Nov. 10, 1953 R. O. PETERSON 2,658,315

BUFF AND METHOD OF MAKING SAME

Filed March 17, 1949 2 Sheets-Sheet 1

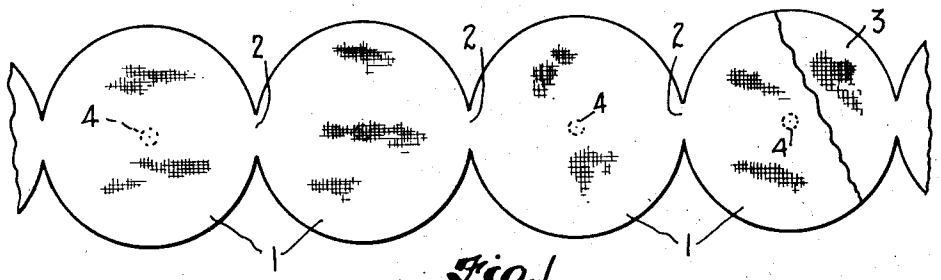


Fig. 1

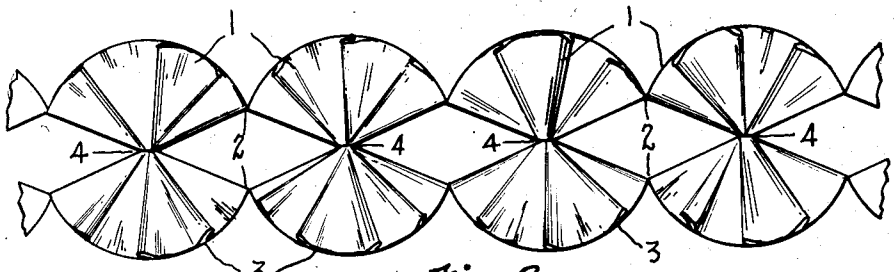


Fig. 2

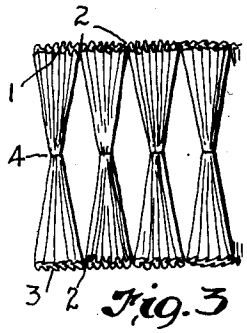


Fig. 3

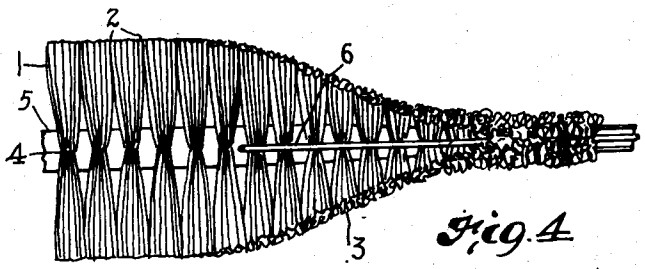


Fig. 4



Fig. 5

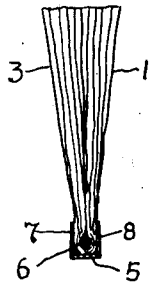


Fig. 6

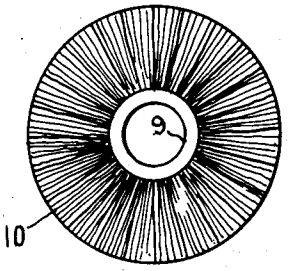


Fig. 7

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BUFF AND METHOD OF MAKING SAME

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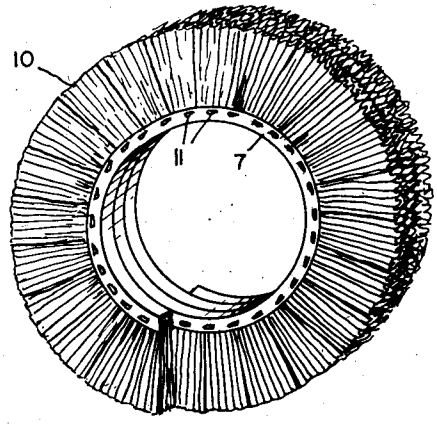


