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COATED CELLULOSIC FILM

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

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COATED CELLULOSIC FILM

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This invention relates to moistureproof sheet wrapping material, and more particularly to the moistureproofing of regenerated cellulose and like film. It especially appertains to the anchoring of moistureproof coatings to the base sheet.

Recently there has appeared in commerce a transparent moistureproof sheet wrapping material consisting of a base sheet of regenerated cellulose film coated with a moistureproofing coating composition. When products containing considerable water (cheese, fish, fresh vegetables, etc.) are wrapped in such material, the surface coating loosens in a few hours. As a result, the effectiveness of the wrapping is very appreciably reduced. Among the various plans which have been proposed for avoiding or overcoming this failing is that of anchoring the moistureproof coating to the base sheet by means of an intermediate coat. In spite of the very great advance described in these patents, there is still considerable room for improvement.

It was an object of this invention to improve sheet wrapping materials having anchored moistureproof coatings. Another object was the production of a flexible, odorless, colorless, transparent, moistureproof sheet wrapping material comprising a regenerated cellulose film having a moistureproof coating adhering tenaciously thereto even in the presence of water. Further objects were to devise a simple process applicable to existing and conventional equipment for anchoring moistureproof coating to regenerated cellulose and like film, to improve the anchorage of moistureproof coatings comprising film former, a moistureproofing agent, a blending agent and a plasticizer to regenerated cellulosic film, and to anchor a moistureproof coating to a regenerated cellulose film with a dimethylol urea ether type synthetic resin. A still further object was to compound the sub-coat of a moistureproof coated regenerated cellulose film from a normally tacky resin so that it would, upon deposition from solution, exude material reducing its tackiness to such an extent that rolling or stacking prior to the application of the adjacent coat is possible. A general advance in the art and other objects which will appear hereinafter are also contemplated.

Surprisingly, it has now been found that an intermediate coating of an ether derivative of a methylol urea will securely adhere a moistureproof coating to regenerated cellulose film, and that the resulting moistureproof sheet wrapping material is greatly superior to the products heretofore known.

From the following description and specific examples, in which are disclosed certain embodiments of the invention as well as details of what is believed to be the best mode for carrying out the invention, it will be apparent how the foregoing objects and related ends are accomplished.

The written description is amplified by the accompanying drawing, in which:

Figure 1 is a sectional elevation view showing the manner of applying the anchoring coating;

Figure 2 is an isometric view of the base sheet material before the application of an anchoring coating;

Figure 3 is an isometric view showing the relation of the anchoring coating and the base sheet; and

Figure 4 is an isometric view showing the relation of the anchoring coating, the moistureproof coating and the base sheet.

In Figures 2, 3 and 4 the thickness dimension is very greatly exaggerated in the interest of clarity.

The parts are given by weight throughout the application.

Example 1

A web of regenerated cellulose in gel condition, which had been cast from viscose, desulfured, bleached and washed free from impurities in the conventional manner was led through an aqueous softening bath containing 4.33% glycerin. The gel film containing the glycerin softener was then dried in the usual manner by passage over heated rolls at temperatures of 60°–90° C. The web was then passed through a solution consisting of:

	Per cent
Di-iso-butyl ether of di-methylol urea	8.0
Citric acid	1.5
Ethyl alcohol	90.5

The treating bath was proportioned so that 30 pounds of the solution were associated with 100 pounds of cellulose of 0.001 of an inch thickness. The coated sheet was then dried by maintaining it at a temperature of 80° C. until all the solvent had been removed from the sheet and the dimethylol urea ether product had become hard, tack-free and substantially insoluble.

The product employed as this anchoring intermediate or under-coat was prepared by reacting dimethylol urea with isobutyl alcohol in the presence of phthalic anhydride as a catalyst at a temperature approximating 100° C. It was partially condensed (polymerized or hardened) and dehydrated before being applied to the regenerated cellulose sheet.

Where there is a tendency for the dimethylol urea ether product to deposit on the drier rolls, the web may first be given a preliminary partial drying out of contact with any surface, as, for example, by passing this sheet through air heated to an elevated temperature.

