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TACK RAG

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This invention relates as indicated to tack rags and is particularly concerned with a tack rag of the colorless, non-combustible type. In the preparation of a surface to be painted or varnished, it is often necessary to remove all dust, lint and sanding particles. Tack rags have been used for many years for this purpose. Under the older techniques, the painter would dip a cloth or rag into varnish, drain off the excess and allow the cloth to dry until it became sticky or tacky, and then use this for cleaning the surface. After the cloth had been exposed to the air for sufficient period of time, it would become hard and useless. Using the ordinary varnish oils, considerable danger was encountered from spontaneous combustion of these rags.

There then appeared on the market tack rags impregnated with mineral oils and other substances of very low vapor pressure so that the cloth would remain soft and tacky for an indefinite period. These permanently tacky tack rags were, nevertheless, subject to spontaneous combustion.

Recently attention has been given to the production of permanently tacky tack rags coated with non-flammable materials, an example of such prior art being Patent 2,633,593 to Wright, which covers tack rags containing as a principal tackifier certain chlorinated hydrocarbons, namely, chlorinated biphenyls and chlorinated paraffins.

There has now been discovered a new combination of materials which is particularly suitable for use in the manufacture of tack rags of the non-combustible, colorless type having a different chemical composition from those heretofore known or used by others.

It is a principal object of this invention, therefore, to provide a tack rag which is non-flammable and colorless in the sense that a white rag is substantially colorless.

Another object of this invention is to provide a tack rag which is indefinitely tacky at normal temperatures.

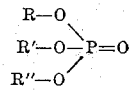
Still other objects of this invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the appended claims, the following description setting forth in detail certain illustrative embodiments of the invention, such disclosed means constituting, however, but a few of the various forms in which the principle of this invention may be employed.

Broadly stated, therefore, this invention is in the provision of a tack rag comprising a fibrous web impregnated with a tackifier consisting essentially of a mixture of (*a*) a polyester of an aliphatic glycol and a dibasic cyclic organic acid selected from the group consisting of hexachloroendomethylenetetrahydrophthalic acid its anhydride, tetrachlorophthalic acid and tetrachlorophthalic anhydride, and (*b*) a tri-ester of phosphoric acid.

It will be observed, therefore, that the impregnating substance which is used in fabricating the tack rags of this invention is a polyester resin dispersed or dissolved in a plasticizer. The principal features of the tackifier material are that it confers a preferred amount and type of permanent tack, and it is a material which on cloth is not spontaneously combustible and which is, in fact, self-extinguishing. In general, the polyester resins employed are formed by the interaction of a polychlorinated dicarboxylic acid or anhydride such as tetrachlorophthalic anhydride or hexachloronedomethylenetetrahydrophthalic acid also known as chlorendic acid, and an aliphatic glycol such as ethylene glycol, proplyene glycol, butylene glycol, pentamethylene glycol, hexamethylene glycol, diethylene glycol, and the like.

The plasticizers suitable for use in the tackifier materials of this invention are those of a flame resistant type of the phosphate tri-ester class, such as tricresyl phosphate, octyl diphenyl phosphate, tris-beta-chloroethyl phosphate, trioctyl phosphate, trinonylphenyl phosphate, phenyl di-2-ethyl hexyl phosphate, etc. These materials have the general formula:



wherein R, R′ and R″ are hydrocarbon radicals containing from 2 to 15 or more carbon atoms. Apparently it makes no difference whether the hydrocarbon radical is aliphatic, aromatic, cyclo-aliphatic, or mixed aliphatic-aromatic or aromatic-aliphatic.

The presence of halogen substituents on these hydrocarbon radicals also aids in reducing flammability, and increasing tack.

Flammable resins such as butyl phenol resins, ester gum, hydrogenated ester gum, maleic-rosin adduct esterified with pentaerythritol, as well as many others may also be employed to a relatively minor extent, not to exceed about 10% by weight of the resin, to impart various desirable properties and, in some cases, to reduce the cost of the formulation.

Also, if desired, volatile solvents may be included in the tackifier composition to aid in the impregnation operation, such solvents being removed by "drying" following the impregnation step.

In general, the tackifier composition of this invention is composed of from about 20 to about 80% by weight of the polyester of the aforesaid type and from about 80 to about 20% by weight of the phosphate ester plasticizer.

A specific example of polyesters suitable for use in accordance with this invention is as follows:

Example 1

	Mols
Tetrachlorophthalic anhydride	1
Ethylene glycol	1.1

The foregoing ingredients were placed in a three-necked, round-bottomed flask fitted with a thermometer, mechanical stirrer and gas inlet tube and connected to a distillation condenser through a short, insulated column. Hydrogen gas was passed through the flask and the reaction mixture heated with constant stirring for a period of 12 hours. During this period of heating, the reaction temperature was gradually raised from 160° to 181° C. and 14 cc. of distillate containing water was collected. On cooling to room temperature, a hard, glassy brittle resin was obtained, having an acid number of 48.5 and a saponification number of 325.

Example 2

	Mols
Chlorendic acid	1
Ethylene glycol	1.1

The foregoing ingredients were placed in a three-necked, round-bottomed flask fitted with a thermometer, stirrer and gas inlet tube and a distillation condenser as in Example 1. A steady stream of nitrogen gas was passed through the flask and the reaction temperature brought to approximately 100° C. The temperature was gradually increased to 170 to 200° C. and water removed from the reaction until the reaction was complete. If the re-

action time exceeds about 2 hours, it is not recommended that the temperature be allowed to go higher than indicated. Best results are obtained when the temperature is held at about 170° C. with efficient agitation and flow of inert gas through the reaction.

