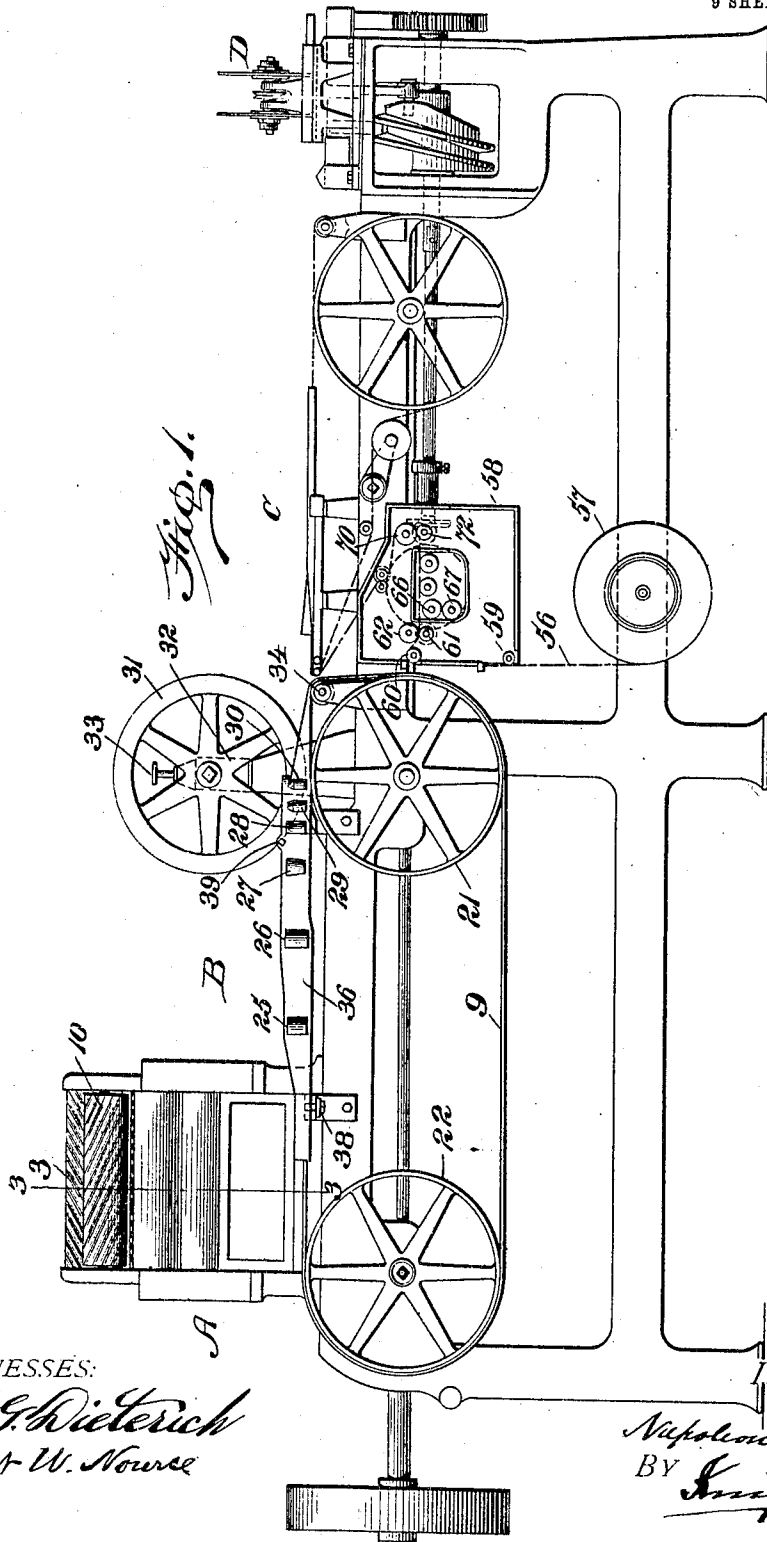


No. 844,783.

PATENTED FEB. 19, 1907.

N. DU BRUL.
PAPER CIGARETTE MACHINE.
APPLICATION FILED DEC. 12, 1904.

9 SHEETS—SHEET 1.



WITNESSES:

