

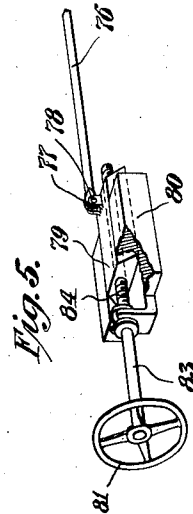
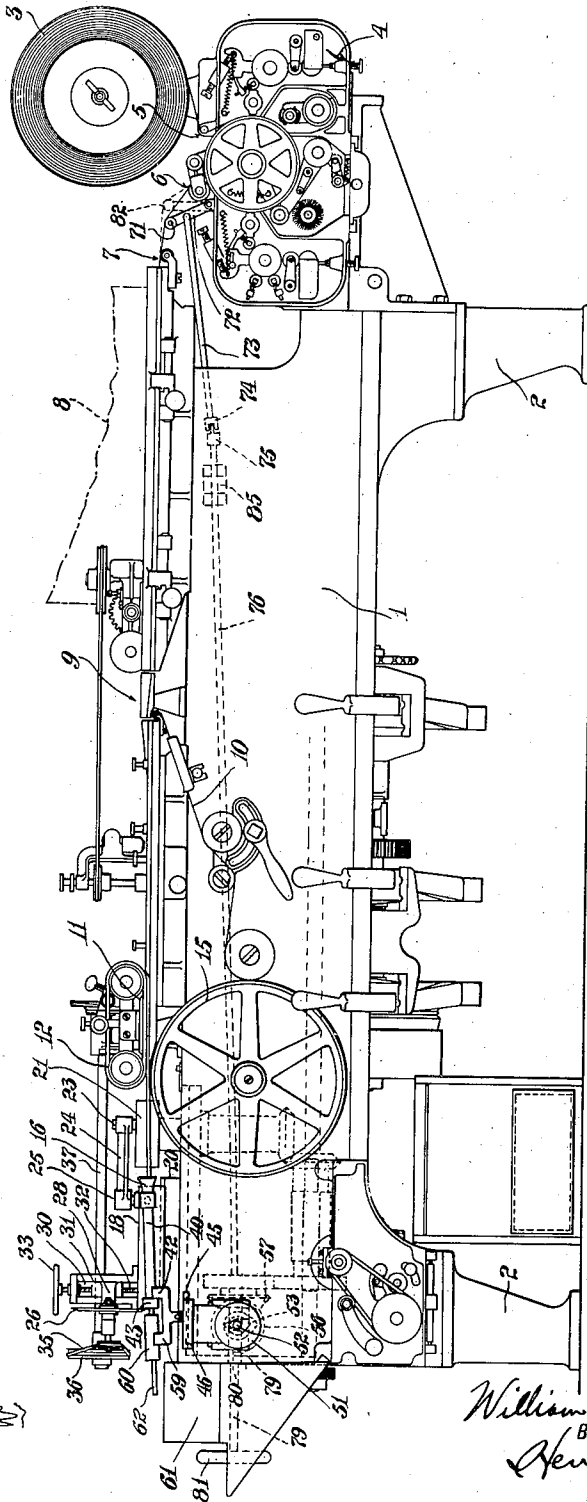
W. F. GRUPE.
CUT-OFF MECHANISM.
APPLICATION FILED MAR. 12, 1920.

1,418,437.

