Patented Feb. 1, 1949 2,460,377

UNITED STATES PATENT OFFICE

2,460,377

FILAMENTS OF PLASTICIZED LOWER FATTY ACID ESTERS OF CELLULOSE

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No Drawing. Application October 2, 1945, Serial No. 619,893

4 Claims. (Cl. 106—186)

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This invention relates to the production of yarns and filaments having a basis of a synthetic filament-forming base material and relates more particularly to yarns and filaments of improved textile characteristics due to the presence therein of a novel modifier or plasticizer for the base material of said yarns or filaments.

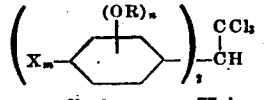
An object of this invention is the provision of improved yarns and filaments of excellent strength and elasticity comprising a synthetic filament-forming base material having incorporated therein a novel plasticizing agent for said base material.

Another object of this invention is the production of improved yarns and filaments comprising a synthetic filament-forming base material containing as a plasticizer therefor a halogenated-diphenyl-trichlorethane or alkoxy derivative thereof whereby improved characteristics are imparted to said yarns and filaments.

Other objects of this invention will appear from the following detailed description.

Yarns and filaments having a basis of a synthetic filament-forming base material find extensive use in the textile industry. To be commercially acceptable, such yarns and filaments must possess a satisfactory degree of strength and elasticity and must be capable of being woven into fabrics which may not only be dyed and processed easily but which also have a satisfactory hand as well as attractive draping qualities.

We have now found that by incorporating a halogenated-diphenyl-trichlorethane plasticizing agent of the following general formula



wherein R is an alkyl group, X is a halogen, m is at least 1 and n is 0, 1 or 2 in the base material from which said yarns and filaments are formed or in the spinning solution from which said yarns and filaments are spun, excellent textile properties are imparted to said yarns and filaments. Examples of said halogenated-diphenyl-trichlorethane compound are dichloro-diphenyl-trichlorethane, phenyl-chlorphenyl-trichlorethane or difluoro-diphenyl-trichlorethane, or the nuclear alkoxy substituted derivatives thereof such as dichlor-dimethoxy-diphenyl-trichlorethane or dichloro-diethoxy-diphenyl-trichlorethane. Fabrics may be woven of said yarns and filaments very efficiently and the fabrics thereby obtained are substantially free of many of the weaving faults normally encountered in the production of

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fabrics, e. g. they are substantially free of slubs, shirry appearance, etc.

Greater or lesser amounts of said halogenated-diphenyl-trichlorethanes or the alkoxy derivatives thereof may be incorporated in said plastic composition, the amount varying from 2 to 50% of the weight of said filaments depending upon the physical properties desired. Fabrics woven of yarns and filaments containing said plasticizing agents may be dyed very satisfactorily. Advantageously, other plasticizing agents such as triphenyl phosphate, tricresyl phosphate, triacetin, dibutyl phthalate, camphor, naphthalene, paradichloro-benzene, castor oil, 2-ethyl-1,3-hexanediol, n-butyl mesityl oxide oxalate may also be incorporated in said filaments together with the halogenated-diphenyl-trichlorethanes.

The plasticized yarns and filaments prepared in accordance with our novel process may have a basis of any suitable synthetic filament-forming base material. As examples of such materials, there may be mentioned organic acid esters of cellulose, such as cellulose acetate, cellulose propionate, cellulose butyrate, cellulose acetate-propionate and cellulose acetate-butyrate and cellulose ethers, such as ethyl cellulose and benzyl cellulose. Other synthetic base materials having filament-forming properties in which said plasticizing agents may be incorporated are, for example, synthetic linear polyamide condensation products, or polyvinyl compounds, such as polymerized vinyl chloride, polymerized vinylidene chloride, polyvinyl acetals and polyvinyl alcohol.

The halogenated-diphenyl-trichlorethanes may be incorporated in the synthetic filament-forming base materials in various ways. Where filaments are being prepared from a solution of the synthetic filament-forming base material in a volatile solvent medium by extrusion operations, the halogenated-diphenyl-trichlorethane may be added to the spinning dope in the desired amount and the solution thus obtained extruded through a spinneret into an evaporative atmosphere. Where melt-spinning operations are employed, which process comprises heating the filament-forming base material to such a temperature that it becomes fluid and then extruding it into a setting medium, such as cold air, the halogenated-diphenyl-trichlorethane may be added in suitable amount to the base material at some stage prior to the point where it is melted and extruded to form the desired filaments. Plasticized filaments which are exposed to heat may advantageously contain a stabilizer such as calcium lac-

tate or dicyandiamide. The halogenated-diphenyl-trichlorethanes may also be incorporated in spinning solutions where the filaments are formed by wet spinning operations comprising extruding a solution of the filament-forming base material into a liquid setting medium, providing, of course, the coagulating or setting medium is not a solvent for the halogenated-diphenyl-trichlorethane.

