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IMPREGNATED PAPER AND METHOD OF MAKING SAME

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The present invention relates to an improved moisture and greaseproof paper and a method of making the same.

The more conventionally used moisture and greaseproof papers used for wrapping purposes ordinarily consist of a paper stock impregnated with various types of wax compositions, both natural and synthetic. One of the disadvantages of such conventional papers is that they are not very pliable so cannot be handled readily on automatic wrapping machines.

In addition, upon coating of the paper stock with a wax composition, it is practically impossible to secure a clearly transparent paper, and the paper normally has an opaqueness which is not desirable from the standpoint of appearance.

Another disadvantage of waxed wrapping paper is the difficulty encountered in providing printed matter on such paper which will be permanent and non-smearing.

In the present invention, I have provided a method of making a moisture and greaseproof paper which is characterized by a clear transparency and a surface which is receptive to printing inks. This is accomplished by treating the paper stock with a sizing composition which has the property of being compatible with hot melt coatings or wax coatings which are ordinarily used for additional waterproofing. In addition, a sized sheet produced by the present invention is compatible with printing ink so that the sheet may be clearly printed in any number of colors without spreading or smearing.

An object of the present invention is to provide a method for sizing a paper stock to condition the same for receiving printing inks and waterproofing compositions.

Another object of the present invention is to provide a method for treating paper stock to provide the same with a high of moisture and greaseproofing prior to the application of hot melt or wax compositions.

Still another object of the present invention is to provide a method for reducing the porosity of paper stocks.

Another object of the present invention is to provide a smooth surfaced sized paper.

Another object of the present invention is to provide a sizing composition in which the use of separate plasticizing ingredients can be dispensed with, thus reducing the overall cost of manufacturing sized paper.

In the practice of the present invention, paper stock which may be any one of a wide variety of stocks including such papers as sulfite paper, machine glazed paper, super calendered paper, glassine paper or kraft paper is impregnated with an aqueous emulsion of a sizing composition. This composition contains a mixture

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of at least three ingredients, a hydrogenated ester of rosin, a polyhydroxy ester of hydrogenated rosin and wax.

The hydrogenated ester of rosin has the property of being non-hygroscopic, and serves the function of moistureproofing and greaseproofing as well as causing the paper stock to assume a transparent glaze.

The polyhydroxy ester of hydrogenated rosin is completely compatible with the hydrogenated ester, and serves the function of tackifying the composition thus obviating the necessity of incorporating extraneous plasticizing agents. However, the addition of such plasticizers, for example, glycols, glycerine, castor oil, alkyl phthalates, and trialkyl phosphates can be incorporated into the sizing composition if desired without departing from the scope of the invention.

The wax composition to be employed may be paraffin or a synthetic wax and should preferably have a melting point in the vicinity of 122° F. If desired, a wax emulsion comprising a wax dispersed in an aqueous solution by means of a surface-active emulsifying agent may also be employed. One such suitable composition is a wax emulsion known commercially as "Paracol."

The aqueous emulsion containing the three ingredients mentioned above is proportioned so that the solids content of the ultimate emulsion is in the range from 40 to 60%.

A specific example of compositions which may be used in the practice of the present invention is given below.

Table I

	Per cent by weight
Hercolyn D	20–50
Staybelite ester 10	20–50
Wax	20–50

The Hercolyn D mentioned above is a hydrogenated methyl ester of rosin, consisting predominantly of hydrogenated methyl abietate which has been deodorized by steam blowing. Staybelite ester 10 is a glycerol ester of hydrogenated rosin.

The various ingredients in the above formula may be varied over considerable ranges depending upon the tackiness and degree of moistureproofing to be imparted into the paper. An emulsion which has been found to be suitable for general overall use has the following solid content:

Table II

	Per cent by weight
Hercolyn D	25
Staybelite ester 10	25
Wax	50

Still another composition which has been found to yield a moisture and greaseproof paper

while being compatible with printing inks is the following:

Table III

	Per cent by weight
Hercolyn D	50
Staybelite ester 10	30
Wax	20

The above formulae represent the analyses of the solids content of the emulsions, the emulsions themselves containing from 40 to 60% solids in water, with 47 to 50% being the preferred value.

The emulsion may be impregnated into the paper through the use of a size press in a process where the paper stock is partially dried after formation, run through the size press and then further dried out. The sizing emulsion may be applied by a series of rollers or the paper may be submerged in the sizing solution before passing through the size press. Alternatively, either one or both sides of the paper web may be sprayed with the sizing emulsion. If desired, the emulsion may be applied to the bottom side of the web by dipping a fountain roll into a trough of the emulsion and contacting the web with the top of the roll by means of a top press roll, thereby transferring the film of the emulsion on the coating roll to the lower side of the web. The top side of the web may be sprayed, by means of a shower pipe, with the sizing emulsion and then the web may be directed between the press rolls to squeeze out the excess amount of emulsion.

After the paper stock has been impregnated, pressed, and dried, the impregnated paper stock may then be treated with a wax composition or a hot melt composition to further increase its moisture and greaseproofing properties and its transparency.

The following is one example of a hot melt composition with which the sized paper is completely compatible:

Table IV

	Parts by weight
Polyamide No. 94	200
Staybelite ester 10	40
Hercolyn D	30
Hydrogenated castor oil	25
Paraffin (M. P. 140–150° F.)	5

The polyamide No. 94 resin mentioned in the above formula is a reaction product of dimerized and trimerized unsaturated acids of vegetable oils, such as linoleic and linolenic acids, with ethylene diamine.

The sized paper of the present invention has numerous advantages over the normally used grease-and moisture-proof papers. The clear transparency of the paper after wax or hot melt coating makes it especially attractive for use as wrapping material for foodstuffs. The ability of the sized paper to take a clear impression of printing inks also enhances its usefulness in this respect. The substantial decrease in porosity occasioned by the sizing also makes the paper more desirable.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. The method of treating a paper stock to condition the same for receiving printing inks and water-proofing compositions, which comprises impregnating said paper stock with an aqueous sizing composition having a solids content consisting essentially of from 20 to 50% of a hydrogenated methyl ester of rosin, from 20 to 50% of a glycerol ester of hydrogenated rosin and from 20 to 50% of paraffin wax, and drying the paper.

2. A paper stock impregnated with a composition consisting essentially of from 20 to 50% of a hydrogenated methyl ester of rosin, from 20 to 50% of a glycerol ester of hydrogenated rosin and from 20 to 50% of paraffin wax.

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