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APPARATUS FOR PRODUCING A TOBACCO ROD

Filed Aug. 30, 1963

2 Sheets-Sheet 1
APPARATUS FOR PRODUCING A TOBACCO ROD
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Filed Aug. 20, 1963, Ser. No. 306,655
Claims priority, application Germany, July 11, 1958,
H 33,783
6 Claims. (Cl. 131—84)

This is a continuation-in-part of my application Serial
No. 826,055, filed July 9, 1959 and now abandoned.

The present invention relates to an apparatus for pro-
ducing a tobacco rod.

It has been proposed hitherto in the production of a
tobacco rod, for the purpose of making therefrom ciga-
rettes, to feed cut tobacco onto a rotary disc and to sub-
ject the tobacco on this rotary disc to the action of cen-
trifugal force, whereupon the rotating tobacco mass is
discharged in a tangential direction from the rotary disc
due to the forming device of a cigarette rod machine.

Such apparatus produces a precompaction of an initial
compact of the rotating material. However, it is not
at all certain that a uniform tobacco mass is pro-
duced and, accordingly, a uniform tobacco rod is also
not produced with absolute certainty, because the necessary
uniform feed of the tobacco onto the rotary disc which
subjects the tobacco to the action of centrifugal force can
practically not be obtained.

It is an object of the invention to produce a rotating
tobacco body or ring of such density and to continuously
maintain such a rotating tobacco ring by continuously
adding loose tobacco particles thereto so that it is possible
to separate (i.e., to sever) from the latter with reasonable
reliability a uniformly dense or compact rod which re-
mains uniformly compact throughout the course of pro-
duction, namely, until that time the rod is cut into pieces.

A further object of the invention is to cut a uniformly
produced tobacco rod from a mass of cut tobacco having
a predetermined cross section and a uniform density,
and to convey this rod toward a cigarette rod forming band.

The invention will now be described in more detail with
reference to the accompanying drawings which illustrate
diagrammatically two apparatus in which a hollow conical
or annular tobacco mass is formed by means of two con-
tactingly arranged conical or ring-shaped casings, while
the rod itself is cut by means of a horizontally or ver-
tically rotating cutting disc which severs a strip from the
base or from the periphery of the hollow conical or an-
nular tobacco mass.

In the drawings:

FIG. 1 illustrates a first apparatus in vertical section
substantially as seen in the direction of arrows from the
line I—I of FIG. 2;

FIG. 2 is a horizontal section through the apparatus
as seen in the direction of arrows from the line II—II of
FIG. 1 but with the double cone casing and its drive
omitted;

FIG. 3 is a horizontal section through a second appa-
ratus, as seen in the direction of arrows from the line
III—III of FIG. 4 and

FIG. 4 illustrates the second apparatus in vertical sec-
tion as seen in the direction of arrows from the line
IV—IV of FIG. 3.

Referring to the drawings, FIGS. 1 and 2 show an
apparatus for transforming a stream of loose tobacco
particles into a tobacco rod. This apparatus comprises a
hollow double conical casing 1 which is formed with an
annular tobacco receiving space 1a between its spaced
concentric annular walls 1b, 1c. The annular space 1a
has a first pair of sides which are bounded by the annular

