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ABRADANT

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8 Claims. (Cl. 51—280)

The present invention relates to new abrasants.

We have found that abrasants such as emery paper or whet stones show particularly good properties if they contain as a binding agent a hardened condensation product of a polyhydric alcohol with a mixture of an organic polybasic acid and a fatty acid of at least 10 carbon atoms in the molecule. These condensation products known in the varnish industry as "rezyles" are mixed esters; they are prepared for instance by esterifying the hydroxyl groups of a polyhydric alcohol in part with a fatty acid and in part with a polyvalent carboxylic acid (see British Patent No. 284,349 and U. S. Patent No. 1,667,189). As polybasic organic acids there may be used for instance: phthalic acid, maleic acid, malonic acid, succinic acid, ether-diglycollic acid of the formula



furthermore polybasic synthetic resin acids obtainable in known manner by reacting with a halogen fatty acid, particularly with chloroacetic acid upon phenol aldehyde resins, particularly upon phenolformaldehyde resins, being in the "A"-state; as fatty acids having at least 10 carbon atoms in the molecule there may be used capric acid, lauric acid, palmitic acid, stearic acid, oleic acid, ricinoleic acid. As polyhydric alcohols there may be used for instance glycol, glycerine, polyglycerine, pentaerythrite, mannite or nitrogen containing polyhydric alcohols such as tri-ethanolamine. As abrasive material there are used all known abrasives that is materials of natural origin such as quartz, sandstone, pumice stone, emery or artificial material such as silicon carbide, electro-corundum or the like in every desired size of grains.

For the preparation of abrasants the above mentioned binding agents may be used in form of a solution (dissolved by means of an organic solvent) or in form of an aqueous suspension. As, in contrast to the hitherto used adhesive substances, these binding agents are distinguished by a particularly good adhesive power, there are obtained abrasants, for instance, emery papers having an excellent grinding effect and wearing out slowly. Owing to the water-proofing property of the binding agents in question, it is possible to prepare water-proof emery papers in one operation by means of these binding agents. It is unnecessary to add to the binding agents a special additional substance, such as oil, caoutchouc or the like for the purpose of imparting to the abrasant the required strength and elasticity.

Even if thin paper and a coarse grain abrasive are used the emery papers are very resistant to creasing.

Instead of paper there may be used with the same advantage cloth or paper having linen threads and the like.

Emery papers are made in the usual manner. It may be useful subsequently to harden the papers at an elevated temperature with or without application of pressure. Furthermore, it may be advantageous to pass the emery papers to which the binding agent and the abrasive have been applied between rollers which may be heated, thus causing the grains firmly to set in the binding agent.

The adhesive layer may be applied by passing the strips through a bath or by coating the strips, carried on the running band, on one side or on both sides with the adhesive material. The binding agent may be embedded in the paper with the aid of suction and pressure in the manner applied for impregnating wood.

Owing to the extremely high degree of elasticity of the abrasants made according to the present process, it is possible to apply the abrasive on both sides of the paper.

Whet-stones can be made by directly moulding the mixture of abrasive material and binding agent so as to form discs which are then hardened. The mixture may also be passed through an extrusion press so as to obtain a more or less thick or broad strip; the discs are then stamped out of this strip and hardened, if desired, by subjecting them simultaneously to heat and pressure.

The following examples serve to illustrate the invention, but they are not intended to limit it thereto:

(1) Glycerine mixed ester from linseed oil and phthalic acid is diluted with twice the quantity by weight of acetone and applied on one side of a strip of paper. The paper strips are passed through a doctor device, then sprinkled with silicon carbide, and rendered smooth by means of a roller. The side which has not been covered with silicon carbide is coated with the same binding agent dissolved in acetone to form a solution of 16 per cent. strength. The abrasant is hardened by drying it for 4 hours at 100° C. and for 1 hour at 130° C. In order to further increase the adhesion of the abrasive material, the abrasants may be subsequently sized in the usual manner with the same or any other usual binding agent.

(2) Glycerine mixed ester from ricinoleic fatty acid and phthalic acid is diluted with methyl-

cyclohexanone until the desired consistency is obtained. A strip of paper is coated on one side with this mixture and then sprinkled with silicon carbide which is pressed into the adhesive layer by application of a slight pressure. After drying the resin has completely and uniformly penetrated the paper; a coating of the other side of the paper can thus be dispensed with. Instead of glycerine there may be used with the same advantage glycol for the preparation of the mixed ester used.

(3) Glycerine mixed ester from linseed oil and phthalic acid is diluted with twice the quantity by weight of acetone and mixed with such a quantity of finely ground silicon powder as will make a suspension which is a very thin liquid lacquer. A band made of asbestos fiber and having a length of 100 cm., a breadth of 5 cm. and a thickness of 6 mm. is impregnated with this suspension. The band is then dried by exposure to air and dried and hardened for 2 hours at 100° C. and 2 hours at 150° C. to 180° C. The band retains a good elasticity and can be used for abrading purposes and among other applications as a brake band.

