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(54) **Impervious plastic materials having a textile or like liner on one major surface thereof.**

(57) A method of manufacturing flexible lined, impervious plastic products by applying to one surface of a liner a plastic reaction mix so that this mix penetrates the liner partially to expose liner on one side of the composite material and impervious plastic on the other, characterised in that the plastic reaction mix contains appreciable quantities of inert fillers and titanate couplers to provide the required consistency of the composition during application. E.g., a glove is made by dipping a preformed liner (1) on a former (3) into the plastic mix, followed by curing (4) thereof.

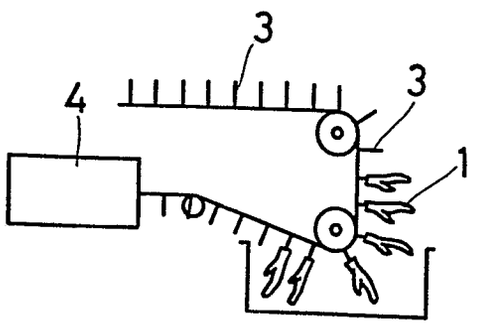

FIG. 2

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"IMPERVIOUS PLASTIC MATERIALS HAVING A TEXTILE OR LIKE LINER ON ONE MAJOR SURFACE THEREOF"

THIS INVENTION relates to impervious plastic materials formed to a sheet-like configuration and having on one major surface thereof a textile liner secured relative to the plastics material as a result of the latter extending partway through the thickness of the liner.

Impervious plastic materials having liners on one surface thereof are employed for many different purposes but are particularly useful in the protective clothing industry. One noteworthy example of such impervious plastics materials is in their use as protective gloves in which case a prefabricated textile liner carries on the outer surface thereof an impervious layer of plastics material such as a polyvinyl chloride (PVC) layer.

Other applications are to the coating on one side of a sheet of textile cloth with a plastic material which, after curing, forms the impervious layer.

In view of the fact that the plastic material is to be permanently and properly secured to the textile liner, it must be ensured, during manufacture of the material, that the plastic extends only partway through the thickness of the liner since otherwise the purpose of the liner is, to a large extent, destroyed.

On the other hand insufficient penetration of the plastic material into the layer of liner could mean that the liner becomes parted from the plastic material.

Such impervious plastic materials having a liner on one major face thereon are usually made by either dipping a prefabricated liner into a basically liquid plastics composition in order to coat them effectively followed by curing of the plastics composition generally by heat. Alternatively, in the case of a sheet-like impervious material, the liner can have a paste-like plastics composition spread thereover by means of a suitable spreading device which is again followed by curing of the plastic material.

In the past it has been found that fairly dense knitted or other textile liners must be employed in order to prevent the wet plastics composition from penetrating the liner to too great an extent. Thus, with a knitted fabric as a liner, it has been found that the fabric generally has a weight of about 230 to 250g/m^2.

On the other hand, it has generally not been possible to mix appreciable quantities of inorganic fillers with the plastics composition since this renders the composition too thick in consistency and this, in turn, prevents adequate penetration when the liner is coated. It also results, in the case of coating by dipping, in too thick a layer of plastics composition adhering to the liner which in turn results in an insufficiently flexible material.

The above comments particularly apply to lined PVC materials of which one of the largest applications is the protective glove industry.

It is the object of this invention to provide impervious lined plastics materials of the above general

type in which lighter weight liners can be employed and inorganic fillers can be added to the plastics composition.

In accordance with this invention there is provided a method of making an impervious plastics material having a liner on one major surface thereof wherein the plastics material extends partway into the thickness of the liner in order to bond two layers of material together, and wherein the liner has applied to one surface thereof a plastics composition which is subsequently cured to define the impervious plastics material, the method being characterised in that the plastics composition includes titanate couplers and inorganic fillers wherein the plastics materials, couplers and fillers are adapted to co-operate with each other to provide the required consistency of the composition during application of the plastic layer to the liner.