Patented June 6, 1922.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

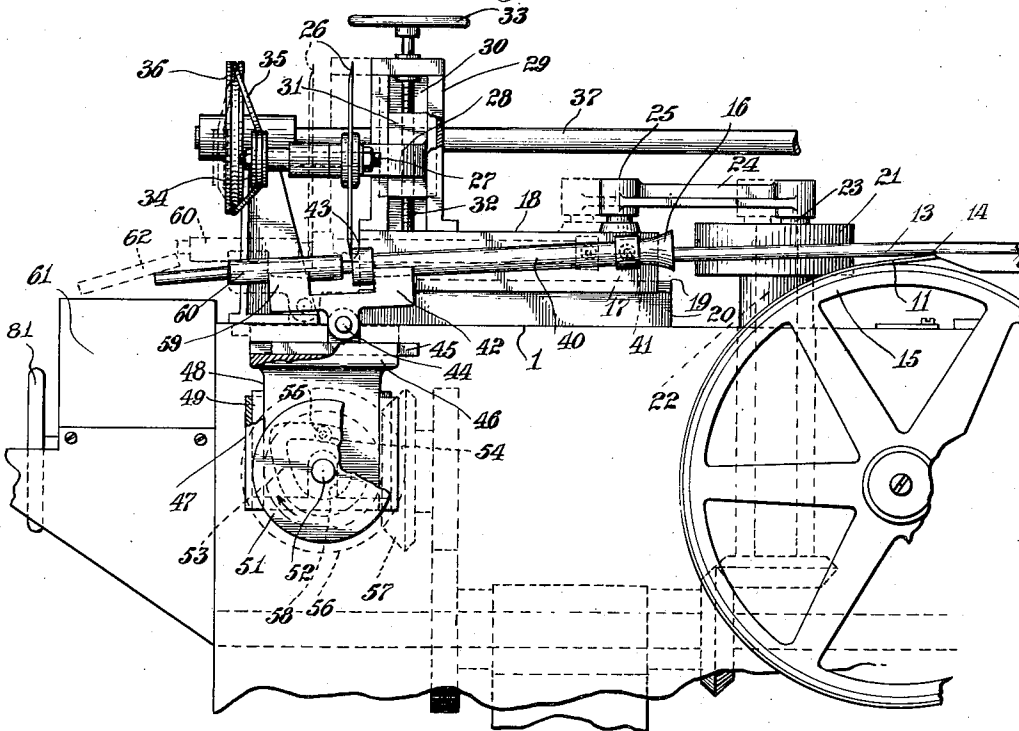
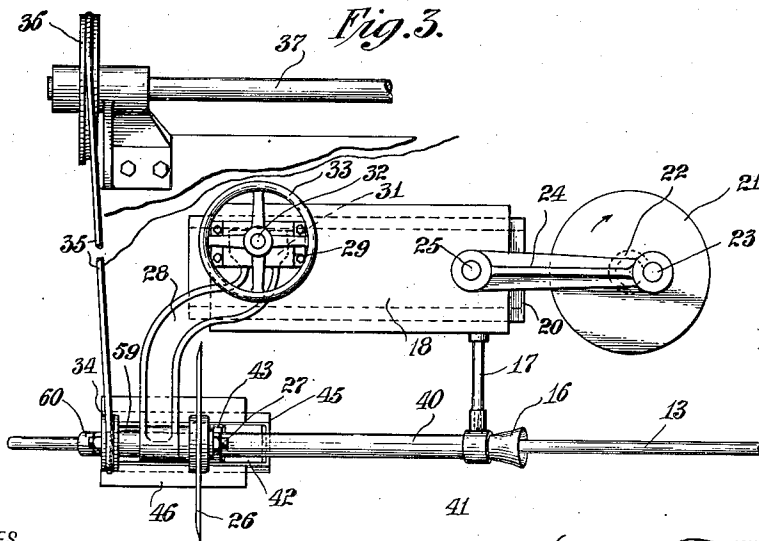


Fig. 3.



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3 SHEETS—SHEET 3.



Inventor:
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UNITED STATES PATENT OFFICE.

WILLIAM F. GRUPE, OF HUDSON HEIGHTS, NEW JERSEY, ASSIGNOR TO ENDLESS BELT CORPORATION, INC., A CORPORATION OF NEW YORK.

CUT-OFF MECHANISM.

1,418,437.

Specification of Letters Patent. Patented June 6, 1922.

Application filed March 12, 1920. Serial No. 365,246.

To all whom it may concern:

Be it known that I, WILLIAM F. GRUPE, a citizen of the United States, residing at Hudson Heights, county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Cut-Off Mechanisms, of which the following is a specification.

This invention relates to cut-off mechanisms for cigarette machines and the like.

It has been common practice in the making of cigarettes to form a so-called cigarette rod to progress the same along a substantially fixed path, to provide a rotary knife and mounted to be bodily reciprocated into and out of the path of the cigarette rod, and thereby brought into and out of contact with the cigarette rod to sever the cigarette rod into individual cigarettes. For the purpose of obtaining a substantially "square" cut at the cigarette ends, the rotary knife is usually mounted to be reciprocated in the direction longitudinally of the rod at a speed equal to the speed of progress of the cigarette rod.

In practice, such heretofore proposed constructions comprise a slide member mounted to be reciprocated on the upper bed of the cigarette machine, a relatively long bracket pivoted on such slide member, such bracket rotatably carrying the shaft of the rotary knife and means for oscillating the bracket to cause the rotary knife to move into and out of contact with the cigarette rod and along with the cigarette rod while in the stage of severing.

To effectively carry out such method of severing, the bracket supporting the rotary knife, is required to be rigid and consequently relatively heavy and the slide member and its reciprocating parts are required to be correspondingly heavy to withstand the stresses and strains introduced by the high momenta incident upon operation. Upon attempts to increase the speed of such prior art cut-off mechanisms for cigarette making machines, a practicable limit of relatively low magnitude is reached, due primarily to the relatively high total mass of the moving parts.

