United States Patent

[11] 3,537,461

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Paris, France
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[33] **France**
[31] **115084**

[54] **PROCESS FOR PRODUCING NON-STRAIGHT STRIPS**
4 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **131/145,** 83/17, 83/176, 131/14, 131/20, 270/76
[51] **Int. Cl.** **A24b 07/12,** A24b 13/02
[50] **Field of Search** ..... 131/14, 16, 20A, 140(P), 145; 270/21, 76; 83/17, 176

[56] **References Cited**

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ABSTRACT: A method to produce a product to be smoked formed by strip-shaped pieces of natural or artificial tobacco, wherein said pieces are nonstraight strands. The strands are formed by bending a tobacco sheet and superimposing the bent portions. The bent sheet is then cut obliquely across the bending axis such that the resultant cut strands, when unbent, have the same extent as that of the unbent tobacco sheet.

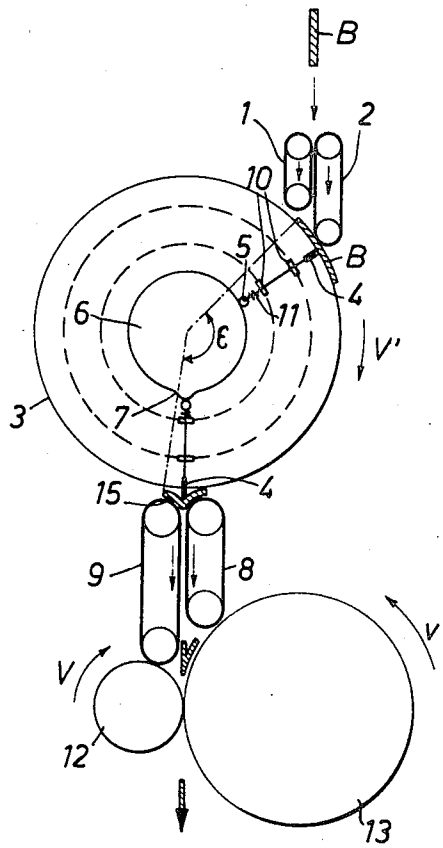


FIG. 1

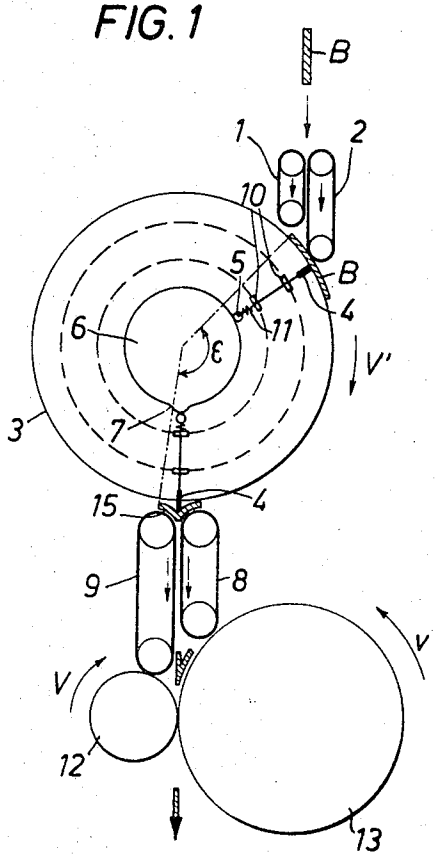


FIG. 2

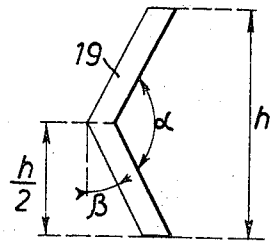


FIG. 3

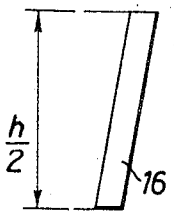


FIG. 4

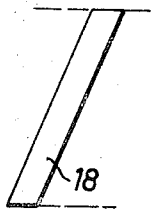


FIG. 5

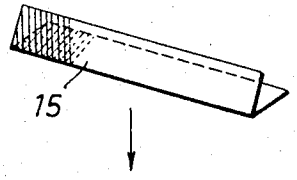


FIG. 6

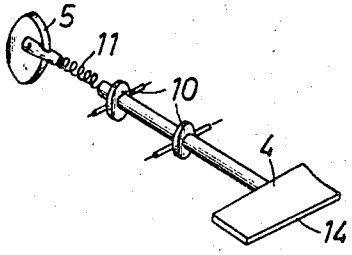


FIG. 7

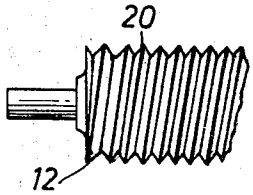


FIG. 8



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PROCESS FOR PRODUCING NON-STRAIGHT STRIPS

The present invention relates to a method for producing nonstraight strips, notably for products intended for smoking.

Tobacco is often cut into strips and used in this form in cigarettes and packets of tobacco. It is especially advantageous to be able to obtain a product with as great a bulk volume as possible. It is the object of the present invention to so produce a product of this kind as to increase its filling capacity.

Such filling capacity can be increased by systematically shaping the strips so that they occupy as much space as possible. To this end it has already been proposed to use wavy strips, but it is possible to achieve at least equally good results by imparting a nonstraight form to the strips. For example, such strips may be cut into V-shape or into sinusoidal shape.

