

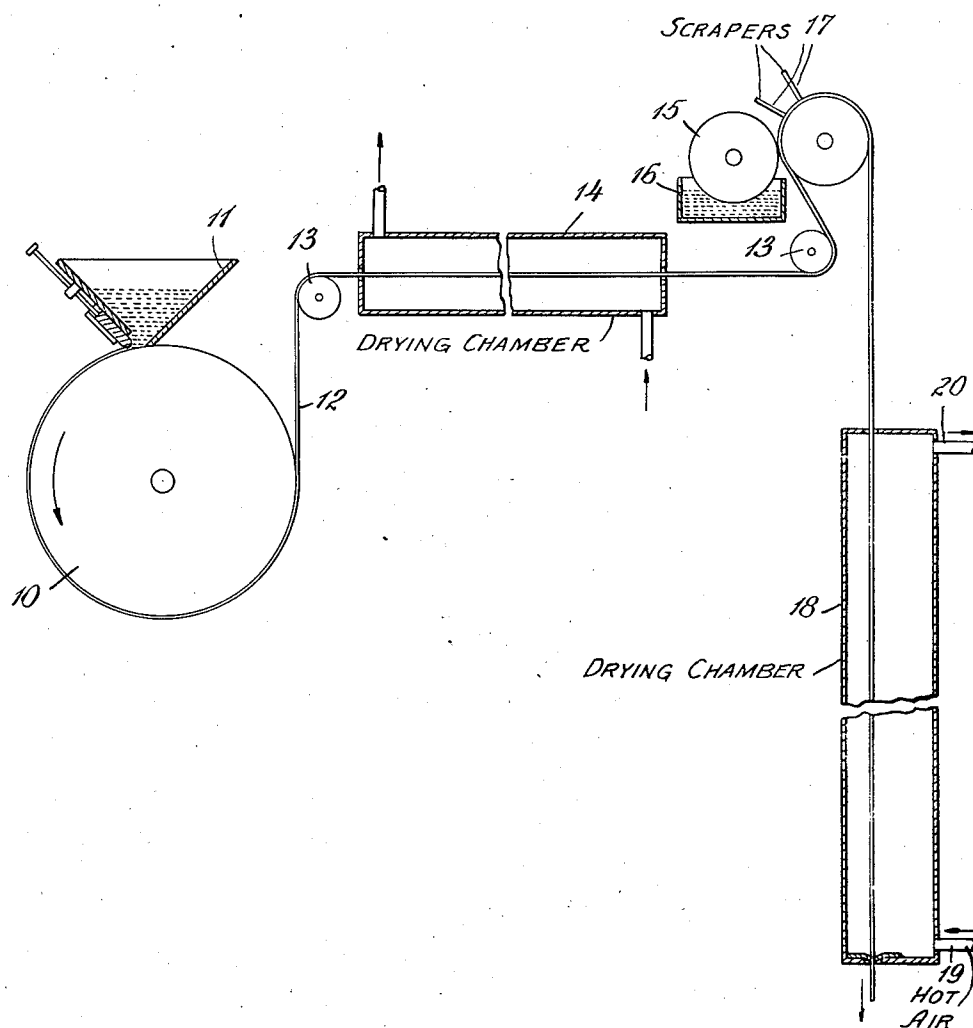
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PROCESS OF MAKING SUPERPOLYAMIDE FILMS

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PROCESS OF MAKING SUPERPOLYAMIDE FILMS

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many; vested in the Alien Property Custodian

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7 Claims. (Cl. 18—57)

The present invention relates to the production of superpolyamide films by the casting process.

It is already known to prepare superpolyamide films according to the casting process. For said purpose alcoholic or aqueous-alcoholic solutions of mixed superpolyamides are suitably used as casting solutions, for instance solutions of superpolyamides for the manufacture of which an amino-carboxylic acid on the one hand and a mixture of a diamine and a dicarboxylic acid on the other hand have been used as parent material. These compounds and other mixed superpolyamides may be dissolved by heating them with aliphatic alcohols or mixtures of alcohols and water and the solution thus obtained may then be cast in known manner so as to obtain films.

On preparing superpolyamide films according to the casting process it turns out to be inconvenient that the films after having been dried and removed from the casting supports tend to roll. The foils roll in such a manner that the surface which had been in contact with the casting support turns outside. The tendency of rolling is extremely strong and cannot be essentially influenced by a variation of the casting and drying conditions. Owing to said tendency of rolling the further treatment of the films involves many difficulties.