Further features of the invention provide for the plastic composition to be a PVC composition and, in particular, an emulsion polymer or plastisol; for the plastic composition to include any required plasticisers, heat stabilisers, pigments or the like; for the inorganic fillers to be present in amounts of

between 10 and 50, preferably from 35 to 50, parts by weight per 100 parts of plastic material and for the titanate to be present in an mount of up to 2% based on the weight of filler employed.

Still further features of the invention provide for the above defined method to be applied to the manufacture of protective gloves in which case a glove liner is positioned on a former therefor and the plastic composition is applied to the outside of the liner located on the former.

The latter application of the plastics material is conveniently applied by a dipping process.

In order that the invention may be more fully understood one embodiment thereof will now be described with reference to the accompanying drawings in which:-

Fig. 1 illustrates a protective glove having a liner covered on the outside with impervious PVC material; and,

Fig. 2 illustrates schematically a dipping process for forming the gloves on liners therefor.

As illustrated the glove comprises a preformed liner 1 made of a textile material and which may be either fabricated to the required shape or knitted to that shape by automatic machines which are available and known in the art. The liner can be, if required, a single jersey type of material, an interlock material, or the automatic knitted liner mentioned already. The advantage of employing a plastic composition according to this invention to define the impervious OVC layer 2 on the outer side of the liner is that the liner can be made to an appreciably lighter weight than heretofore. For example, in place of the conventional 230 to 250/m^2 density of the liner only approximately 150g/m^2 are necessary when the present invention is employed. This represents an appreciable saving in the cost of material from which the liners are made.

The plastic composition for coating the abovedescribed liner was, in this case, PVC plastisol

material composed of a mixture of two different emulsion polymers of a dipping grade. The two polymers in question were those sold under the name Pevikon 737 by KEMA-NORD AB of Sweden (24 parts by weight) and CORVIC P7250 sold by A.E.C.I. LTD. of South Africa (56 parts by weight). To this there was added 100 parts by weight of plasticiser in the form of di-isooctyl phthalate, 40 parts by weight $CaCO_3$ as an inorganic filler, one part by weight pigment, and three parts by weight calcium stearate. To this there was added 0,8% by weight based on the weight of the inorganic filler of a titanate coupler which in this case was that sold under the trade reference KR55 by KENRICH PETRO CHEMICALS INC. of the United States of America.

The liner located on a former 3 was dipped into the plastic composition described above and then cured at a curing station 4 in the usual way whilst on the former.

It has been found that protective gloves manufactured according to the abovedescribed process have substantially as good a chemical and physical properties as similar gloves made using standard

weights of liners and substantially no inorganic fillers and, in fact, the flexibility is increased in some cases. This may result from the fact that a lower temperature can in fact be employed to cure the PVC material than in the prior art process.

Thus an appreciable cost saving can be achieved both in regard to the lighter weight of liner which can be employed as well as the decreased cost of the plastic composition which results from the inclusion of inexpensive inorganic fillers.

It will be understood that numerous variations may be made according to this invention without departing from the scope hereof. Thus numerous different compositions can be employed with the abovementioned only being illustrative. Also, the shape and form of the generally sheet-like protective material lined on the one major face thereof is simply a matter of choice but it must be pointed out that sheets of such material could be manufactured for subsequent fabrication into protective garments or the like.

The invention therefore provides a simple yet effective method of manufacturing flexible,

impervious lined materials which results in less costly articles of equal properties to those manufactured by the prior art processes.

CLAIMS:

1. A method of making an impervious plastics material having a liner on one major surface thereof wherein the plastics material extends partway into the thickness of the liner in order to bond the two layers of material together, and wherein the liner has applied to one surface thereof a plastics composition which is subsequently cured to define the impervious plastics material the method being characterised in that the plastics composition includes titanate couplers and inorganic fillers wherein the plastics materials, couplers and fillers are adapted to co-operate with each other to provide the required consistency of the composition during application of the plastic layer tp the liner.

2. A method as claimed in claim 1 in which the plastic composition is a PVC composition.

3. A method as claimed in either of claims 1 or 2 in which the plastic composition is, when applied to the liner, in the form of an emulsion polymer or plastisol.

