United States Patent Office 3,452,410 Patented July 1, 1969

3,452,410

PROCESS OF OPENING AND CRIMPING TOW

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No Drawing. Filed May 31, 1966, Ser. No. 553,725
Claims priority, application Great Britain, June 4, 1965, 23,870/65
Int. Cl. D04h *17/00;* D05c *15/00*
U.S. Cl. 28—72 8 Claims

ABSTRACT OF THE DISCLOSURE

A process is provided for the production of crimped cellulose acetate tow which comprises spinning cellulose acetate from a number of individual jets, combining the separate ends into a compact ribbon, opening the ribbon into a band and crimping the open band of tow.

This invention relates to the production of crimped cellulose acetate tow, and in particular to the production of crimped cellulose acetate tow which is intended for use in the production of cigarette filter tips.

Cellulose acetate tow which is intended for conversion into filter tips for cigarette tow is normally crimped and opened into a band or web and sprayed with a plasticiser before being compacted into plugs of the right diameter for the filter tips. In order that the plasticiser may be sprayed evenly, and that the filter tips produced may have maximum filtration efficiency, it is important that the band or web should be as uniform as possible and difficulties have been experienced in the opening of a conventional tow, in which the crimped individiual filaments lie substantially parallel with one another in a broad band, to give a satisfactory open band or web. For the most satisfactory opening of a tow the filaments should not hang together in groups, and it is also important to use the least possible tension during opening in order to retain the highest degree of crimp. For this purpose it is necessary to ensure a satisfactory degree of interpenetration between individual filaments, so that the tow opens to give a network of interpenetrated filaments of a substantially regular structure.

According to this invention the process for the production of crimped cellulose acetate tow comprises spinning cellulose acetate from a number of individual jets, combing the separate ends into a compact ribbon or rope, opening the ribbon or rope into a band and crimping the opened band of tow.

In the process of the invention the spinning of the individual ends is carried out by conventional methods, but the ends are not all laid side-by-side. A ribbon of tow may be made by laying a relatively small number of ends side-by-side in each of a number of layers. Alternatively, the separate ends may be combined into a rope.

The degree of interpenetration that is obtained on opening the ribbon or rope of tow is dependent on the ratio of the width of the tow fed to the crimper after opening to the width of the tow before opening. Subject to the condition that the tow is opened in a satisfactory manner, the degree of interpenetration increases as the above-mentioned ratio increases.

The invention is not limited to the use of any particular method of tow opening, but it is preferred that the tow should be opened by passage over one or more guide bars of curved profile. Such bars, which present a convex profile to the tow ribbon or rope, open the tow to a degree which is dependent upon the curvature of

the profile. It is preferred that the opening should be relatively gradual, and two or more bars will normally be desirable. The curvature and number of the bars is selected to obtain the desired opening and to maintain uniform thickness across the tow as it is opened. The amount of tension applied to the tow during its passage across the bars also affects the degree of opening obtained. An alternative method of opening which can be used satisfactorily in the process of this invention is to pass the tow through a pair of nip rollers at which the tension on the tow is relaxed and to open it by passage through an air spreader.

The tow opening guides or other opening device should preferably be as near as possible to the crimper. Passing the tow over guide bars to open it causes the width of the tow being fed to the guide bars to increase, and it is desirable to limit how far backward this increase extends from the first guide bar in order to obtain the maximum uniformity of interpenetration on opening. This may be achieved, for example, by passing the ribbon or rope of tow over a single roller with some lap of the tow around the roller, or by a pair of nip rollers, either of which devices should be situated as close as possible to the tow opening guides.

In an example of the use of the invention, cellulose acetate tow was spun to give 100 ends each ⅛ inch wide. These were to be collected and fed to a stuffing box crimper whose opening was 1 inch wide. A 2:1 ratio of width of tow at crimper to width of ribbon of tow before opening was used and accordingly the ribbon of tow was ½ inch wide. This ribbon was made by laying 5 ends side-by-side with a slight overlap to give the required ½ inch width of ribbon and 20 such layers were laid one on top of the other. The tow was opened by passage over two curved guide bars, and was fed to the stuffing box crimper. On further opening of the tow by conventional means, a web of tow was obtained of substantially uniform thickness which was very suitable for spraying with plasticiser and conversion into cigarette filter tips.

We claim:

1. The process for the production of crimped cellulose acetate tow which compresses spinning cellulose acetate tow from a number of individual jets, combining the separate ends into a compact ribbon, opening the ribbon into a band having interpenetrated filaments and crimping the open band of tow, the width of the compact ribbon being less than that of said band at the time of crimping whereby interpenetration between individual filaments produces a network of substantially regular structure when the tow is opened before crimping.

2. The process as claimed in claim 1 in which a ribbon of tow is produced by laying a relatively small number of ends side-by-side in each of a number of layers.

3. The process as claimed in claim 1 in which the tow is opened by passage over at least one guide bar of curved profile.

4. The process as claimed in claim 3 in which at least two guide bars are used.

5. The process as claimed in claim 1 in which the ribbon of tow is passed through a pair of nip rollers and opened by passage through an air spreader.

6. The process as claimed in claim 1 in which the ribbon of tow is passed over a roller with some degree of lap around the roller and opened by passage over guide bars.

7. The process as claimed in claim 1 in which the ribbon of tow is passed through a pair of nip rollers and opened by passing over guide bars.

8. The process as claimed in claim 1 in which the tow is crimped substantially immediately after opening.

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PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,452,410 Dated July 1, 1969

Inventor(s) Olaf George Dixon and Raymond Kevan Clewlow

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1, line 2, "compresses" should read

--comprises--.

SIGNED AND
SEALED
FEB 17 1970

(SEAL)
Attest:

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