After bringing the coated sheet as produced above to a normal humidity, it was moistureproofed by passing it through a moistureproofing coating composition of the following formula:

	Per cent
12.5% N_2 nitrocellulose, 10'' visc	6.70
Paraffin wax (M. P. 60° C.)	.15
Dibutyl phthalate	2.90
Damar	1.50
Ethyl alcohol	2.90
Acetone	1.45
Water	0.30
Ethyl acetate	51.00
Toluene	33.10

The excess of the coating material was removed by scraping, and the coated sheet dried at a temperature above the melting point of the wax. The finished coated sheet was then again conditioned to bring it to the desired moisture content. There resulted a moistureproofed sheet of regenerated cellulose which was transparent, flexible, odorless and colorless. It retained its moistureproof surface coating tenaciously, even when in direct contact with water and moisture for prolonged periods of time. It was admirably suited for wrapping material to be employed in contact with products containing large amounts of water or moisture such as butter, cheese, wet fish, frozen fish, ice cream, and the like. The wrapping material performed its desired function as a wrapper for these materials even when they were stored for appreciable periods of time.

Example II

The procedure of Example I was repeated, using a sub-coating composition consisting of:

	Per cent
Partially polymerized isobutyl ether of dimethylol urea	3.80
Maleic acid	0.20
Ethyl acetate	44.20
Toluol	38.40
Ethyl alcohol	13.40

This solution was applied in such a way that 10 pounds were associated with 100 pounds of cellulose.

Example III

The procedure of Example I was followed, using an intermediate anchoring coating composition consisting of:

	Per cent
Dilauryl ether of dimethylol urea	12.0
Dewaxed shellac	4.0
Tartaric acid	0.6
Ethyl alcohol	25.0
Ethyl acetate	58.4

This ethyl alcohol solution of the dilauryl ether of dimethylol urea was applied in such a way that 20 pounds of the solution was associated with 100 pounds of cellulose.

Example IV

A web of regenerated cellulose in gel condition, which had been cast from viscose, desulfured, bleached, washed free from impurities in the usual manner in the casting machine, and which was ready for a softening treatment, was led through an aqueous glycerol bath containing, in addition to 4⅓% by weight of glycerol (the amount of glycerol normally used for softening regenerated cellulose film), 0.75% of dimethylol urea ether of ethyl alcohol and 0.08% of citric acid. The web of regenerated cellulose was in contact with this aqueous solution for 10 to 20 seconds, after which the excess solution was removed from the sheet by means of squeeze rolls which reduced the water content of the sheet to between three and four times the weight of the cellulose. The web, wet with the solution of anchoring material and glycerol, was then ready to be dried. During the drying (water removal), the resin forming materials reacted (under the influence of the heat employed for the drying) to form a substantially insoluble resin in or on the sheet. The drying was carried out according to the usual method for drying regenerated cellulose sheeting on a casting machine, namely, by bringing the sheet directly from the squeeze rolls into contact with heated rolls and drying the sheet at a temperature of between 60° and 90° C. A tendency for the substantially insoluble resin to be deposited on the drier rolls as they become wet with the solution from the wet cellulosic web passing over them, may make it desirable to follow a different drying procedure in some cases. A deposit of resin may flake off from time to time on the fresh cellulosic sheeting passing over the rolls, thereby imparting a faintly mottled appearance to the drying sheet.

In this example (which describes a preferred procedure), the regenerated cellulose web, wet with the solution of polymerizable resin material and glycerol, after passing through the squeeze rolls and before coming into contact with the drier rolls, was first given a preliminary or partial drying out of contact with any surface. This was accomplished by passing the web through air heated to an elevated temperature by means of a suitable arrangement of gas burners (electric heaters have also been used satisfactorily), whereby the moisture content of the sheet was reduced to the desired extent, in this instance from one-third to one-half of the initial water content. The partially dried cellulosic sheet was then led over the heated rolls of the casting machine in the usual manner to complete the drying operation and to complete the formation of the substantially insoluble ether in and/or on the sheet.

