Sept. 10, 1940. D. W. MOLINS 2,214,430

CIGARETTE MAKING MACHINE

Filed Feb. 3, 1937 3 Sheets-Sheet 1

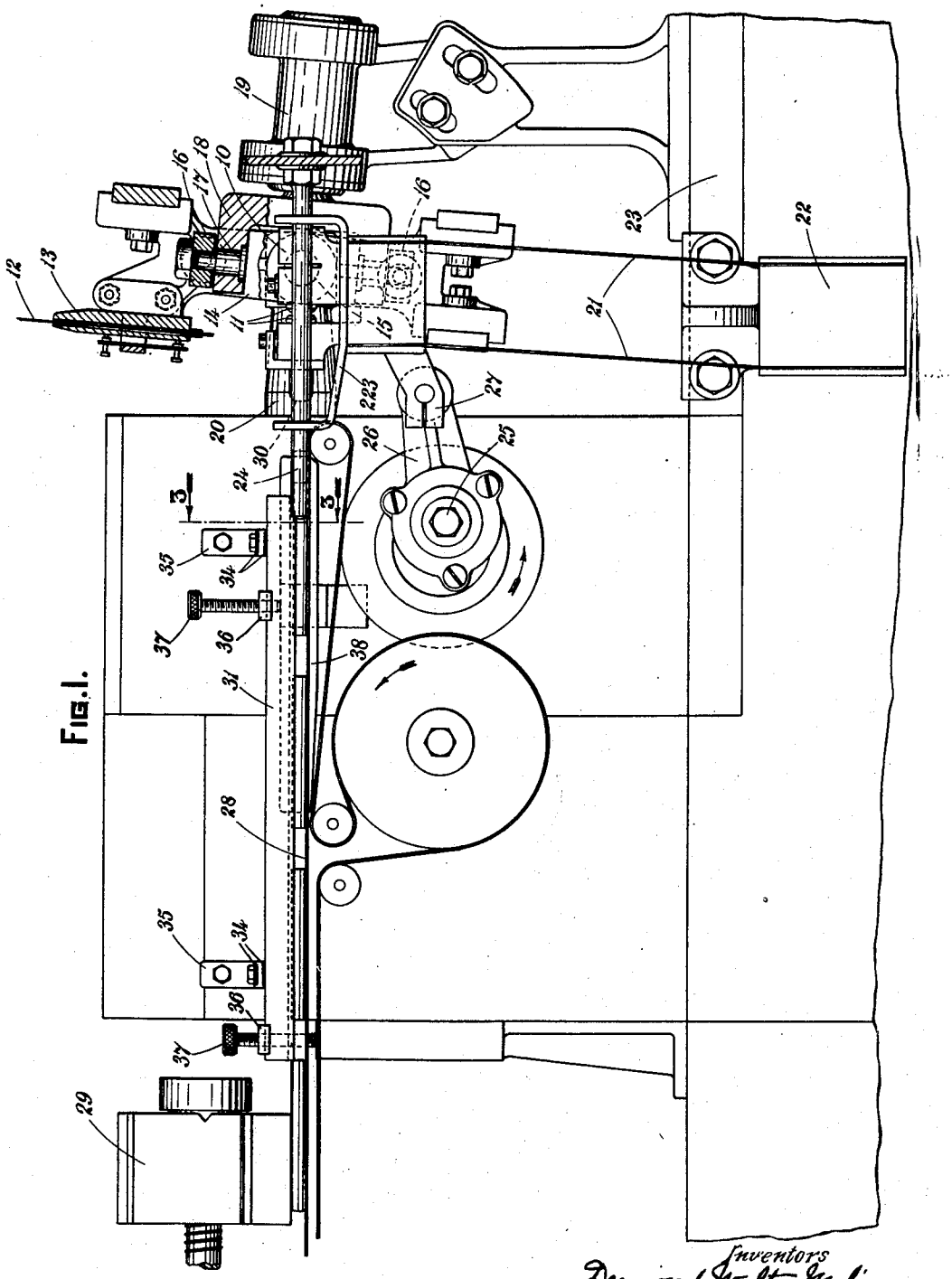


FIG. I.

