

Sept. 19, 1967

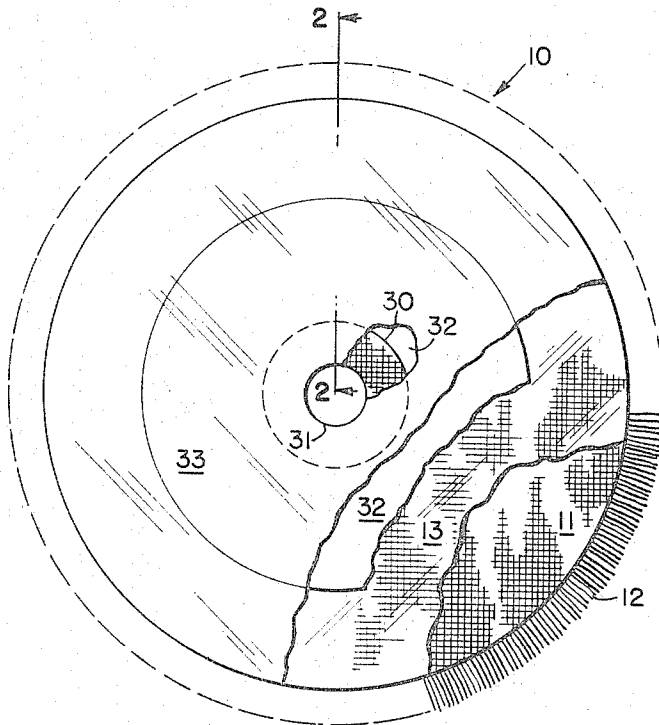
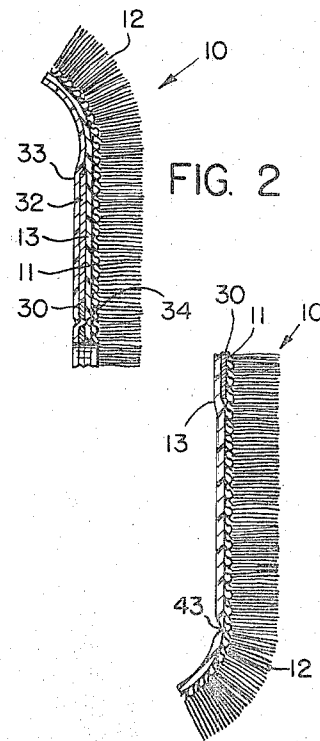
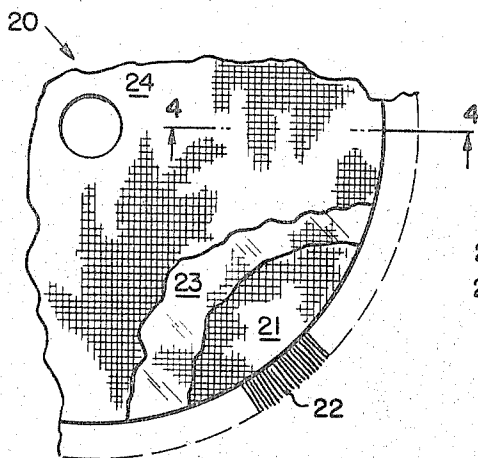
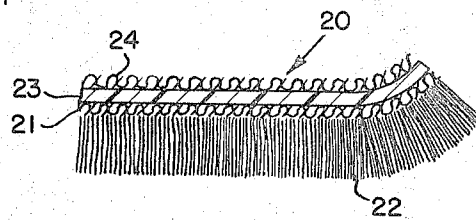
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3,342,533