The resulting sheet of regenerated cellulose with its substantially insoluble ether coating was then rehumidified to ordinary normal moisture content and coated with a moistureproofing coating having the composition:

	Per cent
12.5% N_2 nitrocellulose, 10'' visc	6.70
Paraffin wax (M. P. 60° C.)	.15
Dibutyl phthalate	2.90
Damar	1.50
Ethyl alcohol	2.90
Acetone	1.45
Water	0.30
Ethyl acetate	51.00
Toluene	33.10

The sheet was passed through the moistureproofing composition the excess coating removed by scraping, and the coated sheet dried at a temperature above the melting point of the wax. The finished coated sheet was then again conditioned

to bring it to the desired moisture content. The resulting product was a coated sheet of regenerated cellulose which was inexpensive to produce, transparent, flexible, odorless and moistureproof. The moistureproof surface coating adhered (was anchored) very tenaciously to the sheet and remained so for substantial periods of time even when the sheet was in direct contact with water, dilute acids and the like. It was very satisfactory as a wrapping in direct contact with products containing large amounts of moisture or water such as butter, cheese, wet or frozen fish, ice cream, or the like.

Example V

A softening anchoring coat bath, such as that described in Example IV, was prepared, using as the anchoring resin the dimethylol urea ether of ethylene glycol monomethyl ether. The procedure of Example IV was then followed, using the new treating bath. The final film exhibited the desired anchorage for the moistureproof coating.

Example VI

A solution having the composition:

	Per cent
Dibutyl ether of dimethylol urea	7.0
Citric acid	1.0
11.4% nitrocellulose, 1000 sec. viscosity	1.0
Paraffin	0.2
Ethyl alcohol	20.0
Ethyl acetate	36.0
Toluene	34.8

was prepared and applied to a finished sheet of regenerated cellulose by passing the sheet through the solution and removing the excess solution by means of a suitable scraping mechanism. The coated sheet was then dried at a temperature of 100° C. until all the solvent had been removed from the sheet and the polymerized coating. The dried coating was about 0.0001 of an inch in thickness. The nitrocellulose spewed forth as the solvent evaporated, forming a superficial layer which was hard and tack-free. The coated sheet was rolled for storage purposes, and later coated with a moistureproofing coating composition in accordance with the procedure set out in Example IV.

The resulting moistureproofed sheet of regenerated cellulose was transparent, flexible, odorless, colorless, and retained its moistureproof surface coating continuously even when in direct contact with water or moisture for prolonged periods of time. It was well suited for wrapping moisture-containing products such as butter, cheese, frozen commodities, and the like.

Example VII

The procedure of Example VI was followed, using a sub-coat coating composition of the following formulation:

	Per cent
Urea formaldehyde monohydric alcohol (iso-butanol) resin solution (55% solution in iso-butanol-xylene 2:1 mixture)	7.36
25% solution of phosphoric anhydride in iso-butanol	1.20
Nitrocellulose, 2500 sec. viscosity	0.50
Paraffin	.15
Ethyl alcohol	9.09
Ethyl acetate	48.45
Toluene	33.25

Example VIII

The procedure of Example VI was followed, using a sub-coat coating composition of the following formulation:

	Per cent
Incompletely polymerized isobutyl ether of dimethylol urea	4.0
p-Toluene sulfonic acid	0.5
Nitrocellulose (high viscosity)	0.5
Isobutyl alcohol	33.25
Ethyl acetate	33.25
Toluene	28.50

Example IX

The procedure of Example VI was followed, using a sub-coat composition of the following formulation:

	Per cent
Urea formaldehyde monohydric alcohol (normal-butanol) resin solution (65% solution in normal-butanol)	8.0
Nitrocellulose (2500 second)	.4
Maleic anhydride	1.0
Isobutanol	12.0
Ethanol	.5
Toluene	41.0
Ethyl acetate	37.1