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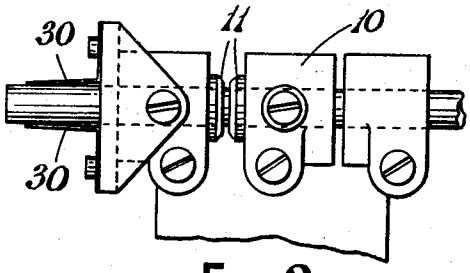


FIG. 2.

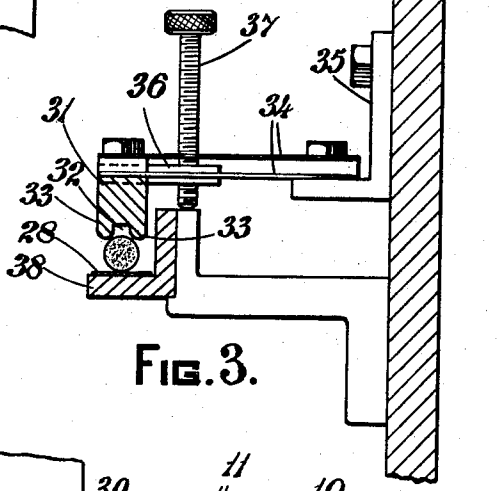
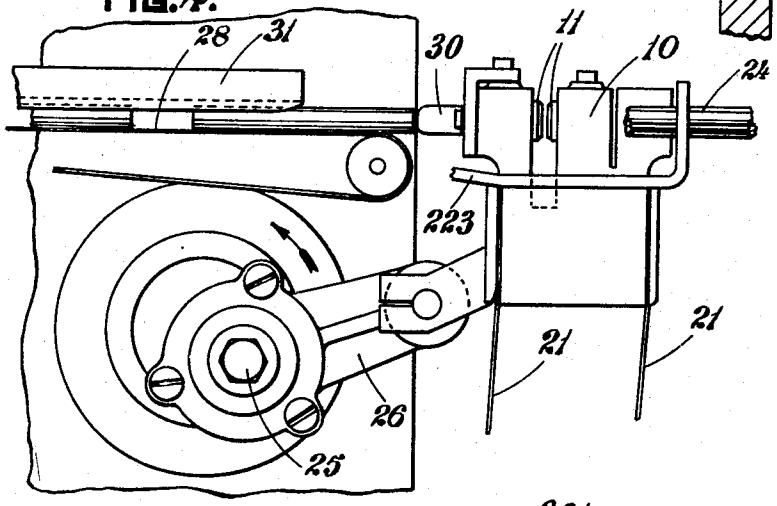


FIG. 3.

FIG. 4.



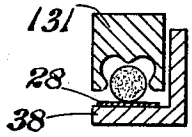


FIG. 5.

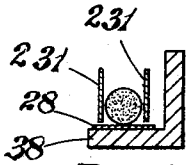


FIG. 6.

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CIGARETTE MAKING MACHINE

Filed Feb. 3, 1937 3 Sheets-Sheet 3

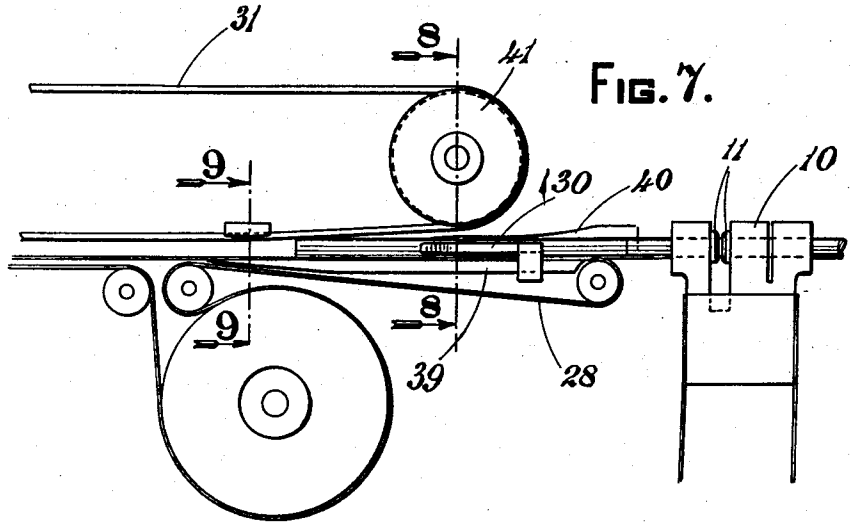


FIG. 7.

