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L. H. ENGLUND

2,432,091

METHOD OF MAKING CLEANSING PADS

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Fig. 1

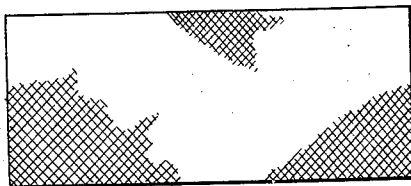


Fig. 2

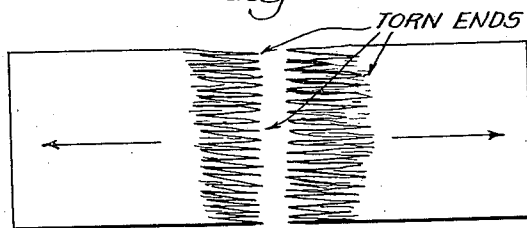
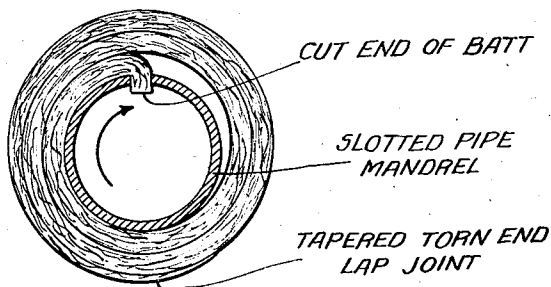


Fig. 3



Fig. 4



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attys

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METHOD OF MAKING CLEANSING PADS

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6 Claims. (Cl. 117-166)

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The present invention relates to the manufacture of fibrous articles. More particularly, it pertains to fibrous articles for cleansing purposes, such as scouring pads or the like impregnated with soap, the fibers of which are held together by a film of cellulosic binder, the binder and soap being a reaction product of a soap-making acid and a cellulose compound containing a saponifying alkali with which the pads successively are treated.

A principal object of the present invention is the provision of pads such as those herein described, and a method of making them, in which a fibrous mass of material has cast or deposited thereon, by regeneration of the cellulose compound, a strong continuous film as a binder to hold such pads intact.

Another object of the invention is the provision of such a pad which is interstitially impregnated with a suitable soap, and in which the soap also is distributed over and around the fibers with a minimum of input of water, thereby greatly reducing the drying load which otherwise would be necessary if ordinary pre-formed soap were used.

It is a further object of the invention substantially completely to eliminate deleterious by-products from such pads, particularly by the elimination of saponifying alkalies, such as caustic soda, which would be deleterious substance if allowed to remain as such in the pads.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the several steps and the relation of one or more of such steps with respect to each of the others, and the article possessing the features, properties, and the relation of elements, which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a plan view illustrating a fibrous batt prior to separation into portions to be rolled into tubular formation;

Fig. 2 illustrates the batt of Fig. 1 thus separated;

Fig. 3 is an enlarged cross sectional end elevation illustrating a fragment of the batt adjacent an area of severance of the batt shown in Fig. 2; and

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Fig. 4 shows the cut end of a batt inserted in a slotted type mandrel, having been given several turns around the mandrel with the tapered torn end of the batt forming a lapped joint.

In the manufacture of fibrous materials into articles of the type herein disclosed, it has been customary variously to condition and prepare fibers, such as Tampico, and run the same through a garnett machine. Thereafter the material is run to a lapping device which consists, for example, of a conveyor belt traveling in one direction while the web coming off the garnett is lapped thereon in a manner such that it continuously traverses the moving conveyor belt in a reciprocating action, laying down on the belt the fibrous web in lapped form. The material is thereafter sprayed on both sides to moisten the same by having the lapped web of fiber travel in a substantially rectilinear traverse, after which it is passed through a suitable dryer. After emerging from the dryer a cutter will cut the lapped web into batts of approximately 10 x 20 inches.