Example X

A web of regenerated cellulose which had been cast from viscose, desulfured, bleached, washed, softened by passage through a 6% aqueous glycerin bath and dried, all in the usual manner, was passed through a 11.7% solids coating composition. The solids consisted of:

	Per cent
Urea formaldehyde monohydric alcohol (iso-butanol) resin solution (65% solution in isobutanol)	25.2
11.4% N nitrocellulose	49.2
Dicyclohexyl phthalate	9.0
Dimethyl cyclohexyl phthalate	9.0
Maleic acid	4.3
Paraffin wax	1.5
Damar resin	1.3

and the solvent consisted of ethyl acetate (46.0%), toluene (40.0%), and isobutyl alcohol (14.0%). The excess of the coating composition was removed by scraping, and the coated sheet dried at a temperature above the melting point of the wax.

Example XI

The procedure of Example X was carried out, using a coating composition consisting of:

	Per cent
Urea formaldehyde monohydric alcohol (normal-butanol) resin solution (60%–65% solution in normal-butanol)	7.2
11.4% nitrogen nitrocotton	4.2
Paraffin	0.6
Phthalic anhydride	0.48
Dewaxed damar	1.2
Dibutyl phthalate	1.2
Ethyl acetate	57.20
Toluene	26.40
Ethyl alcohol	1.52

As shown by the specific examples, the anchorage of a moistureproof coating on regenerated cellulose film is very greatly improved by the presence of a sub-coat comprising essentially polymerized derivative of mono- and/or dimethylol urea alkyl ether. The solids of the sub-

coating composition may consist of the ether material, or, as in Examples VI, VII, VIII and IX, may comprise in addition a material which will blush or exude upon evaporation of the solvent. This exuded material serves the purpose of drying the coating and rendering it tack-free when the coating has become hard upon evaporation of the solvent therefrom. Preferably a blushed material soluble in the moistureproofing coating composition is used. When this is done, the exudate becomes a part of the top coating, thereby preventing its impairing the clarity of the finished sheet material.

The ether type material may be applied to the regenerated cellulose film in the monomeric and partially polymerized forms. In the latter cases the condensation or polymerization may be completed on the base sheet. The water soluble products are economically applied from an aqueous bath, as illustrated in Examples IV and V (this method is simple and has the advantages which accompany such a process). The water insoluble products may be applied in the form of an emulsion, or in solution in organic liquids (solvents). Some of the products being soluble in both water and common organic solvents may be applied to the base as a solution in either one.

Ordinarily the moistureproof coating is not applied until the sub-coat has reached a tack-free and substantially insoluble form.

The preparation of the urea formaldehyde monohydric alcohol reaction product resin solutions may be carried out in various ways. Preferred procedures are described in detail in British Patent 483,399 and United States Patent 2,191,957 dated February 27, 1940 (Edgar & Robinson). The methylol urea ethers may be prepared according to the disclosures in United States Patents 2,191,974, 2,201,927, 2,213,921 and 2,247,419.

The most satisfactory operating procedures for the application of methylol urea ethers from aqueous solutions are obtained when the polymerization products are capable of rapid formation at temperatures of under 200° C. (preferably capable of formation in 5 minutes or less at 100° C. or less because of the inconvenience of operation and effect upon the cellulosic sheet). In addition, the polymerization products should be substantially insoluble in and unaffected by water and organic liquids (such as those employed as solvents in the surface coating compositions), and formed by the reaction of substances which are themselves sufficiently water soluble to yield aqueous solutions of the necessary concentration. Products substantially colorless, at least in very thin films (preferably less than 0.001 inch in thickness) are most desirable. Representative compounds in this group of materials are the methyl ether of mono-methylol urea, the ethyl ether of mono-methylol urea, the methyl ether of di-methylol urea, the ethyl ether of di-methylol urea, the methyl ether of mono-methylol thiourea, the ethyl ether of mono-methylol thiourea, the methyl ether of di-methylol thiourea, the ethyl ether of di-methylol thiourea, the di-methylol urea ether of ethylene glycol mono-methyl ether, and the like.

