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COATED FIBROUS MATERIAL

2,424,638

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Fig. 1

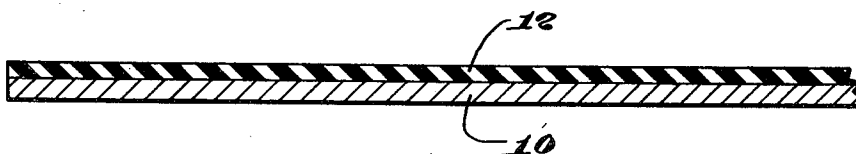
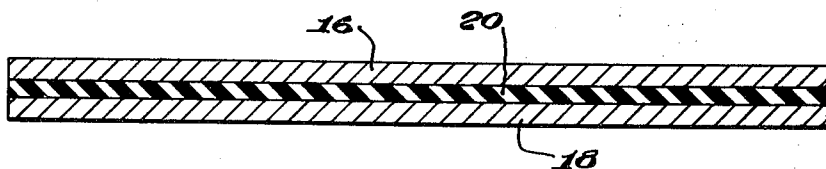


Fig. 2



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COATED FIBROUS MATERIAL

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3 Claims. (Cl. 154—50)

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This invention relates to a coated fibrous material.

One object of the invention is to provide a novel and improved coated fibrous material adapted for use as a waterproof sheeting for the construction of bags, containers, and for the various industrial purposes for which waterproof fibrous sheets are now used, in which the coating has relatively nonstaining characteristics and at the same time is pliable and flexible at normal and subnormal temperatures. The improved waterproof sheeting is characterized by its plasticity, flexibility, and durability, even when subjected to low temperature conditions.

A further object of the invention is to provide a laminated structure embodying a novel and improved waterproofing which imparts to the structure maximum flexibility and plasticity under all conditions of use and particularly when the structure is subjected to low temperature conditions, thus rendering the laminated structure more efficient and of greater utility than similar structures of the prior art.

With these objects in view and such others as may hereinafter appear the invention consists in the waterproof fibrous sheet and in the waterproof laminated structure hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing Fig. 1 is a vertical sectional view of a waterproof fibrous sheet embodying the invention and Fig. 2 is a similar view of a waterproof laminated structure embodying the invention.

Prior to the present invention various waterproofing materials have been employed as a coating for fibrous sheets and in the construction of various laminated fibrous and other materials, among which may be mentioned asphalt, various resins, and other waterproof adhesives. As far as I am aware all of these waterproofing materials heretofore employed for these purposes have been open to one or more objections, and consequently the utility of the fibrous sheet and laminated structures has been restricted on account of the tendency of the waterproofing material to stain the laminated components and to deteriorate upon aging and its lack of plasticity under low temperature conditions.

I have discovered that an improved waterproof fibrous sheet and waterproof laminated structure embodying fibrous and other materials may be produced, utilizing as the waterproofing medium an air blown product which is characterized by its extreme rubber-like nature, by its high co-

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hesive and adhesive strengths, by its relatively low brittleness and corresponding relatively high plasticity when subjected to varying temperature conditions and particularly low temperature conditions, and in addition by its nonstaining nature. This waterproofing medium comprises certain high molecular weight viscous lubricating bodies obtained during the refining of lubricating oils by treatment with propane or equivalent solvents and which are air blown and converted into rubber-like bodies having high cohesive and adhesive strengths and also being relatively nonstaining in nature.

Referring now to the drawing, 10 represents a fibrous sheet which may comprise any of the fibrous sheets now used for various industrial purposes, including various forms of paper sheets utilized for wrappings, for the formation of bags and other containers, and other fibrous materials such as cardboard and the like. The fibrous sheet 10 is provided at least on one surface thereof with a layer 12 of the rubber-like air blown product above described, which is produced by subjecting a molten propane extract of paraffinic crude oil to air blowing. The waterproofing layer 12 may be applied in molten condition or it may be applied in a more liquid form utilizing solvents such as carbon tetrachloride, naphthas, coal tar solvents, various esters, and the like.

Referring now to Fig. 2, a laminated fibrous structure is illustrated therein embodying fibrous sheets 16, 18 and an interposed layer of waterproofing material 20 comprising the air blown product produced by subjecting a molten propane extract of paraffinic crude oil to air blowing as above described.

