March 9, 1965 G. G. LAKOS 3,172,412

DEVICE FOR PRODUCING A CONTINUOUS TOBACCO ROD

Filed May 3, 1961

Fig. 1,

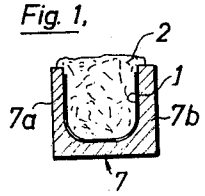


Fig. 2,

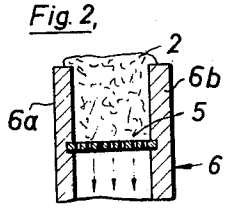


Fig. 3,

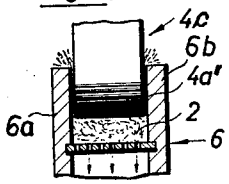


Fig. 4

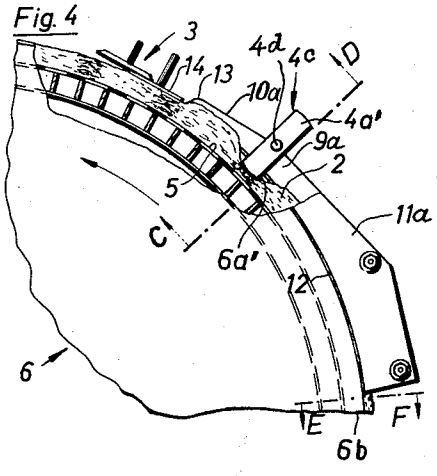


Fig. 5

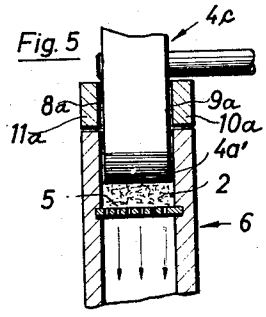


Fig. 6

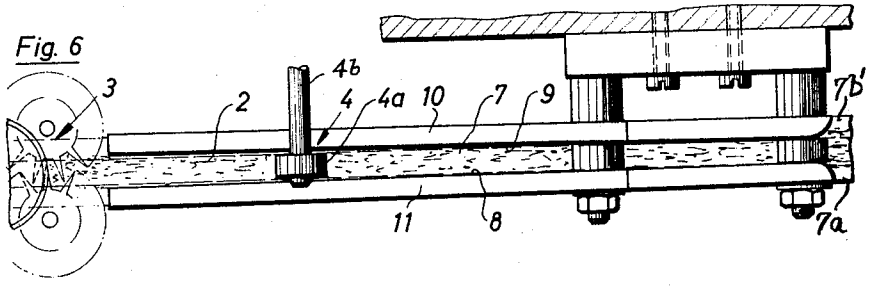
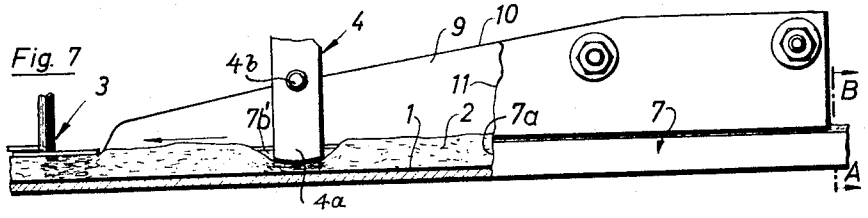


Fig. 7



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DEVICE FOR PRODUCING A CONTINUOUS TOBACCO ROD

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The present invention relates to cigarette making machines, and more particularly to an apparatus for producing a continuous tobacco rod which is provided with longitudinally spaced compacted or denser zones.

The apparatus of the present invention comprises a conveyor for a tobacco stream which cooperates with a trimming or equalizing device for removing excess tobacco from the tobacco stream. Immediately upstream of the trimming device, there is provided a mechanical compressing or compacting means which engages the tobacco stream periodically so as to produce longitudinally spaced compacted zones in the tobacco stream.

In the operating range of the compacting means, the conveyor is provided with an elongated groove for the tobacco stream. This groove has three sides and an open top which terminates in immediate proximity to the trimming plane of the trimming device so that excess tobacco projects beyond two lateral side walls of the groove. When the tobacco stream is operated upon by the compacting means and is compressed, then depending upon the height of the body of tobacco projecting beyond the open top of the groove a portion of the projecting body of tobacco is apt to be deflected laterally which results in non-uniform compacting action and, furthermore, such lateral deflection of tobacco affects the uniformity of the trimming operation.

It is an object of the present invention to eliminate the abovementioned drawbacks and to provide means which prevent any lateral displacement of the tobacco stream beyond the side walls of the tobacco conveying groove within the range of the compacting means. In accordance with the invention means are provided for increasing the height of the lateral side walls of the conveyor by providing separate guide walls or plate members the inwardly directed faces of which are arranged in the same plane as the inner faces of the side walls. This is of particular advantage when the groove is a suction groove whose bottom wall is perforated so that air can pass through the tobacco stream and the perforations so that all of the tobacco fibers are urged by the pressure difference toward the bottom of the groove.