When employing aqueous solutions of polymerizing material, low concentrations are preferred. Ordinarily dilute solutions of such concentration that the total weight of resin-forming material is between 0.5% and 3%, and the weight of the condensing agent (if used) is between 0.01% and 0.15%, are used, although solutions more or less concentrated in resin-forming material or condensing agent may sometimes be desirable.

The heat necessary to condition the sheet material for receiving its final moistureproofing coating may be applied in a variety of ways, as, for example, by bringing the cellulosic sheet into contact with heated drier rolls (or other heated surfaces), or by leading the sheet (or web) through a heated atmosphere in some other manner. The amount of heat required to convert the resin-forming material to a substantially insoluble resin varies with the individual resin and the catalyst or other component of the sub-coating composition. A temperature of much higher than 100° C., even as high as 180° C., can be applied for a very brief interval to a regenerated cellulosic sheet wet with an aqueous solution of polymerizable material to bring about the formation of the desired substantially insoluble polymerization product without damaging the cellulosic sheet. It is usually desirable to effect the formation of the resin in a comparatively brief period, but it is possible to vary the time (as well as the temperature) rather widely to suit the requirements of special resins and resin combinations without unfavorably affecting the quality of the cellulosic sheet. Temperatures very much under 100° C., sometimes as low as 60° to 70° C., are often sufficient (and desirable) to cause resin formation in or on the sheet when a period of time from 5 to 30 minutes is employed. In the preferred procedure for applying the aqueous solution of the polymerizable material to the cellulosic sheet, the application is made directly on the casting machine while the cellulosic sheet is still in gel form. This can be done conveniently by dissolving the resin producing material in the desired amount directly in the bath commonly used to provide a softening treatment (i. e., the bath containing the aqueous solution of glycerin or corresponding material), passing the gel web through the said bath in the usual way, and subsequently drying the film in any desired manner. The resulting sheet is then coated with the moistureproofing surface coat of the desired composition and in the desired manner.

When applying the anchoring under-coat from an organic solvent solution, the ether material is preferably of a type which will polymerize or harden completely to a tack-free, substantially insoluble state in extremely thin coatings (preferably less than 0.0001 of an inch in thickness), in a period of a few minutes at an elevated temperature (preferably not exceeding 125° C.). It is desirable that the period be 5 minutes or less at a temperature of between 70° and 110° C.

As was the case with the materials applied from aqueous solutions, the different polymerization products require different conditions, and the time and temperature may, therefore, be varied according to the nature of the particular polymeriziation product and catalyst used. For example, a longer time at a lower temperature may be employed to effect the desired result with a given polymerization product which in a shorter time would require a much higher temperature. This principle applies to the hardening either in the presence or absence of a catalyst, it being understood that any of the well known catalysts which are soluble in the solvents employed may be used to accelerate the conversion to the final hardened, substantially insoluble form.

In order to obtain under-coats which do not form visible cracks on the cellulosic sheet when it is creased or wrinkled, the methylol urea ether material (for example, the normal-butanol and iso-butanol ethers of the methylol ureas), which will produce film of a fair degree of flexibility, is preferred. It is often possible to use polymerization products which are commonly regarded as somewhat brittle, since for the purpose of this invention they are applied in extremely thin layers which flex with the base sheet. Thicker layers, for example, those on the order of several ten-thousandths of an inch in thickness, would crack visibly if sharply bent. The undercoat is usually extremely thin, being often as thin as 0.00001 to 0.00003 of an inch in thickness, so that the thickness of the resin coated cellulosic sheet is not appreciably greater than that of the original sheet.

Such organic liquids (solvents) as acetone, ethanol, butanol, iso-butanol, ethyl acetate, benzene, toluene, amyl acetate and the like, and mixtures thereof, are suitable for the formation of solutions of the urea ether material. The consistency of such solutions is governed by the apparatus employed, the thickness of the coating desired, the convenience of the operator, and similar factors. Solutions containing between 1% and 20% of solids have been found very convenient for obtaining under-coats of the requisite thickness.

