Oct. 27, 1970 A. T. GERVAIS 3,535,729

POLISHING BUFF

Filed May 3, 1968 2 Sheets-Sheet 1

FIG. 1

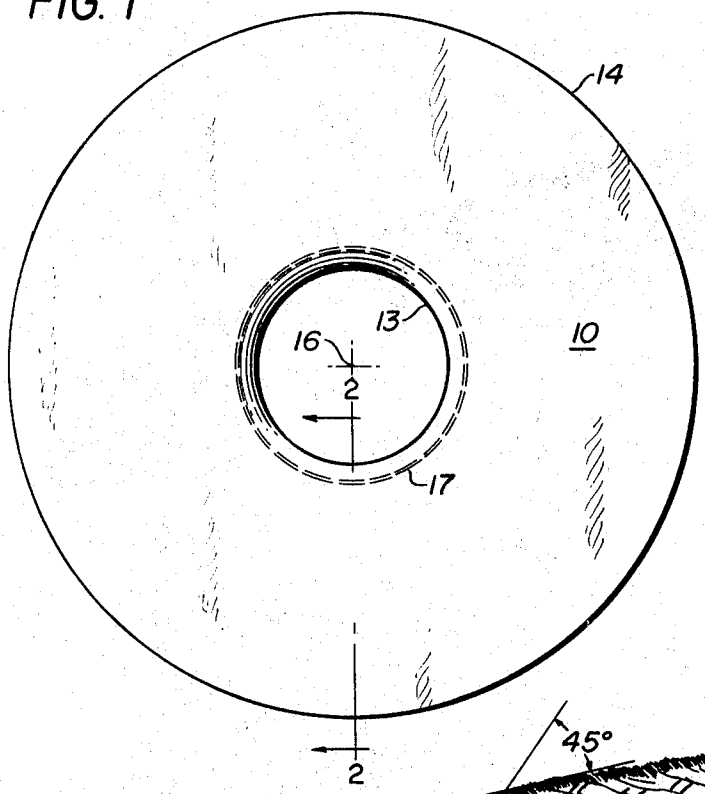
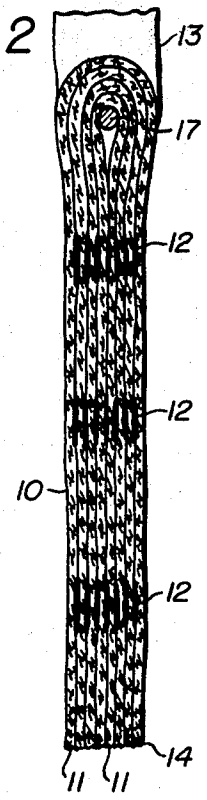


