

[72] Inventors Olaf George Dixon, deceased, late of Leamington Spa, England; Margaret Patricia Dixon, Personal Representative, Leamington Spa; John Fagge, Huberston, Cleepthorpes, England

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[73] Assignee Courtaulds Limited
London, England

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72.14

[56] References Cited

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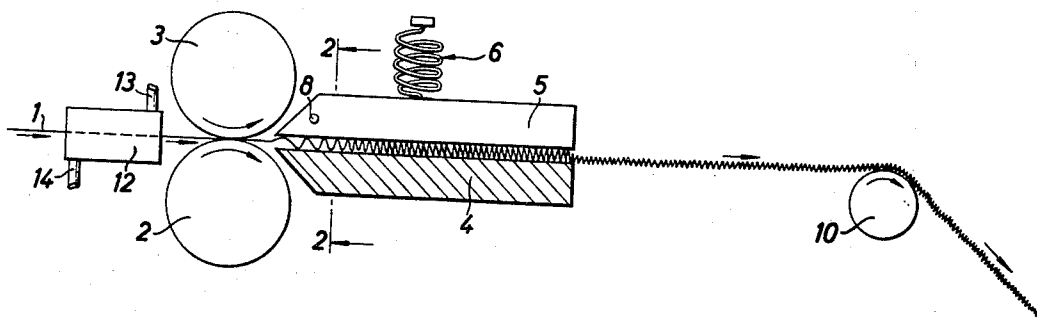
Primary Examiner—Louis K. Rimrodt
Attorney—Davis, Hoxie, Faithfull and Hapgood

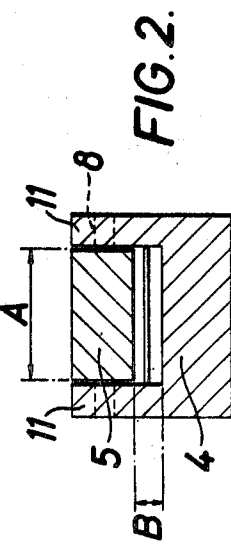
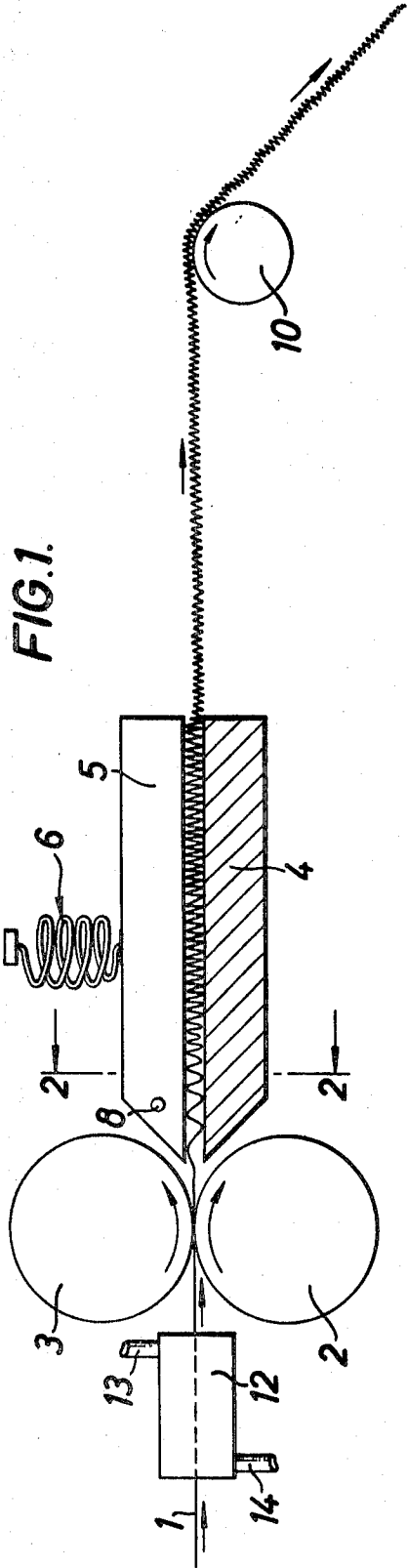
[54] PROCESS FOR THE PRODUCTION OF CRIMPED TOW FOR CIGARETTE FILTERS
6 Claims, 2 Drawing Figs.

[52] U.S. Cl..... 28/72.14

[51] Int. Cl..... D02q 1/12

ABSTRACT: Vertically crimped cellulose acetate tow of 25,000—100,000 denier, suitable for cigarette filters, is made by feeding a band of cellulose acetate filaments in which the filaments have a denier of about 1.5 to about 10, are substantially parallel to one another and are adhered to one another, the band being not more than about 6 filament diameters thick, to a stuffing box crimper having an opening wide enough to accommodate the tow and not more than three-sixteenths inches high.





INVENTORS

BY

Davis, Hoxie, Faithfull & Hapgood ATTORNEYS

PROCESS FOR THE PRODUCTION OF CRIMPED TOW FOR CIGARETTE FILTERS

This application is a continuation-in-part of our copending application Ser. No. 568,748, filed Jul. 29, 1966.

This invention relates to the production of crimped cellulose acetate tow of a type especially suitable for the production of cigarette filters.