Application of the organic liquid resin solution to the cellulosic sheet may be made by any of the usual methods, as for example, by immersing the sheet in the solution, brushing a solution on the sheet, spraying the solution on the sheet, or other convenient means. After application of the under-coating composition it may be smoothed and the excess removed in any suitable manner.

In some cases it is highly desirable, and frequently superior results may be obtained, by carrying out the coating process in such a way that the anchoring media (polymerization products) will not form a hardened, insoluble, non-tacky surface at once. The incorporation of a cellulose derivative in the under-coating composition, in such proportions that it exudes upon removal of the organic solvent to form a superficial coating, enables the web or sheet to be rolled up for storage prior to further treatment. The exuded material, as will be clear from Examples VI, VII, VIII and IX, forms a temporary non-tacky surface. Adherence of adjacent layers of film bearing its anchor coat is prevented, and what would otherwise be a severe handicap in handling is removed.

In this modification of the invention, nitrocellulose or a similar cellulose derivative is added to the organic solvent solution of the urea ether material. The solvents (organic liquids) are so selected, and the concentrations and proportions of the various constituents of the solution so adjusted, that upon the evaporation of the solvent the ether material is substantially all deposited before any great proportion of the cellulose derivative is precipitated. Thereafter, upon completion of the evaporation of the solvent, a deposit or surface layer of the cellulose derivative results. This adequately protects the tacky ether material from adhering to adjacent surfaces when the web is rolled or stacked upon itself, or when in subsequent treatment it comes in contact with apparatus surfaces such as drier members, and the like. By forming the superficial, non-tacky layer of exuded material it is necessary to heat the anchoring coat only to the extent required for solvent removal, and the heat necessary to produce polymerization and hardening of the insoluble non-tacky form can be dispensed with.

The resinous materials especially suitable for this type of application are the ether type derivatives formed from di-methylol urea in the presence of alcohols such as propyl, butyl, isobutyl, hexyl, lauryl, and the like. These are soluble in organic solvents and can, if desired, be polymerized further during the drying process. In order to save time in completing polymerization after application as an anchoring coat, it is desirable to use incompletely polymerized resinous material rather than the monomeric crystalline monohydric alcoholic ether of methylol urea.

These compounds are preferred because they are tacky, soft, and posses a high degree of flexibility even when applied in fairly thick layers (on the order of several thousandths of an inch thick). These materials can be applied in extremely thin layers (even as thin as 0.00001 to 0.00003 of an inch in thickness), and such embodiments are not excluded from the scope of the present invention.

The application of the under-coating compositions containing a cellulose derivative is generally the same as for the other organic liquid solutions of the urea ether material, so far as the concentration of the coating composition and the handling of the web during coating is concerned. The same solvents for the urea ether material, namely, the aliphatic, cyclic, aromatic and chlorinated hydrocarbons, may be employed whether the cellulose derivative is present or not.

Although cellulose nitrate is the most readily available and the most satisfactory of the cellulose derivatives so far found for use in conjunction with the undercoating compositions, other types of derivatives such as cellulose acetate and ethyl cellulose give very satisfactory results.

Whatever the mode of application, it is preferable that the urea ether material be substantially colorless in films of several ten-thousandths of an inch thickness or less. The urea ether material should also be substantially odorless after being hardened (condensed, polymerized).

If for any reason it is desired to modify the characteristics of any specific urea ether resin or of the anchoring under-coat which said ether forms on the cellulosic sheet, for example, with respect to flexibility, hardness or color, certain other materials may be combined with the synthetic ether in question. These include natural resins and resin acids, such as, for example, rosin and hydrogenated rosin, other synthetic resins such as styrene, oils and oil acids, fats, waxes and wax-like materials, drying oils and drying oil acids, rubber derivatives such as Pliolite, dyes or the like. These materials may be combined with the partially condensed, polymerized or hardened synthetic resin either by addition along with the other ingredients during the preparation of the resin itself or by addition to the solution of said resin in organic solvents after it has reached the partially condensed, polymerized or hardened stage and is ready for application to the cellulosic sheet. Since the anchoring coat comprises essentially urea formaldehyde monohydric alcohol reaction product the anchoring

effect definitely depends upon the completion of the condensation, polymerization or hardening of the partially condensed, polymerized or hardened methylol urea ether to the final tack-free, substantially insoluble form on the cellulosic sheet, regardless of the presence of other materials.

