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CIGARETTE ROD FORMING MECHANISM

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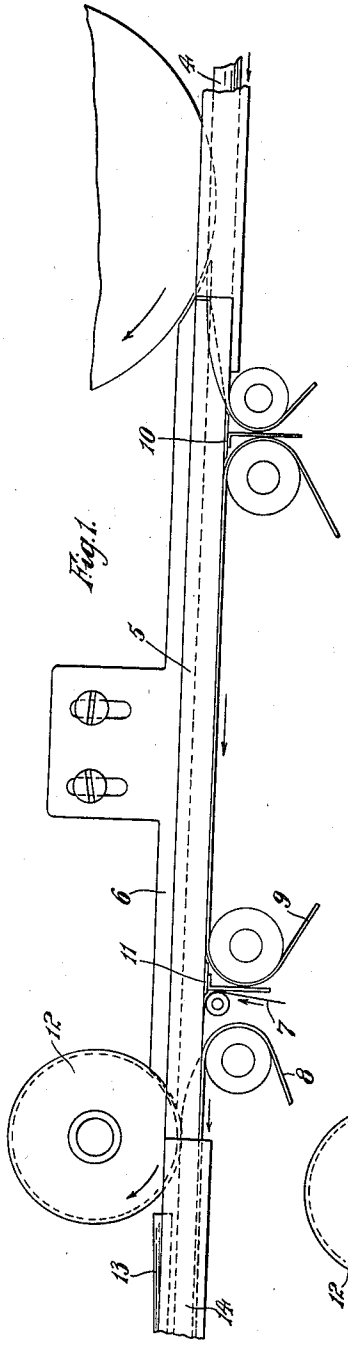


Fig. 1.

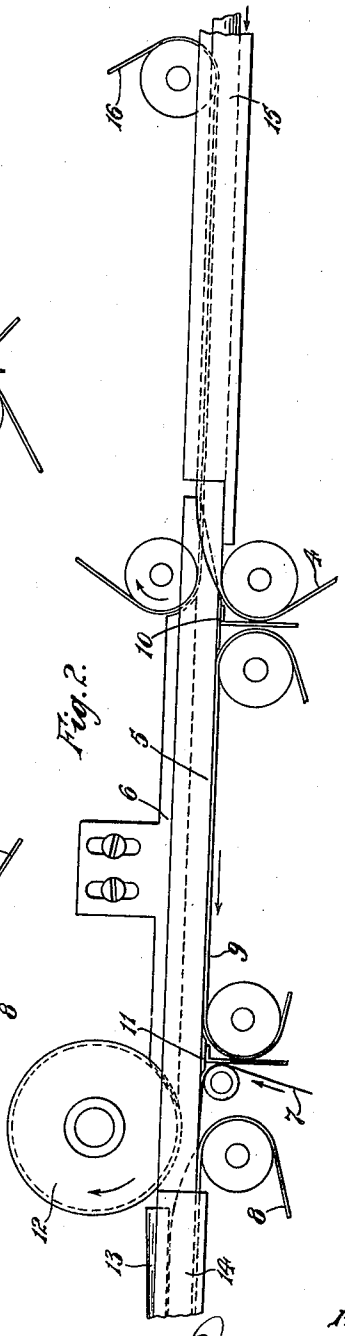


Fig. 2.

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CIGARETTE ROD FORMING MECHANISM

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6 Claims. (Cl. 131—84)

This invention is for improvements in or relating to cigarette rod forming mechanism.

"Cigarette rod forming mechanism" means herein and in the appended claims any mechanism in which a tobacco stream or filler is formed into a continuous wrapped tobacco rod, which latter is severed into lengths. The expression "cigarette" means a portion of wrapped tobacco severed from the continuous wrapped tobacco rod. The term "cigarette" when used herein and in the appended claims is to include "tobacco cartridges" and also severed lengths of wrapped tobacco as severed, for example, on a machine made in accordance with United States Letters Patent No. 2,144,201.

When a tobacco stream or filler is formed in a confining passage by reducing the speed of the tobacco particles within the passage, the tobacco is subjected to lengthwise compacting and it is sometimes found when the tobacco is subsequently encased in the continuous tubular wrapper and cigarette lengths severed from the continuous rod, that there is a tendency for tobacco particles to protrude from the ends of the severed cigarettes.

Among other factors, the extent to which tobacco particles project beyond the ends of the wrappers of the cigarettes is dependent upon the degree of lengthwise compacting in the tobacco filler, and this in turn is dependent upon the difference between the speed at which the tobacco is fed into the confining passage and the speed to which the tobacco is reduced while in the confining passage. The quantity of moisture which the tobacco contains also influences the tendency for the tobacco slightly to expand lengthwise after it has been compacted so as to protrude beyond the ends of the cigarette wrappers.