FIG. 2



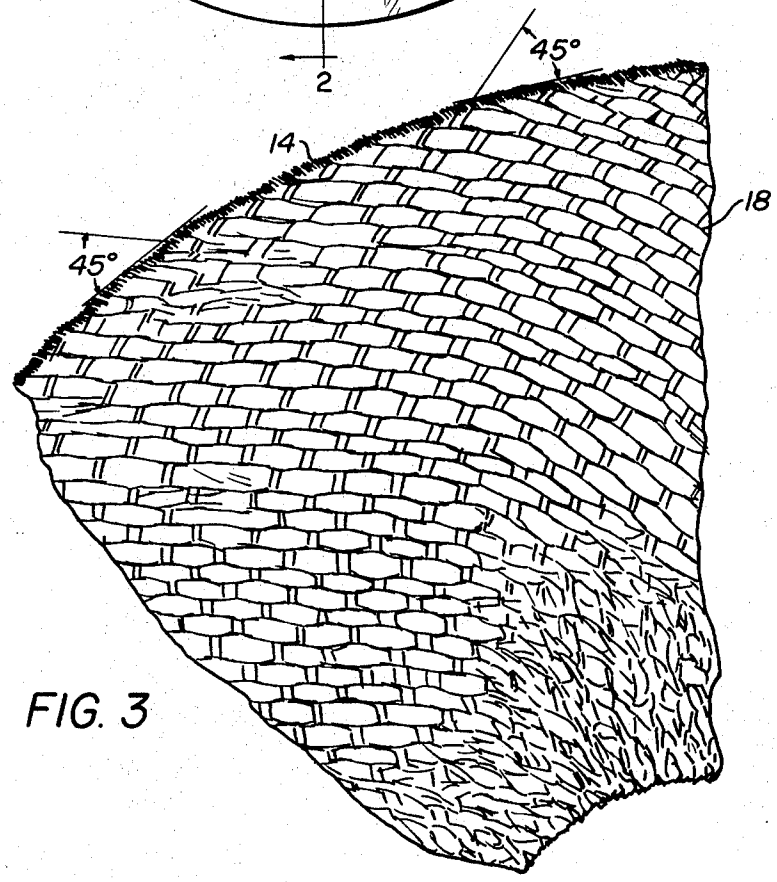


FIG. 3

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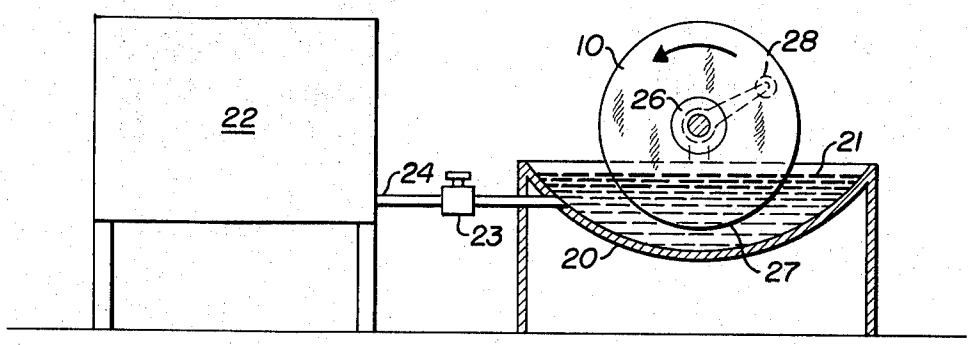


FIG. 4

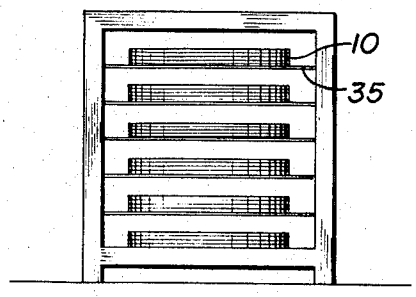


FIG. 6

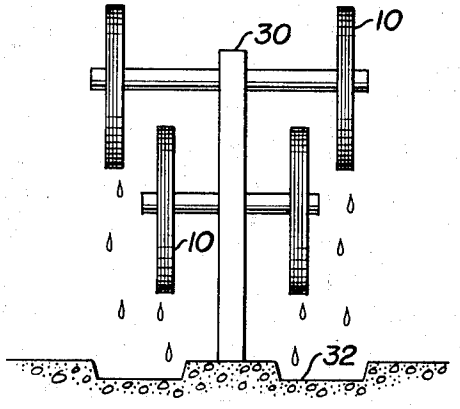


FIG. 5

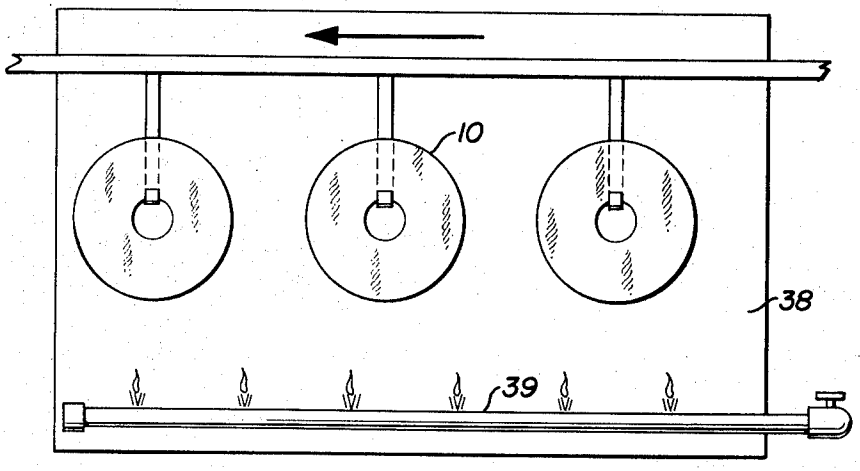


FIG. 7

United States Patent Office 3,535,729 Patented Oct. 27, 1970

3,535,729

POLISHING BUFF

Albert T. Gervais, Bracebridge, Ontario, Canada, assignor to North American Rockwell Corporation, Pittsburgh, Pa., a corporation of Delaware