Fig. 8

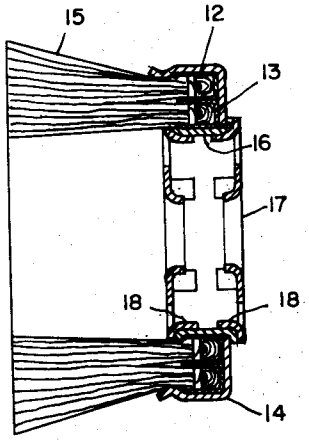


Fig. 9

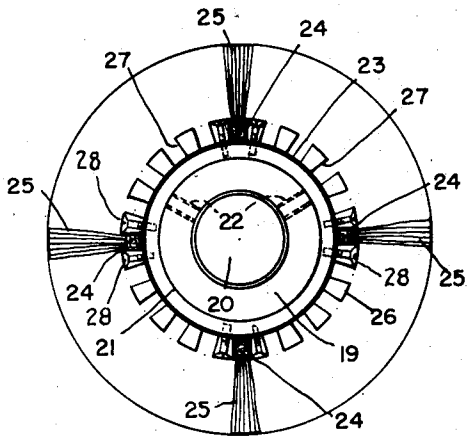


Fig. 11

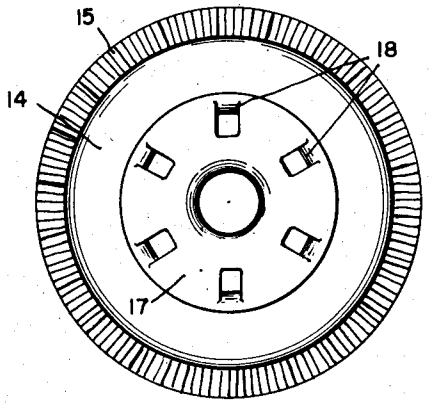


Fig. 10

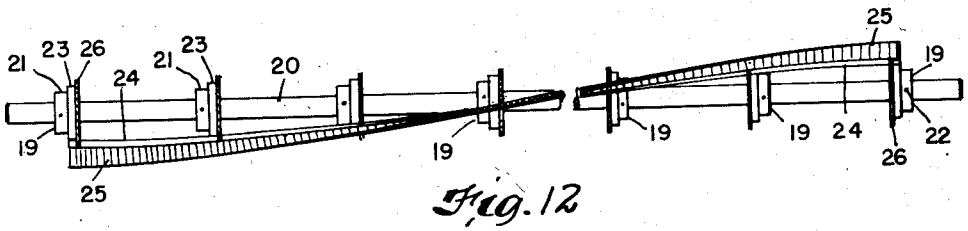


Fig. 12

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UNITED STATES PATENT OFFICE

2,658,315

BUFF AND METHOD OF MAKING SAME

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Application March 17, 1949, Serial No. 81,985

16 Claims. (Cl. 51—193)

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This invention relates as indicated to a novel buff and method of making the same, and more particularly to an improved buff construction especially adapted to continuous manufacture.

Fabric buffs of many types are, of course, well known in the art, perhaps the most common form comprising a plurality of layers of flat fabric discs stitched together and pierced centrally for mounting on an appropriate hub. It is also known to fold fabric sections into pleats or segments which are then stapled or otherwise bound to a central hub portion. This latter type of construction has certain advantages, including an ability to carry a considerable quantity of abrasive or polishing material and also presenting a work contacting surface adapted to have a uniform effect on the work-piece across the width of such face. Uneven application of abrasive and consequent streaking is thereby avoided. Such buffs are also better ventilated and therefore cooler in operation.

In the past, buffs of these several types have generally required to be individually assembled, substantially entirely by hand, and have consequently been rather expensive. In those forms employing pleated fabric "fingers," for example, there has been a tendency for the cut edges of the fabric extending radially from the buff hub to ravel in use with consequent rather rapid destruction of the buff.

It is therefore a primary object of my invention to provide a novel buff construction adapted to substantially mechanical assembly and manufacture and more particularly adapted to be assembled in the general manner shown and described in my prior Patent No. 2,303,386.

Another object is to form a buff comprising a plurality of more or less conical fabric fingers which will have no cut edges extending radially from the back or hub. When such generally conical fabric fingers are arranged around the circumference of a hub part with the broader parts directed outwardly, they readily flatten and accommodate themselves to the space they are desired to fill. When such fingers are properly formed in accordance with this invention, a maximum proportion of the fabric material is distributed at the outer ends thereof where needed to provide a buff face of requisite density. Such a buff will be uniformly filled and non-streaking in operation.

