FLEXIBLE ABRASIVE COATED CLOTH
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This invention relates to abrasive coated cloth and is particularly concerned with such material which is exceptionally flexible and characterized by outstanding properties in other respects.

Abrasive coated cloth is widely used in metal polishing operations and considerable hand polishing of metal articles is done with abrasive coated cloth. In many instances the abrasive coated cloth is furnished in the form of sheets, and strips of desired width are torn from the sheets as needed.

The invention of the present application has as an object the provision of a novel abrasive coated cloth of improved characteristics.

A more specific object of the invention is to provide abrasive coated cloth for metal polishing which is clean tearing.

Another object of the invention is to provide abrasive coated cloth for metal polishing which resists warping or distortion in storage.

Still another object of the invention is to provide abrasive coated cloth for metal polishing that is unusually soft and pliable.

A further object of the invention is to provide abrasive coated cloth for metal polishing in which the abrasive layer is very firmly adherent to the backing.

The foregoing objects are achieved in the production of abrasive coated cloth by the use of a making coat which comprises essentially a mixture of animal glue, an elastomeric latex, and a plasticizer which is compatible with both the glue and the latex. A making coat of the type described permits the production of metal polishing abrasive coated cloth which is extremely flexible, is easy to work with, and produces a superior finish.

The following examples illustrate the production of metal polishing abrasive cloth according to the invention. In Examples 1-5, inclusive, some of the possible variations in the making coat are illustrated as are also some possible changes in certain other elements and factors.

Example 1

Using a conventional coating machine of a type commonly used in manufacturing abrasive coated paper and cloth, abrasive particles in the particle size range known as 180 grit size may be secured to a medium-weight, finished jeans cloth with an adhesive which comprises hide glue, hexaetriol, a butadiene-styrene synthetic rubber latex, and water. For best results the adhesive is applied to the cloth web in an amount corresponding to about 4.5 lbs./ream (9 in. x 11 in., 480 sheets). Such an adhesive mixture may be made from about 79 gallons of the latex (which comprises 48% solids), and 16 gallons of an aqueous solution containing about 45 lbs. each of the glue and the hexaetriol. The abrasive particles are then applied over the adhesive to obtain a coated product with a grain weight of about 10 lbs./ream.

Example 2

Employing the same apparatus and procedure as set forth in Example 1 an abrasive coated cloth can be made by applying abrasive particles in the particle size range known as 150 grit size to a medium weight, finished jeans cloth. The adhesive is applied in an amount corresponding to about 5½ lbs./ream and about 12 lbs./ream of abrasive is employed.

Examples 3-5

Employing the same apparatus and procedure as set forth in Example 1 abrasive coated cloth may be prepared with abrasive in 120, 100 and 80 grit sizes, respectively. The adhesive and abrasive are applied, respectively, in approximately the following amounts (lbs. per ream) 6, 14; 6½, 18; and 8, 23.

It will be clear that by the same process as set forth in the preceding examples abrasive coatings may be applied to cloth with the abrasive particles in grit sizes from about 36 grit to 320 grit. The adhesive making coat may vary, depending on the grit size, from about 2 lbs./ream to about 20 lbs./ream and the grain weight per ream may vary from about 6 lbs. to about 65 lbs.

The adhesive of the making coats in the preceding examples is partially set by reducing its moisture content by conventional procedures to about 15%–20% and an adhesive sizing coat is then applied. The following examples, 6 and 7, illustrate the application of such coatings.

Example 6

The abrasive coated cloth web from Example 1 may be sized by passing it through a conventional machine for this purpose and applying thereto an aqueous solution of animal glue having suspended therein finely divided calcium carbonate. An amount of sizing adhesive equivalent to about 5 lbs./ream is preferably used, corresponding to about ¼ lbs./ream of each of the glue and filter. The final setting of the adhesive of the abrasive coated article may be brought about by drying it in a final moisture content of about 6%–9% by conventional means.

Example 7

Abrasive coated cloth such as that made by the procedure of Example 1 but with 80 grit abrasive grain is sized by applying thereto an aqueous sizing adhesive which deposits on the web a sizing coat that when dry comprises about 2 lbs./ream of animal glue and about 4 lbs./ream of finely divided mineral filler. This sizing coat can be set by the same procedure described in Example 6.

The sizing used in producing abrasive coated cloth in accordance with the present invention need not contain a mineral filler, glue alone being usable if desired. However, the addition of a finely divided, e.g., minus 325 mesh, mineral filler in an amount constituting from about 5% to about 67% of the dry weight of the sizing coating is very satisfactory. The filler used may be selected from a large number of mineral materials. As examples, and not in any limiting way, there may be mentioned besides calcium carbonate (which may be used in various forms), cryolite, silica, alumina, various silicates (including clays, cyanite, magnesium silicate and mullite), magnesium oxide and barium sulfate, and mixtures thereof. The exact percentages of filler which it is preferred to use in a particular instance will vary in accordance with the specific gravity and other specific properties of the filler material. It should also be understood that solutions of phenolic resins, including phenol-formaldehyde resins, and urea-formaldehyde resins may be used as sizing adhesives if desired.

Abrasive coated cloth, is generally employed for polishing metal and accordingly alumina or emery will most frequently be used as abrasives since these are generally desired for this purpose. However, it is to be understood that other abrasives may also be employed without difficulty in making flexible abrasive coated cloth. Thus, for example, silicon carbide, garnet, and flint may be used alone or in combination with each other or with other abrasive materials.
3. In preparing the adhesive making coat the elastomeric latex used may be selected from a number of available ones. These include natural rubber latexes, butadiene-styrene and butadiene-acrylonitrile copolymer latexes, polychloroprene (neoprene) latexes, and others having similar properties. The plasticizer employed is preferably water-soluble and high-boiling with a quite low vapor pressure at ordinary temperatures. Although 1, 2, 6 hexanetriol is the most readily available one, any of the isomeric hexanetriols or mixtures thereof may be employed as the plasticizer. Glycerine and polyethylene glycols are further examples of plasticizing substances that may be satisfactorily used. Hide glue is preferred as an ingredient of both the making coat and sizing coat but a good grade of bone glue may also be used.

