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## WATERPROOF ABRASIVE PAPER

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The present invention relates to processes for the production of waterproof abrasive paper, and, more particularly, to processes for producing waterproof abrasive paper with the use of cellulose esters as the binding media for the abrasive material and to the product thereof.

Heretofore, waterproof properties were generally imparted to waterproof abrasive paper by the impregnation thereof with drying oil either before or at the same time the paper was covered with abrasive material. Usually, linseed oil, Chinawood oil and the like have been used as the drying oils. In some cases, resins were used in conjunction with quick drying oils for the purposes of binding the abrasive particles to the paper. In carrying this procedure into practice, the paper was first oiled and then a solution of resin applied together with the abrasive granules; or the paper was treated with a mixture of resin and drying oil in which case the oil penetrated into the paper to a substantial extent while the resin remained on or near the surface to bind the abrasive material. In other cases, the paper has been waterproofed upon the paper-making machine by increasing the concentration or amount of sizing as is well known by those skilled in the art. Upon such strongly or heavily sized paper, a layer of resin (with or without the addition of a drying oil) was applied for binding the abrasive agent. The foregoing customary procedures had disadvantages of one sort or another. Although attempts have been made to overcome the disadvantages, none, as far as I am aware, have been wholly satisfactory and successful in producing a completely acceptable product, particularly when a cellulose ester is used as a binding agent. A cellulose ester cannot adhere at all to an oiled paper, but even with a well-sized paper, it has not been possible to secure an adhesion sufficient to cause the finished product to withstand the great mechanical strains and stresses to which it is subjected in use.

I have discovered a process which avoids prior disadvantages and overcomes prior difficulties, and which provides a process of manufacturing waterproof abrasive paper involving the use of a cellulose ester as a binding agent.

It is an object of the invention to provide a process of producing waterproof abrasive paper which is simple and practical and which can manufacture a product with a cellulose ester as a binding agent having great mechanical strength and capable of withstanding the action of water without splitting.

It is another object of the invention to provide

a process capable of manufacturing a waterproof abrasive paper having a cellulose ester as a binding agent and having a special resin mixture as a sizing and waterproofing agent.

It is a further object of the invention to provide a process of manufacturing a waterproof abrasive paper from unsized paper and with the use of a cellulose ester as a binding agent and an alcoholic resin solution as a sizing and waterproof agent.

It is also within the contemplation of the invention to provide an improved waterproof abrasive paper which has an integral structure which is capable of resisting the destructive actions involved in the use of the paper and which will not split when immersed in water.

Other objects and advantages of the invention will become apparent from the following description of a preferred procedure of carrying the invention into practice and of a preferred embodiment of the improved waterproof abrasive paper.

In carrying the present invention into practice, an unsized paper is employed as the carrying medium or base of the improved waterproof abrasive paper. Upon the top of the paper, herein termed the front face, a solution of cellulose ester is applied. Due to the fact that the unsized paper is merely a mass of felted or matted paper fibers, it has a high absorptive capacity for the solution of cellulose ester. The cellulose ester solution, such as a colodion solution, penetrates or sinks to a certain depth and obtains a firm hold on the paper fibers which it surrounds or envelopes. The layer of cellulose ester on the surface of the paper is able to bind the abrasive agent or particles to the paper tenaciously and to provide an adhesion sufficient to enable the finished waterproof abrasive paper to withstand the great mechanical strains and the destructive actions to which it is subjected in use. The depth to which the cellulose ester solution penetrates can readily and easily be adjusted and controlled by the degree of dilution or the extent of thinning of the solution and also by the proper selection of the viscosity of the applied cellulose ester. The abrasive particles can be sprinkled or applied to the surface of the coated paper in any customary manner. The paper is then dried so that the abrasive material is permanently secured to the front face of the paper.

After the application of the abrasive layer to the front face of the paper, the bottom or rear face of the paper is treated with a special resin

solution. It is to be noted that the usual aqueous resin or rosin sizing solution cannot be employed. I have discovered that an alcoholic resin or rosin solution containing a certain amount of a special solvent for cellulose ester such as, for instance, ethyl acetate or acetone, can be employed not only to size and waterproof the paper but also to penetrate into the interior of the paper and effect a union between the cellulose ester layer on the front face of the paper and the resin on the rear face. The applied alcoholic resin solution is then permitted to dry. In this manner an improved waterproof abrasive paper is produced which has an integral structure and which has a layer of cellulose ester on the front face for binding the abrasive particles and a resin layer on the rear face which sizes and waterproofs the paper and which is bonded to the cellulose layer. The improved waterproof abrasive paper will not split when immersed in water and is capable of withstanding the strains and actions to which it is subjected in use.

In carrying out the invention, various cellulose esters may be used in place of collodium and various alcoholic resin solutions may be used instead of rosin dissolved in alcohol containing ethyl acetate or acetone. Similarly, a variety of paper fibers and of abrasive material can be employed. Of course, the conventional apparatus and equipment usually utilized in the manufacture of waterproof abrasive paper may be used. Various specific examples will occur to those skilled in the art in view of the foregoing description of the invention.

It is to be observed that the present invention provides a novel process for manufacturing an improved waterproof abrasive paper which has a cellulose ester layer extending from one face to the interior of the paper and a resin layer extending from the other face to the interior. The resin layer is likewise bonded to the cellulose ester layer in the interior of the paper. Due to the use of unsized paper, the cellulose ester and the resin surround and envelope unsized fibers of paper. Of course, the cellulose ester layer holds or binds abrasive material to the face of the paper.

Although the present invention has been described in conjunction with certain preferred embodiments of the invention, it is to be understood that variations and modifications are within the scope and purview of the invention as defined by the appended claims.

1. The process of producing a waterproof abrasive paper which comprises applying a solution of a cellulose ester to a face of an unsized paper for holding abrasive material placing abrasive material on the thus-treated face, drying the paper, and treating the other face of said paper to size and waterproof the same with an alcoholic resin solution containing an organic solvent for said cellulose ester and said resin whereby a union between the cellulose ester layer and the resin layer can be effected.

2. The process of producing a waterproof abrasive paper which comprises applying a collodium solution to the front face of an unsized paper for holding abrasive material thereto placing abrasive material on the thus-treated face, drying said paper, and treating the other face of paper to size and waterproof the same with an alcoholic rosin solution containing a solvent of the group consisting of ethyl acetate and acetone for bonding the rosin to the cellulose ester.

3. The process of producing a waterproof abrasive paper which comprises binding abrasive material to one face of an unsized paper by means of a cellulose ester, and treating the other face of said paper to size and waterproof the same with an alcoholic resin solution containing an organic solvent for said cellulose ester and said resin whereby a union between the cellulose ester layer and the resin layer can be effected.

4. The process of producing a waterproof abrasive paper which comprises binding abrasive material to one face of an unsized paper by means of a collodium solution and treating the other face of paper to size and waterproof the same with an alcoholic rosin solution containing a solvent of the group consisting of ethyl acetate and acetone for bonding the rosin to the cellulose ester.

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