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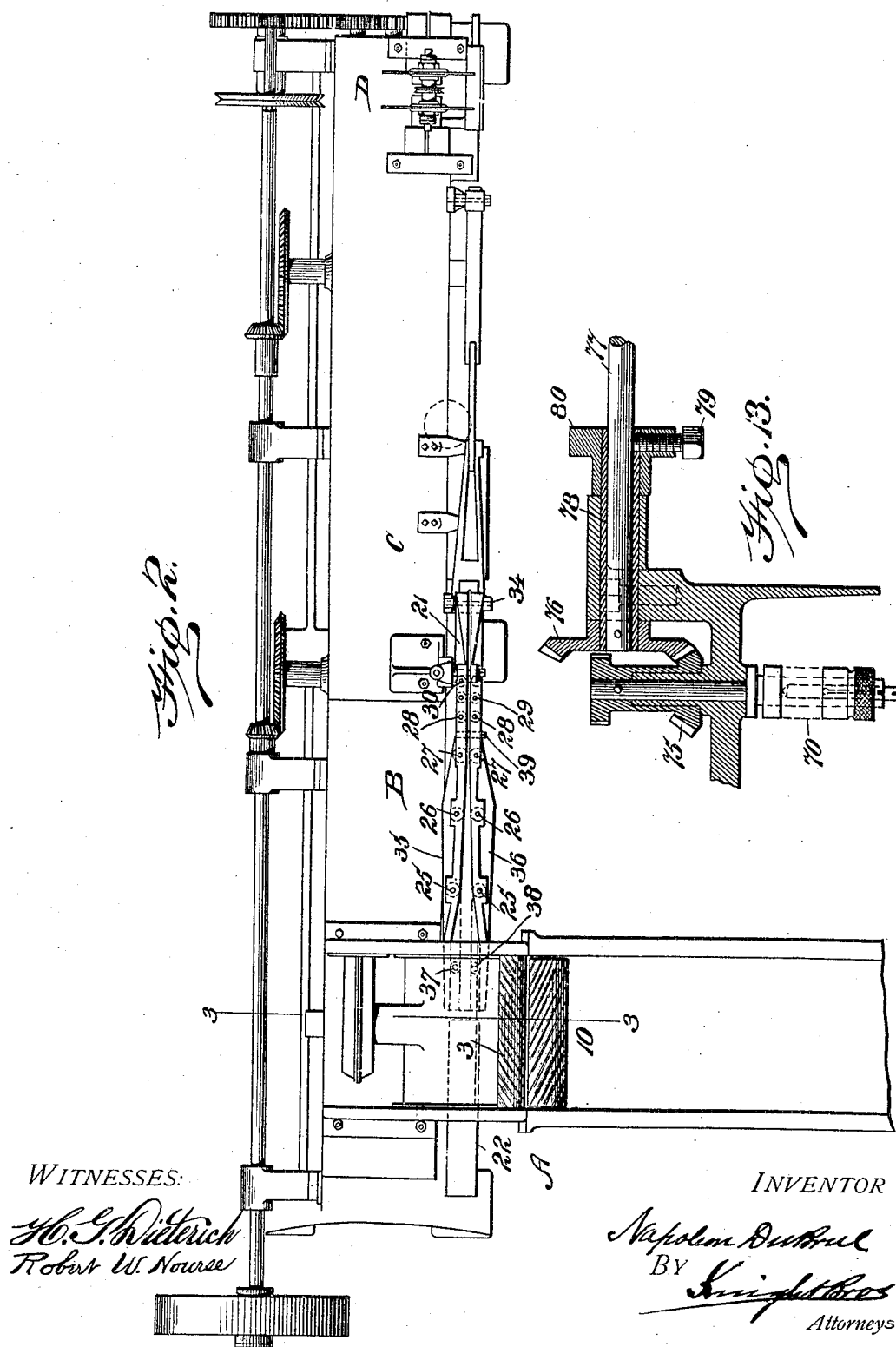
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9 SHEETS—SHEET 2.

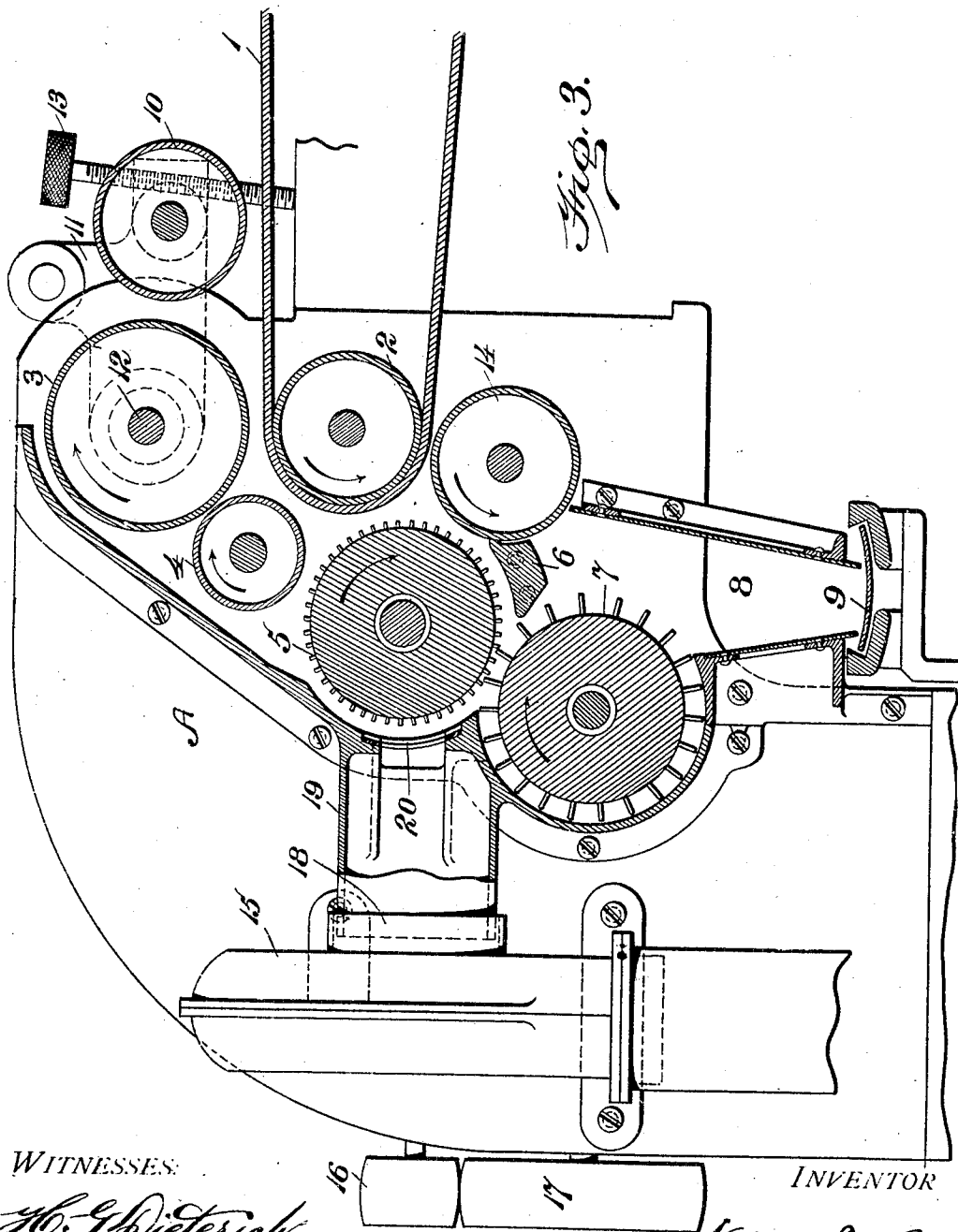


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9 SHEETS—SHEET 3.