METHOD OF MAKING POLISHING BUFF

Filed June 14, 1965

2 Sheets-Sheet 1



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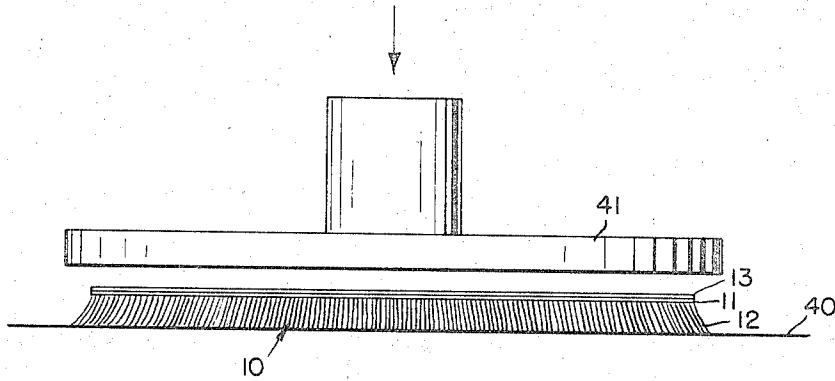


FIG. 6

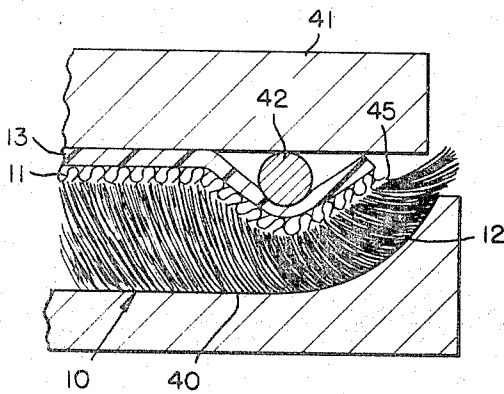


FIG. 7

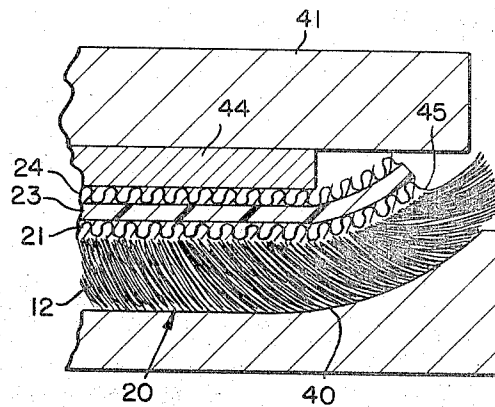


FIG. 8

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1

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METHOD OF MAKING POLISHING BUFF

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ABSTRACT OF THE DISCLOSURE

A polishing buff is made by cutting a fabric backing into a disk shape, tufting pile onto the disk and fusing synthetic thermoplastic material into the back of the tufted disk to fill the interstices in the disk and anchor the tufts in place. Overlying disks of fabric, plastic, or other material can be added to the back of the disk, and the buff can be held in a dished shape by the thermoplastic material. The laminae of thermoplastic and other materials can be fused together and to the back of the buff by pressing a heated platen against the back of the buff, and a dished shape can be impressed on the buff by pressing it into a mold.

The present invention relates to a polishing buff and a method of making such buff, and more particularly, to an improved polishing buff that is cheaper and easier to manufacture, and that has improved characteristics.

It is an object of the invention to make a polishing buff that will not be damaged by dry cleaning solvents so the buff's life can be extended by dry cleaning.

Another object of the invention is to make a buff more cheaply than previous buffs and to provide such buff with high-quality characteristics such as long life, resistance to injury, and high polishing capability.

Another object of the invention is to make a buff, the pile tufts of which are securely anchored in their backing sheet, and the tufting of which is a relatively simple and inexpensive operation.

Another object of the invention is to curve back the periphery of a polishing buff in a generally dished shape by a simple method which is economical and which results in an inexpensive, permanently dished buff.

Another object of the invention is economically to make a generally dished-shaped buff having pile disposed around the periphery of the fabric backing disk for the buff to protect the buffed surface from any contact with such fabric disk.