A further object is to so preliminarily interconnect the buff material elements that they may be continuously fed to a brush strip machine or the like.

Other objects of my invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

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In said annexed drawing:

Fig. 1 is a plan view of a plurality of fabric discs blanked out with a slight overlap, thereby to interconnect the same;

Fig. 2 shows two layers of such continuously interconnected discs secured together at their respective centers and in process of being formed into a plurality of oppositely directed tubular fingers;

Fig. 3 shows the material of Fig. 2 after completion of such finger forming operation;

Fig. 4 is a top plan view illustrating somewhat diagrammatically the formation of such novel buff material into a continuous strip;

Fig. 5 is a side elevational view corresponding to Fig. 4;

Fig. 6 is a view in cross-section taken along the line 6—6 on Fig. 5;

Fig. 7 shows a rotary buff assembled as taught in Whittle Patent No. 2,288,337 but employing my novel buff material;

Fig. 8 shows a length of buff strip circularized in a plurality of helical turns to form a rotary buffing element suitable for mounting on an arbor or the like;

Fig. 9 illustrates a cup buff, shown in cross-section, employing the novel buff element of my invention;

Fig. 10 is a top plan view of such cup buff;

Fig. 11 is an end elevational view of a long lead helical strip buff constructed in accordance with my invention; and

Fig. 12 is a longitudinal elevational view of the arbor and assembly of the buff of Fig. 11.

Referring now more particularly to said drawing and the preferred embodiment of my invention there illustrated, I may blank out a plurality of discs 1 from a continuous strip of fabric, with such discs overlapping slightly to provide interconnecting portions 2 and thereby preserving the blanked out material in the form of a continuous strip. Two layers of fabric may be thus simultaneously blanked out or one layer of blanked out discs may be superimposed on a similar layer of discs 3 of like dimensions, being secured thereto at their respective centers 4 by means of adhesive, stitching, or any other appropriate means. When certain plastic sheet materials are employed to form the discs, the two layers may be centrally adhered together by application of heat or solvent as appropriate.

The two layers of discs are then separated except at their centers and spread apart as shown in Fig. 2, and folded into oppositely extending pairs of generally conical pleated fingers as shown in Fig. 3.

A continuous series of such interconnected fingers may then be fed to a brush strip machine in the same general manner in which the stranded brush material is fed thereto as described in my prior Patent No. 2,303,386, being placed transversely of a flat metal strip 5 with a retaining element such as wire 6 disposed lengthwise thereof along to secure such fingers within the channelform back produced by turning up the side portions of strip 5 to form the channel sides 7 and 8. The resulting strip may be mounted in any form of holder desired or may be circularized either helically or to form an annular channelform brush back 9 adapted to be seated on an arbor or otherwise mounted with the fabric fingers 10 extending substantially radially therefrom. Or an annular buff may be produced as taught in Whittle Patent No. 2,288,337, employing my oppositely extending pairs of buff material fingers instead of stranded brush material.

Various modifications of the foregoing construction and method of assembly are obvious without departing from the spirit of my invention. For example, the fabric discs may be individually blanked out and then adhered or stitched together at 2 (Fig. 1) rather than being blanked in the indicated overlapping relationship. Or individual pairs of discs may be superimposed to form two layers without being laterally connected at their edges to other adjacent pairs. In such latter case the pairs of conical fabric fingers will be formed into the finished strips as illustrated in Fig. 4 but will require to be supplied to the metal strip 5 forming the channel back in much the same manner that the individual strands of brush material are supplied to the backing strip as described in my Patent No. 2,303,386. By interconnecting the pairs of discs at their edges and thereby thus interconnecting the pairs of fingers (Fig. 3) the buff material is, however, considerably better adapted to be automatically transported to the strip machine and a more uniform density of fill in the finished article is assured. The term "fabric" as employed herein and in the claims is intended to include any suitable sheet material, whether textile or imperforate plastic sheet, for example. Thus, cotton cloth, nylon (polyamide resins), Pliofilm (rubber hydrochloride), or paper sheets are entirely suitable in embodiments of my invention for certain purposes and various other natural or manufactured fiber materials may be employed.