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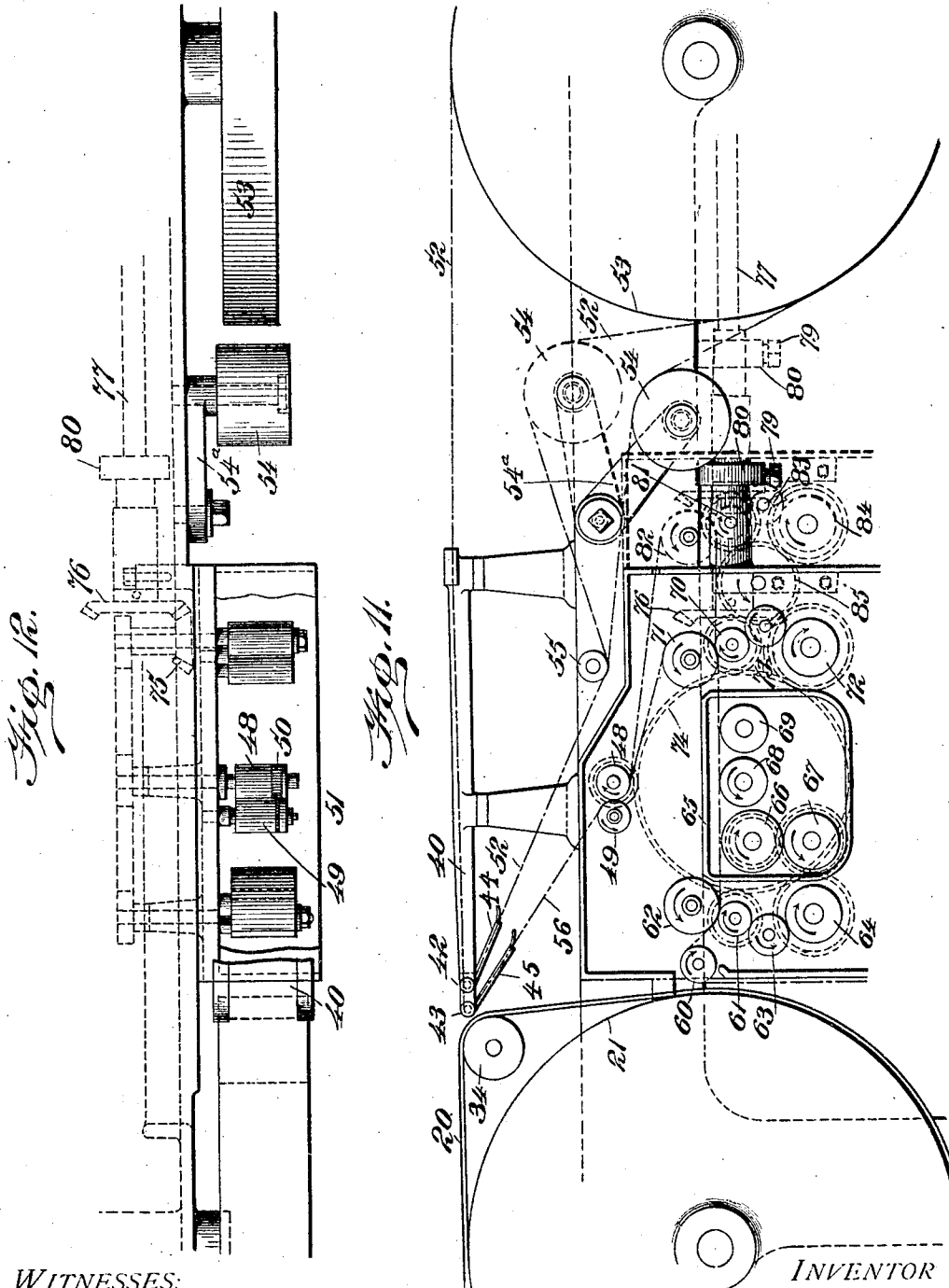
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9 SHEETS—SHEET 5.



