Nov. 26, 1935. C. DREYFUS 2,022,410

TEXTILE PROCESS

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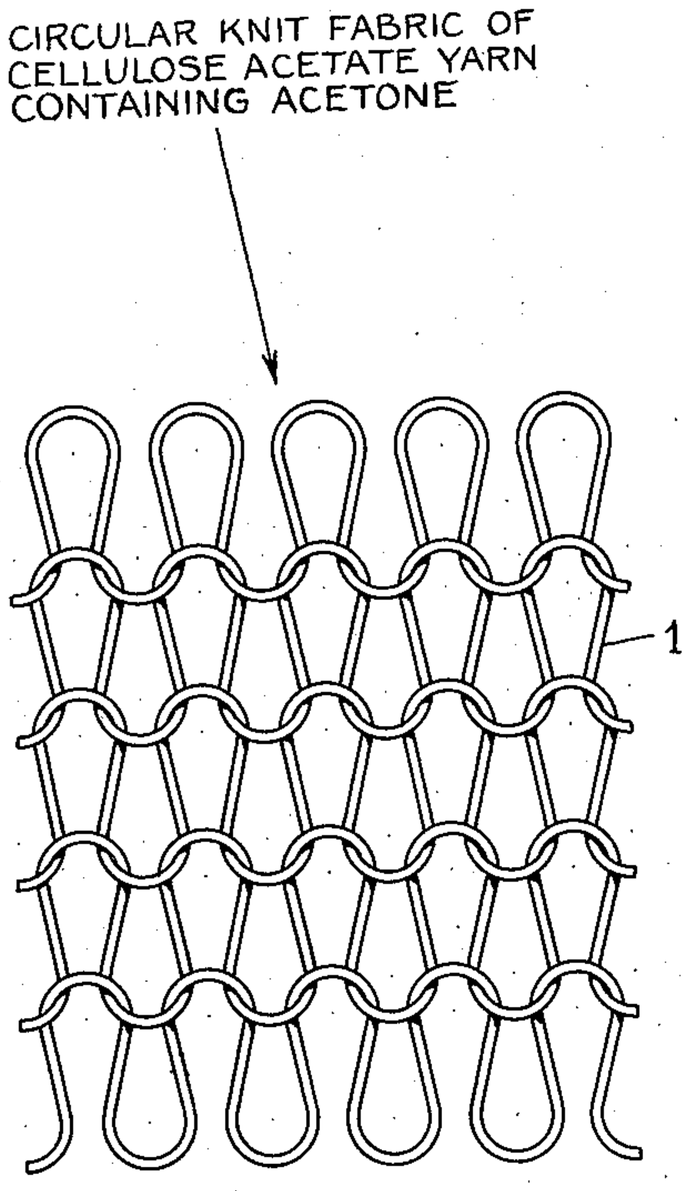

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TEXTILE PROCESS

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4 Claims. (Cl. 66—202)

This invention relates to the preparation of yarns, filaments and the like made of cellulose acetate which are more amenable to knitting or other severe textile operations.

An object of my invention is to prepare yarns or filaments of cellulose acetate which are more amenable to knitting and other severe textile operations. Other objects of my invention will appear from the following detailed description.

The knitting of yarns made of cellulose acetate presents serious difficulties, since if attempts are made to form a closely knit fabric from such yarns by circular knitting machines forming a straight stitch, serious defects known as pin holes, distortions and rowiness develop because of lack of pliability of such yarns. In order to condition such yarns, animal oils, vegetable oils such as olive oil, or mineral oils have been applied, but these have not given satisfactory results and moreover their use involves the added expense of cost of the materials and the operations of applying them to the yarn and of their removal from the knitted fabric. Moreover under the prior practice, it was not possible to knit cellulose acetate yarn having a twist of less than 4 or 5 turns per inch to form satisfactory fabric on knitting machines.

I have made the surprising discovery that if the cellulose acetate yarns or filaments contain a certain amount of acetone when they are supplied to the knitting machines, or subjected to other severe textile operations, they may be successfully knitted, knotted, braided and the like. Moreover, such yarns of cellulose acetate may be successfully knitted when they have little or no twist.

In accordance with my invention, then, I subject yarns or filaments of cellulose acetate to knitting or other severe textile operations while such yarns of filaments contain an appreciable amount of acetone.

The textile material forming the subject matter of this invention may be in the form of yarns containing a plurality of filaments made of cellulose acetate, preferably the acetone soluble variety, which filaments may be associated together by any desired degree of twist. However, an important advantage of this invention resides in the fact that it makes possible the knitting of cellulose acetate yarn having little or no twist, that is twists of less than 2 or 3 turns per inch down to yarns containing filaments in substantially parallel relationship without any twist. Circular knit fabrics of excellent quality can be made from cellulose acetate yarn made of a plurality of filaments associated together by only 0.8, 0.9, or 1.0 turn per inch, when they contain acetone in accordance with this invention.

The term filaments includes artificial bristles, straws and the like, which when they contain acetone in accordance with my invention can be knotted, bent or braided more easily than prior corresponding cellulose acetate filaments.