4. A method as claimed in any one of the preceding claims in which the organic fillers are present in amounts of between 10 and 50 parts by weight per 100 parts of plastic material.

5. A method as claimed in claim 4 in which the fillers are present in an amount of from about 35 to 50 parts by weight.

6. A method as claimed in any one of the preceding claims in which the titanate is present in an amount of up to 2% based on the weight of filler employed.

7. A method as claimed in any one of the preceding claims in which the impervious material is in the form of a glove.

8. A method as claimed in claim 7 in which the glove is made by dipping a preformed liner into the required plastic mix followed by curing thereof.

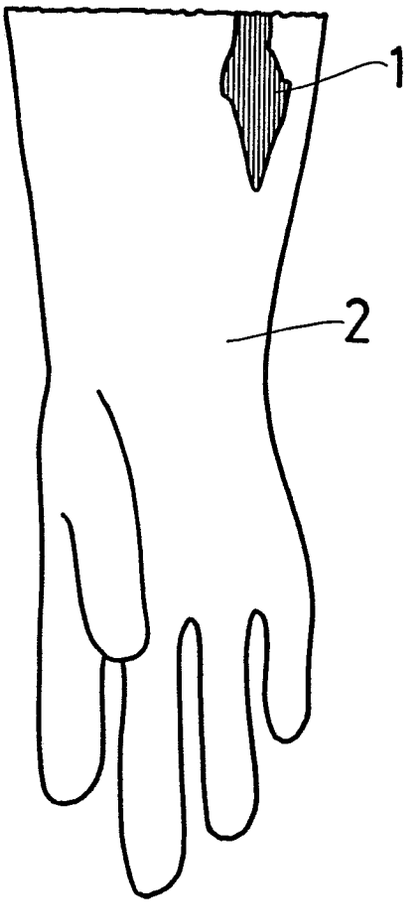

FIG. 1

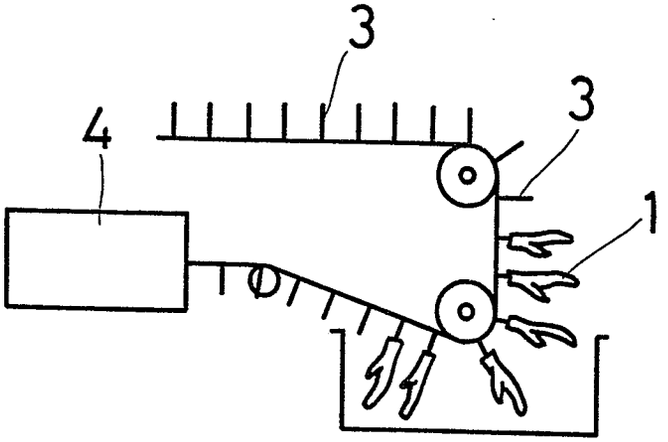

FIG. 2

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EUROPEAN SEARCH REPORT

Application number

EP 81 30 5687

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
A	US - A - 2 777 826 (OLSON) * Claims; column 2, lines 45-55 *	1-3	D 06 M 15/32 D 06 N 3/06 D 06 M 13/50 A 41 D 19/00
A	GB - A - 1 279 282 (MONTECATINI) * Example 4 *	1	
A	BE - A - 700 183 (BAT) * Examples *	1	
A	GB - A - 681 558 (HAWURTH) * Claims; figures *	1,2,8	D 06 M 15/00 D 06 N 3/00 D 06 M 13/00 A 41 D 19/00 C 08 L 27/00 C 08 K 3/00 B 05 D 1/00 B 29 H 3/00
A	CHEMICAL ABSTRACTS, vol. 95, no. 14, October 1981, page 70, no. 116929a Columbus, Ohio, U.S.A. S. NAKAMURA et al.: "Studies on the substituted finish for fibers. III. Effect of titanate coupling agent" & OSAKA-FURITSU SEN'I GIJUTSU KENKYUSHO KENKYU HOKOKU 1980, 13, 48-52 * Abstract *		

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same category
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	15-02-1982	HELLEMANS