It is the object of the present invention to improve the appearance of the ends of the cigarettes when they are made by a cigarette rod forming mechanism in which a tobacco stream is subjected to a lengthwise compacting.

This object is achieved by subjecting a tobacco stream to a lengthwise compacting by reducing the speed of the tobacco while in a confining passage and a conveyor arranged to move the lengthwise compacted unwrapped tobacco forwardly at a speed greater than the reduced speed but less than the speed at which the tobacco enters the passage.

Mechanism made in accordance with the invention will now be described by way of example with reference to the accompanying drawing, in which—

Figure 1 shows diagrammatically mechanism for forming a tobacco filler.

Figure 2 shows diagrammatically an alternative mechanism for forming a tobacco filler.

Like reference numerals refer to like parts throughout the specification and drawing.

Referring to Figure 1, a tobacco stream is fed lengthwise by a conveyor device comprising a fast moving band 4 into a confining passage 5 having a stationary but adjustable top wall 6. The tobacco issuing from the confining passage is received by the upper surface of a paper web 7 which is supported by a further endless band 8 and which moves the lengthwise compacted unwrapped tobacco forwardly at a greater speed than the speed to which the tobacco is reduced in the confining passage during the compacting of the tobacco. An intermediate conveyor 9 is disposed between the conveyor device 4 and the paper web 7 and forms a part of the bottom wall of the confining passage. The intermediate conveyor is, as can be seen from Figure 1, movable in the same general direction as the conveyor device 4, and the paper web 7 but at a slower speed than the paper web 7.

The relative difference between the linear speeds of the intermediate conveyor 9 and the conveyor 7 must of course be determined for each particular machine according to the circumstances at a given time, which circumstances include the difference in speed between the fast moving band 4 and the conveyor 9, which latter difference has resulted in the lengthwise compacting of the tobacco in the confining passage. Thus, for example, if it is found that in cigarettes issuing from a cigarette rod forming mechanism (the tobacco filler of which has been compacted lengthwise) that the tobacco expands lengthwise and some of the tobacco projects from the ends of the cigarette wrappers for a distance equal to, say, 5% of the length of the cigarette as severed, then the proportion of the length to which the tobacco has expanded relative to the length of the cigarette as severed is 105 to 100. It may, therefore, be presumed that the excess lengthwise compacting within the cigarette amounts to 5%. In these circumstances, if the conveyor 7 moves at a speed in the proportion of 105 to 100 relatively to the speed of the intermediate conveyor the tobacco stream will, due to the greater speed of the conveyor 7, tend to become slightly elongated. It is found that by keeping the proportions of the difference

in speed of the conveyor 7 and the intermediate conveyor approximately the same as is the proportion of the length to which the tobacco would, due to the lengthwise compacting, otherwise expand lengthwise in the severed cigarette relatively to the length of the cigarette as severed, the tendency for the tobacco to expand lengthwise beyond the ends of the cigarette wrapper will be greatly reduced if not entirely eliminated.

It will be appreciated that if the difference in speed between the intermediate conveyor and the conveyor 7 were too great then there would be a tendency for the tobacco filler to be stretched to too great an extent, and the advantages obtained by forming the filler in the confining passage by reducing the momentum of the tobacco particles would be, at least to some extent, lost. The best results are obtained when the relative speeds between the conveyor 7 and the intermediate conveyor are calculated so as, for a particular set of circumstances, to reduce only what is determined to be the approximate excess lengthwise compacting before the tobacco is enclosed in the continuous wrapper.

It has been found that with a blend of Virginia tobacco having about 14% to 16% moisture content, that good results are obtained when the ratio of speed of the intermediate conveyor 9 to the speed of the conveyor 7 is as 100 is to 105 and the ratio of speed of the conveyor 9 to the speed of the band 4 is as 100 to 120.

Bridge pieces 10 and 11 are provided respectively between the conveyor device 4 and the intermediate conveyor 9 and between the intermediate conveyor 9 and the conveyor 7. The compacted tobacco filler as it leaves the confining passage passes beneath a compression roller 12 the main purpose of which is to guide the tobacco filler beneath the usual compression tongue 13. The band 8 and paper web 7 are passed between folding elements 14 which, in the well-known manner, fold the paper wrapper around the tobacco filler, and the seam of the cigarette rod is secured in the well-known manner by suitable pasting and heating mechanism (not shown). Cigarettes are severed from the continuous cigarette rod by any suitable known cut-off mechanism (not shown) such for example as that described in prior United States Letters Patent No. 1,860,197.