walls 1b, 1c of the casing 1 and a second pair of sides
including an open upper side or upper end and an annular
side or lower end. The casing is supplied with a stream
of cut tobacco particles which are fed through the upper
side of the annular space 1a by the discharge end of a
belt conveyor or another suitable feeding means so that
the particles of cut tobacco descend in the direction indi-
cated by the arrow 2. The annular bottom 1a' of the
casing is located beneath the annular space 1a and has a
substantially horizontal helicoidal top surface having a pitch equal to the vertical dimension indicated by a reference numeral 3. The bottom 1a' is
fixed to a stationary part of the machine. The hollow
double conical casing 1 is rotated about a vertical axis
and for this purpose is provided with a toothed rim Z
which forms part of the means for rotating the annular
walls 1b, 1c, of the casing 1 in the same direction and
which is driven in any desired manner. As a result of
the rotation of the hollow double conical casing 1 and the
centrifugal force acting upon the particles of cut tobacco
which drop downwardly through the open upper side of
the annular space 1a, there is formed at the lower end
of the hollow double conical casing 1 a tobacco body or
ring T which at the end E of the helicoidal top surface
of the bottom 1a' is continuously cut by a cutter means
here shown as a rotary circular knife 4 having a blade rotating
about a vertical axis and located in a horizontal plane
which is disposed below the underside of the annular space
1a. The blade of the knife 4 extends into the rotating
body of tobacco which moves in a direction from the
upper side toward the underside of the ring T below the
annular space 1a. The severed continuous tobacco 1a which has a trimmed or equalized upper surface and a
trimmed or equalized under surface is discharged onto a
conveyor belt 5 which feeds the tobacco rod tangentially
toward the forming device, not shown. A belt 7, trained
around rolls 8, partially surrounds the lower portion of the
belt 1a and a portion of this belt extends tangentially
from the wall 1c to constitute a side wall for the tobacco
rod which advances with the upper stringer of the belt 5.

The helical top surface of the bottom 1a' is inclined down-
wardly from the level of the blade of the knife 4 in the
same direction in which the walls 1b, 1c of the casing 1
rotate, and its lead equals the height of the tobacco rod.

The tobacco rod is formed between the belt 7, the lower
part of the wall 1b, and the bottom 1a'.

It will be noted that, in accordance with the apparatus
of FIGS. 1 and 2, the cutter 4 severes the tobacco rod
from the leading (lower) end of the annular body of
tobacco which revolves in and which moves axially
through the annular space 1a and that the body of tobacco
is being rebuilt by tobacco added at the trailing (upper)
end thereof at the same rate at which tobacco which forms
the rod is being removed therefrom.

The tobacco rod is formed in the embodiment shown
in FIGS. 1 and 2 by feeding shredded tobacco between
the walls 1b and 1c forming a rotating annular cone of
tobacco in the space 1a whose bottom is defined by the
upper surface of the helical member 1a'. The ring T,
below the space 1a, is defined externally by the belt 7
and internally by a short substantially cylindrical flange
member which is shown in FIG. 1. The upper portion of
the flange extends tangentially to a stationary portion of
the device. The cylindrical flange has a tangential extension in confronting relation with a portion of the belt 7 on opposite sides of and above the
belt 5, forming a U-shaped channel extending downwardly from the position E as shown in FIG. 2. The
height of the rod on the belt 5 is determined by the loca-
tion of the cutting knife 4. Obviously, and as shown in
FIGS. 3 and 4, another apparatus for producing a tobacco
rod of constant density and uniform cross section may be
employed and in such apparatus one side surface of the
tobacco rod which faces the tobacco ring is limited by the knife which rotates in a vertical plane about a horizontal axis; while the other three surfaces of the tobacco rod are bounded by suitable moving wall or belt like. This modified apparatus comprises suitable means for feeding a stream of loose tobacco particles and such means may assume the form of a fixedly mounted hopper 101 located above the central portion of a circular disc 102 driven in a horizontal plane. The motion of this disc 102 is adjacent to the inner side of the fixed wall 106. Another belt 113 runs at the same speed over rolls 114. The strings of the belt 113 are located in vertical planes. Parts of the belts 111, 113 and of a further belt 115 guided by a roll 116 together form a chute which is tangential to the peripheries of the flat rings 104 and 105. The upper stringer of the belt 115 is located in a horizontal plane beneath the adjacent portions of the belts 111, 113. In a plane tangent to the rings 104, 105 there is mounted a rotating cutter 117 driven about a horizontal axis by a motor 118 and having a blade which is located in a vertical plane extending into the annular body of tobacco which is formed in the annular space between the rings 104, 105. The particles of loose tobacco continuously supplied through the hopper 101 and landing on the central portion of the rotating disc 102 are subjected to the action of centrifugal force and are hurled in radial directions through the inner side of and into the annular space formed by the rotating flat rings 104 and 105 bounded along its outer side by the belt 111. The cross section of the annular space is larger than the cross section of the tobacco rod to be produced. A part of the so formed rotating annular tobacco body, which is precompressed by centrifugal force, is severed by the rotating cutter 117 and leaves the annular space by being tangentially propelled in the chute formed by the belts 111, 113 and 115. The blade of the cutter 117 trims both side surfaces of the resulting one side surface (which travels along the belt 111) is trimmed just before the tobacco rod enters the chute and because the other side surface (which travels along the belt 113) was trimmed during the preceding revolution of the rings 104, 105. This will be readily understood since the tobacco which is being rotated from the rod (i.e., the remainder of the revolving tobacco body in the annular space between the rings 104, 105) travels along the inner side of the belt 111 and its peripheral surface remains trimmed while moving toward and along the belt 113. In other words, in all embodiments of my invention, a single cutter can trim two sides of the tobacco rod by first trimming one side of the tobacco rod during a first revolution of the precompressed tobacco body and by thereupon trimming the opposite side of the tobacco rod during the next revolution of the tobacco body.