While the percentage of elastomer in the making adhesive on a dry weight basis may vary from about 60% to about 80%, the range between approximately 65%–75% is preferred. It is preferred to use plasticizer in about equal proportions by weight to the dry glue but under suitable conditions the percentage of plasticizer with respect to dry glue may vary within the range from about 75% to about 150%. Although in the preceding examples jeans cloth has been used, it will be evident that any desired type and weight of cloth may be employed in accordance with known practices. The kind and weight of the cloth will of course be an important factor in determining the strength and flexibility of the product.

The product of the present invention is a very useful one and a marked improvement over the metal polishing cloth previously available. One of the most important advantages of the invention is the improved adhesion of the abrasive layer to the cloth backing. With previously produced abrasive coated metal polishing cloth it is not uncommon of have the abrasive layer and adhesive lift from the backing. With the present novel product grain can be stripped from the adhesive by destructive procedures but the abrasive coating as a whole cannot be stripped off by hand.

It has also been found that the tearing characteristics of the novel abrasive-coated cloth of the present invention are much superior to those of the previously produced similar product. Strips torn from sheets have clean edges comparable to slit edges with no fuzz, loose thread ends, or edge chipping.

Thirdly, the flexibility of the novel product is outstanding and it has a distinctive feel or hand which is attractive to users. In addition, it is not adversely affected by normal changes in atmospheric humidity and lies flat in spite of such changes.

We claim:

1. Flexible, abrasive coated cloth which comprises a cloth backing having a layer of abrasive granules firmly attached to one face thereof by an adhesive coating said coating consisting of a making coat layer and a sizing coat layer, said making coat layer consisting essentially of a mixture of animal glue, a water-soluble, high-boiling plasticizer, and an elastomer, said elastomer comprising from about 60% to about 80% of said making coat layer.

2. An abrasive product as defined in claim 1 in which said elastomer comprises from about 65% to about 75% of said adhesive.

3. An abrasive product as defined in claim 1 in which the glue and plasticizer are present in about equal proportions by weight.

4. An abrasive product as defined in claim 2 in which the glue and plasticizer are present in about equal proportions by weight.

5. An abrasive product as defined in claim 1 in which said elastomer is a butadiene-styrene copolymer.

6. An abrasive product as defined in claim 2 in which said elastomer is a butadiene-styrene copolymer.

7. An abrasive product as defined in claim 1 in which said plasticizer is hexanetriol.

8. An abrasive product as defined in claim 2 in which said plasticizer is hexanetriol.

9. An abrasive product as defined in claim 1 in which said plasticizer is hexanetriol and said elastomer is a butadiene-styrene copolymer and in which said elastomer comprises from about 65% to about 75% of said adhesive and said glue and said plasticizer are present in about equal proportions by weight.

10. A process for producing a flexible, abrasive-coated cloth which comprises applying to a cloth backing a coating of an aqueous adhesive which consists essentially of water containing a mixture of animal glue, a water-soluble, high-boiling plasticizer, and an elastomeric latex in sufficient amount to constitute from about 60% to about 80% of the dry weight of said adhesive, applying to said coating before drying a layer of abrasive granules, setting said adhesive by partially drying it, and applying an adhesive size coat over said layer of abrasive granules.

11. A process for producing a flexible, abrasive-coated cloth which comprises applying to a cloth backing a coating of an aqueous adhesive which consists essentially of water containing a mixture of animal glue, a water-soluble, high-boiling plasticizer, and an elastomeric latex in sufficient amount to constitute from about 65% to about 75% of the dry weight of said adhesive, applying to said coating before drying a layer of abrasive granules, setting said adhesive by partially drying it, and applying an adhesive size coat over said layer of abrasive granules.

12. A process for producing a flexible, abrasive-coated cloth which comprises applying to a cloth backing a coating of an aqueous adhesive which consists essentially of water containing a mixture of animal glue, a water-soluble, high-boiling plasticizer, and an elastomeric latex in sufficient amount to constitute from about 60% to about 80% of the dry weight of said adhesive, applying to said coating before drying a layer of abrasive granules, setting said adhesive by partially drying it, and applying an adhesive size coat over said layer of abrasive granules.

13. An abrasive product as defined in claim 1 in which said plasticizer is hexanetriol and said elastomer is produced from a latex selected from the group consisting of natural rubber latexes, butadiene-styrene latexes, butadiene-acrylonitrile latexes, and polychloroprene latexes and in which said elastomer comprises from about 65% to about 75% of said adhesive and said glue and said plasticizer are present in about equal proportions by weight.

14. An abrasive product as defined in claim 1 in which said sizing coat includes a finely divided filler.

References Cited by the Examiner

UNITED STATES PATENTS

1,965,693 7/1934 Dunham -- 106--138
2,024,591 12/1935 Manchester ----- 51--301
2,127,298 8/1938 Isaacs ----- 51--301
2,297,959 10/1942 Heckel ----- 106--144
2,497,469 2/1950 Robie ----- 51--301
2,651,580 9/1953 Reilly ----- 260--6
2,780,533 2/1957 Hust ----- 51--298
2,981,615 4/1961 Baumgartner et al. ----- 51--298

OTHER REFERENCES


ALEXANDER H. BRODMERKEL, Primary Examiner.
MORRIS LIEBMAN, Examiner.