In the preferred procedures an acidic condensing agent is employed in conjunction with the methylol urea ethers. In general such materials are more effective the lower the pH of their solution. Acidic condensing agents for the polymerization processes of the present invention are well known in the art, and include acids such as phosphoric, maleic, citric, lactic, acidic, trichloracetic, tartaric, oxalic, phthalic and the like. Acid esters and half esters and the like such as mono-isobutyl phosphate (and generically acid esters of phosphoric acid), dibutyl phosphate, monophenyl phosphate, monobutyl phthalate and mono-ethyl succinate, are satisfactory condensing agents, as are acid resins such as rosin and the like. Shellac, alkyd resins and the like may also be used.

The solvents employed for the surface (moistureproofing) coating should be solvents for the exuded nitrocellulose which is deposited as a superficial layer upon this anchoring coating, and the constituents of the surface coating should be so adjusted that the addition of the superficial cellulose derivative coating already present upon the surface of the anchoring coating will blend with the other constituents of the surface coating applied to give a final coating of suitable transparency, flexibility, moistureproofness or other desired characteristic.

Moistureproofness, moistureproofing and moistureproof materials and expressions, are defined in United States Patent No. 2,147,180 (Ubben). In the interest of brevity the definitions are not repeated here. The terms and expressions related thereto and employed herein are used in accordance with such definitions.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that this invention is not limited to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. The process which comprises coating sheet regenerated cellulose with a methylol urea ether resin, and thereafter applying a top coat of a moistureproofing coating composition.

2. A moistureproof regenerated cellulose sheet wrapping material having a moistureproofing top coating anchored with an under-coating of a methylol urea ether resin.

3. The process which comprises coating a softened regenerated cellulose sheet with a composition consisting of:

	Per cent
Incompletely polymerized isobutyl ether of dimethylol urea	4.0
p-Toluene sulfonic acid	0.5
Nitrocellulose (high viscosity)	0.5
Isobutyl alcohol	33.25
Ethyl acetate	33.25
Toluene	28.50

maintaining the sheet at about 80° C. until the coating becomes tack-free, and then top-coating the same with a moistureproofing coating composition.

4. The process which comprises coating a softened regenerated cellulose sheet with a composition consisting of:

	Per cent
Incompletely polymerized isobutyl ether of dimethylol urea	4.0
p-Toluene sulfonic acid	0.5
Nitrocellulose (high viscosity)	0.5
Isobutyl alcohol	33.25
Ethyl acetate	33.25
Toluene	28.50

maintaining the sheet at about 80° C. until the coating becomes tack-free, and then top-coating the same with a moistureproofing coating having the composition:

	Per cent
12.5% N_2 nitrocellulose, 10'' visc	6.70
Paraffin wax (M. P. 60° C.)	.15
Dibutyl phthalate	2.90
Damar	1.50
Ethyl alcohol	2.90
Acetone	1.45
Water	0.30
Ethyl acetate	51.00
Toluene	33.10

5. The process which comprises coating sheet regenerated cellulose with a methylol urea ether resin, and thereafter applying a top coat of a moistureproofing coating having the composition:

	Per cent
12.5% N_2 nitrocellulose, 10'' visc	6.70
Paraffin wax (M. P. 60° C.)	.15
Dibutyl phthalate	2.90
Damar	1.50
Ethyl alcohol	2.90
Acetone	1.45
Water	0.30
Ethyl acetate	51.00
Toluene	33.10

6. The process which comprises coating regenerated cellulose sheet with a methylol urea ether, polymerizing the coated material, and thereafter moistureproofing the sheet material by applying a moistureproofing coating composition to the polymerized ether material.

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