

[54] **APPARATUS FOR CONVEYING WEBS**
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[73] Assignee: **Celanese Corporation**, New York, N.Y.
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[52] U.S. Cl. 93/1 C, 93/1 WZ, 93/20, 93/82, 29/122, 226/195, 242/155
[51] Int. Cl. B31d 5/02, B31f 1/00, B31c 5/00
[58] Field of Search 93/1 C, 1 G, 1 WZ, 20, 82, 93/94; 29/122; 226/195; 242/155

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[57] **ABSTRACT**

The uniformity of cigarette filters formed from coherent webs of filtration material is improved by feeding of the web about a convex idler roll just prior to feeding of the web into the garniture of a cigarette filter rod maker, and preferably feeding the web from the idler roll to the rod maker along the axis of the garniture.

3 Claims, 3 Drawing Figures

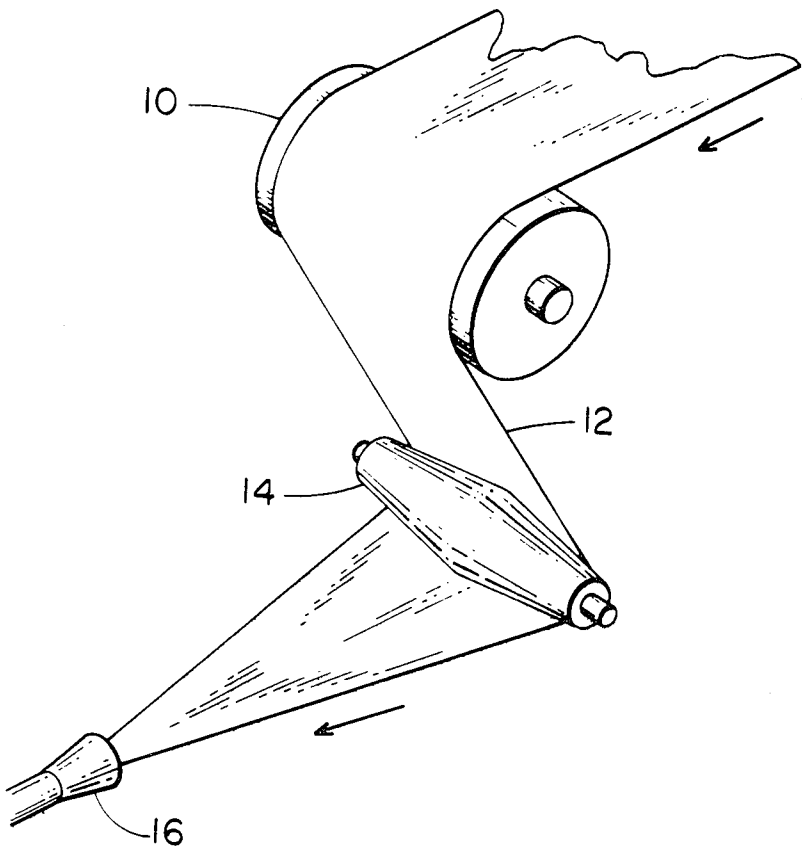


FIGURE 1

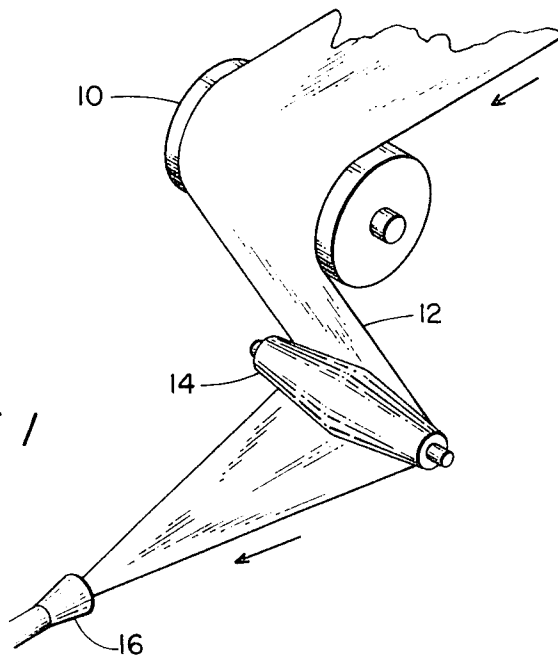


FIGURE 2

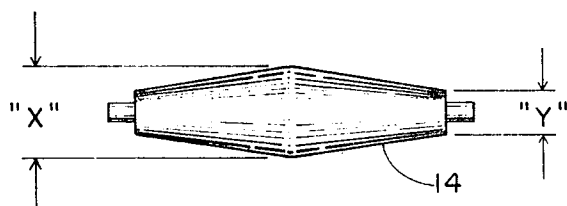
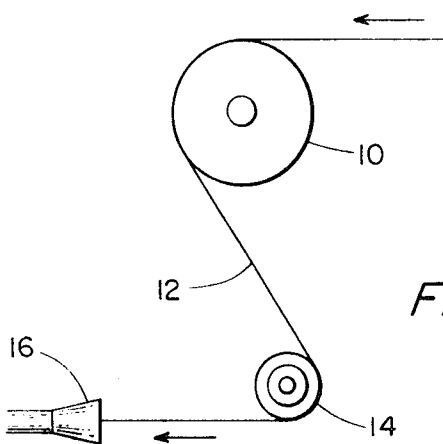


FIGURE 3

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APPARATUS FOR CONVEYING WEBS

SUMMARY OF THE INVENTION

The present invention relates generally to the formation of improved aerosol filter rods, and more particularly to formation of improved cigarette filters. Briefly, the present invention is concerned with apparatus and process improvements which serve in the preparation of cigarette filters having improved uniformity.