Furthermore, more than two layers of discs may be superimposed and centrally secured together as shown in Fig. 1 to form oppositely directed tubular pleated fingers in which each finger comprises more than a single disc of fabric. For example, four layers of discs may be thus superimposed and centrally secured together and then separated with two layers forming one finger extending in one direction and the remaining two layers forming another single finger extending in the opposite direction. In order that the oppositely extending fingers may be of equal size the number of layers of discs employed will ordinarily be some multiple of two.

If desired, the brush strip channelform back may have teeth punched in from the sides thereof as shown in Patent No. 2,303,386 for the purpose of securing the retaining wire 6 thereunder to produce a stronger assemblage. Such teeth also penetrate the fabric of the flattened conical fingers and additionally secure the same.

The fabric discs may be coated with suitable abrasive materials such as emery, Corundum, Alundum, and the like together with an appropriate adhesive, or such abrasives may be applied simply by dusting the same onto the textile fabrics or by pressing the same into the plastic sheets. Or a small amount of a solvent may be applied with the abrasive to the plastic sheet material to cause the abrasive particles to become cemented thereto when the solvent evaporates. Still another suitable type of fabric for my purpose is disclosed in Radford Patent No. 2,328,998, with abrasive incorporated in the fabric strands.

When the sheet material has been bunched into generally conical pleated fingers, adhesive may be applied to assist in retaining this condition, or clips or staples may be employed.

The buff sheet material need not necessarily be cut in disc form, although this is preferred, but a strip of fabric may merely be partially slit to form a series or chain of interconnected squares. The squares of two layers will be joined centrally as above described, formed into fingers, and assembled into the channel back. The resultant article will then be trimmed to proper contour.

In either case, pairs of generally conical, somewhat tubular pleated fingers are provided joined at their inner ends for securing under an elongated retaining member and interconnected at their outer ends for continuous feeding to the backing strip. Such interconnection of the outer ends of adjacent pairs of fingers also assists in maintaining the desired uniform density of the material in the channel back.

As shown in Fig. 8, a length of buff strip may be helically wound with the conical pleated fingers 10 extending radially and then mounted on a suitable mandrel or arbor between clamping plates. Frequently, adapters will be desired and a buff constructed as taught in my prior Patent No. 2,409,309 will be particularly well ventilated and cool in operation. Teeth 11 punched in from the sides 7 and 8 of the channelform back in accordance with my prior Patent No. 2,303,386 assist in securing retaining member 6 in place and also, by penetrating the fabric, further reinforce the construction.

As best shown in Figs. 2 and 3, the generally conical shape of the buffing fingers results in a maximum density of material at the outer ends of the same, this being of especial importance when an annular or helical buff is formed (Figs. 7 and 8).

Figs. 9 and 10 illustrate a typical cup buff employing the buffing element of my invention. Two separate turns 12 and 13 of my new buff strip are inserted within an annular receptacle or cup 14, with the buffing material 15 extending generally axially rather than radially therefrom. The two individual turns or loops of strip are dimensioned so that one fits snugly within the other. An inner tubular retainer 16 is clinched in place and a hub or adapter 17 inserted and secured by means of tabs 18. The finished buff may now be mounted on a drive spindle in the usual manner. It will be apparent that one or two turns of a single length of buff strip could be employed if desired, but a better balanced assembly is obtained when two separate individual turns are used, one inside the other.

Referring now to Figs. 11 and 12, a buff is there illustrated using long lead helical buff strip as the buffing elements. It is often desired to produce a long roller type buff of general cylindrical shape and more particularly a buff in which the buffing elements are spaced circumferentially of the arbor to permit internal feeding

of abrasive, improved ventilation, and an intermittent action of such elements on the work. Considerable difficulty was encountered in developing a construction which would be adjustable and capable of holding the rather oddly shaped lengths of buff strip and yet not be too expensive for general use. It was found impractical to mill a plurality of angular slots about the peripheries of a number of spaced hubs to receive the helical buff elements.