It is an object of the present invention to provide a method of obtaining such strips by superimposing, *i.e.*, by directing towards each other, adjacent portions of the same side of a sheet material consisting for example of natural or artificial tobacco, and then cutting said sheet obliquely in relation to the fold line. The superimposition can be obtained by a concertina folding process, for instance, so that the two sides of the sheet are operated upon alternately. The term "fold" is not necessarily to be understood as implying a straight fold, and the super imposition may be such that the cross section of the sheet is shaped as a U or an O, or is rolled upon itself at one edge, or is rolled into a spiral.

It is a further object of this invention to provide a method for producing such strips, which includes means for directing two portions of the same side of a sheet towards each other, and a rotary cutting member positioned past said means for producing parallel cuts in said sheet along an oblique line in relation to the fold line or rolling line.

In accordance with one form of embodiment of the invention, the axis of the rotary cutting member is inclined to the fold line. Alternatively, the fold line may be made parallel to said axis by using a cutting member the peripheral carvings of which are formed by screw-threads and notably by a plurality thereof.

For the purpose of producing strands from strips of sheet material, the means for superimposing, or directing towards each other, the said two portions of the same side of a sheet, include conveyor means fed with successive strips and means for exerting upon each strip a pressure directed towards the middle portion thereof, and means for restraining said strip on either side of said pressure exerting means, said pressure exerting means being further devised so as to impel said strip towards another conveyor adapted to grip said middle portion of the strip.

The description which follows with reference to the accompanying nonlimitive exemplary drawing will give a clear understanding of how the invention can be carried into practice.

In the drawing:

FIG. 1 is a schematic view of a device for folding and cutting nonstraight strands from strips of sheet material;

FIG. 2 is a schematic sectional view of a nonstraight strand obtained by cutting a strip obliquely;

FIGS. 3 and 4 are schematic portrayals of a strand folded back upon itself along the fold line, as obtained with cutting members having a single screw-thread and a plurality of screw-threads, respectively;

FIG. 5 is a schematic perspective view of a folded strip as it is offered up between the cutting members;

FIG. 6 shows in perspective a detail of FIG. 1;

FIG. 7 shows a cutting roll with threaded cutting edges; and

FIG. 8 shows a rolled-up sheet of tobacco.

