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PROCESS OF TREATING SPINNERETS

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This invention relates to the art of producing artificial thread by the dry spinning process. More particularly, it relates to a method of treating the spinnerets so that a continuous and uninterrupted flow of material extruded therethrough may be expeditiously secured, either at the beginning of the operation or at any stage thereof, when the orifices of the spinnerets have been wholly or partially clogged or closed.

In the process of producing artificial thread by the dry spinning or evaporative process, the material constituting the mass of the thread is usually dissolved in a volatile solvent or in a solvent mixture which contains a volatile solvent or solvents. The volatility of the solvent or solvent mixture of the spinning solution is such that the filaments or thread may be conveniently formed upon extrusion and during a relatively short travel in an evaporative medium, such as is present in the spinning cell or other device, whereby the volatile ingredients are wholly or partly dissipated.

The easy volatility of the liquid components of the spinning solution is, however, a liability to the extent that the spinning solution frequently deposits the solute in the orifices of the spinnerets or on the surfaces thereof. As a result, non-uniform thread, occasioned by the interrupted and non-continuous production of filaments, is produced. For example, in starting a spinning position in operation, the spinning solution issuing from the orifices of the spinneret, even though it be clean and clear, has a tendency to spread over the face of the spinning die instead of issuing therefrom as a column of liquid or a partially formed thread or filament. Frequently, during operation of a spinning position one or more of the orifices in the spinneret become wholly or partly closed and the same phenomenon of the spinning solution crawling along the surface of the spinneret and/or building-up around the orifices occurs. Usually this phenomenon proceeds to a point where other orifices of the same spinneret are involved. In any case, there results a situation which must be corrected in order to have successful spinning.

Prior to this invention, an attempt was made to overcome the above-mentioned difficulty by either dipping the spinneret, and particularly the face thereof, in a solvent for the material constituting the mass of thread or by wiping the face of the spinneret with a cloth which has been wetted with the solvent. This practice is not very satisfactory. Not only does it require considerable time and labor in getting the position into proper operation, but there results a large amount of waste in the form of inferior and unmarketable materials.

The problem has been attempted to be solved by applying a vacuum to the spinneret until the orifices are clean and clear. In actual practice, a solvent was applied to the face of the spinneret prior to applying the vacuum. This procedure required additional apparatus.

I have found that by applying a non-solvent of the solute of the solution which constitutes the mass of the thread, and either subsequently or simultaneously wiping the face of the spinneret, I can easily, quickly and effectively bring the spinneret in condition for proper and successful spinning.

It is therefore an object of this invention to provide a simple method, without the use of any auxiliary expensive apparatus, of treating spinnerets whereby they may be quickly and effectively brought into proper condition for successful spinning.

A specific object of this invention is to provide a method of bringing the spinneret into the necessary condition for successful spinning which comprises applying a non-solvent of the material constituting the mass of the thread and either simultaneously or subsequently wiping the face of the spinneret.

Other objects will appear from the following description and appended claims.

As is apparent from the foregoing objects, the method constituting this invention comprises treating the spinneret, and particularly the face thereof, preferably while in spinning position with a non-solvent for the material constituting the mass of the

thread and either simultaneously or subsequently wiping the face of the spinneret.

Instead of diluting the spinning solution or re-dissolving a deposit of the solute to form a dilute solution which may again produce the bad condition, the non-solvent precipitates the solute in place and permits the precipitate to be subsequently removed.

In actual practice, for example, when a spinning position is begun in operation, the face of the spinneret or a portion thereof may be wiped one or more times with a cloth wetted with a non-solvent for the material constituting the mass of the thread. The non-solvent precipitates the solute and the mechanical action occasioned by wiping the cloth across the face of the spinneret removes the precipitated mass. As a modification of the above procedure, the face of the spinneret may be dipped or immersed in a small receptacle containing a non-solvent and subsequently removing the precipitated material from the spinneret in any suitable manner, such as by wiping with a cloth.

I do not know the exact reason why the above-described procedures produce satisfactory results. It may be that in addition to removing the precipitated materials the face of the spinneret is coated with a thin film of the non-solvent which produces an interfacial tension between the spinning solution and the so-coated spinneret that the spinning solution tends to remain in the form of a column of liquid or partly formed thread as it issues from the spinneret.

In the production of artificial thread from cellulose acetate by the dry spinning process, I find that I can quickly bring the spinnerets in proper spinning conditions by employing, as above described, any one of a number of substances which are non-solvents for cellulose acetate.

A few of the specific non-solvents which have been successfully used with cellulose acetate may be mentioned—gasoline, kerosene, petroleum, toluene and benzene.

It is to be understood that the invention is not restricted specifically to cellulose acetate thread but that it is equally applicable to other cellulose derivatives, including the esters, such as cellulose nitrate, cellulose formate, cellulose butyrate and the like, and the ethers, such as benzyl cellulose, butyl cellulose and the like. When these cellulose derivatives are spun, it is only necessary to select a material which is a non-solvent therefor as explained hereinabove.

Since it is obvious that various changes may be made in the specific details above-described without departing from the nature or spirit of the invention, the invention is not restricted thereto except as defined in the appended claims.

I claim:

1. A method of bringing a spinneret employed in the dry spinning process into proper spinning condition, either substantially immediately prior to the beginning of spinning or at any necessary time during spinning, which comprises applying to the face of the spinneret in spinning position a non-solvent for the solute in the spinning solution and wiping the face of said spinneret.

2. A method of bringing a spinneret employed in the dry spinning process into proper spinning condition, either substantially immediately prior to the beginning of spinning or at any necessary time during spinning, which comprises simultaneously applying to the face of the spinneret in spinning position a non-solvent for the solute in the spinning solution and wiping the face of said spinneret.

3. A method of bringing a spinneret employed in the dry spinning process into proper spinning condition, either substantially immediately prior to the beginning of spinning or at any necessary time during spinning, which comprises applying to the face of the spinneret in spinning position a non-solvent for the solute in the spinning solution and then wiping the face of said spinneret.

4. A method of bringing a spinneret employed in the dry spinning process into proper spinning condition, either substantially immediately prior to the beginning of spinning or at any necessary time during spinning, which comprises wiping the face of the spinneret in spinning position with a cloth wetted with a non-solvent for the solute in the spinning solution.

In testimony whereof, I have affixed my signature to this specification.

JEAN LADRETTE.