Filed May 3, 1968, Ser. No. 726,511
Int. Cl. B24d 13/00
U.S. Cl. 15—230.12 1 Claim

ABSTRACT OF THE DISCLOSURE

An improved polishing buff of natural plant fibers and a method for making the buff in which sodium silicate is associated with the fibers in a proper quantity for increasing its stiffness, useful life, and fire resistance while maintaining the hardness, or abrasivenss, of the buff at a level below that at which the part to be buffed will be scratched or marked.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to improved polishing buffs made of natural plant fibers such as sisal and, more particularly, to improved polishing buffs having increased stiffness, fire resistance, and useful life. The invention also relates to a method for making the improved buffs.

Description of the prior art

Polishing buffs made of plant fibers, including sisal, have been known for many years. Such a buff is illustrated in U.S. Pat. No. 2,642,706, issued June 23, 1953, to J. R. Davies and entitled "Bias Sisal Buff." For certain applications as in the polishing of wheel covers of certain configurations, buffs of this type are not stiff enough and have a very limited useful life. Where the parts to be polished, such as wheel covers, have high ribs, an intermittent type rub is produced with a heavy battering action on the buff. Very smooth surfaces also present a problem in that the quality of the surface finish is critical and that the buffing of such surfaces generates heat very rapidly. Polishing buffs of the type disclosed in the aforesaid Pat. No. 2,642,706 are not wholly satisfactory for either of these conditions. When subjected to heavy battering action, they wear out very quickly. When subjected to rapidly generated heat, they overheat and burn.

Efforts have been made in the past to treat polishing buffs so as to at least partially overcome these deficiencies. One such approach is disclosed by U.S. Pat. No. 2,945,750, issued July 19, 1960 to E. Gareis and entitled "Polishing Bodies of Vegetable Fibrous Material, in Particular Polishing Wheels, Grindstones and Sliding Contact Discs." According to this patent, buffs of cotton or a similar material can be stiffened through the application of x-amylase and sodium hydroxide solutions by means of an involved process including not only application of the solutions, but also numerous rinses at carefully controlled processing times and temperatures.

SUMMARY OF THE INVENTION

With these considerations in view, it is the primary object of the present invention to provide an improved polishing buff in which a stiffening agent is utilized for greatly prolonging the life of the buff and rendering the buff more fire resistant.

Another object of this invention is to provide an improved buff made of sisal or a similar plant fiber suited for polishing a wide range of parts including both ribbed and smooth parts without scratching or marking the parts.

Yet another object is to provide the foregoing objects in a sisal buff of the bias wrapped type.

Still another object is to provide an improved method that is relatively simple and inexpensive for producing polishing buffs providing the foregoing objects.

Briefly stated, in carrying out the invention in one form, a polishing buff of natural plant fibers, particularly sisal, has improved means associated with its fibers for increasing its stiffness, useful life, and fire resistance. By a further aspect of the invention, the improved means is dried sodium silicate, the relative amount of which varies in accordance with the amount of hardness, or abrasiveness, desired. A suitable dye is also associated with the fibers for indicating the relative hardness, different colors being used to indicate different hardnesses. The invention is particularly adapted to sisal buffs of the bias wrapped type in which the outer peripheral edge of the buff fabric is uniformly cut on the bias.

By a still further aspect of the invention, the method of making the improved polishing buff includes the steps of immersing the buff in a body of the stiffening agent in liquid form and subsequently drying the immersed buff. The liquid stiffening agent is preferably an aqueous solution containing sodium silicate in a proportion suitable to provide, when the buff is dried, the desired degree of hardness. The aqueous solution also contains a dye of the proper color for indicating the proportion of sodium silicate.