The devices depicted in FIGS. 1 and 6 include, past a transverse cutter, two conveyor belts 1 and 2 revolving in opposite directions. The transverse cutter cuts strips B from a continuous sheet or produces strips still attached to one another at a limited number of points along a line extending transversely relative to the direction of travel. Positioned past this dual conveyor system is a cylinder 3 having a conventional suction pull-in surface over that part of its area which is subtended by the angle ϵ. Cylinder 3 is formed with radial vanes 4 which slide through slots formed along generatrixes of cylinder 3. The rotation speed V' of cylinder 3 is adjusted according to that of the transverse cutter in such manner as to cause the middle of each strip B led up by dual conveyor 1, 2 to contact cylinder 3 just above one of said vanes. At its end adjacent the centre of the cylinder, vane 4 bears a follower 5 riding over a fixed cam 6 formed with a lobe 7 directed towards two conveyor belts 8 and 9 revolving in opposite directions. Vanes 4, which revolve with the cylinder 3, slide through guide-rings 10, a return spring 11 being provided between follower 5 and the first ring 10. Conveyor belts 8 and 9 positioned past cylinder 3 are made of rough material whereas the vanes are smooth and polished. Past conveyors 8, 9, is located a cutting device formed by two rolls 12 and 13 arranged with their axes parallel and formed with interpenetrating peripheral threads 20 thereon. The plane passing between the two adjacent runs of conveyors 8 and 9 is substantially tangential to both rolls 12 and 13.

The ribs on rolls 12 and 13 may be formed by circular grooves, in which case the leading edge 14 of vane 4 must extend obliquely to the plane containing the axes of rolls 12 and 13 so as to cause the bent edge of strip 15 to penetrate obliquely between said two rolls.

FIG. 5 shows the bent strip 15 inserted by conveyors 8 and 9 obliquely in relation to the plane containing the rotation axes of rolls 12 and 13.

FIG. 8 shows a rolled strip 21 with oblique cutting lines.

The ribs formed on rolls 12 and 13 may be screw-threads. In the case of rolls with a single screw-thread thereon, a half-strand 16 of height $h/2$ steeply inclined to the bending line will be obtained (FIG. 3), since for a given cutting width and a given diameter for roll 12, the obliquity of the screw-thread relative to the direction of travel is an imposed one, and the smaller the cutting width the less marked will be the obliquity of the screw-thread relative to the direction of travel. In such cases it may be necessary to proceed as set forth with reference to rolls with circular ribs. With rolls having a plurality of parallel threads thereon, the half-strand 18 (FIG. 4) will be more steeply inclined to the direction of travel, since for a given screw-thread the pitch is equal to n times the cutting width, where n is the number of threads. Such rolls are shown in FIG. 1 and are intended to produce an oblique cut directly. The linear velocity V at the periphery of roll 12 is preferably very substantially greater than the velocity v at the periphery of roll 13.

The strand obtained 19 will be shaped as shown in FIG. 2. The angle β is equal to the obliquity of the screw-threads, and to the bending axis and the number of screw-threads in large enough for angle α to be fairly substantial.

The theory of operation of the device shown in FIGS. 1 and 6 is as follows:

The strips B delivered one by one by a cutter producing transverse cuts in a continuous band of sheet material are entrained in succession between, and gripped by, conveyors 1 and 2. Each strip is taken up by the pull-in cylinder 3, the velocity V' of which is such that the middle of each strip B registers with a slot in cylinder 3 through which a vane 4 is radially slidable. The strip drawn in and restrained thus is conveyed by the rotating cylinder up to the place of entry b etween the two adjacent runs of conveyors 8 and 9. At this point cam 6 causes the vane to emerge from its housing and protrude from the cylinder. The strip, which is still held by the pull exerted on it, then gradually assumes an inverted V-shaped profile until the peak of this profile contacts conveyors 8 and 9, which then grip the strip shaped thus. The bent strip between the conveyors is then transferred towards the zone of interpenetration of rolls 12 and 13.

We claim:

1. A process of producing tobacco fragments for smokers articles, in the form of nonstraight strands, comprising the step of directing toward each other two portions of a tobacco sheet by bending said sheet to cause said portions to be superim-

posed and face each other and cutting said sheet obliquely across and in relation to the bending axes, whereby the major portion of said strands when unbent have the same extent as that of the unbent tobacco sheet.

2. A process as in claim 1, wherein said superimposition is such as to cause said two portions of said sheet to face one another alternately.

3. A process as in claim 1, wherein said sheet is folded back upon itself to form a U-and oblique cuts are made in relation to the fold line thus produced.

4. A process as in claim 1, wherein said sheet is rolled up and cuts are made obliquely in relation to the rolling axis.