In the apparatus of FIGS. 3 and 4, tobacco forming the revolving body descends toward the lower end of said annular space whereby the thus obtained annular body of compacted tobacco descends toward the lower end of said annular space; cutter means arranged to sever a continuous rod of tobacco from the annular body of tobacco emerging at the lower end of said annular space; cutter means comprising a blade located in a substantially horizontal plane and rotating about a fixed substantially vertical axis; and a stationary bottom wall having an annular upper surface of helicoidal outline located beneath the lower end of said annular space and having a pitch which corresponds substantially to the height of the tobacco rod, said surface being inclined downwardly from the level of said blade and in the direction of rotation of said annular walls so that the annular body of tobacco which rests on said surface descends while it rotates with said annular walls.

2. An apparatus for forming a continuous rod of uniformly compacted tobacco, comprising an inner annular wall; an outer annular wall disposed around and defining with said inner annular wall an annular tobacco receiving space having an upper end and a lower end; means for feeding tobacco through the upper end of said annular space; means for rotating said walls about a substantially vertical axis so as to rotate in and to simultaneously compact the tobacco in said annular space whereby the thus obtained annular body of compacted tobacco descends toward the lower end of said annular space; cutter means arranged to sever a continuous rod of tobacco from the annular body of tobacco emerging at the lower end of said annular space; cutter means comprising a blade located in a substantially horizontal plane and rotating about a fixed substantially vertical axis; and a stationary bottom wall having an annular upper surface of helicoidal outline located beneath the lower end of said annular space and having a pitch which corresponds substantially to the height of the tobacco rod, said surface being inclined downwardly from the level of said blade and in the direction of rotation of said annular walls so that the annular body of tobacco which rests on said surface descends while it rotates with said annular walls.

3. An apparatus as set forth in claim 2, wherein said inlet port is located at a level above said annular outlet port and has a diameter that is smaller than the diameter of said annular outlet port.

4. An apparatus as set forth in claim 2, wherein said predetermined axis is a substantially vertical axis.

References on following page
### References Cited by the Examiner

<table>
<thead>
<tr>
<th>Number</th>
<th>Date</th>
<th>Inventor</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>459,118</td>
<td>9/1891</td>
<td>Allison</td>
<td>131—84</td>
</tr>
<tr>
<td>739,897</td>
<td>9/1903</td>
<td>Moesinger</td>
<td>131—66</td>
</tr>
<tr>
<td>2,629,386</td>
<td>2/1953</td>
<td>Kochalski</td>
<td>131—66</td>
</tr>
<tr>
<td>2,835,297</td>
<td>5/1958</td>
<td>Kochalski</td>
<td>146—106</td>
</tr>
<tr>
<td>3,074,414</td>
<td>1/1963</td>
<td>Dearsley</td>
<td>131—84</td>
</tr>
</tbody>
</table>

### FOREIGN PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Date</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>184,314</td>
<td>4/1907</td>
<td>Germany</td>
</tr>
<tr>
<td>624,871</td>
<td>1/1936</td>
<td>Germany</td>
</tr>
</tbody>
</table>

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