It is another object of the invention to increase the effective height of the lateral side walls of the conveyor by means of stationary lateral guide walls or plates which are arranged within the range of the compacting means and are positioned on top of the edges of the side walls.

It is also an object of the invention to provide in a continuous tobacco rod producing machine a circular disc whose periphery is formed with a groove for receiving the tobacco stream. The disc is rotated about a horizontal axis and is disposed in a vertical plane. Guide walls are adjacent to the periphery of the disc within the range of the compacting means extend close to the trimming device. These guide walls are stationary plates having bottom edges which are closely adjacent to the periphery of the disc.

Another object of the invention is to provide in a machine for producing a continuous tobacco rod a straight conveyor which receives the tobacco stream from a tobacco distributor and which defines an elongated straight conveyor groove whose depth is defined additionally by

two side plates providing guide walls arranged adjacent the top of the tobacco receiving groove.

With these and other objects in view, the apparatus of my invention will now be described in more detail with reference to the accompanying drawings which illustrate two embodiments of the apparatus and in which:

FIG. 1 is a transverse section through a conventional straight tobacco stream conveyor channel as seen in the direction of arrows at the ends of the line A–B of FIG. 7;

FIG. 2 is a transverse section through a conventional tobacco stream conveyor groove as seen in the direction of arrows at the ends of the line E–F of FIG. 4;

FIG. 3 is a section similar to that of FIG. 2, and illustrates the manner in which the pressing segment of a pressing element compacts the tobacco in the suction groove of a conveyor disc;

FIG. 4 is an elevational view of a portion of a rotary suction conveyor disc which is provided with novel guide surfaces for the tobacco stream and which cooperates with compacting and trimming means for the tobacco stream;

FIG. 5 is an enlarged transverse section as seen in the direction substantially of the line C–D of FIG. 4;

FIG. 6 is a top plan view of another conveyor which defines a straight tobacco receiving channel and which is used in a continuous rod cigarette making machine having compacting and trimming means for the tobacco stream; and

FIG. 7 is a side elevational view of the structure shown in FIG. 6, partly in section.

Referring to FIGS. 1, 6 and 7, there is shown a conveyor including an endless straight conveyor band 1 which is U-shaped in cross section and contains tobacco in excess of that required in the tobacco rod to be produced. The upper run of this U-shaped band 1 with the tobacco therein is moved endwise in an elongated straight path defined by a U-shaped supporting channel 7 having side walls 7*a* and 7*b*. Such conveyors are well known in tobacco rod making machines. FIG. 1 shows the channel 7 in section at a point where the channel 7 is not provided with the guide walls of my invention. It will be noted that the tobacco has the tendency to spread laterally at the top of the U-shaped channel 7. As shown in FIGS. 6 and 7, a trimming device 3 is arranged above the channel 7 and is positioned with respect to the channel in such a manner that the tobacco stream 2 moving from the right toward the left is trimmed to a predetermined cross section so as to form a tobacco filler which contains only such quantity of tobacco as is required for producing the desired tobacco rod.

At a point upstream of the trimming device 3, there is arranged a mechanically compacting or compressing element 4 which is rotatable in a circular path about the axis of a horizontal driving shaft 4*b* and which is operated in such a manner that it engages and compresses or compacts the moving tobacco stream 2 at regular intervals so that the tobacco stream is compacted to a desired density at points which are spaced at a pre-determined distance from each other. When the tobacco stream subsequently passes the trimming device 3 which removes excess tobacco, very little tobacco or none at all will be removed in the zones in which the tobacco stream is compressed. In actual practice the stations at which compacting and trimming of tobacco take place are very close to each other. The compacted tobacco in such zones will expand to some degree before reaching the trimming station. The extent of such expansion is known and is considered at the time the compacting element 4 engages and compresses the tobacco stream. After passing the compacting element 4, the tobacco stream is conveyed toward the trimming device 3 so that, upon completion of the trimming operation, the quantity of to-

bacco per unit length of the thus obtained filler is less than the quantity of tobacco per unit length of the stream which passes along the compacting station. The peripheral speed of the compacting element 4 in that portion of its path which is immediately adjacent to a portion of the path of the tobacco stream corresponds to the speed of the tobacco stream. The compacting element 4 comprises two diametrically opposed pressing segments 4*a*, and the distance between two adjacent compacted tobacco zones is assumed to correspond to the combined length of two cigarettes.

