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MACHINES FOR PRODUCING A CONTINUOUS ROD OF FIBROUS MATERIAL

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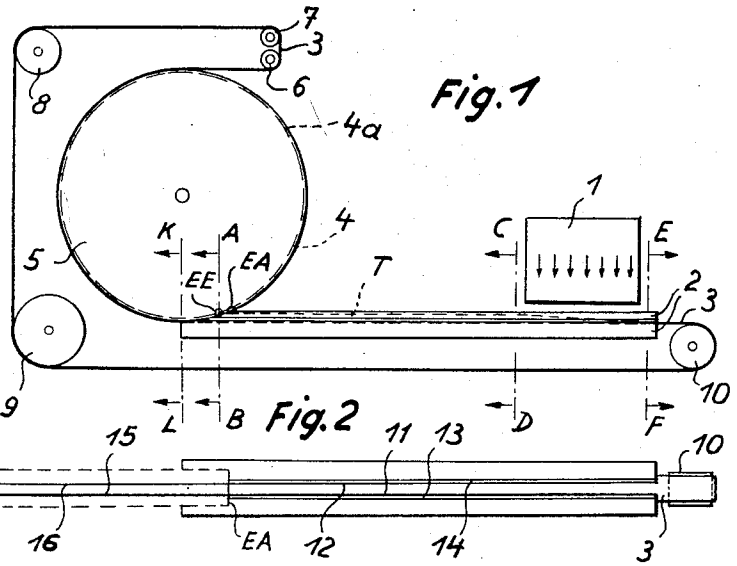


Fig. 1

Fig. 2

Fig. 3

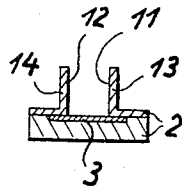


Fig. 4

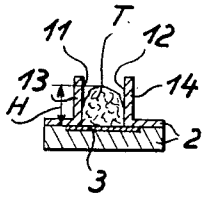


Fig. 5

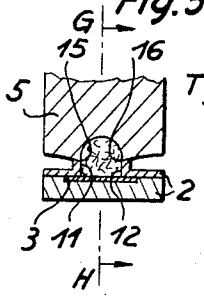


Fig. 6

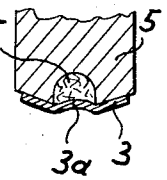
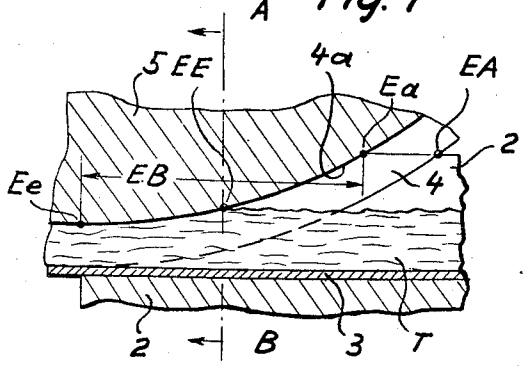


Fig. 7



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MACHINES FOR PRODUCING A CONTINUOUS ROD OF FIBROUS MATERIAL

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2 Claims. (Cl. 131—84)

The present invention relates to improvements in machines for producing a continuous rod of fibrous material and particularly to machines for producing cigarettes, cigarillos and the like using an opener disposed at a lower level than or beneath the rod-forming elements by which the tobacco is formed into a rod, and in which the tobacco coming from the opener is deflected into the opposite direction by means of a feeder belt and a feed wheel rotating in a vertical plane and provided with a groove in its periphery, said wheel being surrounded by the belt for about one-half of its periphery, is raised to a higher level and fed to the rod-forming elements.

