Dec. 17, 1935. F. H. MANCHESTER 2,024,591

ABRASIVE WHEEL

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Fig. 1

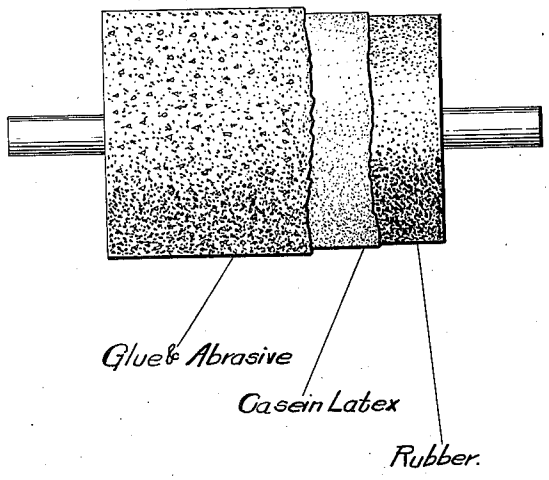
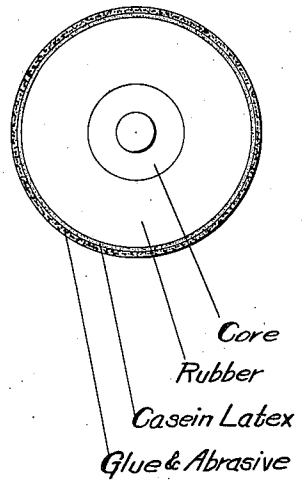


Fig. 2



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ABRASIVE WHEEL

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8 Claims. (Cl. 51—230)

This invention relates to improvements in abrasive wheels the surface of which are made resilient either by making the whole central portion of the wheel of rubber, or by incorporating rubber in the wheel near the surface. More particularly the invention relates to such abrasive wheels in which the abrasive is cemented together and to the wheel by a water-soluble binder and in which the portion of the wheel to which the water-soluble binder adheres is a water-insoluble material which adheres strongly to both the rubber in the wheel and the water-soluble binder.

The advantages of using rubber in an abrasive wheel have been previously recognized but difficulty has been experienced in finding a proper binding or cementing medium for causing the abrasive surface of the wheel to adhere to the rubber. Since rubber is elastic it is more desirable as a base for certain types of abrasive wheels than an unyielding substance such as porcelain or steel. It has been also recognized that glue or gelatin forms a desirable adhesive for binding the abrasive material to the wheel. However glue or gelatin does not form a satisfactory bond with rubber and when pressure is applied to an abrasive wheel in which the abrasive is fastened to the rubber by glue the abrasive will chip off as the layer of glue becomes broken under the yielding of the rubber base.

It has now been found that if glue is used as the adhesive in the abrasive outside layer of the wheel and a layer of latex and a protein material, such as glue or casein, etc., is used as a binder between the outside layer of glue and the rubber, an improved abrasive wheel is formed in which the abrasive will adhere to the wheel thruout a prolonged period of use. Altho glue may be satisfactorily used with latex it will generally be preferred to use casein with the latex because a casein-latex composition is water-insoluble and when it becomes necessary to resurface the abrasive wheel with an abrasive layer, the old layer of glue and abrasive may be removed by soaking the wheel in water and the casein latex layer will not be affected. After removal of the glue and abrasive by such soaking a new layer of glue and abrasive may be applied.

The abrasive wheel of this invention may be a narrow abrasive wheel or a broader wheel such as an abrasive roll. The body portion of the wheel may be composed entirely of rubber or the central portion may be of steel or wood, etc. coated with a sufficient layer of rubber to give the desired resilience to the surface of the wheel. Any suitable abrasive may be used such as carborundum, emery etc. in making up the outside abrasive layer of the wheel.

The drawing shows such a wheel in which a core of suitable material is surrounded by rubber and in which an abrasive layer using glue as a binding material is bonded to the rubber by a casein-latex layer. Fig. 1 shows a side view with portions broken away and Fig. 2 shows an end view.