DESCRIPTION OF THE DRAWING

While this specification concludes with claims particularly pointing out and distinctly claiming the subject matter forming the invention, the invention, together with further objects and advantages, may best be understood by reference to the following description taken in conjunction with the accompanying drawing, in which:

FIG. 1 is a side view of a bias wrapped sisal buff treated in accordance with the invention;

FIG. 2 is a view taken along viewing line 2—2 of FIG. 1;

FIG. 3 is an enlarged view of a peripheral portion of the buff illustrating the bias cut peripheral edge;

FIG. 4 is an elevation view, partially in cross-section, of appartus for immersing the buff in a stiffening agent in liquid form;

FIG. 5 is an elevation view of an arrangement for draining excess stiffening agent from the immersed buffs;

FIG. 6 is an elevation view of a first drying arrangement for use in producing relatively hard buffs; and

FIG. 7 is an elevation view of a second drying arrangement for use in producing moderately hard and relatively soft buffs.

Referring first to FIGS. 1–3, a bias wrapped sisal buff **10** is illustrated, the buff **10** comprising a number of layers **11** of sisal fabric generally abutting and glued to each other at **12** to form a relatively thin composite disc having an inner circular margin **13** and an outer circular margin **14**. By mounting and rotating the buff **10** about an axis of symmetry **16** normal to its plane, a part may be polished by urging the outer peripheral portion **14** of the buff **10** against the relatively stationary part. The buff **10** is formed generally in accordance with the teaching of the aforesaid U.S. Pat. 2,642,706 in that strips of the sisal fabric are first arranged in a cylindrical form and then gathered by a wire or cord **17** to form the disc. The edges of the strips are cut on the bias so that, when the layers are gathered by the wire **17**, the layers **11** present bias-cut edges around the entire periphery **14**. The fibers **18** comprising the fabric forming the layers **11** are preferably cut, as illustrated by FIG. 3, on approximately a 45° angle so that the fabric will be unlikely to unravel under the influence of centrifugal force and polishing pressure.

While a single buff **10** comprised of eight layers **11** (four strips of sisal fabric) is illustrated, it will be appre-

ciated that individual buffs may be formed of any reasonable number of layers of fabric and that any reasonable number of buffs may be stacked to form a buffing wheel of a desired axial length.

As pointed out above, polishing buffs of the type just described are not entirely satisfactory under certain conditions. When subjected to heavy battering action, they wear out quickly. When subjected to rapidly generated heat, they overheat and burn. To overcome these deficiencies, a novel stiffening treatment has been developed in accordance with the invention and will now be described with reference to FIGS. 4–7.

Referring to FIG. 4, an open tank **20** is filled to a fixed level **21** with a liquid stiffening agent from a supply tank **22**, a valve **23** being provided in a conduit **24** between the supply tank **22** and the open tank **20** for controlling the liquid level **21**. In accordance with the present invention, the liquid stiffening agent is preferably a solution of sodium silicate and water in proportions determined by the intended use of the treated buffs. In general, the larger the proportion of sodium silicate, the harder or stiffer the treated buff. These relative proportions will be defined with greater particularity as this specification proceeds.

Sodium silicate, commonly known as water glass, is available in various forms which may be utilized in the practice of the invention. However, it has been found that Type N, available from the Philadelphia Quartz Company, is particularly suited for use in the treatment of sisal buffs, and the proportions given in this specification are based on the use of Type N sodium silicate. This particular material has a ratio of one mole of Na_2O to 3.22 moles of SiO_2.

Still referring to FIG. 4, one or more buffs **10** are mounted on a rotatable arbor **26** with a peripheral portion **27** of the buff **10** immersed in the body of stiffening agent. By means of a hand crank **28** on the end of the arbor **26**, the buffs **10** are slowly rotated so that the entire peripheral portion **27** of the buff **10** is immersed in the stiffening solution. After immersion, the buffs **10** are hung on a rack **30**, as illustrated by FIG. 5, to permit any excess amount of the stiffening agent to drip into channels **32**, from which the excess liquid is returned to the supply tank **22** by suitable means not illustrated.