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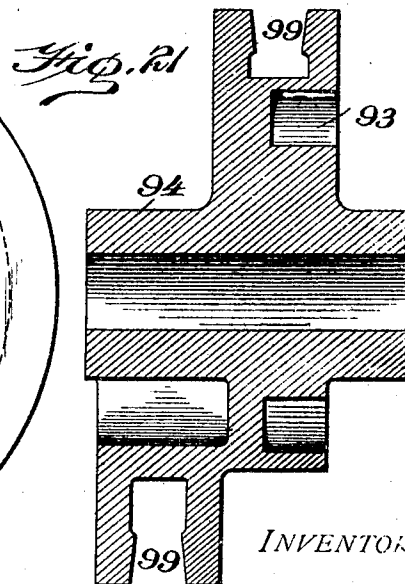
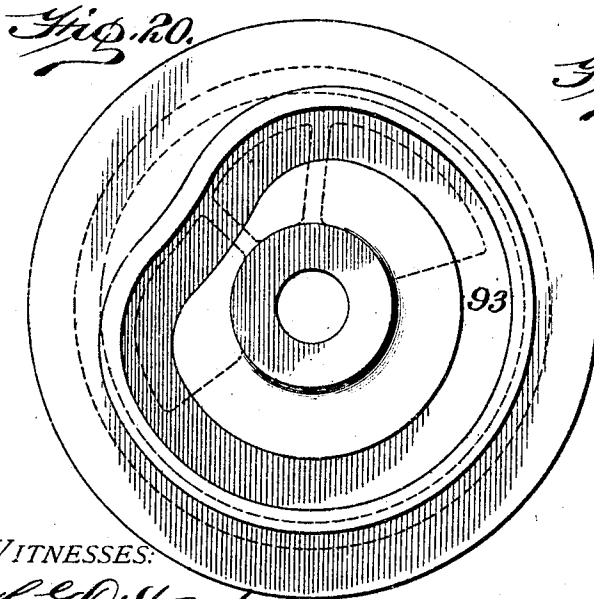
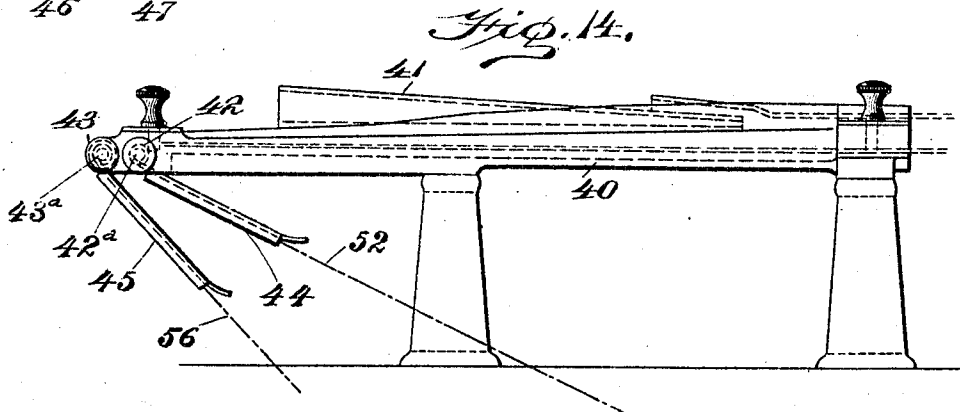
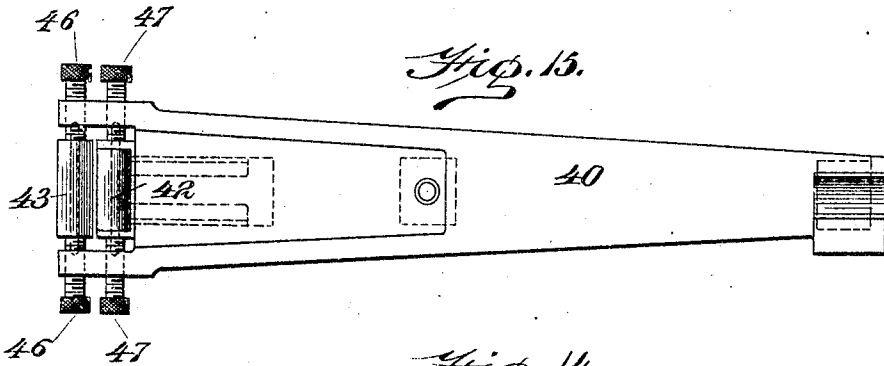
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9 SHEETS—SHEET 8.



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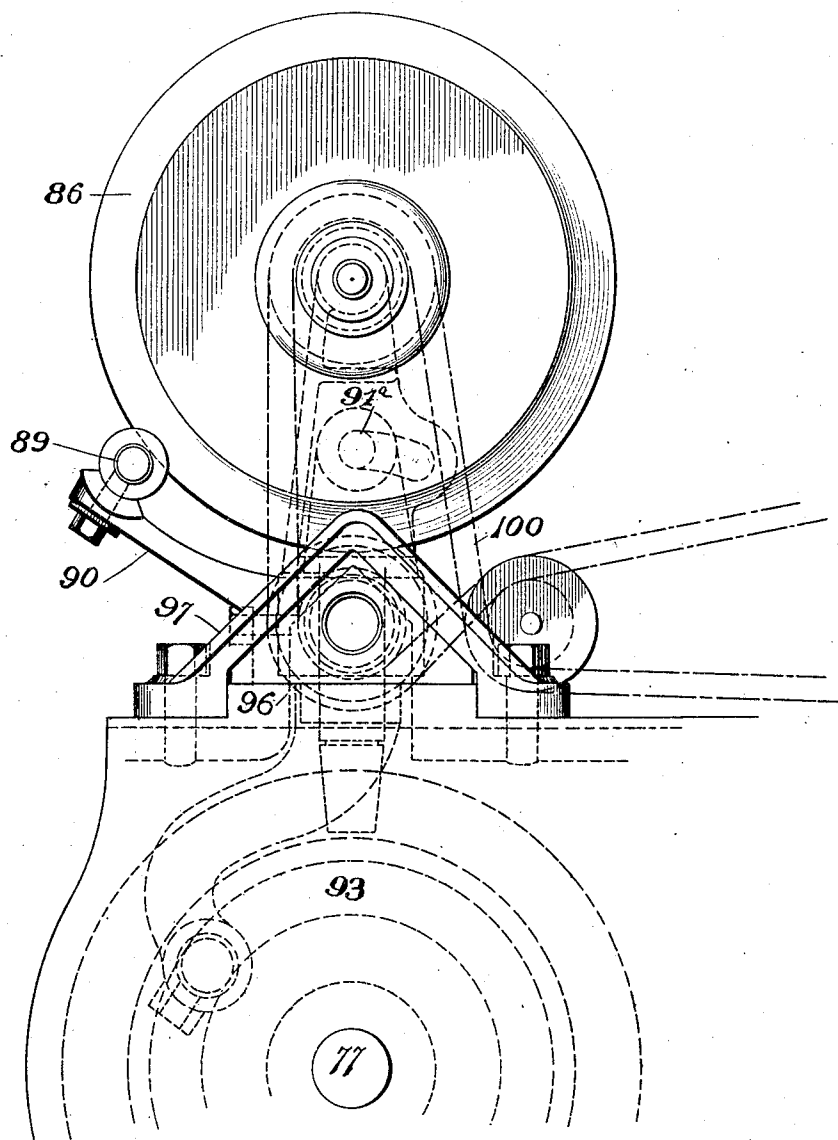
No. 844,783.

PATENTED FEB. 19, 1907.

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PAPER CIGARETTE MACHINE.
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9 SHEETS—SHEET 7.

Fig. 16.