Other objects of the invention will be apparent hereinafter from the specification and from the recital of the appended claims. To these and other ends, the invention resides in certain improvements, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings:

FIG. 1 shows a plan view, partially cut-away of a preferred embodiment of the buff according to the invention;

FIG. 2 shows a partial cross section of FIG. 1 taken along the line 2-2;

FIG. 3 shows a partial plan view, partially cut-away, of another preferred embodiment of buff according to the invention;

FIG. 4 shows a partial cross-sectional view of the buff of FIG. 3 taken along the line 4-4;

FIG. 5 shows a partial cross-sectional view of another preferred embodiment of the invention;

FIG. 6 shows a partially schematic side elevation of a heat fusing step in the method of making buffs according to the invention; and

FIGS. 7 and 8 show partially schematic, partial side

2

elevations of the forming of dished-shaped buffs according to the invention.

Generally, the inventive buff is formed by fusing synthetic thermoplastic material into the back of a disk of fabric material to which a pile is secured. The pile is preferably stitched or tufted to the fabric backing disk, and the fabric material of the disk is preferably impregnated with a synthetic thermoplastic material before such tufting. In an alternative preferred embodiment, an additional capping fabric disk is secured to the back of the tufted fabric disk by a layer of thermoplastic material fused between and flowed into the two fabric disks. Also, within the spirit of the invention, peripheral pile fibers can be bent back against the periphery of the backing disk and bonded thereto by the plastic material.

Referring to FIGS. 1 and 2, a buff 10 is formed with a fabric backing sheet 11 that is preferably canvas and that is preferably cut into the illustrated disk form. Of course, sheet 11 can be cut in any convenient shape during fabrication of buff 10 and can later be trimmed to the illustrated disk shape. Previous buff construction methods have required a relatively closely woven and expensive canvas disk, but for buffs according to the invention, a relatively open-weave and less expensive canvas is preferred.

Pile 12, preferably of wool, is tufted to backing disk 11, but it is preferred that disk 11 be impregnated with a synthetic thermoplastic material such as polyethylene before tufting. To this end, polyethylene or other suitable polyolefin is coated or fused into the interstices of fabric 11 either before it is cut into the illustrated disk form, or after cutting.

The impregnation of fabric disk 11 with a material such as polyethylene makes the tufting of the pile fibers onto the disk more simple and economical than possible with previous buff constructions. The densely woven canvas fabric backing disks of previous buffs were difficult to tuft with pile, and the pile stitching apparatus often cut fibers in such disks during tufting so as to weaken the disk and impair its appearance. Furthermore, tufts of pile are better anchored in the inventive plastic-impregnated disk 11 than is possible with an untreated canvas disk.

Tufting of the inventive buff is accomplished by tufting methods and apparatus that are known per se and comprise generally a sewing machine adapted to stitch pile tufts through the disk and sever outwardly projecting loops of fibers to form a pile projecting from the face of the disk.

After tufting of pile 12 onto disk 11, an additional coating or layer 13 of synthetic thermoplastic material is forced or fused into the back of disk 11. It is preferred that such backing layer be the same material impregnating disk 11 such as a linear, low-density, high-melt-index polyethylene. Such backing plastic material is preferably applied by positioning disk 13 of plastic over the back of fabric 11 and applying heat and pressure to flow the plastic into the interstices in disk 11 and into and around the stitched pile tufts to anchor such pile tufts more securely in backing sheet 11, and to stiffen disk 11 and hold it in its general disk shape.

The preferred way of fusing plastic layer 13 into fabric layer 11 is illustrated in FIG. 6. Tufted disk 11 is positioned with its pile 12 downward in engagement with work surface 40, and heated platen 41 is pressed down against the back of plastic disk 13 to apply heat and pressure to the back of the buff. After an appropriate time-temperature, platen 41 is raised, and the elements of the buff are fused together in an integral unit.

A disk backed with a layer of plastic such as polyethylene is inert to and undamaged by dry cleaning solvents such as trichlorethylene, carbon tetrachloride, per-

chloroethylene, etc., and can be dry cleaned. Since dry cleaning of the inventive buff is possible, dirt can be removed from the pile, and the life of the buff can be prolonged by periodic dry cleaning.