(4) A glycerine mixed ester obtained by esterifying in known manner one part of glycerine with 1 part of ricinoleic fatty acid and 2 parts of a synthetic resin acid from cresolformaldehyde and chloroacetic acid, is diluted with methylcyclohexanone in a quantity sufficient to obtain the desired viscosity. This solution is applied on one side of a strip of paper. The paper thus treated is sprinkled with silicon carbide and dried in a drying oven for removing the solvent. The abrasants thus prepared can subsequently be coated with the same or any other suitable binding agent.

The above mentioned synthetic resin acid can be prepared by reacting with 60 parts of chloroacetic acid upon the liquid initial condensation product from 100 parts of cresol and 90 parts of a formaldehyde solution of 30% strength.

(5) A glycerine mixed ester obtained by esterifying one part of glycerine with 2 parts of linoleic acid and 1 part of a synthetic resin acid from phenolformaldehyde and chloroacetic acid are dissolved in twice the quantity of acetone and applied upon a strip of paper. After passing the paper through a doctor device, they are sprinkled with silicon and rendered smooth by means of a roller. The rear side of the paper is coated with a 16 per cent. solution of the same binding agent. The abrasant is hardened by drying it for 4 hours at 100° C. and for 4 hours at 130° C. The paper can be treated again with the same binding agent.

The synthetic acid in question can be prepared by reacting with 90 parts of chloroacetic acid upon the still soluble and fusible initial condensation product from 90 parts of phenol and 100 parts of a 30 per cent. formaldehyde solution.

(6) 1 part of a resin consisting of equal parts of the resins used in Examples 2 and 5 is dissolved in 1 part of acetone and 1 part of methylcyclohexanone. The solution thus obtained is used for preparing emery papers as described in Example 5.

This application contains subject matter in common with our application Serial No. 567,978, filed on October 9, 1931.

We claim:

1. The article of manufacture comprising a grit or layer of abrasive particles and an adhesive bond

for uniting the abrasive particles to form a coherent mass or layer, said bond including a hardened resinous condensation product of a polyhydric alcohol with a mixture of a polybasic acid from a fusible synthetic resin and a fatty acid of at least 10 carbon atoms.

2. The article of manufacture comprising a grit or layer of abrasive particles and an abrasive bond for uniting the abrasive particles to form a coherent mass or layer, said bond including a hardened resinous condensation product of a polyhydric alcohol with a mixture of a polybasic acid from a fusible synthetic resin and an unsaturated fatty acid of at least 10 carbon atoms.

3. The article of manufacture comprising a grit or layer of abrasive particles and an adhesive bond for uniting the abrasive particles to form a coherent mass or layer, said bond including a hardened condensation product of glycerine with a mixture of a polybasic acid from a fusible synthetic resin and a fatty acid of at least 10 carbon atoms.

4. The article of manufacture comprising a grit or layer of abrasive particles and an adhesive bond for uniting the abrasive particles to form a coherent mass or layer, said bond including a hardened condensation product of a polyhydric alcohol with a mixture of an unsaturated fatty acid and a polybasic resin acid from a still fusible phenolformaldehyde condensation product and chloroacetic acid.

5. The article of manufacture comprising a grit or layer of abrasive particles and an adhesive bond for uniting the abrasive particles to form a coherent mass or layer, said bond including a hardened condensation product of glycerine with a mixture of an unsaturated fatty acid and a polybasic resin acid from a still fusible phenolformaldehyde condensation product and chloroacetic acid.

6. The article of manufacture comprising a grit or layer of abrasive particles and an adhesive bond for uniting the abrasive particles to form a coherent mass or layer, said bond including a hardened condensation product of glycerine with a mixture of linoleic acid and a polybasic resin acid from a still fusible phenolformaldehyde condensation product and chloroacetic acid.

7. The article of manufacture comprising a grit or layer of abrasive particles and an adhesive bond for uniting the abrasive particles to form a coherent mass or layer, said bond including a hardened condensation product of glycerine with a mixture of ricinoleic acid and a polybasic resin acid from a still fusible phenolformaldehyde condensation product and chloroacetic acid.

8. The article of manufacture comprising a grit or layer of abrasive particles and an adhesive bond for uniting said abrasive particles to form a coherent mass or layer, said bond including a hardened resinous condensation product of a polyhydric alcohol with a mixture of an unsaturated fatty acid of at least 10 carbon atoms and a polybasic resin acid from a still fusible phenol aldehyde condensation product and a halogen fatty acid.

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