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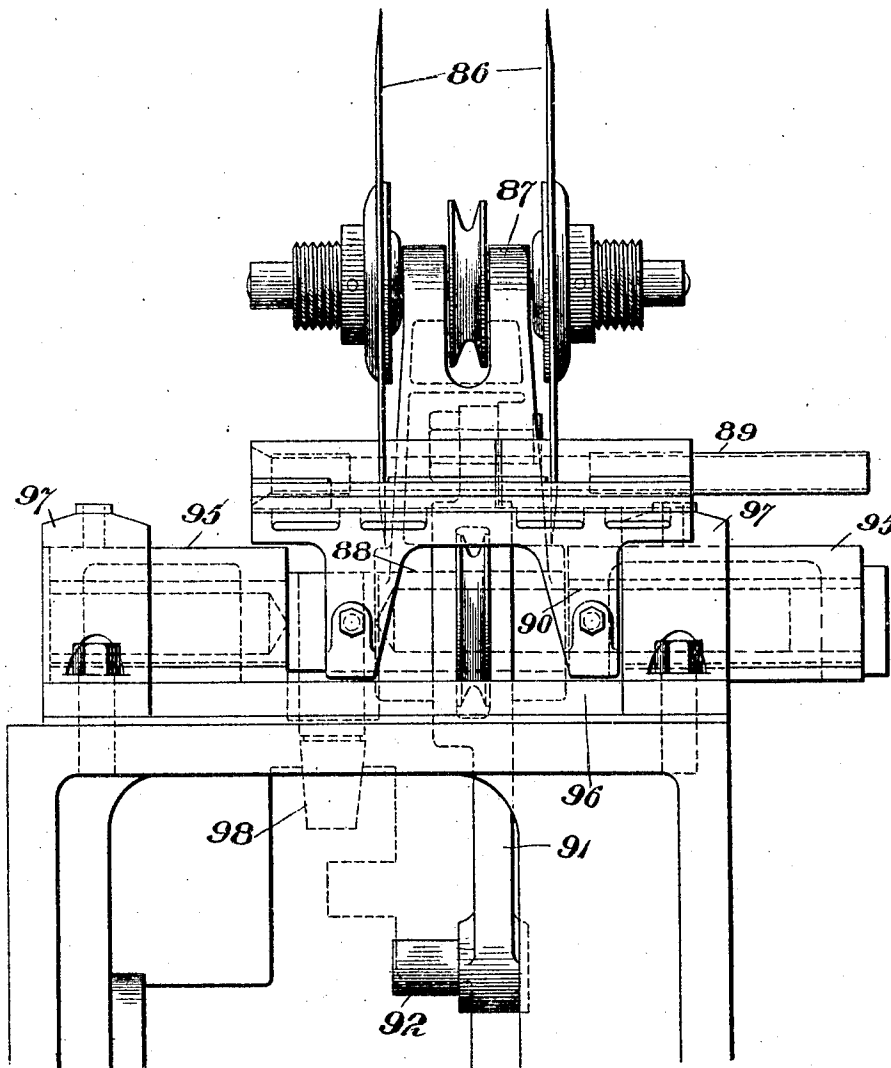
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9 SHEETS—SHEET 8.

Fig. 17.



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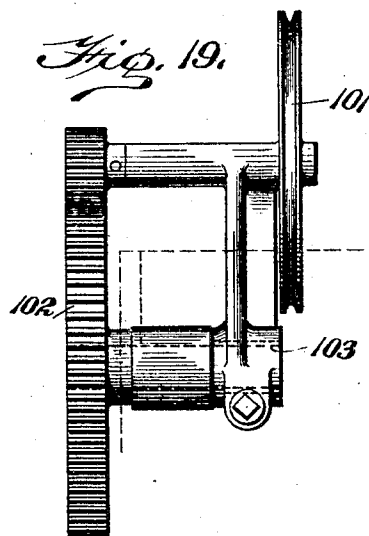
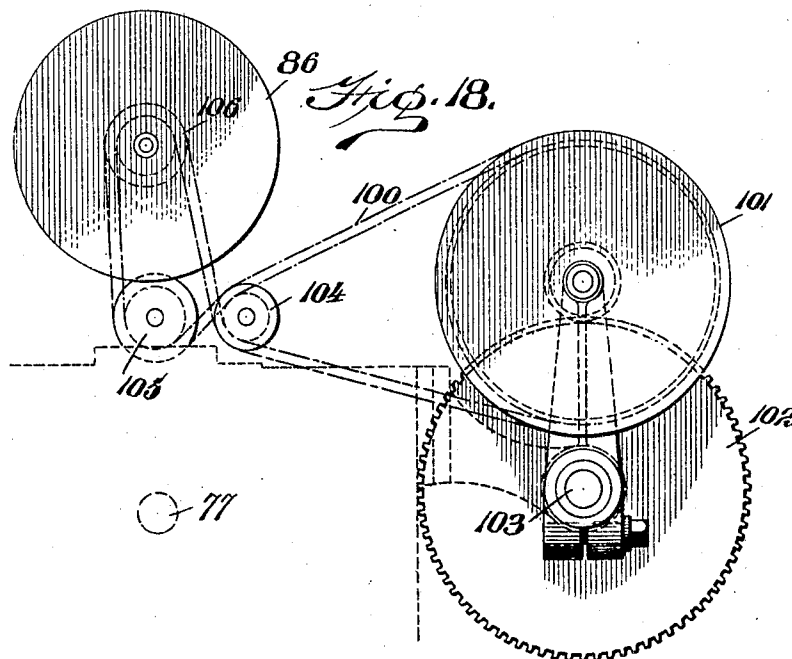
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9 SHEETS—SHEET 9.



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UNITED STATES PATENT OFFICE.

NAPOLEON DU BRUL, OF CINCINNATI, OHIO.

PAPER-CIGARETTE MACHINE.

No. 844,783.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed December 12, 1904. Serial No. 236,511.

To all whom it may concern:

Be it known that I, NAPOLEON DU BRUL, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Paper-Cigarette Machines, of which the following is a specification.