Plastic backing layer 13 also protects the back of the buff, preventing injury or damage to the stitched pile tufts. In addition, plastic layer 13 secures the pile tufts in place and provides body, strength, and the desired degree of stiffness to the inventive buff, and yet the buff retains sufficient flexibility so that it can be rapidly deformed during polishing to conform to the surface being polished. Furthermore, such a plastic-backed buff is lighter in weight than conventional buffs for economy and convenience of use. Moreover, the inventive buff dissipates the heat generated during polishing without injury to the pile or its backing, thus, prolonging the useful life of the buff.

A complete and satisfactory buff can be formed according to the invention by merely fusing plastic layer 13 into the back of backing material 11 to which pile 12 has been tufted, as best illustrated in FIG. 5. However, other variations and modifications of the inventive buff have advantages for some applications, and these have been shown in the drawings and will now be described.

It is preferred for many applications that a buff according to the invention have a central arbor hole 31 and a reinforcing fabric washer 30 immediately surrounding arbor hole 31 as partially illustrated in FIGS. 1 and 2. Such a fabric washer can be formed of the same material from which disk 11 is cut, and can be secured in place by fused plastic as will be described more completely below.

Another variation of the inventive buff illustrated in FIGS. 1 and 2 includes a label 32 preferably formed of stiff paper or other suitable material such as plastic and preferably of smaller radius than disk 11, and concentric therewith. Label 32 is laid over a plastic disk 13, and is preferably apertured to surround washer 30, if such washer is used. A trademark or other information can conveniently be applied to label disk 32, and disk 32 helps stiffen and support the central portion of buff 10 in the preferred flat configuration. Preferably, another plastic disk 33 is laid over disk 32 and the other elements on the back of disk 11, and the entire assembly is fused into an integral unit by heat and pressure.

As best shown in FIG. 2, fabric washer 30, over which label disk 32 can be positioned, is preferably secured in place in buff 10 by plastic projections 34 extending from plastic layer 33 through washer 30 and into fused engagement with plastic layer 13. Projections or nubs 34 are preferably formed by projections on the heat and pressure platen used for fusing the plastic together with the other elements of the buff to form a monolithic unit. Projections disposed on such platen so as to extend into the buff in the area of washer 30 to form rivet-like plastic nubs 34 joining the two plastic layers 13 and 33 together through washer 30 to secure washer 30 in place.

Referring to FIGS. 3 and 4, a buff 20 is formed with a fabric backing sheet 21 similar to backing sheet 11 in that it is also coarsely woven and preferably impregnated with a synthetic thermoplastic material such as polyethylene before being tufted. Pile tufts 22 are stitched through backing sheet 21 in the same manner as described above for buff 10.

Instead of merely having a plastic layer fused into its back, buff 20 has an additional capping fabric disk 24. Preferably, a disk 23 of plastic such as polyethylene and a fabric disk 24 of material similar to disk 21 are laid over the back of disk 21 and heat and pressure are applied to plasticize disk 23 and flow the plastic into the interstices of the fabric disks 21 and 24 and into the stitching of pile tufts to bond disks 21 and 24 together in a monolithic laminated unit and to secure pile 22 in place.

The addition of capping disk 24 improves the appearance of the inventive buff, and also adds to its stiffness for those applications in which a relatively stiff buff is advantageous. Both fabric disks 20 and 24 can be of relatively inexpensive, open-weave canvas, and buff 20 is equally resistant to dry cleaning solvents, and is more economical to manufacture than prior art buffs.

The inventive plastic-backed buff can be conveniently formed into a generally dished shape as shown in the cross section views of FIGS. 2, 4, and 5, and in such dished shape, the peripheral edge of the buff 10 is curled or bent rearwardly to make a rounded edge. Such a rounded edge helps to interpose pile between the surface being polished and the buff's backing element formed of fabric 11 and plastic. Any contact of the backing element with the surface to be polished would burn or mar said surface rather than polish it, hence, it is desirable to have pile around the edges of the buff and disposed between the surface being polished and the backing element of the buff.

