 4 but showing the brush body formed of comparatively soft rubber with a stratum of hard rubber.

Figure 9 is a view corresponding to Figure 1 showing a modified form of the invention having a strip of sheet metal, Celluloid or the like embedded in the rubber to cause the staples to spread and become firmly embedded whilst preventing penetration of the brush body by the same, and

Figure 10 being a cross-sectional view of Figure 5 before the bristles are inserted in position.

Figure 11 is a longitudinal elevation in section of a combined wire and rubber brush for cleaning and renovating suede leather and the like constructed according to the invention, of which

Figure 12 is a plan view.

In carrying the invention into effect according to one convenient manner as illustrated in Figures 1 to 4, which illustrates a rubber backed nail brush, the body *a* is formed in a two part mould (not shown) of the desired shape and size, one part being adapted to form the back surface *b*, either flat as shown, or arched and with or without any desired pattern and/or marking thereon, such as a trade-mark or trade name, size or the like, while the other part of the mould is provided with nipples to form recesses or holes *d* while the back *b* is formed to the desired shape and contour. The nipples extend to or near to the foraminous material *f* such as canvas or other textile fabric, wire gauze, paper or other suitable sheet material as seen in Figures 1, 3 and 4 or may be adapted to depress the same locally as indicated in Figure 5, the completely shaped brush back then being vulcanized in the usual manner.

Bunches of bristles *e* are inserted in the vulcanized back by means of a stapling machine of known kind, which doubles the bunch of bristles, places a staple *g* on the fold which is then pressed into the holes *d* in the brush back to an extent which causes the ends g^1 of the staple to spread and enter through and under the inelastic foraminous material *f* so as to form a positive bond as clearly seen in Figure 4.

Referring to Figures 6 and 7 a nail brush *a* is shown wherein the front part *c* of the brush

body moulded with holes to receive the bristles *e* being formed of comparatively soft rubber while the back part *b* is formed of comparatively hard inelastic rubber b^1, the composite blank being formed by layers of different rubber mixings so that when vulcanized the back is harder and less elastic than the front.

The holes *b* to receive the bunches of bristles are formed as in the preceding example and when said bristles *e* are placed in position, the ends g^1 of the wire staples *g* when driven against the harder rubber b^1 enter the latter and spreads to form an efficient bond without penetrating to or marking the back surface of the brush. In this case the foraminous inelastic material may be omitted if desired.

Instead of making the back part *b* of the brush entirely of comparatively hard inelastic rubber as described with reference to Figure 9 a layer b^2 of such hard inelastic rubber, as seen in Figure 8 may be sandwiched between top and bottom blanks of comparatively soft rubber mixings so that when the brush body is moulded and vulcanized a stratum b^2 of harder and less elastic rubber is located at the bottom of the bristle holes *d* and into which the ends g^1 of the staples *g* are driven to form an effective bond as in the preceding example.

It is found in practice that the inclusion of a stratum or backing of harder rubber in the brush back not only facilitates the insertion of the bristles and staples or anchoring means due to the decrease of the resiliency of the brush back against which the bristle inserting punches have to contend and which necessitates very accurate setting up of the machine, but also positively prevent the liability for the ends of the staples to penetrate the brush back.

Alternatively discs or strips of sheet metal or other sheet material such as Celluloid may be incorporated in a brush body formed of comparatively soft India rubber as indicated at *h* Figures 9 and 10. The strips of sheet material *h* embedded in the rubber may be penetrated by the ends of the staple when inserting the bunches of bristles or may cause said ends to spread laterally below the same, as shown, so as to extend sideways to an extent to form an efficient bond without impairing the elasticity of the bristles.

Although the invention has been described specifically with reference to a nail brush it is to be understood that it may be applied to scrubbing brushes generally, clothes brushes or the like by making the moulds of appropriate size and shape.

Figures 11 and 12 illustrate the formation of a brush having wire bristles and rubber bristles on the same body constructed according to the invention, a blank of canvas *f* being incorporated in the brush body *h* which is formed of comparatively soft elastic rubber in a multi-part mould shaped to form rubber teeth *i* on one side and holes to receive the bunches of wire bristles *e* on the other side.