As to the amount of acetone contained within the cellulose acetate yarns or filaments, while the quantity of acetone present should be appreciable, it need not necessarily be large. I have found that amounts of acetone exceeding 0.1% to 0.2% of the weight of the yarns or filaments produce excellent results while the upper limit of the amount of acetone present need not exceed 6%. Ranges of 0.3 to 4% of acetone produce excellent results.

If desired the yarns or filaments made or treated in accordance with this invention, may contain finely divided pigment like materials, such as titanium dioxide, stannic oxide, antimony oxide or barium sulfate in amounts of say 0.1 to 5% in order to impart thereto increased opacity and reduced luster.

In order to render the yarns more amenable to knitting, there is preferably applied thereto a suitable lubricant or conditioning agent which may contain olive oil, mineral oil or other suitable oil and which may or may not also contain diethylene glycol or other polyhydric alcohol.

Any suitable expedients may be employed for providing cellulose acetate yarns containing the required amount of acetone to be used in the knitting or other severe textile operation.

As an example of one manner of carrying out my invention, a solution of acetone soluble cellulose acetate in acetone may be extruded through fine orifices into a drying evaporative atmosphere, the rate of spinning and the volume and temperature of the evaporative atmosphere being such that the resulting yarn has at least the required amount of acetone. The yarns so spun may then be drawn from the spinning chamber over wicks or other devices furnishing a lubricant or conditioning agent onto a device, such as a cap spinning device, which winds and twists the yarn to the desired degree of twist. The yarn should then be knitted directly from the package, such as a cap spinning bobbin, on which it is spun since if it is rewound from that package to another package, during its passage through the open atmosphere from one package to another, it is liable to lose such a large amount of

acetone that it is no longer suitable for the purpose of this invention.

If the yarn on its original package as above described is knitted within 3 to 7 days from the time it is formed, no special precautions need be taken during its storage. However if a longer time is to elapse between the time of its manufacture and the time of its use for knitting, such packages should be stored or shipped under such conditions as to prevent the loss of such amounts of acetone that the yarn does not contain the minimum amount of acetone required by this invention when it is supplied to the knitting machines. This may be conveniently accomplished by shipping or storing the packages in containers, receptacles or chambers that are sealed or impervious to air and acetone vapors and which may be charged, if desired, with acetone vapors.

If it be desired to wind the yarns from the original package upon which it is wound from the spinning machine onto another package prior to knitting, this winding may be done in a confined space preventing excessive loss of acetone or in an atmosphere conditioned with vapors of acetone to prevent such losses. Similarly cellulose acetate yarns containing little or no acetone may have an amount of acetone required by this invention incorporated therein by suitable means, such as being conditioned in an atmosphere of acetone, or by the application of an aqueous solution of acetone of say 5 to 50% concentration and which does not dissolve cellulose acetate to such yarns.

Cellulose acetate yarns when made or treated in accordance with this invention are very pliable and flexible. As a consequence such yarns may be knitted in circular knitting machines to produce fabrics of many wales and courses per unit length, which fabric has a smooth appearance and is substantially free of pin holes, distortions, tension lines, etc. Moreover cellulose acetate yarns made in accordance with this invention and having low degrees of twist of say 0.5 to 1 turn per inch may be successfully knitted,—a result heretofore not attainable.

The figure on the accompanying drawing shows a circular knit fabric *l* made of cellulose acetate yarn in accordance with my invention.

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 my invention.

Having described my invention what I desire to claim and secure by Letters Patent is:

1. In processes for the manufacture of textile fabrics containing cellulose acetate, the steps of forming filaments or the like from a solution of cellulose acetate by extrusion through suitable orifices into a setting medium, withdrawing the formed materials from the said medium while they still contain at least 0.1% of volatile solvent and subjecting the materials while they still contain the solvent to a fabric-forming operation.

2. In processes for the manufacture of textile fabrics containing cellulose acetate, the steps of forming filaments or the like from a solution of cellulose acetate in acetone by extrusion through suitable orifices into an evaporative atmosphere, withdrawing the formed materials from the said atmosphere while they still contain at least 0.1% of acetone and subjecting the materials while they still contain the solvent to a fabric-forming operation.

3. In processes for the manufacture of textile fabrics containing cellulose acetate, the steps of forming filaments or the like from a solution of cellulose acetate in acetone by extrusion through suitable orifices into an evaporative atmosphere, withdrawing the formed materials from the said atmosphere while they still contain 0.3 to 4% of acetone and subjecting the materials while they still contain the solvent to a fabric-forming operation.

4. In processes for the manufacture of textile fabrics containing cellulose acetate, the steps of forming filaments or the like from a solution of cellulose acetate in a volatile solvent by extrusion through suitable orifices into an evaporative atmosphere, withdrawing the formed materials from the said atmosphere while they still contain at least 0.1% of volatile solvent, twisting the materials to form yarn having a twist of not more than three turns per inch and subjecting the yarn while it still contains the solvent to a fabric-forming operation.

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