The heat and pressure used to fuse plastic into other lamina of the inventive buff as described above and illustrated in FIG. 6 can also be used to form the buff into the desired dished shape in a single operation, but it is preferred that the parts of the buff be fused together in a generally flat configuration and that the periphery of the buff be trimmed before it is formed into a dished shape.

A dished shape is preferably obtained by heating and compressing the buff near its peripheral edge in an annular area concentric with the buff. At the same time such compression and heat are applied, it is preferred that the peripheral edge of the buff be forced rearward to curl back the edge of the buff in a dished shape. After removal of heat, compression, and bending forces from the buff, its thermoplastic lamina sets and retains the buff in a dished shape. Shrinkage of plastic and canvas at the periphery of the buff tends to increase the rearward curl of the buff and accentuate its dished configuration.

To form the curved edge buff preferred for many applications, one of the methods illustrated in FIGS. 7 and 8 is preferred. Generally, the methods include placing the buff pile-downward in a preferably concave support member 40 and pressing the buff into support member 40 while compressing the buff to a greater extent a short distance away from its peripheral edge to force an upward curl into the buff periphery and to urge some plastic outward toward the periphery of the buff.

In FIG. 7, a wire ring is shown disposed on the upper surface of buff 10 which is positioned with its pile 12 in engagement with support member 40, and platen 41 is shown as having driven wire ring 42 into the upper surface of buff 10 to compress it more in the area of ring 42. Ring 42, for purposes of illustration, is merely shown in cross section, but preferably comprises a ring of somewhat smaller radius than disk 11 and arranged concentrically with disk 11 to be evenly spaced from the periphery thereof. Ring 42 can be carried by platen 41, or disposed on the upper surface of buff 10 as a separate unit, but it is preferred that ring 42 be metal or other heat conducting material so as to transmit heat from platen 41 to plastic 13 in buff 10.

Forcing of ring 42 down into the back surface of buff 10 in cooperation with the concave form of support 40 forms the periphery of buff 10 in an upward curvature to produce the desired dished shape. Also, some of the plastic 13 is squeezed radially outward toward the periphery of buff 10 and the thickness of plastic layer 13 is reduced under wire 42 so that any shrinkage of plastic 13 and canvas 11 tends to accentuate the rearward curl of buff 10 at its periphery, and such curling is not transmitted past the zone of wire 42 toward inner, flat areas of the buff. A depression 43, best shown in FIG. 5, is formed in the back of a buff that is dished by compression from ring 42.

5

6

In the method shown in FIG. 8, a solid disk 44 is substituted for the ring 42 and provides greater compression of the buff 20 in the central portion than at its periphery. This forces some molten plastic radially outward toward the periphery of buff 20, and in cooperation with concave support 40, curls the periphery of buff 20 upward.

The methods illustrated in FIGS 7 and 8 are each applicable to any of the preferred embodiments of buffs illustrated in FIGS. 1-5, and other methods of forming the inventive buff into a dished shape can be used within the spirit of the invention. Thus, platen 41 can be replaced by a male die member shaped to give the buff a dished shape when the buff is compressed between such male die member and concave female support member 40.

Another function of the methods illustrated in FIGS. 6-8 is to force molten plastic radially outward toward and beyond the periphery of the buff and through fabric layers at the buff periphery to engage portions of the pile bent back and extending outward at the periphery 45 of the buff. As platen 41 forces buff 10 downward, the peripheral pile fibers of the buff are forced radially outward from the edge of the buff, and molten plastic that is squeezed out to and adjacent the periphery 45 of the fabric disks 11 or 21 engages portions of the pile fibers at that point and bonds them to the edge of the fabric backing disk so that such fibers are bent around and secured to the outer edge of the disk to be disposed between the fabric backing and a surface being polished by the buff. This prevents burning or marring of the polished surface from engagement directly with the backing element of the buff and insures that pile is always disposed between such polished surface and the buff backing elements.