Such brushes are used for cleaning suede leather and the like and the mould is shaped to form serrations *l*, *m*, on the ends as shown, or other desired part, the moulded brush body with integral rubber teeth being vulcanized and the bunches of bristles subsequently inserted by means of a stapling machine as described with reference to the preceding example.

The bristle incorporating means have been described in detail as comprising a wire loop or staple embracing the bunches of bristles, but it is to be understood that they may be in the form of a metal bridge piece having tangs or barbs adapted to engage the inelastic material to form the bond.

It is to be understood that the recesses for the bristles may be formed by other means than moulding, for example, they may be formed by drilling or punching.

By these means rubber and like elastic backed brushes can be made more expeditiously and cheaply than hithertofore, and in a form giving more efficient service and longer life.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A brush having a body portion composed of soft, flexible moulded rubber, an inelastic sheet material around which the moulded rubber extends and which is wholly enclosed by the rubber, a plurality of bunches of bristles mounted in the body portion and projecting out of at least one face thereof, each bunch of bristles being engaged by an anchoring staple having prongs entering the rubber body portion and extending only partly therethrough, said prongs penetrating the inelastic sheet material and holding the bristles firmly secured thereto.

2. A brush having a soft, flexible body portion formed of relatively soft moulded rubber, said body portion being provided with a plurality of spaced holes extending only partly through it, a sheet of inelastic material disposed within the body portion and wholly enclosed thereby, said sheet being located adjacent to the inner termination of the holes, a bunch of bristles located in each of the holes, said bristles having their free ends projecting out of the holes, each bunch of bristles being engaged by a wire staple, said staples penetrating the sheet material and being clenched over on one face of the same, said staples being wholly confined within the rubber body portion and prevented from movement through the same by their engagement with the sheet material.

3. A brush having a body composed of rubber, said body having a soft face portion and a harder back portion integrally united thereto, a sheet of relatively inelastic material disposed within the body and located substantially at the point of joinder of the hard and soft portions of the body, the soft portion of the body being provided with a plurality of bunches of bristles extending through it, and a staple extending around each bunch of bristles and securing it to the sheet material.

4. A brush having a soft flexible rubber body, inelastic sheet material around which the body is moulded, bristles held in the body, and fastening elements for said bristles comprising staples extending through the sheet material and clenched over on one face of the same and held thereby from shifting movement through the body of the brush.

5. A brush comprising a body portion composed of soft, flexible material, a sheet of inelastic material embedded within and surrounded by said body portion and disposed between two faces of the body portion, a plurality of bristle bunches having parts embedded in the body portion and having other parts projecting from one face thereof, the embedded portions of the bristles being wholly disposed between the sheet member and the face of the body portion from which parts of said bristles project, and means for attaching the bristles to said sheet member.

6. A brush comprising a body portion of soft rubber, a sheet of inelastic but flexible foraminous material embedded within the body portion, bristles embedded in the body portion and stapled to the foraminous material, said bristles being disposed wholly to one side of the sheet and having portions projecting out of the body portion.

7. A brush comprising a body composed at least in part of flexible and soft material, a plurality of bristle bunches having parts embedded in the body portion, means engaging said bristle bunches and securing the same within the body portion, and a sheet of material embedded in the body portion and wholly disposed between all of the bristles and one face of the body portion to thereby prevent shifting movement of the bristles or their fastening means in a direction toward said face of the body portion.

8. A brush having a body portion composed of a back part of relatively hard rubber, an integral front portion of relatively soft and flexible rubber, a sheet of flexible textile fabric embedded within the body portion, the softer front portion being formed with a plurality of deep depressions having their inner ends located adjacent to the textile fabric sheet, a bunch of bristles situated in each of said depressions and having free ends projecting for a distance out of the same and away from a face of the body portion, one end of each bunch of bristles within a depression being embraced by a fastening member, the inner end of each bunch of bristles being located at one side of the sheet, the embedded portions of the bristles being wholly disposed between the sheet and the face of the body portion out of which parts of said bristles project.

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