The resultant product had an acid number of 34, a chlorine content of 40%, a specific gravity of 1.6, a hot bar sticking point of 60–65° C.

In general, the polyesters made from the highly chlorinated dicarboxylic acids of this invention are produced by reacting them under an inert atmosphere with a slight excess over the stoichiometric amount of glycol required for complete reaction. The reaction is carried out at temperatures below about 200° C. for a period of time sufficient to complete the reaction as evidenced by the cessation of the evolution of water of esterification.

Other examples of suitable polyesters may, therefore, be readily prepared by those skilled in the art without the necessity of having to give further examples of the preparation of this component.

The composition of the tackifier is determined in large measure by the properties which are desired in the end product. For example, if the polyester resin is very hard to begin with, perhaps larger quantities of certain plasticizers will be required in order to render the admixture suitably tacky for the purposes of this invention. Thus, amounts of plasticizer approaching the upper limits will be used in such case. Where, however, the resin is normally of the softer variety, amounts of plasticizer approaching the lower end of the range will be found suitable. Specific examples of tackifier compositions suitable for use in impregnating a fibrous web include the following. It is to be understood that these examples are for the purpose of illustrating only the manner of compounding tackifier materials useful in accordance herewith. With the specific examples here given and the preceding discussion, those skilled in the art will be able to compound numerous additional tackifier materials. It is not intended that the scope of the claims shall be limited to the scope of the examples, variations therefrom being well within the ability of those skilled in the art.

Example 3

	Parts by weight
The resin of Example 1	52
Tricresyl phosphate	48

Example 4

The resin of Example 2	52
Tricresyl phosphate	48

Example 5

Chlorendic acid-propylene glycol polyester	70
Triphenyl phosphate	30

Example 6

The resin of Example 2	45
Ester gum	4
Tricresyl phosphate	51

Example 7

Diethylene glycol-tetrachloro-phthalic anhydride polyester	60
Octyl, diphenyl phosphate	40

Example 8

Ethylene glycol tetrachlorophthalic anhydride	60
Tris-(nonylphenyl) phosphate	40

Example 9

Hexamethylene glycol-chlorendic acid polyester	80
Tricresyl phosphate	20

The foregoing tackifier materials either as above described or cut in a volatile solvent such as styrene, benzene, methyl ethyl ketone or any suitable solvent for the polyester-phosphate combination may then be used to impregnate a fibrous web. Normally for economical and satisfactory results, cheese cloth having a 20 x 16 thread per inch mesh is used. Of course it will be understood that any fibrous web suitable for carrying the tackifier material may be used ranging from fiber glass to paper webs and including the normal cloth materials whether of synthetic or naturally occurring fibrous structure.

Impregnation is effected by merely dipping the fibrous web into a heated bath of the tackifier or a solution containing the tackifier, the excess either being pressed off or allowed to drip off; if any solvents are present, they are forced out by heat. Usual procedure is to employ a padding process whereby the excess is removed between squeeze rolls. In the absence of solvents, the polyester-phosphate composition is usually applied as a warm solution at about 240–260° F. At this temperature the viscosity is such that excessive quantities of material are not left on the cloth.

Following impregnation, the cloth is cut in suitable size for packaging as a finished article.

The tack rags of this invention are useful in removing all dust, lint, and/or sanding particles from a surface to be painted merely by wiping the surface containing such contaminants with a tack rag of the type above described.

Other modes of applying the principle of this invention may be employed instead of those specifically set forth above, changes being made as regards the details herein disclosed, provided the elements set forth in any of the following claims, or the equivalent of such be employed.

It is, therefore, particularly pointed out and distinctly claimed as the invention:

1. A tack rag comprising a fibrous web impregnated with a tackifier consisting essentially of (*a*) a polyester formed from an aliphatic glycol and a dibasic cyclic organic acid selected from the group consisting of chlorendic acid, chlorendic anhydride, tetrachlorophthalic acid and tetrachlorophthalic anhydride and, in chemically unreacted physical admixture therewith (*b*) a tri-ester of phosphoric acid.

2. A tack rag comprising a fibrous web impregnated with a tackifier consisting essentially of (*a*) from 20 to 80% by weight of a polyester formed from an aliphatic glycol and a dibasic cyclic organic acid selected from the group consisting of chlorendic acid, chlorendic anhydride, tetrachlorophthalic acid and tetrachlorophthalic anhydride and, in chemically unreacted physical admixture therewith, (*b*) from 80% to 20% by weight of a tri-ester of phosphoric acid.

3. A tack rag comprising a fibrous web impregnated with a tackifier consisting essentially of approximately equal parts by weight of (*a*) a polyester formed from an aliphatic glycol and a dibasic cyclic organic acid selected from the group consisting of chlorendic acid, chlorendic anhydride, tetrachlorophthalic acid and tetrachlorophthalic anhydride and, in chemically unreacted physical admixture therewith, (*b*) a tri-ester of phosphoric acid.

4. A tack rag comprising a cheese cloth web impregnated with a tackifier composed of 52 parts by weight of ethylene glycol-chlorendic acid polyester and, in chemically unreacted physical admixture therewith, (*b*) 48 parts by weight of tricresylphosphate.

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