It was previously thought that the tobacco must be pre-compacted if it is to be raised to this higher level and for this reason care was taken to ensure that the tobacco was already pre-compressed in the feed duct to the feed wheel, that is before its entry into the groove thereof and the bottom of the tobacco feed duct was formed by the feeder belt travelling beneath the opener. For this purpose the fundamental starting point was the pre-compression of the tobacco stream by reducing its cross-section, particularly by compressing it transversely to the feed direction, by making the cross-section of the tobacco feed duct of progressively reducing cross-section towards the feed wheel and the groove in the periphery of the said wheel was made only as wide as the minimum cross-section of the duct at the entry point to the feed wheel.

Since tobacco compressed in this or any other way tends to expand again, piling up may occur in the region of the entry point and attempts have been made to avoid this by enlarging the reduced cross-section of the tobacco feed duct, as seen in the direction of movement of the tobacco, in the region of a tapered entry guide at the entry point to the feed wheel. In this case however additional compression means is necessary, for example an endless steel belt acting from above on the tobacco stream, but such devices should preferably be avoided owing to their liability to damage.

The invention has for its object to provide another way of securing the wanted result which is free from the aforesaid disadvantages, and is based on an arrangement wherein the groove in the feed wheel is as wide as possible to prevent any piling up of tobacco in the entry region thereof and is in fact so wide that an unencumbered and complete entry of the tobacco stream is reliably permitted without it having been influenced by any compression means and avoids all compression of the tobacco stream transversely to the feed direction.

A further object of the invention is to provide a continuous rod cigarette machine in which a feeder wheel is provided having a peripheral groove equal or approximately equal to the uniform spacing of mutually opposed elements defining the sides of the tobacco stream, which are set as far apart as possible and the bottom of the groove in the feed wheel acts on the tobacco stream from one side and the feeder belt acts thereon from the other side with a slight curvature directed towards the groove,

and both the opposed surfaces are so proportioned relatively that together they are only sufficient to effect the displacement and reversal of the non-compressed tobacco stream.

According to the invention the aforesaid defining elements for the tobacco stream in the region of the tobacco feed duct must therefore coincide or nearly coincide with the development of the side defining walls of the groove in the periphery of the feed wheel but the side walls defining the tobacco stream may diverge to a comparatively minor extent in the direction of travel of the tobacco. This divergence of the side defining elements of the tobacco stream only serves the purpose of compensating frictional resistance which may occur between the tobacco and the walls of the tobacco feed duct as the bearing points of the tobacco stream are not formed on all sides by the tobacco belt, and the groove in the feeder wheel is then made wider by this small amount.

Hence in carrying out the formation of a tobacco rod in accordance with the present invention there is no pre-compression of the tobacco stream before entry into the feeder wheel groove, but on the other hand the actual compression to form the rod is effected after the position of the tobacco stream has been reversed on the feed wheel.

One constructional example of the machine according to the present invention is shown by way of example on the accompanying drawing wherein:

Fig. 1 is a partial general view of a machine with the feed wheel and the tobacco feed duct.

Fig. 2 is a plan of the tobacco feed duct with a development of the side defining elements of the side wall edges of the groove in the feed wheel,

Fig. 3 shows the tobacco feed duct in section on the line E—F in Fig. 1,

Fig. 4 shows the tobacco feed duct in section on the line C—D in Fig. 1,

Fig. 5 shows the tobacco feed duct and the feed wheel in section on the line A—B in Fig. 1,

Fig. 6 shows the tobacco feed duct and the feed wheel in section on the line K—L in Fig. 1 on a larger scale, and

Fig. 7 is a section on the line G—H in Fig. 5.

In the constructional example shown a part of a continuous cigarette or like rod-forming machine is shown, this being part of a machine for producing cigarettes or the like and since the rest of the machine is arranged in a manner which will be appreciated by those skilled in this art it has not been deemed necessary to show the rest of the machine in detail.