My present invention relates to cigarette-machines of the same general character as that described in my United States Letters Patent, Serial No. 671,417, granted April 2, 1901, and consists in certain novel features of construction in (a) the means for feeding and carding the tobacco, whereby tobacco with long fiber may be fed uniformly in proper condition and in sufficient quantity and the breaking of the fiber is reduced to a minimum and means for producing an air-current through the tobacco as it is fed, whereby dust is extracted therefrom; (b) the means for producing the tobacco rope, wherein the belt-forming mechanism is greatly simplified in its construction and improved in its operation; (c) the means for supplying the paper wrapper, wherein the wrapper-forming paper may be printed at accurately-spaced intervals with one or more colors at will for labeling the cigarette, also indented along its pasting edge, whereby the difficulty of causing the paste to adhere to the paper, which is sometimes encountered, is completely overcome, and (d) the means whereby the cigarettes are cut off from the cigarette-rod, which means is so simplified in its construction that it is greatly reduced in weight, operates to better advantage and with much less wear upon the rapidly-reciprocating parts, and is readily adjustable to take up wear and insure accuracy in its operation.

My invention will be fully understood upon reference to the accompanying drawings, in which—

Figures 1 and 2 are respectively a side elevation and a plan of the continuous cigarette-machine embodying my present improvements. Fig. 3 is a vertical transverse section of the tobacco feeding and carding mechanism on the line 3 3, Figs. 1 and 2. Figs. 4 and 5 are respectively a side elevation and a plan of the belt-forming mechanism in the machine for producing the tobacco rope. Figs. 6, 7, 8, 9, and 10 are sections taken, respectively, on the lines 6 6, 7 7, 8 8, 9 9, and 10 10, Figs. 4 and 5. Figs. 11 and 12 are respectively a side elevation and a plan of the

bronzing, printing, and crimping mechanism. Fig. 13 is a horizontal section through parts shown in Fig. 11 of the driving connections of the printing and bronzing mechanism and the means whereby the driven parts may be rotated relatively to the driving-shaft to change the points of applying the bronze and other printing to bring them into proper relation with the points at which the cigarettes are severed. Figs. 14 and 15 are respectively a side elevation and a plan of the wrapper-folder. Fig. 16 is an end, and Fig. 17 is a side, elevation of the cigarette-cutter for severing the cigarettes from the cigarette-rod. Figs. 18 and 19 are respectively an end elevation and a side elevation of the driving-gear for the cigarette-cutter. Figs. 20 and 21 are respectively a face view and an axial section of the cam which imparts a reciprocating motion to the cutter and an oscillating severing movement to its knives.

Referring to Figs. 1 and 2, A represents the tobacco feeding and carding mechanism; B, the rope-forming mechanism; C, the mechanism for supplying the wrapper-paper, bronzing and printing it, preparing its edge to receive the paste, and applying the paper wrapper to the cigarette rope to complete the cigarette-rod. The means for supplying paste to the edge of the paper is omitted for the sake of clearness; but it is to be understood that any suitable form of pasting mechanism is to be employed; and D is the mechanism for severing the cigarettes from the cigarette-rod.

Tobacco feeding and carding mechanism.—Referring to Fig. 3, the tobacco is delivered upon an apron 1, which passes around a driving-roller 2 and is carried by said belt beneath a compressing-roller 3, from which point it is directed downwardly by a roller 4 and is delivered to and pressed upon a picker-roll 5, with which it travels past a concave 6, where it is removed from the picker-roll 5 by a stripping-roll 7, rotating at twice the rate of picker-roll 5, so that the tobacco which is pressed onto the picker-roll 5 in a dense continuous band is stripped therefrom in a finely-divided state and deposited in a uniform way upon the rope-forming belt 9.

The roller 3 has heretofore been provided with grooves or ribs parallel to its axis, a construction that compressed the tobacco in a band having a series of straight grooves extending the width thereof and perpendicular to its edges, so that as the stripping opera-

tion went on light and heavy sections of the tobacco band were transformed into corresponding elongated sections in the continuous cigarette-filler, which caused a lack of uniformity in the weight of the cigarettes produced. According to my present invention this defect is obviated by providing the roller 3 with spiral grooves, as shown in Figs. 1 and 2, which feeds the tobacco uniformly to the carding-rolls, (the picker-roll 5 and stripper-roll 7.) With this arrangement the tobacco is compressed into a spirally-corrugated band which is acted upon by the stripping-roll 7 in a surface, cutting at once the ridges and grooves of the corrugated surface in such manner as to furnish the granulated tobacco to the rope-forming mechanism in a steadily-sustained supply.

In making cigarettes of the smaller sizes the compressing-roller 3 is quite sufficient to condense the tobacco to the desired degree; but in making cigarettes of larger sizes I find it very desirable to employ an auxiliary compressing-roller 10 in addition to the main compressing-roller 3 and to mount the same in a frame 11, which swings about the shaft 12 of the roller 3 and has its height regulated by a screw 13. Roller 10 is spirally grooved like roller 3 and for the same reasons, and it is so adjusted that the rollers 10 and 3 cooperate to gradually compress the tobacco when it is supplied to the apron in sufficient quantities to make the larger sizes of cigarettes.

According to my present invention the picker-roll 5 is made with comparatively short pins for receiving and forwarding the tobacco in order that the relatively long pins of stripper-roll 7 will intermesh but slightly with the pins of the picker-roll, and thereby maintain the addendum circles of these rolls in approximately tangential relation. With this arrangement in the carding mechanism the long-cut tobacco will be removed from the picker-roll without breaking the fiber. The short pins are further advantageous in that they are less liable to be injured by nails or other hard foreign substances or obstructions that are often inadvertently fed in with the tobacco. Moreover, these short pins leave more space between the picker-roll on the one side and the concave 6 and roller 14 on the other for the passage of such foreign substances or obstructions, and thereby reduces likelihood of injuring or damaging the pins of the picker-roll 5, as frequently happened when the pins were made longer.