After any excess stiffening solution has been allowed to drip off of the buffs **10**, the buffs are permitted to dry in an evaporation rate controlling atmosphere. Depending upon the ultimate hardness or stiffness desired, the evaporation rate controlling atmosphere may be either an evaporation rate retarding atmosphere as illustrated by FIG. 6, or an evaporation rate accelerating atmosphere as illustrated by FIG. 7. Referring to FIG. 6 the wet buffs **10** may be dried slowly by placing them on wire mesh racks **35** and allowing air at ambient or room conditions to circulate around them. It has been found that relatively hard buffs **10** particularly suited for polishing heavily ribbed structures may be produced by slow drying in this manner buffs **10** immersed in a solution comprised of equal parts of water and sodium silicate, the sodium silicate having the composition identified above.

Referring now to FIG. 7, the wet buffs **10** may be dried quickly by hanging them for a period of about one hour in a large oven **38** heated by gas burners **39** to an elevated temperature in the vicinity of 200° F. It has been found that moderately hard buffs and relatively soft buffs particularly suited for polishing smooth surfaces may be produced by fast drying in this manner buffs **10** immersed in solutions comprised of one part of sodium silicate to five parts and eight parts, respectively, of water. Various gradations in hardness may, of course, be produced by varying either or both the relative proportions in the liquid stiffening agent or the drying time. The hardness selected for a buff intended to be used for polishing a particular part should, of course, be maintained at a level below that at which the abrasiveness will be sufficient to scratch or mark the part. Furthermore, it should be appreciated that relatively soft buffs stiffened in accordance with this invention are substantially harder than the generally unsatisfactory untreated buffs.

Tests conducted on sisal buffs treated in this manner have indicated that sisal fibers of the buff are both coated and, to a limited extent, impregnated with the dried sodium silicate. This combination of coating and impregnating contributes in large measure to the unique properties of buffs treated in accordance with the invention.

As indicated above, a dye o a suitable color is dispersed in the liquid stiffening agent to indicate when the buff is dry the relative hardness or abrasiveness of the buff. All dyes are, of course, not compatible with sodium silicate and sisal fibers. It has been found, however, that certain dyes produced by the Eaton Chemical Company of Detroit, Mich. are well suited for use in connection with sisal buffs treated in acordance with the invention. In particular, Dye No. 14644—Sisal Red was found to be suitable for indicating a relatively soft buff by mixing four ounces of the dye with 45 gallons of the 8:1 stiffening agent, Dye No. 15148—T.S.P. Blue was found to be suitable for indicating a moderately hard buff by mixing eight ounces of the dye with 45 gallons of the 5:1 stiffening agent, and Dye No. 14729—Sisal Fast Green was found to be suitable for indicating a relatively hard buff by mixing four ounces of the dye with 40 gallons of the 1:1 stiffening agent. Those skilled in art will, of course, be able to determine the identity and required proportions of other suitable dyes.

Polishing buffs treated in accordance with this invention are more fire resistant than untreated buffs because of the well-known fireproofing characteristics of sodium silicate, or water glass. In addition, the life of the buff is greatly increased without increasing the buff's hardness to a level at which parts to be polished are scratched or marked. The improved buff is produced by improved methods that are relatively simple and inexpensive.

While particular polishing buffs and methods for making the buffs have been shown and described, it will be understood that various changes and modification may be made without departing from the spirit and scope of the invention, and it is intended to cover all such changes and modifications by the appended claim.

What is claimed as new and is desired to secure by Letters Patent is:

1. A polishing buff of fabric comprised of natural plant fibers having a predetermined amount of sodium silicate only associated with the fibers thereof to stiffen said fibers and impart longer useful polishing life and fire resistance to said buff without rendering said buff sufficiently abrasive to scratch or mark parts to be polished by said buff, the fibers of said buff having a dye associated therewith, the color of which is indicative of the relative amount of sodium silicate associated with said fibers and the resulting hardness of the peripheral portion of the buff, the hardness increasing with increased sodium silicate.

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DANIEL BLUM, Primary Examiner

U.S. Cl. X.R.

51—295; 300—21