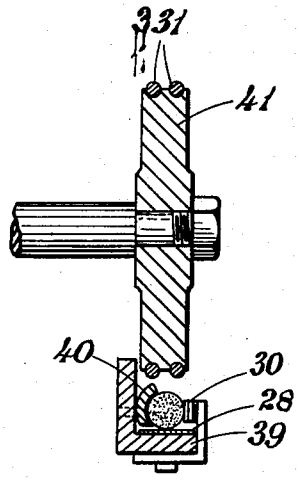


FIG. 8

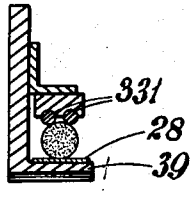


FIG. 9.

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Patented Sept. 10, 1940 2,214,430

UNITED STATES PATENT OFFICE

2,214,430

CIGARETTE MAKING MACHINE

Desmond Walter Molins, Deptford, London, England, assignor to Molins Machine Company, Limited, Deptford, London, England

Application February 3, 1937, Serial No. 123,902
In Great Britain December 15, 1936

10 Claims. (Cl. 131—25)

This invention is for improvements in or relating to cigarette making machines, and refers to a device in which a conveyor is arranged to receive cigarettes issuing from the cut-off mechanism of a continuous rod cigarette making machine and to move the cigarettes in an axial direction at a speed greater than the linear speed of the continuous cigarette rod, whereby the cigarettes are spaced apart in an axial direction and in which the cut-off mechanism includes a cutting element and a reciprocating guide member with which the cutting element co-operates to sever the axially moving continuous cigarette rod, said guide member being movable in the direction of movement of and at the same speed as the continuous cigarette rod during a cutting operation. A device as just set forth will be referred to in the appended claims as "a device of the type described."

According to the invention there is provided a device of the type described wherein cigarette engaging means are provided to engage each cigarette successively and prevent each cigarette from moving at a faster speed than that of the continuous cigarette rod, and to release each cigarette after the latter is wholly or substantially wholly above the surface of the conveyor whereby the whole or substantially the whole of each cigarette on being released is operatively engaged by the conveyor for the purpose of reducing the tendency of the cigarettes to slip on the conveyor when being accelerated thereby.

The cigarette engaging means may be movable with the reciprocating guide member and a cigarette released by the cigarette engaging means while said means moves in the direction opposite to the direction of movement of the continuous cigarette rod. The cigarette engaging means may comprise a yielding element or elements (e. g., a spring plate or plates) to provide a yielding engagement with the cigarettes. The cigarette engaging means may be connected to the reciprocating guide, and if desired, the reciprocating guide member may be driven so that a cigarette is released by the cigarette engaging means whilst the reciprocating guide member is moving at or substantially at its maximum speed in a direction opposite to the direction of movement of the continuous cigarette rod.

The invention will be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a side elevation of a cigarette cut-off mechanism and a device for spacing the cut off cigarettes apart axially.

Figure 2 is a plan of a part of the apparatus shown in Figure 1 and is drawn to an enlarged scale.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a view showing some of the mechanism shown in Figure 1, the parts, however, being in positions different from those shown in Figure 1.

Figure 5 is a sectional view of a modification which may be made to the construction shown in Figures 1 to 4.

Figure 6 is a sectional view showing another modification which may be made to the construction shown in Figures 1 to 4.

Figure 7 is a side elevation showing a modified form of cigarette spacing mechanism.

Figure 8 is a section on line 8—8 of Figure 7.

Figure 9 is a section on line 9—9 of Figure 7.

Like references refer to like parts throughout the specification and drawings.

Referring to Figures 1 to 4, a continuous cigarette rod is formed by continuous cigarette rod forming mechanism (not shown) and the continuous cigarette rod passes into a reciprocating guide member 10, sometimes referred to as a "ledger" or "ledger tube" provided with hardened steel members 11 which are spaced apart from each other in the direction of the axis of the continuous cigarette rod as can be more clearly seen in Figure 2, by a distance which is slightly greater than the thickness of a cutting element which is to pass between the members. A cutting element 12 mounted in a rotatable carrier 13 co-operates with the hardened steel members 11 to sever the axially moving continuous cigarette rod into lengths. The knife 12 and carrier 13 are secured to arms 14 which are pivoted on a pin 15 carried at one end of a shaft 20 which drives the cutting mechanism. The arms 14 are bolted together by bridge pieces 16 and each bridge piece has a pin 17 which fits into holes in a yoke 18. The yoke 18 is mounted for rotation in a bearing 19, and its axis of rotation is inclined to the axis of the driving shaft 20.