Another important feature of my invention is the creation of an air-exhaust from the feed-hopper, and thereby extracting from the carded tobacco dust which would otherwise gather in appreciable quantity during operation of the machine and be suddenly precipitated at times upon the tobacco in the rope-former feed-belt and spoil the tobacco with

which it mixes for cigarette purposes. The dust-extractor thus provided acts upon and withdraws dust from the tobacco as it passes through the feeder and comprises a suction-fan 15, driven in any suitable manner, as by pulleys 16 17, and having its eye 18 connected through a flue 19 with an exhaust-port 20 in the casing of the feeder. By this arrangement a current of air will be set up through the feeder—especially through the hopper 8, where the tobacco is being discharged in more or less loose condition—and will take up and carry off through flue 19 the objectionable dust that otherwise would enter into the cigarettes. The direction of this exhaust is transverse to the axis of the stripper-roll and to the rope, so that if the tobacco is deflected by the current of air it will not be in a direction to produce unevenness in the thickness of the rope being formed.

It is to be understood that the rollers of the tobacco feeding and carding mechanism are positively driven in the directions indicated by the arrows thereon. I have not shown this driving mechanism, as it forms no part of the present invention.

The rope-producing mechanism comprises the belt 9, supported wholly by pulleys and rollers—viz., drive-pulley 21, idler 22, and intermediate supporting-rollers 23 24, while the belt is formed up into a trough of the desired section by a series of pairs of rollers (preferably six pairs) 25, 26, 27, 28, 29, and 30, the rollers of which pairs 25 26 27 28 are located at gradually-decreasing distances apart. Those of the pair 27 are flared upwardly to press the upper sides of the belt together to get the rope in condition to receive the condensing-wheel 31, mounted in standard 32 and having a pressure-screw 33. Those of the pair 28 are straight, and those of the pairs 29 and 30 are beveled to better admit the condensing-wheel 31 between them and permit the belt to gradually straighten out preparatory to passing over deflecting-roller 34 and returning to drive-pulley 21.

Heretofore it was customary to provide separate adjustments for the rollers on opposite sides of the rope-forming belts, which involved difficulty in securing uniformity of contact of the opposite sides of the belt against the condensing-wheel and causing the belt to run unevenly. According to my present invention, I construct the belt-former of two adjustable side members 35 36, pivoted at 37 38 and carrying the respective forming-rollers of the several pairs 25–30, while one of said members carries the supporting-rollers 23 24, and I connect these two members 35 36 by an adjusting-screw 39, which draws together the rollers of the pairs 29 and 30, and through them the belt 9, with any desired fitting contact, to the opposite sides of the presser-wheel, while leaving them free to equalize such contact by swinging on their pivots.

This prevents excessive thinning and stretching of the sides of feed-belt and consequent unsteady running. The side members are also easily adjustable to any width of former-wheel for different sizes of cigarettes. This close uniformity of contact also prevents the tobacco during compression from slipping between the sides of the presser-wheel and feed-belt, and thereby completely overcomes the defect of objectionable fins on the sides of the tobacco rope so common on many other formers. In addition to thus insuring uniformity in the adjustment of the sides, with consequent even running of the belt, the adjustment is greatly facilitated, the construction of the belt-former greatly simplified, and wear and tear on the belt reduced.

The wrapper mechanism is shown more clearly in Figs. 11, 12, 14, 15, wherein 40 represents the support for the folding or wrapping tube 41, Figs. 14 and 15, in which 42 represents a freely-rotating roller over which the tape passes, and 44 a flanged guide through which the tape passes to said roller, this guide being suspended to swing freely from a pin 42^a, on which the roller 42 is journaled. This pin 42^a is socketed in set-screws 47, which are screwed into opposite sides of the support, and by this means the roller and guide may be adjusted laterally in relation to the paper.

43, Figs. 14 and 15, represents a rounded extension of a flange-guide 45, by which the paper is guided in its passage to the folder-tube. This extension loosely encircles a pin 43^a, which enables guide 45 to swing freely thereon, said pin being also socketed in adjusting set-screws 46 on each side of the supporter 40, which provides a lateral adjustment of the paper relatively to the tape and folder-tube. By this arrangement of separate guides for the tape and paper these guides are free to swing independently on the centers around which the paper and tape are respectively deflected and are self-adjusting to the angle of the tape or paper. Moreover, the pressure or weight of the guides upon the wrapper and tape serves to make the wrapper and tape move more steadily and with less tendency to crowd against the inside edges of the guides than is the case when the wrapper and tape run loosely between the flanges and the backs of their guides. The free swinging of the guides also insures a constant and invariable action of such pressure. By the lateral adjustment the extent to which the edge of the paper projects to receive the paste may be varied at will. The paper by passing over a non-rotating independent deflector is smoothed and ironed out on the hard surface, while the tape runs over the ordinary rotatable roller, which better adapts the tape for its work and reduces wear thereon. The running of the tape and paper together over one roller, as in machines here-

tofore constructed, causes a wrinkling of the paper due to its contact with the uneven relatively narrow surface of the tape, and also entirely interferes with the independent adjustments which are so essential to the production of fine-lap cigarettes.

Crimping the pasted edge.—Difficulty is frequently encountered under some conditions in causing sufficient paste to "lay" to the pasted edge of the paper. I have devised a means of overcoming this difficulty and securing a better pasting effect under all circumstances by what I term "crimp-pasting." This consists in nurling the paste-receiving or overlapped edge of the wrapper-paper before it reaches the paste-applying means, so that the paste can take a better hold on the paper. This results not only in facilitating the pasting operation, but in an improved product *per se*. I do not herein claim the new article thus produced, but claim the same in a copending application, Serial No. 245,762, filed February 15, 1905. To illustrate that part of my invention which relates to the production of this novel pasting effect, I have shown, by way of example, a pair of nurling or crimping rolls 48 49, which preferably serve as feed-rolls for the paper, being positively driven by a pinion connected to large gear 74, and these rolls 48 49 are provided with corresponding and intermeshing grooves and ridges 50 51, of which the ribs on the one press and stretch the paper into the grooves of the other.

The tape is indicated by the numeral 52 and travels continuously around the drive-wheel 53 and over suitable deflecting-idlers 54 55, of which the idler 54 is mounted in an adjustable arm 54^a for a purpose to be described. 56 indicates the paper which is supplied from roll 57, Fig. 1.