FIG. 6 shows a tobacco rod making machine in which the tobacco stream 2 contains excess tobacco and this tobacco stream is compressed by two pressing segments 4*a* of a compacting element 4 while it passes the compacting station. It will be noted that the straight path of the tobacco stream is tangential to the circular path of the segments 4*a*. The compacted zones 7*b'* of the tobacco stream 2 expand somewhat before they reach the trimming device 3 so that a greater quantity of tobacco is trimmed off the non-compacted zones of the stream whereas only a small quantity of tobacco or none at all is removed from the compacted zones of the stream.

The trimmed-off excess tobacco is led away in a conventional manner by a conveying means which is not illustrated in the drawings and such excess tobacco is returned either to the tobacco distributor or to the tobacco stream at a point upstream of the compacting element.

In order to prevent lateral expansion of the tobacco stream 2 when it is compacted in a vertical direction as viewed in FIG. 3, the upwardly extending lateral side walls of the U-shaped conveyor band 1 are extended by two guide faces 8 and 9 provided on lateral guide walls or plates 10 and 11 which are arranged in a manner to permit the compacting element 4 to enter the tobacco-receiving groove. These plates 10 and 11 are mounted on top of the side walls 7*a* and 7*b* of the channel 7 and prevent lateral expansion of the tobacco stream so that the entire body of tobacco is compressed in a vertical direction toward the bottom of the conveyor band 1.

FIGS. 2, 3, 4 and 5 illustrate another embodiment of the invention in which the straight groove 7 formed by the U-shaped conveyor band 1 is replaced by a circular suction groove 5 provided in the periphery of a suction conveyor disc 6 which rotates about a horizontal axis and is disposed in a vertical plane. Compacting element 4*c* which rotates in a circular path about the axis of a horizontal shaft 4*d* is adjacent to and is disposed above the suction groove 5, adjacent to the periphery of the circular conveyor disc 6 so that, upon rotation of the compacting element 4*c*, its two pressing segments 4*a'* enter periodically into the suction groove 5 of the disc 6. As shown in FIGS. 2 and 3, the layer of tobacco at the radially outer periphery of the tobacco stream 2, which stream advances in a circular path tangential to the circular path of the element 4, may expand laterally in the same manner as shown in FIG. 1. However, such lateral expansion of the tobacco stream is prevented by radially projecting extensions of the lateral side walls 6*a* and 6*b* which bound the suction groove 5. These extensions assume the form of two fixedly mounted parallel guide walls or plates 10*a* and 11*a* whose inner sides 8*a* and 9*a* face each other and are spaced from each other through a distance which is substantially the same as the distance between the side walls 6 and 6*b* of the groove 5. The inner end faces 12 of these guide walls 10*a* and 11*a* have the same curvature as the conveyor disc, see FIG. 4.

The leading portions 13 of the guide walls 10*a* and 11*a* extend very close to a pair of meshing star wheels 14 which are located directly upstream of the trimming device 3. Therefore, lateral expansion of the tobacco stream 2 in the region 6*a'* where the stream is subjected to the action of the pressing segments 4*a'* in the suction groove 5 is prevented by the guide walls 10*a* and 11*a*.

The operation of this modified machine is substantially the same as that of the machine shown in FIGS. 1, 6 and 7.

What I claim is:

1. In a tobacco rod making machine, in combination, a conveyor including bottom and side walls forming a tobacco receiving groove having an open side into which tobacco is adapted to be fed so as to form therein a filler stream containing an excess of tobacco over that required for the tobacco rod, said conveyor being arranged to move in an elongated path to advance said filler stream; stationary lateral guide walls located along a first portion of said elongated path and constituting extensions of said side walls so that the filler stream is confined between said side walls and said guide walls while advancing along said first portion of the elongated path; tobacco compressing means located adjacent to said first portion of the elongated path and being arranged to move between said guide walls in a path having a component which is transversely directed with respect to said elongated path so as to compress spaced portions of the filler stream against the bottom wall of said conveyor providing compacted spaced zones therein while said filler stream is confined within said guide walls and said side walls; and trimming means located in a second portion of said elongated path downstream of said guide walls and said compressing means and in close proximity to the open side of said groove, said trimming means being located substantially closer to said groove than the outer ends of said guide walls so as to remove said excess of tobacco from the filler stream thereby forming a filler stream having a uniform cross section and having compacted zones alternating with zones of lesser density.

2. In a tobacco rod making machine as set forth in claim 1, wherein the paths of said conveyor and said compressing means are circular paths.

3. In a tobacco rod making machine as set forth in claim 1, wherein said conveyor is arranged to move in a straight path.

4. In a tobacco rod making machine as set forth in claim 1, wherein said conveyor is a rotary disc and wherein said groove is provided in the periphery of said disc.

5. In a tobacco rod making machine as set forth in claim 1, wherein said compressing means comprises a pressing member which is arranged to rotate about a fixed axis so as to move into engagement with the tobacco stream at least once during each revolution thereof.

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