When the shaft 20 is rotated it also rotates the arms 14, and due to the angular disposition of the axis of rotation of the yoke 18 the cutting element 12 receives a reciprocating movement. During the time the cutting element 12 is cutting through the cigarette rod the plane of the cutting element is substantially at right angles to the axis of the continuous cigarette rod and the cutting element 12 is moving in the same direction as the continuous cigarette rod and at the same speed as the cigarette rod.

The reciprocating guide member 10 is supported by a pair of flat spring plates 21, one end of each of the spring plates being secured to the guide member 10, the other ends of the flat spring plates 21 being rigidly clamped to a bracket 223 secured to the bed 23 of the cigarette making machine. Secured to the guide element 10 there is a bracket 23 which is arranged to slide on a rod 24 rigidly secured to the machine, the axis of the rod 24 being parallel with the axis of the continuous cigarette rod. The guide member 10 is reciprocated by a driving member comprising a crank 25 to which is secured a link 26 which connects the crank with a projection 27 secured to the guide member 10. The crank 25 is driven in timed relationship with the shaft 20, so that the guide member 10 is moving in the same direction as and at the same speed as the continuous cigarette rod during a cutting operation. As will be seen from the drawings, the flat spring plates 21 flex as the guide member 10 is reciprocated, and the guide member 10 is caused to move in a straight line by reason of the bracket 223 which slides on the rod 24 whose axis is parallel with the axis of the continuous cigarette rod. It is to be understood that the cut-off mechanism, including the reciprocating guide member above described, is given by way of example and that such mechanism can be replaced by any other suitable form of cut-off mechanism.

The cigarettes issuing from the cutoff mechanism are guided by the reciprocating guide member 10 and are delivered on to a conveyor shown in the drawings as an endless canvas band 28. The conveyor 28 is driven so that it has a surface speed which is greater than the linear speed of the continuous cigarette rod, and by this means the severed cigarettes received by the conveyor 28 are spaced apart in an axial direction and are delivered by the conveyor 28 to a deflecting device indicated generally by the reference 29, which moves the cigarettes laterally off the conveyor 28 and deposits them in a row or rows on a further endless band not shown or deposits them into a suitable receptacle.

In order to obtain an even spacing of the cigarettes on the conveyor 28 cigarette engaging means are provided to engage with each cigarette successively and prevent each cigarette from moving at a faster speed than that of the continuous cigarette rod, and to release each cigarette after the latter is wholly or substantially wholly above the surface of the conveyor whereby the whole or substantially the whole of each cigarette on being released is operatively engaged by the conveyor for the purpose of reducing the tendency of the cigarettes to slip on the conveyor when being accelerated thereby.

In the construction shown in Figure 1 the cigarette engaging means comprises a pair of flat spring plates 30 which are connected with the reciprocating guide member 10 for movement therewith. It will be seen from Figure 2 that the spring plates 30 are so arranged that the space between them is normally less than the diameter of a cigarette, therefore, as a cigarette issues from the guide member 10 the spring plates yield and grip the body of the cigarette, thus preventing the cigarette from moving at a speed greater than the speed at which the continuous cigarette rod is moving, because each severed cigarette is ejected from the guide member 10 between the spring plates 30 and on to the conveyor 28 by the leading end of the continuous cigarette rod engaging with the rear end of the severed cigarette. The tension in the spring plates is arranged or regulated so that when the leading end of a cigarette is received by the conveyor 28 the grip of the spring plates is sufficient to ensure that the cigarette will be held in position against the leading end of the continuous cigarette rod and will not be accelerated by the faster moving conveyor. In some cases, however, it may happen that as the leading end of a cigarette moves on to the conveyor, the friction between the cigarette and the conveyor is sufficiently great as to cause the cigarette momentarily to move at a speed which is slightly greater than the speed of the continuous cigarette rod, but the grip of the spring plates is in all cases sufficient to ensure that before the cigarettes can be moved at the speed of the conveyor, the cigarettes are wholly or substantially wholly on the conveyor. In the construction shown in the drawings the crank 25 is timed so that at the moment that the continuous cigarette rod completely ejects a severed cigarette from between the spring plates 30 the cigarette has been wholly or substantially wholly received by the conveyor 28, and at this moment the guide member 10 is moving at or substantially at its maximum speed in a direction opposite to the direction of movement of the continuous cigarette rod. By this means the time interval between the time when the cigarette is released by the springs and is accelerated by the conveyor 28 is reduced to a minimum so that the friction between each cigarette and the band is made more constant, thereby making the spacing between successive cigarettes more constant.