In the construction of my invention, I slide a plurality of solid aluminum alloy hubs 19 onto an arbor 20. Each such hub is stepped to provide a portion of lesser diameter 21 in which set-screws 22 are inserted to secure the hub to the arbor against relative rotation, and a portion of greater diameter 23 on which the channelform back 24 of the buff strip is seated with the buff material 25 extending generally radially. A relatively thin steel disc 26 is firmly attached to the wider side of each hub 19, such disc having notches 27 punched in its periphery dimensioned to receive buff strip back 24 and hold the same against lateral displacement. The peripheral face of wide portion 23 of hub 19 is drilled and tapped to receive conical-headed screws 28 adapted to engage the sides of the channelform buff strip backs 24 to hold such backs firmly seated against the hub. Disc 26, of course, provides the necessary lateral support. One of the chief advantages of this arrangement is that disc 26 is sufficiently thin that the buff strip may be fitted in notches 27 even when passing therethrough at quite an angle, and this angle may be varied as desired. Thus, the various hub members may be sequentially rotated or indexed on the arbor 20 to offset the corresponding notches to receive the helical buff strip, or where, as shown, a large number of closely spaced notches are provided about the peripheries of hub discs 26 such notches may be in alignments parallel to the arbor and the strip offset one or more notches with each successive hub. In this manner any desired degree of helical pitch may be obtained, within reason, without the necessity of in any way modifying the hub members.

It will be apparent that the above-described construction is also adapted for use with conventional brush strip employing stranded brushing material such as Tampico fiber, nylon, etc. instead of my novel buffing material.

The objects of my invention have been achieved in a novel and inexpensive manner, providing a buff having both improved operating characteristics and longer life. I consider the principal advantage of my new buff to reside in the ease with which it may be manufactured despite the fact that it is relatively more complex in construction than buffs now on the market. Reference may also be had to my co-pending application Serial No. 308,242, filed September 6, 1952, where certain related inventions are disclosed and claimed.

As illustrated in the drawing, many different types of buffs may be produced within the teaching of my invention, generally comprising a plurality of pairs of tapering buffing fingers joined at their narrow inner ends, in which region of joining they are secured to a support by means of an elongated retaining member. Such retaining member may be held in place by various means known in the art, as by inwardly extending teeth from one or both sides of a channel back or by pinching in the neck of such channel somewhat.

Certain inventions disclosed but not claimed herein are disclosed and claimed in my co-pending application Serial No. 195,011, filed November 10, 1950, and my co-pending application Serial No. 173,465, filed July 12, 1950.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. The method of producing a rotary buff which comprises superimposing a plurality of fabric layers, blanking out an interconnected chain of discs from such superimposed layers, joining such fabric layers at the respective centers of such discs, separating certain of such layers from the other such layers, except where thus joined at the centers of such discs, to form pairs of oppositely extending generally conical tubular pleated fingers connected at their outer extremities to adjacent pairs thereof, placing such interconnected pairs of oppositely extending fabric fingers transversely of a metal strip, placing an elongated retaining member thereon longitudinally of such strip, forming such strip to channel form with such fingers secured therein beneath such retaining member, and circularizing such strip with such fingers extending generally radially outwardly.

2. The method of producing a rotary buff which comprises cutting out continuous series of interconnected fabric discs, superimposing one such series of discs on a similar series, joining the center portions of superimposed pairs of discs, separating such superimposed discs, except where thus centrally joined, to form pairs of oppositely extending inverted conical pleated fingers connected at their outer extremities to adjacent pairs thereof, placing the resulting chain of buff elements longitudinally of a continuous metal strip with such fingers extending transversely thereof, placing an elongated retaining member on such chain of buff elements longitudinally of such strip, forming such strip to channel form with such joined apices of such conical fingers secured therein beneath such retaining member, and circularizing such strip with such fingers extending generally radially outwardly.

3. The method of producing a buff element which comprises interconnecting a plurality of discs of buffing material at their edges to form a continuous chain, superimposing one such chain on a similar chain of discs to form superimposed pairs of such discs, joining such pairs at their respective centers, separating such superimposed discs to the extent permitted by the joining of their centers to form pairs of oppositely extending generally conical tubular pleated fingers connected at their outer extremities to adjacent pairs thereof, and securing such pairs of fingers to a self-sustaining supporting member at the point of central joining of such fingers, with such fingers extending therefrom in side-by-side relationship.

4. The method of producing a buff element which comprises joining a plurality of pairs of discs of buffing material at their centers, separating such discs of each such pair, except where thus joined, to form pairs of oppositely extending generally conical tubular pleated fingers, and securing such pairs to a self-sustaining supporting member adjacent the point of joining of such oppositely extending fingers.

5. The method of producing a buff element which comprises forming a plurality of pairs of oppositely extending generally tubular fingers of buffing material joined at their inner ends, interconnecting such pairs of fingers near their outer ends to adjacent pairs to form a continuous chain, and securing such pairs to a self-sustaining supporting member at the point of joining of such oppositely extending fingers.