Such prior art machines are also objectionable owing to the wide range of the longitudinal and lateral movements of the rotary knife, rendering the provision of suitable guards difficult, and at best depriving

access by the operator from a considerable proportion of the cigarette machine as a whole.

I have discovered that the speed of the cigarette making machine may be greatly increased and the output of commercially perfect cigarettes correspondingly increased by effecting the severing of the cigarette rod into individual cigarettes by moving the cigarette rod into and out of contact with the rotary knife and mounting the rotary knife in fixed relation to a suitable slide member to sever the rod into individual cigarettes. I have discovered that the cigarette rod may be thus moved without causing any permanent bend or unequal distribution of the tobacco in the paper casing, or breakage of the rod.

In one preferred form of my invention, the cigarette making machine is provided with a suitable slide member, which may be relatively light, a relatively light bracket fixed on such slide member, a rotary knife mounted on such bracket, a tube for receiving the cigarette rod as it is progressively formed from the rod forming parts and suitable means for reciprocating the tube and therewith the cigarette rod through a relatively narrow range of movement. The rotary knife is driven in a simple manner from a suitable pulley mounted in a bracket fixed to the cigarette machine. A further object of the invention is to provide simpler means for adjusting the cut of the cigarettes with respect to the printing matter of the paper wrapper or casing.

Further features and objects of my invention will be more fully understood from the following description and the accompanying drawings in which—

Fig. 1 is a side elevation of a preferred form of my invention;

Fig. 2 is a detail side elevation, partly broken away and in vertical section, on an enlarged scale, of the cut-off mechanism shown in Fig. 1;

Fig. 3 is a top plan view of Fig. 2;

Fig. 4 is a perspective side view, shown diagrammatically, of Fig. 2;

Fig. 5 is a detail perspective view of a portion of my adjusting means of Fig. 1; and

Fig. 6 is side elevation of a modified form of rotary knife.

Referring to Figs. 1 to 4, inclusive, the

bed of the cigarette machine proper is indicated at 1, such bed 1 being usually in the form of a table having legs 2. The roll of paper 3 is shown disposed at the right hand end of the cigarette machine, see Fig. 1, above the printing mechanism 4. The printing mechanism 4 shown in the drawings is of any approved type. The strip of paper 3 enters the printing mechanism at 5 and emerges at 6, and is delivered at 7 to the tobacco feeding mechanism of the hopper 8 of the cigarette machine, whereby the regulated amount of tobacco is fed on the upper face of the paper strip 7, the paper strip bearing the tobacco is forwarded at 9 on the upper face of the tube belt 10 through the forming shoe or former 11 of the cigarette machine. The adhesive for applying the lap of the "rolled" cigarette rod is supplied in the usual manner and sealed by any approved type of sealing device 12.

The aforesaid operations result in the formation of a cigarette rod 13, which, as indicated in Fig. 2, progresses from a location 14, at which location the tube belt 11 passes downwardly about its driving pulley 15.

The guide funnel 16 is pivotally supported on its arm 17 carried by the slide 18, such slide 18 being provided with a suitable groove 19 corresponding to the guide block 20, fixed on the bed 1 of the machine. As a suitable means for reciprocating the slide 18 I have shown the eccentric 21 mounted on and driven by its shaft 22 in any suitable manner, such eccentric 21 having its pin 23 connected by the pitman 24 to the pin 25 of the slide 18.

The slide 18 carries suitable severing means, such as the circular knife 26 fixed on the stub shaft 27, rotatably mounted on the bracket 28 carried by the standard 29, fixed to and extending above and laterally of the slide 18.

The bracket 28 is preferably adjustably mounted on the slide 18, as by angularly slotting its standard 29 at 30, to receive the angular base 31 of the bracket 28 and supporting the base 31 on the threaded stud 32 provided with the adjusting head 33 (see Figs. 3 and 4).

The shaft 27 of the rotating knife 26 is driven from the pulley 34, over which passes the belt 35, driven by the pulley 36 mounted on and driven by the shaft 37 in any suitable manner. The pulley 36 is mounted on any suitable bracket fixed on the bed 1 of the cigarette machine.