In the normal process for the production of cellulose acetate cigarette filters, as described for example in British Pat. 909,940, cellulose acetate is spun through a spinnerette having say 100 — 200 orifices. The bundles of filaments or "ends" from each of a number of spinnerettes and their associated "spinning cabinets" are assembled to form a tow. This tow is normally composed of filaments of about 1.5 to about 10 denier and the denier of the tow is from about 25,000 to about 100,000. The tow is then sent to a crimping device in the form of a flat band of say 1 to not more than 6-filament-diameters thickness. The width of the tow or band may vary considerably, depending on the number of ends combined. Typically it may be say 2 to 2-1/2 inches wide.

A typical crimper comprises a pair of nip rollers by which the tow is forced into a stuffing box against back pressure. This causes the tow to crimp.

It is, of course, highly desirable that the crimp inserted in the tow be regular. In the conventional crimping process, the tow is crimped horizontally, that is to say the crimps lie in the plane of the band of tow. It has been discovered, however, that a much more uniform product is obtained if the tow is crimped vertically, that is if the crimps lie in a plane perpendicular to the plane of the tow. It is an object of this invention to provide tow which has a vertical crimp.

According to the invention vertically crimped cellulose acetate tow is obtained by feeding a band of cellulose acetate filaments each having a denier of say 1.5 to 10, the thickness of the band being not more than about 6 filament diameters, all of the filaments in the band being substantially parallel to one another and all having some degree of adherence to neighboring filaments, to a stuffing-box crimper having a width sufficient to accommodate the band and a height not more than 3/16 inch.

The adherence of the filaments one to another may be secured by a variety of methods. Thus, the nip rollers which feed the band of tow to the stuffing box crimper may be so arranged that the nip pressure is high enough to cause the adherence. Alternatively, a relatively light nip may be applied and the band of tow may be lightly plasticized. It may even be sufficient in some cases to moisten the band with water when the capillary action of the adjacent fibers may be sufficient to cause the individual filaments to adhere together. When the adherence is produced by the pressure of the rollers or by the application of the plasticizer, it is frequently advantageous to treat the band of filaments with steam to soften them slightly before passing through the rollers.

After the treatment to secure adherence of the filaments to one another the band is passed from the nip rollers into the stuffing box crimper which is of a smaller height than the usual stuffing box crimper. This height, that is to say the distance across the opening of the stuffing box in the direction perpendicular to the plane of the band of tow, must not be greater than three-sixteenths of an inch and is preferably about one-eighth of an inch.

Tow which has been crimped in accordance with the inven-

tion shows a substantial degree of vertical crimp.

The drawing is a schematic diagram illustrating the invention, in which specifically:

FIG. 1 shows schematically, in side elevation, a band of tow being passed through a crimper, according to the invention.

FIG. 2 is a schematic view, in vertical section, of the crimper of FIG. 1, the section being taken along the line 2-2 of FIG. 1.

Referring to FIG. 1 of the drawing, a band of filaments 1 is fed between nip rollers 2 and 3 of which either or both are driven by driving means (not shown). On issuing from the nip of the rollers 2 and 3 the band of filaments is fed into the opening of the stuffing box formed of a fixed blade 4 and a movable blade 5 pivoted at 8 on which a load is applied at 6. The band of filaments folds in the stuffing box as a result of the resistance applied by the load 6 to its egress and crimping takes place. The crimped tow is withdrawn under minimum tension for example over the guide roller 10. A steam heater 12 is provided through which steam may be passed through the inlet 13 and outlet 14 if it is desired to apply steam heating to the tow 1 before crimping.

Referring to FIG. 2 the opening of the stuffing box is wide enough in the dimension A to accommodate the band of filaments 1 without substantial folding over of the edges. According to the invention, it is not greater than 3/16 inch in the dimension B. Preferably the dimension B is about 1/8 inch. Smaller openings can be used, but increased frictional factors make these openings less desirable. Side extensions 11 of the fixed doctor blade 4 complete the stuffing-box assembly and the pivot 8 passes through these side extensions.

It is claimed:

1. In a process for the crimping of cellulose acetate tow for cigarette filters by forcing a tow having a denier from about 25,000 to about 150,000 into a stuffer box against back pressure, the improvement which comprises maintaining the individual filament denier in said tow at from 1.5 to about 10, forming the filaments into a band having a thickness not more than about 6 filament diameters and in which the filaments are adhered to one another and delivering the band to a stuffer box having an opening wide enough to accommodate the band and not more than 3/16 inches high, to crimp said filaments in a plane perpendicular to the plane of the band.

2. A process as claimed in claim 1 in which the height of the opening of the stuffing-box crimper is one-eighth of an inch.

3. The process as claimed in claim 1 in which filaments are caused to adhere to one another by moistening the band of filaments with water.

4. The process claimed in claim 1 and comprising passing the band between a pair of feed rollers prior to delivering it to the stuffer box and maintaining the nip pressure in said feed rollers at a level sufficient to cause adjacent filaments in said band to adhere to one another.

5. The process claimed in claim 1 and comprising applying a plasticizer to the filaments and passing the band of filaments between a pair of feed rollers prior to delivering it to the stuffer box, to cause the adjacent filaments in said band to adhere to one another.

6. The process claimed in claim 1 and comprising contacting the band with steam to soften the filaments thereof and passing the band between a pair of feed rollers prior to delivering it to the stuffer box, to cause adjacent filaments to adhere to one another.