Any desired degree of twist may be inserted in the plasticized filaments in the manner known to the art and the yarns formed may then be woven into fabrics. The construction of the fabrics may be such that all of the yarns comprising said fabric both in the warp and filling contain the plasticizing agent. The plasticized yarns may also be woven together in such a manner with yarns of various other synthetic textile materials or naturally occurring fibers to yield a fabric in which only a part of the yarns forming the fabric contain the plasticizing agent, the plasticized yarns forming either the warp or filling, alternating in the warp or filling with unplasticized yarns or they may be doubled in any desired manner with the unplasticized yarns.

Surprisingly enough, we have found that the insecticidal properties of the halogenated-diphenyl-trichlorethane plasticizing agents are not lost when incorporated in said filament-forming base materials, thus giving the yarns or fabrics formed in accordance with the present invention highly desirable insecticidal properties. The plasticized synthetic filaments may be reduced to a staple fiber form by suitable cutting operations as well known in the art and mixed with wool fibers during carding operations prior to the formation of yarns. In this way said fibers may be uniformly distributed throughout the yarns which are then formed from the mixed fibers and any fabrics woven from said modified woolen yarns will possess a substantially permanent moth-proof or other insect-proof character.

In lieu of incorporating synthetic staple fibers containing halogenated-diphenyl-trichlorethane, or an alkoxy derivative thereof, in wool prior to the formation of the woolen yarns, the woolen fabrics may be woven with effect threads of a synthetic material either in the warp or in the weft, said threads being formed of a synthetic yarn into which halogenated-diphenyl-trichlorethane has been incorporated and in this way a satisfactory moth-proof or other insect-resistant fabric may be obtained.

Screens having outstanding insecticidal properties may be formed by suitably weaving a mesh fabric from highly twisted yarns or heavy denier mono-filaments of a synthetic filament-forming material in which halogenated-diphenyl-trichlorethane, or an alkoxy derivative thereof, has been incorporated. Any insects coming in contact with or resting upon such screening are ultimately destroyed.

In our application S. No. 619,892 filed on even date herewith the use of our applicants' novel plasticizer is described in connection with plastic compositions which may be molded under the action of heat and pressure.

In order further to illustrate our invention, but without being limited thereto, the following examples are given:

Example I

A 75 denier, 40 filament cellulose acetate yarn is prepared by extruding a solution of the following composition through a 40-hole spinneret into an evaporative atmosphere comprising heated air:

	Parts by weight
Cellulose acetate	25.0
Acetone	71.25
Water	3.75
Dichloro-diphenyl-trichlorethane	5

Example II

Filaments may be formed of the following composition as described in Example I:

	Parts by weight
Cellulose acetate	100
Dichloro-diphenyl-trichlorethane	15
Methyl phthallyl ethyl glycollate	15
Acetone	320
Alcohol	80
Dicyandiamide	2

Excellent yarns are obtained.

Example III

Filaments are formed of the following composition:

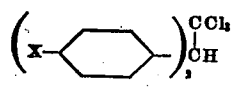
	Parts by weight
Vinyl chloride and vinyl acetate copolymer	100
Dichloro-diphenyl-trichlorethane	25
Ethyl methyl ketone (hot)	350

The filaments obtained produce excellent fabrics on weaving.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

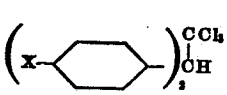
Having described our invention, what we desire to secure by Letters Patent is:

1. A textile material comprising filaments consisting essentially of a lower fatty acid ester of cellulose and having incorporated therein as a plasticizer and in an amount of from 2 to 50%, based on the weight of said ester a compound of the formula



wherein X is a halogen, and a stabilizer imparting resistance to chemical change under the action of heat.

2. A textile material comprising filaments consisting essentially of cellulose acetate and having incorporated therein as a plasticizer and in an amount of from 2 to 50%, based on the weight of said cellulose acetate a compound of the formula



wherein X is a halogen, and a stabilizer imparting resistance to chemical change under the action of heat.

3. A textile material comprising filaments consisting essentially of cellulose acetate and having incorporated therein as a plasticizer dichloro-diphenyl-trichlorethane in an amount of from 2 to 50%, based on the weight of the cellulose acetate, and a stabilizer imparting resistance to chemical change under the action of heat.

4. A textile material comprising filaments consisting essentially of cellulose acetate and having incorporated therein as a plasticizer dichloro-diphenyl-trichlorethane in an amount of from

2 to 50%, based on the weight of the cellulose acetate and having incorporated therein dicyandiamide as a stabilizer.

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