In such particular embodiment, I have mounted the guide tube 40 to provide for substantially vertical reciprocation of the tube 40, such tube 40 being disposed substantially vertically below the path of reciprocating movement of the shaft 27 of the rotary knife 26. Such vertical reciproca-

tion of the guide tube 40 is effected by the block 42, supporting the guide tube 40 adjacent the edge of the ledger plate 43, and pivotally mounted at 44 on the horizontally reciprocating slide 45 carried by its supporting block 46 mounted in guide plate 47 fixed on a lateral side of the bed 1 of the machine. The lateral face or faces 48 of the supporting block 46 have angular edges 49 received within the angular flange 50 of the guide plate 47. The block 46 is reciprocated vertically by the cam 51, mounted on its driving shaft 52, and provided with the cam groove 53 receiving the roller 54 of the pin 55 fixed to the block 46. The shaft 52 of the cam 51 is rotated by any suitable means, as by means of the indicated gearing, comprising the bevel gear 56 fixed to the shaft 52 and meshing with the bevel gear 57, driven by any suitable means. The block 46 is provided with the slot 58 to permit reciprocation of the block 46 relative to the shaft 52.

Preferably, the block 42 is bifurcated as shown, the bifurcation 59 serving to support the delivery guide tube 60, for receiving the severed, individual cigarettes and discharging the same at a desired distance from the path of movement of the aforesaid operating parts, as to the delivery table 61.

Thus, upon setting my cigarette machine into operation, the slide 18 will be reciprocated at a desired speed from its forward position shown in full outline in Fig. 2, toward its rearward position shown in dotted outline in Fig. 2, corresponding to the rate of progress of the cigarette rod 13 and the discharge of the same through the guide funnel 16, thence through the guide tube 40 and therethrough, and upon upward movement of the block 42 by its operating means, the cigarette rod 16 is severed by the rotary knife 26, the individual cigarettes 62 thus formed being successively delivered through the discharge tube 60. The full outline of these parts as shown in Fig. 2 represents substantially their lowermost positions, and the dotted outline their uppermost positions.

For the purpose of regulating the position of cut of the cigarette rod relative to the printing matter thereon I provide the roller 71 to guide the course of travel of the paper strip at any suitable location between the delivery end of the printing mechanism 4, and the rotary cutter 26, as at the location indicated in Fig. 1, namely between the delivery end of the printing mechanism 4 and the tobacco delivery portion of the hopper 8 and adjust the position of such roller 71 to thereby determine the length of the paper strip, and as one means of such adjustment I have shown the roller 71 mounted on the pivoted arm 72, the link 73 controlling such arm 72, its end 73 being pivotally or otherwise yieldably connected at 74 to the end 75

of the rod 76, and pivotally connecting the rod 76 at 77 to the pivot joint 78 of the block 79, slidably mounted in the base 80. The block 79 is provided with suitable regulating means comprising the hand wheel 81 mounted on the short shaft 83 and having its threaded end 84 meshing with threading in any suitable opening in the block 79, such shaft 83 being provided with spaced collars fixed thereto and abutting the inner and outer faces of the base 80, as shown in Fig. 5, to retain the shaft 83 against longitudinal displacement, as will be understood.

The rod 76 is slidably supported in the recessed block 85, shown attached to the side of the bed 1 of the cigarette machine.

Thus, upon rotation of the hand wheel 81 the rod 76 is adjusted, in turn adjusting the link 73, arm 72 and the guide roller 71 to in turn regulate the length of the paper strip between the delivery end 6 of the printing mechanism and the location of severing of the cigarette rod 16 by the rotary knife 26. In Fig. 1 I have indicated in dotted outline at 82 a position of adjustment of the roller 71.

By my means, as I have discovered, the paper strip notwithstanding its fragile nature may be adjusted as shown to regulate the locations of severing by the severing means relative to the locations of printing on the strip by the printing mechanism 4, while the cigarette machine is in operation.

In Fig. 6 I have shown a modified form of my rotary knife.

It will be understood that the speed of drive of the aforesaid operating means in reciprocating the block 42 of the construction shown in Figs. 1 to 4, inclusive, and the block 91 of the construction shown in Fig. 6 is arranged in proper synchronism with the effective speed of progress of the formed cigarette rod; and similarly, the speed of reciprocation of the rotary cutter in its stroke of like movement with the cigarette rod is synchronized with the speed of progress of the formed cigarette rod. Such synchronizing means are also provided in any approved type of adjustment of the gearing to regulate the instants of contact of the cigarette rod with the rotary knife corresponding to the different lengths of cigarettes as desired.

By my invention, in its several forms herein described, the parts of the cut-off mechanism may be constructed of less weight and consequent less momentum and permitting greater speed of operation and thereby materially increasing the output of formed cigarettes per each machine, as compared with cigarette making machines of prior construction. In the use of my machine as above described, the cigarette rod is deflected toward the rotary knife without opening the seam of the rod, or disturbing the distribu-

tion of the tobacco or otherwise deforming the cigarette rod and I am enabled to attain and even exceed the percentage of commercially perfect cigarettes of prior cigarette machine construction.