Essentially, the present invention resides in an improved feed means and method for conveying a coherent web of filter material to the garniture, or condensing funnel, of a rod maker which converts the coherent web into a cylindrical rod of filtration material which may be subsequently processed, e.g., by cutting to desired lengths.

DRAWINGS

FIG. 1 is a perspective of the present feeding systems and a coherent web being conveyed.

FIG. 2 is a plan view of the feeding system and a web.

FIG. 3 is a side view of the convex roll of the present invention.

DESCRIPTION OF THE INVENTION

One of the primary disadvantages experienced in the preparation of cigarette filters from coherent webs of filtration material, e.g., paper webs, nonwoven webs and corrugated webs, such as described in Ser. No. 737,519 to the assignee of the present invention, is lack of uniformity as evidenced by variations in pressure drop, i.e., resistance to draw, of the prepared filter.

Accordingly, it is an object of the present invention to provide an apparatus and process for reducing the variability of such filters.

It is yet another object to provide a feed means for conveying coherent webs from a source of supply to the garniture of a rod maker.

Another object is to provide an idler roll of improved configuration.

Other objects of the present object, if not specifically set forth herein, will be apparent to one skilled in the art from a reading of the detailed description of the present invention.

After careful study of the factors influencing the variability of cigarette filters, it has been discovered that nonuniform feeding of webs to the garniture of a rod maker is attributable primarily to variations resulting primarily from undulation of the edges of the web prior to its entrance into the garniture, and from feeding of the web at an angle into the garniture. The present invention serves to eliminate these undesirable factors, and thus improve filter uniformity.

In the practice of the preferred embodiment of present invention, drive roll 10, rotatable by way of a drive means not shown, withdraws filter web 12 from a suitable source of supply, also not shown. The source of supply may be a roll, a bale, or a unit used in the production of the filter web, for example. Web 12 is then conveyed around the surface of a freely rotatable idler roll 14 and into garniture 16 of a filter rod maker, not shown. Preferably, drive roll 10 and idler roll 14 are positioned in such a manner that the web travels in a "Z" path from the source of supply to the rod maker. Desirably, the rolls are also positioned such that the web contacts from one-fourth to one-half or more of the circumference of each roll.

It will be noted from the drawings that rolls 10 and 14 are substantially parallel and that roll 14 is positioned such that a web traveling about the surface thereof will be fed along the longitudinal axis of the garniture.

In the preferred embodiment of the present invention, idler roll 14 has a convex configuration, i.e., the diameter of the roll at the center will be from about one and one-half to two and one-half times the diameter at each end. As shown in FIG. 3, X is one and one-half to two and one-half times the length of Y. It is to be understood, of course, that lower or higher ratios

may be employed with some loss in the advantages of the present invention being experienced. It is also desirable that idler roll 14 by a low inertia roll in order that insignificant drag will be exerted on the web and so that the speed of the roll will be readily alterable with changing web speeds. Ordinarily, the roll will be about 12 to 18 inches in length. However, any length equal to or greater than the width of the web being processed is satisfactory.

EXAMPLE

In order to determine the effect of location and roll configuration upon product variability, a coherent filter web was first conveyed about a drive roll such as illustrated drive roll 10, and then fed into the garniture of a rod maker at an angle by conveying the web about an idler roll positioned above the axis of the garniture. Results obtained are designated below as the control. Runs were then conducted using the "Z"-shaped configuration illustrated in the drawings with the idler roll on line with the axis of the garniture. Data was obtained employing a cylindrical roll, a concave roll and the convex roll of the present invention. Twenty-five sample rods having a diameter of substantially 8 mm. were taken from each run and pressure drop was determined. The results obtained are set forth in the following table.

TABLE

	Rod Pressure Drop mm./H ₂ O	% Variability From Average
Control	169-223	± 13.8
Concave Roll	208-260	± 11.3
Cylindrical Roll	181-225	± 10.7
Convex Roll	182-221	± 9.5

As will be observed from the above data, substantial improvement is observed when the "Z"-shaped configuration is employed. Even further improvements are observed using the convex idler roll as opposed to a conventional cylindrical idler roll.

The term "coherent web" as employed herein is intended to define sheets of filtration material which is not readily separable by transverse forces. Conventional filter tows are not within the scope of the present invention.

It is believed from observation of the presently claimed apparatus during operation that increased uniformity is obtained somewhat by the fact that there is no shifting and variation in resistance to movement of the web due to angular feeding and primarily to the action of the convex roll. Specifically, it appears that the greater surface speed at the center of the convex roll causes a cupping of the web and a drag effect on the edges thereof, which drag effect tensions the edges of the web, thus inhibiting the freedom of such edges to undulate during movement of the web.

While the preferred embodiment of the invention has been described with application to cigarette filter formation, it is to be understood that the invention is also useful in other applications where the conveyance of a coherent web is desired; for example, in the formation of other filters, pen wicks, tampons, etc.

It will be apparent to one skilled in the art from a consideration of the preceding description and drawings that many modifications and variations of the present invention are possible.

The embodiments of the present invention in which an exclusive property or privilege is claimed are defined as follows:

1. An apparatus for conveying a coherent filter web from a source of supply to a condensing means comprising a cylindrical drive roll and a freely rotatable convex idler roll, said drive roll and said idler roll being so positioned that a web material being drawn from a source of supply will pass in a "Z" path

about at least one-fourth of the surface of each of said rolls, and then along the longitudinal axis of said condensing means.

2. The apparatus of claim 1 wherein said condensing means is the garniture of a rod maker.

3. The apparatus of claim 1 wherein said convex idler roll 5 has a center diameter of about 1½ to 2½ times the diameter at each end.

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