6. The method of producing a buff element which comprises forming a plurality of pairs of oppositely extending fabric fingers, interconnecting such pairs to form a continuous chain, and continuously securing such chain of pairs of fingers in a channelform support beneath a continuous elongated retaining member applied on the point of juncture of such oppositely extending fingers to cause such fingers to assume a side-by-side relationship.

7. A rotary buff comprising a circularized metal channelform back opening radially outwardly, and buff material retained therein and extending generally radially therefrom comprising pairs of fabric discs joined at their centers and separated otherwise to form pairs of generally conical tubular pleated fingers, said fingers being connected to adjacent pairs of fingers near their outer extremities, and an elongated retaining member overlying such pairs of fingers at their points of joining to secure the same in said channelform back with said fingers extending generally radially therefrom in side-by-side relationship.

8. A rotary buff comprising a circularized metal channelform back opening radially outwardly, and buff material retained therein and extending generally radially therefrom comprising pairs of fabric discs joined at their centers but otherwise separated to form pairs of oppositely extending generally conical tubular pleated fingers, and an elongated retaining member overlying such pairs of fingers at their points of joining to secure the same in said channelform back with said fingers extending generally radially from the respective sides of said retaining member in side-by-side relationship.

9. A rotary buff comprising an inner supporting element and buff material extending generally radially therefrom, said buff material comprising pairs of fabric discs joined at their centers but otherwise separated to form pairs of oppositely extending generally tubular pleated fingers, and means securing said pairs of fingers to said supporting element at their points of joining, with the fingers of each pair extending individually in side-by-side relationship radially from said element.

10. A rotary buff comprising a circularized metal channelform back opening radially outwardly, and buff material retained therein and extending generally radially therefrom comprising pairs of generally tubular fabric fingers joined at their inner ends, such pairs of fingers being connected with adjacent pairs of such fingers near their outer ends, and an elongated retaining member overlying such pairs of fingers at the points of joining of their inner ends to secure the same in said channelform back with said fingers extending generally radially therefrom and with the fingers of each pair in side-by-side relationship.

11. A rotary buff comprising an inner supporting element and buff material extending generally radially therefrom, said buff material comprising pairs of generally tubular fingers joined at their inner ends, such pairs of fingers being connected

with adjacent pairs of such fingers, and means securing said pairs of fingers to said supporting element at the points of joining of their inner ends, with the fingers of each pair extending individually in side-by-side relationship radially from said element.

12. A buffing element comprising a metal channel back and buff material retained therein, said buff material comprising pairs of fabric discs joined at their centers and separated otherwise to form pairs of generally conical tubular pleated fingers, said fingers being connected to adjacent pairs of fingers near their outer extremities, and an elongated retaining member overlying such pairs of fingers at their points of joining to secure the same in said channel back with the fingers of each pair extending therefrom in generally side-by-side relationship.

13. A buffing element comprising a channel back and buff material retained therein, said buff material comprising pairs of fabric discs joined at their centers but otherwise separated to form pairs of generally tubular pleated fingers, and an elongated retaining member overlying such pairs of fingers at the points of joining of said discs to secure the same in said channel back with the fingers of each pair extending individually therefrom in generally side-by-side relationship.

14. A buffing element for use in rotary buffs and the like comprising two fabric sheets joined together at their centers but otherwise separated to form a pair of oppositely extending generally conical tubular pleated fingers joined at their respective apices for securing to a hub or like support.

15. The method of producing a buff element which comprises joining a plurality of sheets of buffing material generally centrally of such sheets, separating certain of said sheets from the remainder of said sheets, except where thus joined, to form pairs of oppositely extending generally conical pleated fingers joined together at their narrower ends, and securing a plurality of such pairs of buffing fingers to a self-sustaining support adjacent the points of joining of such fingers.

16. A buffing element comprising a channel back and buffing material retained therein, said buffing material comprising pairs of fabric discs joined at their centers but otherwise separated to form pairs of individual generally conical pleated fingers, an elongated retaining member overlying said pairs of fingers at the points of joining of said discs to secure the same in said channel back with the individual fingers of each pair extending therefrom in generally side-by-side relationship, and teeth extending inwardly from at least one side of said channel back penetrating such fabric and overlying said retaining member.

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