PROCESS OF OPENING TOW

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ABSTRACT OF THE DISCLOSURE

The invention is a process for the production of cigarette filters which comprises passing the tow through the nip of a pair of rollers, at least one of which rollers is driven, and spreading the tow into a band while it hangs freely in the form of a loop. Preferably, the tow is subjected to control pressure while passing between the rollers and the drive of the rollers is controlled in respect of its speed so as to maintain the freely hanging loop of constant length.

This invention relates to the manufacture of cigarette filters and in particular to the presentation of tow to a cigarette filter-making machine.

In the production of cigarette filters tow, such as cellulose acetate tow, is drawn from the bale and is spread out into a band or web before being passed to the machine in which filter plugs are made. The tow is highly crimped and any small variations in tension which may occur in the tow as presented to the filter-making machine may have a considerable effect upon the weight of tow per unit length fed into the machine. The diameter of the filter plugs is highly critical and the density of the plugs is also of considerable importance, so that it is necessary to control the weight of tow per unit length with considerable care.

According to the invention a process for the opening of tow for the production of cigarette filters comprises passing the tow through the nip of a pair of rollers, at least one of which rollers is driven, and spreading the tow into a band while it hangs freely in the form of a loop.

In the process of the invention the tow may conveniently be passed through at least one guide ring to the nip of the rollers, some pressure being applied to the tow between the rollers. Thus, for example, if one roller is arranged vertically above the other, the lower roller may be driven while the upper roller merely exerts pressure on the tow by its own weight. Alternatively, if increased pressure is required, the rollers may be urged together, for example by spring loading. It is in any case preferred that there should be a finite spacing between the two rollers. It is particularly preferred that the spacing between the rollers be adjustable according to the degree of crimp in the tow and the degree of opening required.

It is convenient to provide the rollers with one or more guide plates which lead the tow at the correct presentation angle to the rollers and disengage the tow from the rollers at the outlet side. On leaving the rollers the tow is allowed to hang freely in the form of a loop, preferably by passing it over a bar or a non-driven roller in such a way that a free loop hangs between the rollers and the bar or non-driven roller.

It is desirable that the length of the hanging loop shall be controllable within prescribed limits, in order that the tension of the tow may be substantially constant. For this purpose, preferably the driven roller, or rollers, of the pair of nip rollers is, or are, operated by a variable speed motor, the speed of which is controlled to maintain the loop length substantially constant. The control means may, for example, be operable by photo-cell observation of the loop length.

The tow is passed in the free hanging state through a spreader which may be of any known form suitable for opening the tow into a broader band or web. If desired, a spreader may also be used before the nip rollers in order to open the tow to some extent before passing through those rollers.

Adjustment of the spacing between the nip rollers allows control of the degree of opening obtained in the spreader. Thus, for a given degree of crimp, decrease of the spacing leads to increased opening of the tow. Unless the tow is provided with an anti-static finish, a substantial static charge may be produced during passage through the nip rollers, and in such a case a static eliminator may be desirable.

After passing over the bar or non-driven roller the band of tow may be fed between the tensioning rollers of a filter-making machine and converted into filter plugs.

The process may be also applied to newly manufactured tow when it is desired that this should be opened before baling, in which case the opened tow will be fed to the bale.

The invention also includes apparatus for carrying out the process of the invention.

One form of the present invention is illustrated in the accompanying drawing which is a diagrammatic representation of the apparatus for carrying out the process of the invention.

Referring to the drawing, the tow 1 is withdrawn from a bale 2 through a guide ring 3 to a pair of rollers 4, the lower of which rollers is driven by any suitable means such as a variable speed motor 12 and belt 13. The upper roller presses onto the tow under its own weight and under pressure of a spring 13, the distance between the two rollers being adjustable by means 14. The tow is presented to the rollers over a guide plate 5 and is disengaged from the rollers over a guide plate 6 whereafter it hangs as a loop 7 between the guide plate 6 and a bar 8. The length of the loop is controlled by a photo-electric cell 15 connected to the motor 12. The free hanging tow is passed through a spreader 9 wherein it is opened into a band and passes in this form over the bar 8 to the tensioning rollers 10 and 11 of a cigarette filter-making machine (not shown) wherein it is converted into filter plugs.

1. The process for opening a tow of thermoplastic filaments for the production of cigarette filters which comprises passing the tow through the nip of a pair of rollers, at least one of which rollers in driven, forming a freely hanging vertical loop in the tow between the nip rollers and an idler roller, said loop having two vertical courses, passing one of said vertical courses through a spreader and maintaining the length of said freely hanging loop constant to maintain the tension of the tow passing through said spreader substantially constant.

2. The process as claimed in claim 1 in which the nip rollers are urged together to increase the loading.
3. The process as claimed in claim 1 in which the spacing between the nip rollers is adjustable by mechanical means.

4. The process as claimed in claim 1 in which at least one guide plate is provided on each side of the nip rollers.

5. The process as claimed in claim 1 in which the drive to the pair of nip rollers is operated by a variable speed motor controlled to maintain the loop length substantially constant.

6. The process as claimed in claim 5 in which the control means for the variable speed motor is operated by photo-cell observation of the loop length.

7. The process as claimed in claim 1 in which the tow of thermoplastic filaments consists of highly crimped cellulose acetate filaments.

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