

## UNITED STATES PATENT OFFICE

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## MANUFACTURE AND PRODUCTION OF ARTIFICIAL FILAMENTS FROM VISCOSE

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3 Claims. (Cl. 18—54)

This invention relates to the manufacture and production of wool-like threads or filaments from viscose.

The production of such threads by various mechanical devices causing movement of the nozzle or the coagulating bath has already been proposed. It has also been proposed to produce such threads by subjecting threads produced in the normal way to treatment with swelling or the like agents. We, however, are concerned with that type of process in which, by variation of the conditions of extrusion and coagulation, threads with wool-like properties are obtained. In this connection it has already been proposed to extrude unripened viscose in the preparation of which the cellulose has only been hydrated to a slight extent, and to extrude the xanthate solution immediately after formation into a normal acid bath wherein the threads remain as long as possible. It has also been proposed to unite threads having different shrinking properties, whereby a curl in the thread is produced. It has further been proposed to form threads of cellulose xanthate by extruding viscose into a suitable bath and then treating this thread in other baths which decompose the xanthate to cellulose hydrate, either before or after cutting into staple fibres.

The present invention relates to the production of a new type of wool-like thread from viscose, the thread being characterised by possessing, in addition to a dull lustre and a springy handle, an irregular surface which, like the epidermal scales of wool, assist in holding the separate filaments together when they are spun into a thread or felted together. We prepare our new type of thread by a special combination of factors employed during the production of thread.

According to the present invention the process for the production of wool-like threads of the type described above, comprises extruding viscose aged to a salt point below 3.0 into an acid coagulating bath containing sodium and ammonium sulphates and less than 6.0 per cent of sulphuric acid and adjusting the time of immersion of the resulting thread in the bath so that the thread on leaving the bath carries with it only just sufficient coagulating liquid to complete regeneration of the cellulose.

The "salt point" of a viscose signifies the concentration of a common salt solution that just suffices to coagulate a drop of viscose which is allowed to fall into it and is then broken up by stirring.

The factors above mentioned will depend to

some extent upon one another, so that they may be varied among themselves between the limits set forth. For example, as the age of the viscose is increased, that is, as the salt figure diminishes below 3.0, the wool-like properties of the thread improve, and the range of immersion of the thread in the coagulating bath, over which wool-like threads can be obtained, increases. Again, in regard to the composition of the coagulating bath, as the proportion of sulphuric acid diminishes below 6 per cent, the wool-like properties of the thread are improved. On the other hand the ease of spinning also diminishes, so that in practice we prefer to use a bath containing about 4 per cent of acid whereby the desired effect is obtained with the least spinning trouble. The baths we prefer to use also have a normal content of sodium sulphate, for example, about 10 per cent, but on the other hand they preferably have a moderately high content of ammonium sulphate for example, 20 per cent. Although it is possible to obtain a wool-like thread using as little as 5 per cent of ammonium sulphate, it is found that the jelly-like nature of the thread so produced is not conducive to easy spinning, and the easiest spinning occurs and the softest thread is obtained when using a proportion of ammonium sulphate of about 20 per cent.

The time of immersion of the thread in the coagulating bath must then be varied, so that the thread on reaching the collecting or cutting device carries with it only just sufficient coagulating liquid to complete regeneration of the cellulose. The time of immersion may be altered, for example, by altering the length of thread passing through the bath if the rate of extrusion and the rate of withdrawal are kept constant. I have found that according to the age of the viscose and the strength of the coagulating bath, the length of immersion may vary considerably, for instance between 3 and 18 inches. It will also depend on whether or not the thread passes over a guide soon after leaving the coagulating bath. In order to give a reasonable length of immersion to make the process controllable, it has been found desirable to carry out the thread forming operation at a temperature below 30° centigrade, for instance at about 25° centigrade.

Since the wool-like properties of the ultimate thread diminish if the thread is stretched to any considerable extent when leaving the coagulating liquid, it is desirable that as little stretch as possible should be effected, and in any case not more than 35 per cent.

The following example will further illustrate

how the said invention may be carried out in practice but the invention is not limited to this example.

*Example*

5 Viscose containing 6½ per cent caustic soda and 7½ per cent cellulose is aged for 7 days at 20° centigrade after which the salt point will correspond to a figure of about 1. It is then extruded through a 372 hole jet into a coagulating bath containing 4 per cent of sulphuric acid, 10 20 per cent of ammonium sulphate and 10 per cent of sodium sulphate at 25° centigrade to form a thread comprising 372 filaments each of 4 15 denier. The thread is drawn from the bath at the rate of 60 metres per minute without stretching, the length of thread immersed in the bath being about 12 inches. The threads pass over a guide about 2 inches above the surface of the coagulating bath and collected or sent through a 20 cutting device. They are allowed to stand for half-an-hour in order to complete the fixation, after which they may be desulphurised and bleached. The product has a somewhat springy 25 handle and a wool-like lustre, and, in addition, the irregular surface described above.

What I claim is:

1. A process for the production of wool-like threads which comprises extruding viscose aged 30 to a salt point below 3.0 into an acid coagulating bath containing about 10 per cent sodium sulphate and from 5 per cent to 20 per cent am-

monium sulphate and a substantial quantity up to 6.0 per cent of sulphuric acid, the time of immersion of the resulting thread in the bath being such that the thread on leaving the bath carries with it only just sufficient coagulating liquid 5 to complete regeneration of the cellulose.

2. A process for the production of wool-like threads which comprises extruding viscose aged to a salt point below 3.0 into an acid coagulating bath containing about 10 per cent sodium sulphate and more than 5.0 per cent ammonium sulphate and from 4 to 6.0 per cent of sulphuric acid and by arranging the time of immersion of the resulting thread in the bath so that the coagulating liquid carried with the thread on leaving the bath is only just sufficient to complete regeneration of the viscose. 15

3. A process for the production of wool-like threads which comprises extruding viscose aged to a salt point about 1.0 into an acid coagulating bath containing about 10 per cent of sodium sulphate, about 20 per cent of ammonium sulphate and 4 per cent of sulphuric acid at about 25° centigrade and arranging the length of thread immersed in the bath and the rate of withdrawal of the resultant thread and the denier per filament of the thread, so that the coagulating liquid carried with the thread on leaving the bath is only just sufficient to complete regeneration of the viscose. 25 30

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