Figure 4 shows the relative position of the parts in one suitable construction at the moment that the spring plates 30 have released a cigarette so that it is substantially wholly above the conveyor and is about to be accelerated by the conveyor.

When the apparatus is working at the high speeds usual at the present date, that is, for example at about 1000 or more cigarettes per minute, it is found to be desirable to control the cigarettes whilst they are being moved by the conveyor 28 to control the cigarettes transversely of the direction of movement of the conveyor. For this purpose a controlling element 31 is provided and is positioned above the conveyor 28, that surface of the control element 31 which is nearest the conveyor 28 being recessed as shown at 32 so as to provide two substantially semi-circular projections 33, which are capable of engaging the cigarettes and controlling them transversely of their direction of movement. The control element 31 is arranged so that the projections 33 normally do not engage with the cigarettes, but so that the projections engage with the cigarettes only if the cigarettes tend to become displaced transversely of their direction of movement whilst they are being carried by the conveyor 28. It will be seen that by the semi-circular form of the projections 33, should the cigarettes engage with the projections the resulting friction between the surfaces of the cigarettes and the projections will be reduced to a minimum. In order that the control element 31 may be easily adjusted and within fine limits the control element is supported by yielding supports 34 which supports comprise flat spring plates secured to a bracket 35 fixed to the frame of the machine. The control element 31 is also provided with projections 36 in which are mounted adjusting screws 37 which engage with a pro-

jection 38 secured to the frame of the machine, and by reason of the adjusting screws 37 and yielding supports 34 the controlling element 31 is provided with a micrometer adjustment by means of which the control element 31 may be minutely adjusted relatively to the conveyor 28.

In practice it is sometimes found preferable that whilst that end of the control element 31 beneath which the cigarettes first pass does not normally engage with the cigarettes, the other end of the control element is adjusted so that the cigarettes passing beneath such other end are engaged by the control element. It will be appreciated that by means of the adjustment above referred to it is possible so to arrange the controlling element that it may be used to the best advantage according to the varying conditions which are found when producing cigarettes of different kinds or quality.

Figures 5 and 6 show modified forms of controlling element, thus in Figure 5 a controlling element 131 is shown engaging or capable of engaging the cigarettes at three points instead of two as shown in Figure 3, whilst in Figure 6 two controlling elements 131 are shown to control the cigarettes laterally as they are moved by the conveyor 28, but in this instance no means are shown to control the cigarettes at a point or points above the horizontal diameters of the cigarettes.

Referring to the constructions shown in Figures 7 to 9, the cigarettes are arranged to be accelerated by the conveyor 28, but in this instance instead of the cigarette engaging means being connected with the reciprocating guide member 10 a spring plate 130 is provided, and this spring plate is secured to a support 39 over which the conveyor 28 passes. The spring plate 130, cooperates with a reaction surface which comprises a concave guide element 40 secured to the support 39, and shaped so as substantially to conform with the shape of a cigarette. In this construction it will be seen that two cigarettes are above the conveyor 28 before the first of the two cigarettes is released by being pushed out of the control of the spring plate 130 by the leading end of the continuous cigarette rod. As will be seen from Figure 7, the leading cigarette is wholly above the conveyor whilst the second cigarette is substantially wholly above the conveyor at the time when the leading cigarette is released by the spring plate 130. In this construction a control element 331 is provided and comprises a pair of endless spring bands which are passed around suitable guide rollers, one of which is indicated at 41 and the adjacent surfaces of the endless spring bands and the conveyor 28 are arranged to move in the same direction and at the same speed. As will be seen from Figure 7, the spring bands 31 are inclined where the cigarettes first pass beneath the bands 331 so that the spring bands do not engage with the cigarettes until the cigarettes have been released by the spring plate 130. The arrangement shown in Figure 7 is such that the cigarettes after being released by the spring plates 130, are gripped between the cooperating surfaces of the endless spring bands 331 and the conveyor 28 and are therefore held in position on the conveyor 28.