Propane has heretofore been used as a de-waxing and de-asphalting agent in the refining of lubricating oils. However, it is not considered to be a selective solvent of the type of phenol, furfural, nitrobenzene, chlorex, sulphonated benzol, and the like whose function has been to dissolve those bodies of an unstable nature generally classified as of aromatic and naphthenic nature. The propane is considered as a solvent in which waxes, asphalts, and other high molecular weight bodies are insoluble under certain temperature and volume ratios. Of course, the chemical and physical characteristics of these propane extracts vary with the different crude oils treated and the processing technique employed, and in general these extracts are of a semiliquid nature, possessing extremely low melting points. When paraffinic crude oils are

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extracted with propane there are obtained propane extracts which differ markedly from the propane extracts which are obtained by treatment of nonparaffinic crude oils. In general, when a nonparaffinic crude oil is extracted with propane the extracts are substantially of an asphaltic nature, and when these materials are subjected to air blowing, products are obtained comparable to and not substantially unlike, from a physical standpoint, the blown products obtained from asphalt residua or asphaltic fluxes. The propane extracts, however, from dewaxed and deresined lubricating oils, particularly those oils coming from paraffinic crude oils, when air blown produce products of a rubber like nature having high cohesive and adhesive strengths, low brittle properties, and the unusual property of being relatively nonstaining.

In producing the present waterproofing compound propane extracts from paraffinic crude oils such as the Pennsylvania crude oils, it is preferred to air blow the extract until a compound is produced having a melting point (ball and ring) of at least 100° F. and preferably within the range from 180° to 200° F. If found desirable, the polymerization may be carried on until the melting point exceeds 300° F., although for practical purposes this is not necessary. Under this wide range of melting points it has been found that the pliability and general rubber-like characteristics of the air blown compounds do not substantially deteriorate on aging.

One of the most noticeable characteristics of the blown propane extracts from paraffinic crude oils is its nonstaining characteristics. When such a product is melted and poured upon filter paper it has been found that little or no seepage occurs beyond the confines of the original pouring whereas with ordinary asphaltic or similar bituminous compound extensive seepage and staining takes place, particularly on aging. Research has indicated that a relationship exists between the ability of these compounds to withstand shock and consequently to refrain from cracking and drying out under practical use and their nonstaining characteristics. In other words, those compounds exhibiting the greatest staining tendency also exhibit the greatest tendency to crack under a thermal and physical shock.

One of the more important characteristics of the present coated material resides in its ability to age without substantial staining. Heretofore it has been found difficult, if not impossible, to impart nonstaining characteristics to the usual asphaltic compounds which have heretofore been employed in coating fibrous and other materials and in the production of laminated structures and at the same time to maintain pliability and flexibility at low temperatures. For example, it is possible to produce a relatively nonstaining asphaltic compound using asphalts of a distinctly asphaltic nature as distinguished from semi-asphaltic bases such as mid continent. These, however, are characterized by relatively high brittle points and hence are not desirable where the coatings with laminated products are subjected to low temperature conditions. On the other hand, it is possible to produce pliable, flexible coatings using residua of a semi-asphaltic nature, such as mid continent, but these all exhibit a marked tendency to stain at normal and elevated temperatures.

The air blown propane extracts above referred to comprise high molecular weight viscous lubri-

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cating bodies produced by the refining of lubricating oil by the propane process. While propane is the solvent commonly used, other solvents may be used to take out these high molecular weight viscous lubricating bodies in the refining of lubricating oils and when such products are air blown they are converted to rubbery compounds having high cohesive and adhesive strengths and characterized particularly by their nonstaining characteristics. These products lend themselves to use as above described for the coating of various fibrous materials for the production of laminated structures including use as the protective and adhesive coating covering the steel and serving to bond the felt of the various fibrous covered protected metals now commonly used for building and siding purposes such as is illustrated in the Robertson patent, No. 1,277,755.

As used throughout the specification and claims, the term propane extract is intended to define and include all such high molecular weight viscous lubricating bodies produced during the refining of lubricating oils by the use of propane and other solvents as above set forth and which when air blown produce rubbery products of high cohesive and adhesive strengths and possessing nonstaining characteristics.

Having thus described the invention, what is claimed is:

1. A fibrous sheet having at least one surface thereof coated with a non-asphaltic waterproofing layer comprising an air blown extract produced by subjecting molten propane extract from paraffinic crude oil comprising a natural chemically unmodified constituent of said paraffinic base oil residuum to air blowing, said air blown extract being characterized by its plasticity, its stability upon aging, and its nonstaining characteristics.

2. A laminated fibrous structure comprising two superimposed fibrous sheets bonded together by an interposed non-asphaltic waterproofing layer comprising an air blown extract produced by subjecting a molten propane extract of paraffinic crude oil comprising a natural chemically unmodified constituent of said paraffinic base oil residuum to air blowing, said extract being characterized by its pliability, stability upon aging, and nonstaining characteristics.

3. A laminated structure comprising a metal sheet and a superimposed fibrous sheet bonded to the steel sheet by an interposed non-asphaltic waterproofing layer comprising an air blown extract produced by subjecting a molten propane extract of paraffinic crude oil comprising a natural chemically unmodified constituent of said paraffinic base oil residuum to air blowing, said extract being characterized by its pliability under wide temperature range, its stability upon aging, and its nonstaining characteristics.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,120,376	Shipp	June 14, 1938
2,144,694	Smith	Jan. 24, 1933
2,296,712	Grant et al.	Sept. 22, 1942
2,076,799	Thurston	Apr. 13, 1937