Referring to Figure 2, the mechanism therein shown is similar to that shown in Figure 1 but above the conveyor device 4 which is folded by a U shaped trough 15 so that the tobacco receiving surface of the conveyor device assumes a substantially U form there is provided an endless band 16 having a tobacco engaging surface which extends lengthwise of the conveyor device 4 and which is, together with the tobacco receiving surface of the conveyor device 4, arranged substantially wholly to confine the tobacco stream and laterally to compress the tobacco stream. It will be seen that due to the length of the co-operating surfaces of the conveyor device 4 and the band 16 the tobacco stream is subjected to a relatively long compression, and this compression is maintained substantially up to the point at which the tobacco stream is moved into the confining passage. The tobacco engaging surface of the band 16 moves in the same direction as the tobacco receiving surface of the conveyor device 4 and at the same linear speed as that of the conveyor device 4. The relative speeds of the conveyor device, the intermediate conveyor and the conveyor 7 are as described above with reference to Figure 1.

The confining passages in the two constructions are preferably as nearly as possible of substantially constant cross-section. It may be, however, that if the passages are of a constant and unvarying cross-sectional size throughout their length, jamming and choking of the tobacco will occur in the confining passage. This jamming is more likely to occur in a construction where the top and sides of the passage comprise stationary members. Where there is a tendency for the tobacco to jam in the confining passage a slight divergence of the walls of the passage towards the outlet end thereof will relieve the tendency to jam. A divergence of the walls which makes the cross-section of the passage at the outlet two millimetres larger in height and one millimetre larger in width than at the inlet end will usually be found sufficient to prevent jamming. Since this divergence is small in a passage of a length of, say, 70 to 140 millimetres, the cross-section of the passage may in such cases be said to be substantially constant.

What I claim as my invention and desire to secure by Letters Patent is:

1. A cigarette rod forming mechanism comprising a confining passage through which a tobacco stream is moved lengthwise, means for reducing the speed of the tobacco in the confining passage, a first conveyor to feed said stream into said passage, and a second conveyor movable at a speed slower than that of the first conveyor but greater than that to which the tobacco is reduced in the confining passage to move the tobacco stream lengthwise away from the outlet of said passage.

2. A cigarette rod forming mechanism comprising a confining passage through which a tobacco stream is moved lengthwise and in which the stream is compacted lengthwise by reducing the speed of the tobacco while the tobacco is in the passage, a first conveyor to feed said stream into said passage, a second conveyor movable at a speed slower than that of the first conveyor but greater than that to which the tobacco is reduced in the confining passage to move the tobacco stream lengthwise away from the outlet of said passage, and an intermediate conveyor movable in the same general direction as said first and second conveyors and at a speed less than that of the first and second conveyors, said intermediate conveyor forming a part at least of the bottom wall of the confining passage.

3. A cigarette rod forming mechanism comprising a confining passage through which a tobacco stream is moved lengthwise, means for reducing the speed of the tobacco in the confining passage, a first conveyor folded to substantially U shape to feed said stream into said passage, an endless band extending lengthwise of the first conveyor and co-operating with the tobacco receiving surface of said first conveyor substantially wholly to confine and to compress the tobacco stream laterally prior to the entry of the stream into the passage, and a second conveyor movable at a speed slower than that of the first conveyor but greater than that to which the tobacco is reduced in the confining passage to move the tobacco stream lengthwise away from the outlet of said passage.

4. A cigarette rod forming mechanism comprising a confining passage through which a tobacco stream is moved lengthwise and in which

the stream is compacted lengthwise by reducing the speed of the tobacco while the tobacco is in the passage, a first conveyor folded to substantially U shape to feed said stream into said passage, an endless band extending lengthwise of the first conveyor and co-operating with the tobacco receiving surface of said first conveyor substantially wholly to confine and to compress the tobacco stream laterally prior to the entry of the stream into the passage, a second conveyor movable at a speed slower than that of the first conveyor but greater than that to which the tobacco is reduced in the confining passage to move the tobacco stream lengthwise away from the outlet of said passage, and an intermediate conveyor movable in the same general direction as said first and second conveyors and at a speed less than that of the first and second conveyors, said intermediate conveyor forming a part at least of the bottom wall of the confining passage.

5. A cigarette rod forming mechanism comprising a confining passage, means to feed tobacco into the passage, means for reducing the speed of the tobacco in the confining passage, and a conveyor movable at a speed slower than that of said first named means but greater than the speed to which the tobacco is reduced in the confining passage to move the tobacco stream lengthwise away from the outlet of said passage.

6. A cigarette rod forming mechanism comprising a confining passage, means to feed tobacco into the passage, means for reducing the speed of the tobacco in the confining passage, and a conveyor movable at a speed slower than that of said first named means but greater than the speed to which the tobacco is reduced in the confining passage to move the tobacco stream lengthwise away from the outlet of said passage, the speed of said conveyor exceeding the speed to which the tobacco is reduced in said confining passage by an extent approximately proportional to the length to which the tobacco of a severed cigarette would otherwise tend to expand, relative to the length of the cigarette as severed.

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