It is found in practice that it is not necessary when the spring plates 30 are connected with the guide member 10 to utilise moving control elements, but when the cigarette engaging members are arranged in positions such as that shown in Figure 7 then it is preferable to provide the moving control element 331 shown in Figure 7.

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

1. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, the combination of a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, and means engaging the severed rod lengths while the latter are partly engaged by the conveyor to prevent accelerated movement of the rod lengths until the major portion of each rod length has been received by the conveyor, whereby the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized.

2. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, the combination of a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, and means engaging the severed rod lengths while the latter are partly engaged by the conveyor to prevent accelerated movement of the rod lengths until substantially the whole of each severed rod length rests on said conveyor, said last named means including a member yieldingly engaging the surface of the successive rod lengths as they are severed to apply pressure thereto, whereby slippage of the rod lengths on the conveyor during acceleration thereby is reduced.

3. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, said rod severing means including a guide member reciprocating in the direction of rod movement, the combination of a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, and means carried by said guide member and engaging the severed rod lengths while the latter are partly engaged by the conveyor to prevent accelerated movement of the rod lengths until the major portion of each rod length has been received by the conveyor, whereby the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized.

4. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, said rod severing means including a guide member reciprocating in the direction of rod movement, the combination of a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, and means carried by said guide member and engaging the severed rod lengths to prevent accelerated movement thereof until the major portion of each rod length has been received by the conveyor, where by the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized, said retarding means being so disposed in the direction of movement of the severed rod

lengths that the latter are released therefrom during movement of the guide member in a direction reverse to that of the severed lengths.

5. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, said rod severing means including a guide member reciprocating in the direction of rod movement and a cutting blade cooperating with said guide member and partaking of movement with the latter in the direction of rod movement during the severing operation, the combination of means imparting reciprocating movement to said guide member, a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, and means carried by said guide member and engaging the severed rod lengths to prevent accelerated movement thereof until the major portion of each rod length has been received by the conveyor, whereby the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized, said retarding means being so disposed in the direction of movement of the severed rod lengths that the latter are released therefrom during movement at substantially maximum velocity of the guide member in a direction reverse to that of the severed lengths.

6. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, said rod severing means including a guide member reciprocating in the direction of rod movement and a cutting blade cooperating with said guide member and partaking of movement with the latter in the direction of rod movement during the severing operation, the combination of means imparting reciprocating movement to said guide member, a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, and means including a spring finger carried by said guide member and engaging the severed rod lengths to prevent accelerated movement thereof until the major portion of each rod length has been received by the conveyor, whereby the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized, said retarding means being so disposed in the direction of movement of the severed rod lengths that the latter are released therefrom during movement at substantially maximum velocity of the guide member in a direction reverse to that of the severed lengths.

7. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, the combination of a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, means engaging the severed rod lengths while the latter are partly engaged by the conveyor to prevent accelerated movement of the rod lengths until substantially the whole of each rod length has been received by the conveyor, whereby the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized, and means associated with said conveyor for controlling transverse movement of cigarettes thereon.

8. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, the combination of a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, means engaging the severed rod lengths while the latter are partly engaged by the conveyor to prevent accelerated movement of the rod lengths until substantially the whole of each rod length has been received by the conveyor, whereby the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized, and means associated with said conveyor for controlling transverse movement of cigarettes thereon, said last named means being disposed above said conveyor for adjustment toward and away from the latter.

9. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, the combination of a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, means engaging the severed rod lengths while the latter are partly engaged by the conveyor to prevent accelerated movement of the rod length until substantially the whole of each rod length has been received by the conveyor, whereby the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized, and means associated with said conveyor for controlling transverse movement of cigarettes thereon, said last named means including endless band means moving in the direction of and at the speed of the conveyor.

10. In a cigarette making machine of the continuous rod type having means for feeding a cigarette rod axially in a predetermined path and means disposed adjacent said path for severing said rod into lengths, said rod severing means including a guide member reciprocating in the direction of rod movement, the combination of a conveyor receiving the severed rod lengths and forwarding the same axially at a higher linear speed than that of the rod, whereby separation of the severed lengths is effected, and a pair of opposed yielding elements carried by said guide member and engaging the severed rod lengths to prevent acceleration thereof by the conveyor until the major portion of each rod length has been received by the conveyor, whereby the tendency of the rod lengths to slip on the conveyor during acceleration thereby is minimized.

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