The protein-latex bonding layer may, for example, be applied by painting or rolling the wheel in a solution of the ingredients employed and several applications of the same or somewhat different coating compositions may be applied if necessary. For example a rubber wheel, the entire central portion of which is solid rubber, may first be coated with two coats of a 5% solution of casein and 20% latex. (The references to latex content herein refer to the rubber in the latex.) After these two coatings have been applied and dried, two coatings containing 5% of casein and 12½% of latex may then be applied. Two further coatings of 5% casein and 2½% latex may then be used to form a surface to which the glue will strongly adhere.

Instead of applying several coats of different composition, only one casein-latex composition need be used as, for example, a coating comprising 5% of casein and 15% of latex. Several different layers of this coating composition may be applied to build up a thicker layer than can advantageously be formed by a single application. A layer several thousandths of an inch thick, e. g., five- to eight-thousandths will form a good bond between the rubber and the glue.

Instead of mixing casein with the latex other protein material such, for example, as glue may be used. For example, a mixture of 5% of glue and 15% of latex forms a desirable composition for binding the glue in the abrasive layer of the wheel to rubber when a water-insoluble composition is not required. Other materials which may be used include hæmoglobin, mucin, etc.

Instead of forming the wheel of an outside abrasive layer of glue or gelatin with a separate layer for bonding this outside layer to the rubber the abrasive may be cemented together and directly to the rubber itself by a composition which includes latex and a protein material such, for example, as casein, glue or hæmoglobin. For example, a composition comprising 30% of casein and 5% of latex or a composition comprising 30% of glue and 5% of latex may be employed for this purpose. When latex is incorporated in the surface layer it gives longer life in service to the

abrasive coating. Plasticizers, such as polyglycerol, may be used with the glue, with or without latex, or with casein or other protein, in binding the particles of the abrasive together.

Casein may be incorporated with latex by dissolving the casein with an alkali. A type solution would be 20 parts of casein, 150 parts of water and 6 parts of concentrated ammonium hydroxide. The casein may be soaked in half the water for several hours, then the ammonium and the rest of the water may be added with slight heating to make a smooth solution. This is then added to rubber latex in the proportions which give the desired properties to the finished composition. Other protein-latex cements may be made by dissolving the desired protein in water and adding this to the latex to form the adhesive.

A vulcanized latex may be employed in the formulae disclosed herein or a small amount of sulfur may be added and the composition vulcanized. However unvulcanized latex without sulfur may be employed satisfactorily. Modified forms of natural latex, such as concentrated latex, etc., may be used and other water dispersions of rubber may be employed. The term latex as employed herein includes such equivalents.

The proportions of latex and protein in the bonding agents included in this invention may be varied. In the preferred form of the invention the casein-latex layer adjacent to the vulcanized rubber contains 5% of casein and 20 to 25% or more of latex and the top layer of the bonding material adjacent to the glue contains 5% casein and 12 to 15% or less of latex. An improved structure is obtained if the layer of bonding material immediately adjacent to the outer glue-abrasive layer does not contain too much latex.

I claim:

1. An abrasive wheel comprising rubber to which the outside abrasive surface is bonded by a protein-latex composition.

2. An abrasive wheel, the abrasive surface of which comprises an abrasive material and glue which is bonded to a resilient rubber portion within the wheel by a protein-latex composition.

3. An abrasive wheel comprising a resilient rubber portion near the surface and an abrasive surface consisting of an abrasive material and glue as the bonding agent, in which the abrasive layer is bonded to the rubber by a protein-latex composition.

4. An abrasive wheel comprising a resilient rubber portion near the surface and an abrasive surface consisting of an abrasive material and glue as the bonding agent, in which the abrasive layer is bonded to the rubber by a casein-latex composition.

5. An abrasive wheel comprising a resilient rubber portion near the surface, in which the abrasive on the surface is bonded together and to the rubber by a protein-latex composition.

6. An abrasive wheel comprising a resilient rubber portion near the surface in which the abrasive on the surface is bonded together and to the rubber by a casein-latex composition.

7. An abrasive wheel comprising rubber, abrasive on the surface which is bonded together by a water-soluble binder, and a water-insoluble bonding layer between the abrasive layer and the rubber.

8. An abrasive wheel comprising a resilient rubber portion near the surface, abrasive on the surface which is bonded together by glue and a water-insoluble bonding layer between the abrasive layer and the rubber.

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