We have found that the afore-named drawback may be overcome as follows: the films cast in known manner are treated with a swelling agent on the side which had been in contact with the casting support; they are then dried.

As swelling agents there may particularly be used aliphatic alcohols, especially ethanol. The alcohols may have a high content of water. A mixture of 60 parts of water and 40 parts of ethyl alcohol may be used in many cases. The film moistened on one side is suitably dried with the aid of hot air by passing the film through a drying chamber.

In order to more readily describe the present invention there is attached hereto a sheet of drawings, the single figure of which is a diagrammatic representation of apparatus suitable for practicing the process of the present invention.

The following example serves to illustrate the invention, but it is not intended to limit it thereby:

25 parts of a mixed superpolyamide, obtained by condensing 30 parts of the adipic acid salt of hexamethylene-diamine with 40 parts of caprolactam, are heated together with 56 parts of methanol and 19 parts of water in a stirring vessel

provided with a reflux condenser, so that the solvent boils gently. When complete dissolution has occurred, the solution is filtered and then cast from hopper 11 in the usual manner, while hot, onto an endless metal band or casting wheel 10 so as to obtain a film 12 having a thickness of about 0.1 mm. After having been dried at a temperature of 70° C.—100° C. the foil now substantially free from any solvent is removed from the casting support; for after-drying it is passed by means of guide rollers 13 through a drying chamber 14 which has likewise been heated to 70° C.—100° C. The foil may then be rolled up. To facilitate the illustration of the present invention, the web or film 12 is shown in the drawing as passing directly to apparatus suitable for processing it to remove any tendency to curl. Parts which have been cut out of such a web possess the inconvenient property of strongly rolling.

To the surface of the foil which had been in contact with the casting support a mixture of 40 parts of ethyl alcohol and 60 parts of water is applied at ordinary temperature by means of a roller or a felt soaked with the liquid at which the foil is passed along. Such means are here illustrated as a roller 15, which dips into a bath of said mixture of ethyl alcohol and water in trough 16. The web is then conducted along scrapers 17 by which the excess of the unilaterally applied moistening agent is removed; directly afterwards the web is passed, while being freely suspended, through a vertically mounted drying chamber 18 having a length of about 4 meters and wherein hot air of 90° C.—100° C. introduced through pipe 19 flows in opposite direction to the course of the web and is removed therefrom through pipe 20, thus causing a rapid drying of the unilaterally moistened web. After the afore-described treatment is complete the foil has lost its tendency of rolling. Parts cut therefrom remain both under the usual storing conditions and on storing in the heat in the flat condition or show only extremely insignificant, no longer disturbing tendency of rolling.

The process may be performed with high speed, for instance with a speed of 20 meters per minute. By altering the speed and the temperature of the moistening liquid as well as by a more or less thorough removal of the excess of liquid by the mentioned scrapers the effect attained by the after-treatment may be influenced. The optimum conditions required for each case may readily be ascertained by some tests.

We claim:

1. In the process of casting superpolyamide

films wherein a solution of a superpolyamide in a solvent is cast on a casting support and dried thereon and the dried film removed from the support, the method for overcoming the tendency of rolling of the thus obtained film which comprises treating the film after its removal from the casting support only on the side which had been in contact with said casting support with a liquid swelling agent, and then drying the thus treated film.

2. In the process of casting superpolyamide films wherein a solution of a superpolyamide in a solvent is cast on a casting support and dried thereon and the dried film removed from the support, the method for overcoming the tendency of rolling of the thus obtained film which comprises treating the film after its removal from the casting support only on the side which had been in contact with said casting support with a liquid swelling agent, and then drying the thus treated film by treating the thus treated side with hot air at a temperature of 90-100° C.

3. A process as defined in claim 1 wherein said swelling agent comprises an aliphatic alcohol.

4. A process as defined in claim 1 wherein said swelling agent comprises ethyl alcohol.

5. A process as defined in claim 1 wherein said swelling agent consists of aqueous ethyl alcohol.

6. A process as defined in claim 1 wherein said superpolyamide is a mixed superpolyamide obtained by condensing the adipic acid salt of hexamethylene diamine with caprolactam.

7. In the process of casting superpolyamide films wherein a solution of a mixed superpolyamide obtained by condensing the adipic acid salt of hexamethylene diamine with caprolactam in a solvent, is cast on a casting support and dried thereon and the dried film removed from the support, the method for overcoming the tendency of rolling of the thus obtained film which comprises treating the film after its removal from the casting support only on the side which had been in contact with said casting support with a liquid swelling agent, and then drying the thus treated film by treating the thus treated side with hot air at a temperature of 90-100° C.

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