Tobacco is fed from an opener **1** in a continuous shower on to a feeder belt **3** in a tobacco duct **2** which supplies the tobacco into a groove **4** of the feed wheel **5**. The tobacco located in the groove **4** and now covered by the feeder belt is raised to a higher level by the rotation of the feed wheel and removed in known manner from the groove **4**. The feeder belt **3** returns to the opener by passing over reverser rollers **6**, **7**, **8**, **9**, and **10**. Any suitable means are provided for conjoint displacement of the belt **3** and the feed wheel **5** and for maintaining the belt in tension for the part of its path of movement where it partly encircles the wheel **5**. As shown the duct **2** is disposed tangentially to the feed wheel **5** at the lowermost point thereof.

In the example shown a continuous rod machine is indicated having a tobacco duct **2** of right-angular form, the bottom of which is formed by a travelling feeder belt **3** which is flat at this point, but it will be understood that these parts may be arranged in other ways such as will be evident to those skilled in the art.

As will be seen from Fig. 2 the inner surfaces **11** and **12** of side wall members **13** and **14** of the tobacco duct **2** form the side defining walls of the tobacco stream

which are set as far apart as possible and are shaped from the point EA onwards to coincide with the edges **15**, **16** of the groove in the periphery of the feed wheel and lying in the same plane. The tobacco stream T falling in a continuous shower on the feeder belt **3** is fed without any deformation and without compression to the feed wheel **5** at the entry point EA at which point the bottom *4a* of the feed wheel groove **4** approaches the tobacco stream T as shown in Fig. 7, thus smoothing out any unevenness in its upper surface, and as shown in Fig. 6 the feeder belt **3** presses against the tobacco stream from one side as a result of a slight curvature *3a* thereof so that only the height or thickness of the tobacco stream is reduced and this only to such a small extent that the tobacco stream can be carried in an upward direction and reversed in direction to reach the rod-forming elements which may be disposed above the opener **1**.

In the preferred arrangement shown on the drawings the periphery of the feed wheel **5** is of broadly convex form so that the corners **15**, **16** between the peripheral face portions and the groove **4** comprise the parts of the wheel of largest diameter. This arrangement has the merit of ensuring that the feeder belt **3** tends to centralise itself on the face of the wheel and assists in forming the inwardly curved part *3a* pressing on the tobacco T.

Referring to Fig. 7 it will be seen that the upper edges of the side wall parts **13**, **14** intersect the periphery of the wheel **4** at the points EA. If the plane of the upper face of the duct **2** is continued it will meet the base of the groove **4** at point E*a* and the portion of the periphery of the wheel **5** between point E*a* and the lowermost point E*e* permits smoothing out or evening of the tobacco and is such as to ensure efficient transport of the tobacco stream to a higher level where it can be combined with a paper strip and fed into the usual cigarette rod forming mechanism, not shown.

The duct **2** is conveniently formed by a base member with a shallow facial depression to accommodate the belt **3** and by angle members **13**, **14** fitted to the upper face thereof which overlap the depression taking the belt **3** so that when the latter reaches the wheel **5** the tobacco stream T is caused to enter the groove **4** while the edges of the belt **3** are guided onto the peripheral faces of the wheel.

What we claim is:

1. Apparatus for forming a continuous rod of tobacco comprising a feed wheel rotatable in a vertical plane and having a peripheral groove therein, a tobacco feed duct, and an endless feeder belt leading tangentially to said feed wheel at its lowest point and travelling in facial contact with part of the periphery of said feed wheel, said feed wheel being of convex formation at its periphery with the parts of largest diameter forming the corners of said peripheral groove, and side walls forming lateral defining elements being positioned in line with said corners and tapering to a point where the feeder belt meets the periphery of the wheel tangentially, and wherein the foremost edges of said side walls follow the curvature of the feed wheel at said corners and are slightly spaced therefrom so that the tobacco stream is led smoothly into the groove without lateral compression and is engaged and gripped on one side by the groove walls and on the other side by the incurved part of the belt lying between the corners of the feed wheel, the other edge parts of the belt lying on the parts of the feed wheel disposed on each side of the groove.

2. Apparatus as claimed in claim 1, including means to hold the belt in tension against a part of the periphery of said feed wheel to cause the incurving of the part of the belt between the corners of the groove.

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