These batts are then pulled apart, rolled on mandrells into tubular formations, and the tubular forms of fibrous material are then subjected to a cutting operation in which the tube is cut into thicknesses or pads which are approximately two inches long after the ends have been trimmed. In this connection I have discovered, as one aspect of the present invention, that in order to obtain a suitable tubular formation of the fibrous material, the torn-apart ends must not form a shoulder by having an abrupt severance. In rolling the web into the tube there will be formed a plurality of layers, or lamina, and it is essential that they do not unwind or spring out of position after having been so rolled. To prevent this, I separate the batts in such a manner that the fibers present ends of varying lengths in a feathered edge which, when wound into the tubular formation, present no shoulder but blend evenly along the outside of the tube. In separating these batts to procure this particular effect, it is essential that the same be pulled in the direction of the longitudinal axes of the fibers. The batts are torn or pulled apart to yield two batts of approximately 10 x 10 inches, and by such pulling apart the severed ends are comprised of protruding or extending fibers of varying length thus presenting a feathered or tapered end. They will then present ends of varying lengths, the essential characteristic of which is to give the tapered or feathered edge a proper lap joint, frictionally and interlockingly

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engaging the fibers immediately adjacent thereto when the same is rolled into the above mentioned tubular form prior to cutting the ultimate pads.

The pads are then treated in accordance with the principles of the present invention which, briefly, contemplates their impregnation in a soap forming solution, such as a fatty acid which is neutralized by a saponifying caustic solution contained in a cellulose compound simultaneously to deposit a binder on the individual fibers of the pads as well as provide the necessary soapy material in situ with the simultaneous elimination of deleterious alkali.

More specifically, the pads are impregnated in a liquid fatty acid, or other acids, of such composition as will yield a suitable soap. Such soap-making acids can be chosen from any of the groups consisting of fatty acids of the water insoluble type running from oleic through stearic acids. These soap-making acids can also be chosen from the rosin acids, such as abietic acid, also useful in soap making. As a further alternative, naphthenic acid or other acids derived from petroleum can be used in the process. In other words, the pads are impregnated in liquefied fatty acids, or other soap-yielding acids such as rosin, naphthenic or other petroleum-derived saponifiable substances, which yield soaps upon saponification with an alkali.

Thereafter the fatty acid impregnated pads are dipped in a cellulose liquid solution containing sodium hydroxide, e. g., in an alkaline aqueous solution in which is dissolved ethyl-hydroxy cellulose ether, or equivalent film-forming cellulose compound. Both the acid and the cellulose compositions enter the reaction as liquids and emerge as solids. Thus the cellulose forms the binder and the fatty acid the soap with saponifying alkali present.

It is also desirable to have the ultimate pad contain an abrasive material. Heretofore, such a material as pumice stone has been used and the present invention contemplates the use of this type of material or any other similar suitable material such as fuller's earth, rotten stone, etc. Preferably, this abrasive material may be incorporated in the fatty acid solution or other soap-making acid solution. It will be understood that the inclusion of the abrasive need not be with this material but can be used at a later stage in the process. However, it is preferable to incorporate it in the first impregnating or fatty acid solution. This may be done by suspending it in the liquid solution and at this stage there is a distinct advantage. By its presence I am able to control the proportion of fatty acid retained in the fiber pad because it acts as a thickener, thereby increasing the viscosity of the solution and hence giving a better retention on the fibers.

After the pad has thus been impregnated it is immersed in a solution comprising a cellulose compound soluble in a saponifying alkali. This cellulose compound, or other film-forming substance, must be soluble in a saponifying alkali such as, for example, caustic soda, and it should be film-forming to the extent that it will regenerate, that is, deposit or coat the cellulose compound in the form of a continuous film over the individual fibers of the pad. This reaction will occur upon the removal of a critical proportion of the caustic alkali as the same is reacted with the particular fatty acid present. Preferably, such a cellulose compound comprises a cellulose ether, such as an ethyl hydroxy cellulose ether, or may consist of a methyl hydroxy cellulose

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ether. In other words, this step, which is carried out by immersion of the fatty-acid-impregnated pads in the alkaline aqueous solution of ethyl-hydroxy cellulose ether, or other equivalent cellulosic compound, simultaneously results in the saponification of the fatty-acids into soap, the elimination of alkali, and the depositing of the ethyl-hydroxy cellulose ether in the form of films, thus binding the individual fibers of the pad together.

The reaction which will occur by the immersion of the impregnated abrasive pad containing a fatty acid of the soap-making variety and a cellulose compound which is soluble in a saponifying alkali, will provide two products. One of these products is the combination of fatty or soap-making acid with the alkali or caustic soda, yielding thereby a soap formed in situ on the fibers of the material. The other product of the reaction is the regeneration or deposition of the cellulose compound in the form of a continuous film which acts as a binding agent to hold the fibers together in the structural form of a pad. Thereafter the pad can be dried by any suitable means such as, for example, a cabinet drier utilizing a stream of dry air, whereupon the pads can be packaged ready for distribution.