My invention is also advantageous in that it enables the knife to be more readily sharpened by means of a whet-stone or equivalent, and with less danger to the operator, in view of the simpler path of travel of the cutting knife or knives; also, in permitting a proper guard of less over-all dimensions to be installed to protect the operator and affording direct access to the operator to a greater portion of the machine.

My invention is further advantageous in that it affords the employment of simpler mechanism in the operation and control of the operated parts and generally attains a more simple construction in operation, supervision and repair.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention, as defined by the appended claims.

I claim.

1. The combination of a cigarette making machine, of mechanism for forming a cigarette rod having the lap of the cigarette paper located to travel along a predetermined path, severing means located on the side of the formed cigarette rod and adjacent the lap thereof, and means for actuating said severing means and means for moving the formed cigarette rod toward the path of travel of said severing means.

2. The combination of a cigarette making machine, of mechanism for forming a cigarette rod to progress the lap of the cigarette paper upwardly of the cigarette rod, severing means disposed above the formed cigarette rod, means for actuating said severing means and means for moving the formed cigarette rod upwardly toward said severing means to sever cigarettes therefrom and for moving the cigarette rod away from said severing means.

3. The combination of a cigarette making machine, of means for forming a cigarette rod to progress the lap of the cigarette paper upwardly of the cigarette rod, severing means located above the formed cigarette rod, means for actuating said severing means and for reciprocating said severing means along the path of progress of the cigarette rod, and means for reciprocating upwardly and downwardly the formed cigarette rod relative to the path of travel of said severing means.

4. The combination of a cigarette making machine, of means for forming a cigarette rod to progress the lap of the cigarette paper upwardly of the cigarette rod, severing

means located above the formed cigarette rod, means for actuating said severing means and for reciprocating said severing means along the path of progress of the cigarette rod, and means for reciprocating upwardly and downwardly the formed cigarette rod relative to the path of travel of said severing means, said cigarette rod reciprocating means comprising a member enclosing a portion of the cigarette rod adjacent a line of severing thereof by said severing means.

5. The combination with a cigarette making machine provided with rod forming mechanism, of severing means, means for reciprocating said severing means in the direction of progress of the cigarette rod, means for reciprocating the cigarette rod toward and away from said severing means and means for synchronizing said rod reciprocating means with said rod forming mechanism, said rod reciprocating means comprising a member for supporting the cigarette rod, a horizontally reciprocating element supporting said member and a vertically reciprocating element for supporting said horizontally reciprocating element.

6. The combination with a cigarette making machine provided with rod forming mechanism, of severing means, means for reciprocating said severing means in the direction of progress of the cigarette rod, means for reciprocating the cigarette rod toward and away from said severing means and means for synchronizing said rod reciprocating means with said rod forming mechanism, said rod reciprocating means comprising a tube supporting the cigarette rod, a horizontally reciprocating element pivotally connected to said tube, a vertically reciprocating element supporting said horizontally reciprocating element, a cam controlling said vertically reciprocating element, and gearing connecting said cam in synchronous operation with said rod forming mechanism.

7. The combination with a cigarette making machine provided with rod forming

mechanism, of severing means, means for reciprocating said severing means in the direction of progress of the formed cigarette rod, means for reciprocating the formed cigarette rod and toward and away from said severing means, said rod reciprocating means comprising a horizontally reciprocating element and means for vertically reciprocating said horizontally reciprocating element.

8. The combination with a cigarette making machine provided with mechanism for forming the cigarette rod to progress the lap of the cigarette paper substantially horizontally and upwardly of the cigarette rod, of severing means, means for actuating said severing means, and means for vertically reciprocating the formed cigarette rod upwardly toward and downwardly away from the path of travel of said severing means.

9. The combination with a cigarette making machine provided with a support for a reel of paper strip, printing means and means for severing the formed cigarettes, of means for regulating the location of severing relative to the printed matter on the paper strip comprising an element for adjusting the length of the paper strip between the printing means and the severing means.

10. The combination with a cigarette making machine provided with a support for a reel of paper strip, printing means and means for severing the formed cigarettes, an arm constructed to frictionally engage the paper strip, means for yieldingly mounting said arm between said printing means and said severing means and means for regulating the location of severing relative to the printed matter on the paper strip comprising an element for adjusting the position of said arm relative to the path of travel of the paper strip.

In testimony whereof I have signed this specification this 2nd day of March, 1920.

WILLIAM F. GRUPE.