While the invention has been disclosed herein by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative, rather than a limiting, sense, and it is contemplated that various modifications of the procedures and construction will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

We claim:

1. A method of making a polishing buff, said method comprising:

- (a) cutting a fabric backing material to form a general disk shape;
- (b) tufting a pile onto said disk so that said pile tufts are anchored closely to the back of said disk and said pile extends from the face of said disk; and
- (c) fusing synthetic thermoplastic material into the back of said tufted disk to fill the interstices in said disk and said anchored tufts and to overlie the back of said disk and said anchored tufts to secure said tufts in place and to stiffen and support said buff in a generally disk shape.

2. The method of claim 1 wherein said fusing step is accomplished by laying a disk of said thermoplastic material over the back of said fabric disk and heating said thermoplastic material to flow it into the back of said fabric disk.

3. The method of claim 2 with the additional step of laying a capping fabric disk over said thermoplastic material disk so that when said thermoplastic material is heated, it flows not only into the back of said backing disk, but into the interstices in said capping disk to bond said capping disk and said backing disk together.

4. The method of claim 3 with the additional step of forming said buff into a generally dished shape while said thermoplastic material is heated.

5. The method of claim 1 with the additional step of trimming the periphery of said buff.

6. The method of claim 1 with the additional step of forming said buff into a generally dished shape while said thermoplastic material is heated.

7. The method of claim 1 with the additional step of bending a portion of said pile back against said fabric disk at the periphery thereof and bonding a portion of said bent-back pile to said disk periphery by said thermoplastic material.

8. A method of making a polishing buff, said method comprising:

- (a) cutting a fabric backing material to form a general disk shape;
- (b) tufting a pile onto said fabric disk, said pile tufts being anchored closely to the back of said disk and said pile extending from the face of said disk;
- (c) positioning said tufted disk pile-downward on a work surface;
- (d) positioning a disk of synthetic thermoplastic material over the back of said disk; and
- (e) pressing a heated platen against said thermoplastic disk to plasticize and to flow said thermoplastic material into the interstices in said fabric material and said anchored tufts, and to form a plastic coating overlying the back of said fabric material and said anchored tufts to secure said tufts in place and to stiffen and support said buff in a generally dished shape.

9. The method of claim 8 including forcing said buff downward under said platen in an area adjacent the periphery of said buff to curl the periphery of said buff upward into a generally dished shape.

10. The method of claim 8 with the additional step of positioning a capping fabric disk over said thermoplastic material disk so that when said thermoplastic material is heated, it flows not only into the back of said backing disk, but into the interstices of said capping disk to bond said capping disk and said backing disk together.

11. A method of making a polishing buff, said method comprising:

- (a) impregnating a relatively open-weave fabric with a synthetic thermoplastic material;
- (b) cutting a generally disk-shaped piece of said fabric;
- (c) tufting a pile onto said disk so that said pile tufts are anchored closely to the back of said disk and said pile extends from the face of said disk;
- (d) laying a disk of said thermoplastic material over the back of said tufted fabric disk;
- (e) heating said thermoplastic disk to flow it into the back of said fabric disk to fill the interstices therein and to overlie the back of said disk and said anchored tufts; and
- (f) trimming the periphery of said buff.

12. The method of claim 11 with the additional step of compressing said buff near the periphery thereof while said thermoplastic material is heated to curl said periphery back in a generally dished shape.

13. The method of claim 12 wherein the pile surface of said buff is pressed against a generally concave form.

14. The method of claim 11 wherein a portion of said pile is bent back near the periphery of said disk and a portion of said bent-back pile is bonded to said disk at the periphery thereof by said thermoplastic material.

15. The method of claim 11 with the additional step of positioning a label over the back of said thermoplastic material disk and positioning another disk of thermoplastic material over the back of said label and heating both of said thermoplastic disks.

16. The method of claim 11 with the additional step of positioning a capping disk of fabric over the back of said thermoplastic disk so that said thermoplastic material flows into said capping disk as well as into the back of said tufted disk to bond said capping disk and said tufting disk together.

No references cited.