By means of the foregoing procedure, it will be seen that the objects hereinbefore set forth may readily and efficiently be attained, and since certain changes in carrying out the above process and certain modifications in the article which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description may be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Particularly, it is to be understood that in said claims, ingredients or compounds recited in the singular are intended to include compatible mixtures of such ingredients wherever the sense permits.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In the manufacture of fibrous material into articles of the class described, the improvement which comprises impregnating such fibrous material in a liquid fatty acid solution of such composition as will yield a soap upon saponification with an alkali, and saponifying said fatty acid impregnated material in a solution comprising an alkali soluble cellulose ether which is solubilized in a saponifying alkali to cast a continuous enveloping film of cellulose around said fibrous mass of material to bind the same into a compact unitary structure.

2. In the manufacture of fibrous material into cleansing articles, the improvement which comprises impregnating such fibrous material in liquid fatty acid of such composition as will yield a soap upon saponification with an alkali, saponifying said fatty acid in said impregnated pad in a solution comprising an alkali soluble cellulose ether which is solubilized in a saponifying alkali, and continuing the saponification of said fatty acid therewith until there is a deposit of regenerated cellulose in the form of a continuous film upon the fibers and around the fibrous mass of

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material which acts as a binding agent to hold said fibers together and said pad intact.

3. In the manufacture of fibrous material into cleansing articles, the improvement which comprises impregnating such fibrous material in liquid fatty acid of such composition as will yield a soap upon saponification with an alkali, and saponifying said fatty acid in said impregnated material in a solution comprising an alkali soluble cellulose ether which is solubilized in a saponifying alkali, and continuing said reaction until said acid and cellulosic compound yield a soap in situ on the fibers of said fibrous material and a continuous enveloping film of cellulose around said fibrous mass of material to bind the same into a compact unitary structure.

4. In the manufacture of fibrous material into cleansing articles, the improvement which comprises impregnating such fibrous material in liquid fatty acid of such composition as will yield a soap upon saponification with an alkali, saponifying said fatty acid in said impregnated material in a solution comprising an alkali soluble cellulose ether which is solubilized in a saponifying alkali contained therein, and continuing said reaction until two products are formed, one of which is a regeneration and subsequent deposition of cellulose compound in the form of a continuous film which forms a binding agent around the fibrous mass to hold it together in the form of a pad, and the other of which is a soap formed in situ on said fibrous material as a reaction of the combination of fatty acid with said alkali.

5. In the manufacture of fibrous material into cleansing articles of the character described, the improvement which comprises impregnating said fibrous material with a liquefied acid which will yield soap upon saponification with alkali and subjecting said acid to reaction with a material

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which is an alkali soluble cellulose ether solubilized in caustic soda solution and which will regenerate the cellulosic compound and deposit the same in a continuous film around said fibers to hold the same in a compact mass.

6. In the manufacture of fibrous material into cleansing articles, the improvement which comprises impregnating such material with a suitable soap-making acid, and subjecting said acid in said material to reaction with an ethyl hydroxy cellulose ether compound which is a film forming substance in sodium hydroxide solution, which reaction will regenerate the cellulose compound upon removal of a critical proportion of the sodium hydroxide and deposit said cellulose in the form of a film around the mass of said fibrous material.

LEONARD H. ENGLUND.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

25	Number	Name	Date
	1,557,473	Cross	Oct. 13, 1925
	1,612,531	Peed	Dec. 28, 1926
	1,672,539	Novak	June 5, 1928
	1,681,745	Pohl	Aug. 21, 1928
30	1,036,282	Lilienfeld	Aug. 20, 1912
	1,722,928	Lilienfeld	July 30, 1929
	2,107,852	Bolton	Feb. 8, 1938
	2,372,713	Curado	Apr. 3, 1945
	105,320	Eaton	July 12, 1870
35	1,970,872	Warren	Aug. 21, 1934
	2,010,330	Stanley	Aug. 6, 1935
	2,284,738	Hurst	June 2, 1942
	2,268,403	Kingman	Dec. 30, 1941