Printing and bronzing mechanism.—The paper wrapper 56 is fed positively to the type-rolls of the component elements comprising a printer and bronzer through the instrumentality of the pair of feed-rolls 48 49, revolving at the same peripheral speed as the printing-rolls and gripping the paper firmly between their opposed faces. The invention includes a drive-shaft 77 and gearing 75 76, Figs. 11 and 12, connecting the cutter (to be described) with the printing-rolls to rotate the latter in unison with the former, and a device 80 for disengaging such mechanism whenever it is necessary to rotate the printing-rolls in any desired degree to adjust the relation of the cut-off to the registered design. It is to be understood that through this disengaging device the other elements of the cigarette-machine may be permitted to run independently of the printer and bronzer to produce unprinted cigarettes without removing the printing mechanism from the machine, or either a bronze or colored design may be singly imprinted upon the wrap-

per, or these may be disengaged and the crimping-rolls for nurling the edges of the paper run independently. The above advantages are obtained by combining the several component elements of the printer and bronzer as a unit in one frame or casing and engaging all the printer-rolls and the drive and crimping rolls through one master-gear. Not only does this effect a simplicity of construction and a reduction of gears, but through the consequent diminution in size of the casing it may be affixed to a more prominent and accessible position on the main frame than heretofore, and a more nearly perfect printing and bronzing machine can be produced, since all parts may be permanently set in proper relation and alinement to one another, and the gear connections being driven directly from a master-gear insure closely-related uniform running.

An additional printer, if more than two colors are required, for the brand, may be attached to the printer and bronzer-casing, this additional printer being a substantial duplicate of the color-printer and having gear connections with the printing-rolls of same through the medium of an idler-gear. Still other printers may be added in like manner by providing for each consecutive printer a similar idler-gear connection to last preceding printing-roll.

From the paper-reel the paper passes over suitable guiding-rollers 59, Fig. 1, and 60, Figs. 1 and 11, located in the casing 58, by which the paper is delivered in proper relation to first printing-roller 61 and its presser-roll or rotary platen 62, where suitable sizing as a ground for the bronze is applied, the die on printing-roll 61 being inked by transfer-roll 63 from distributor-roll 64. The paper leaves this first printer with designs in ink applied at points where it is desired to have the bronze adhere, and this at intervals accurately corresponding to the length of the finished cigarettes, and enters the bronze-box 65, where it receives bronze from bronzer-roll 66, running in contact with bronze-feed roll 67, then passes over cleaner-rolls 68 69 to remove surplus bronze, and passes out and between the second printing-rolls 70 71, of which type-roll 70 is fed by rolls 72 73 with ink of a different color and is made to print either an additional design or ornament or some matter in registry with the imprint already made, after which the paper may pass directly around rotary platen or presser roll 71 to the paper-drive rolls 48 49, and thence to the folding-tube; or the paper may be subjected to other printing mechanisms adapted to be applied to or removed from the machine at will, as hereinafter described. It will be seen that a master gear-wheel 74 meshes with the paper-drive roll 48, printing and inking roll 61 64, and printing and inking rolls 70 72, while bronzing-

rolls 66 67 are driven from inking-roll 64. This establishes an unchanging relation between all these rolls, and the whole series is driven through bevel-gear 75 on the shaft of second printing-roll 70 from bevel-gear 76 on shaft 77, which extends directly from the cutter.

Shifting the registered design relative to the cut, Figs. 11, 12, and 13.—This is accomplished by connecting the bevel-gear 76 to shaft 77 through a sleeve 78, having a set-screw 79 in its hand-grip 80. By loosening set-screw 79 and turning hand-grip 80 on shaft 77 the bronzing and printing mechanism and paper-feed may be shifted relatively to the cutter and the points of severing the cigarettes brought into the exact relation desired to the imprinted designer-brand.

Additional printing mechanism, to be attached when additional colors are desired in the printing, may be a substantial duplicate of that indicated at 70 71 72 73. As shown in dotted lines in Fig. 11, a third printing-roll 81, with platen 82, transfer 83, and ink-distributor 84, may be arranged in substantial continuation of the second printing-rolls, the idler-gear 85 being introduced between the second printing-roll 70 and the third printing-roll 81. The paper would then pass into printing relation to the third printing-roll before going to the paper-drive rolls 48 49. With equal facility the third printing attachment may be removed and the driving connections reestablished directly with the second printing-roll. In like manner more than one additional printing mechanism might be added to or taken from the machine at will.

When adding printing attachments other than the second, the guide-roller 54 of the tape may be adjusted upwardly by swinging its adjustable arm 54^a, as indicated by dotted lines in Fig. 11.

The cutter.—In no other element of the machine is the necessity for a stable, simple, and durable mechanism more apparent than in the cigarette-cutter. The device shown in Figs. 16 to 21, representing my improved cutter mechanism, secures these advantages in a more perfect degree than heretofore known, as it consists merely of an oscillating arm for knives and a reciprocating slide so designed that the retaining-caps act as take-ups for wear. The degree of movement of the oscillating arm upon a turned portion of this slide is so little as to be negligible. The central portion of slide is turned to receive the oscillating arm, so as to carry all weight in the center line of reciprocation, through which line the roller extends to engagement with the cam. The cam is so designed that its return-curves equal the smooth return movement of a crank in effect, with the added advantage of the reliable straight-line angle for driving the reciprocating slide through

the cutting portion of its stroke, forming the ideal drive for the cigarette-cutting operation.

Referring to Figs. 16 to 21, in which the cutting mechanism is illustrated, 86 represents a pair of rotary cutting-knives spaced apart by the length of one cigarette, mounted in an oscillating frame 87, having its oscillating bearing upon a turned portion 88 of a reciprocating slide, said knives being fixed upon their rotating shaft and made to intersect the cigarette-tube 89 and sever two cigarettes therein at each stroke as their frame oscillates. Tube 89 is fastened on a bracket 90, attached to the slide proper. 91 represents the cam-lever of the oscillating frame, which carries a pin 92, that enters the groove 93 of cam 94, said groove being shaped to impart a cutting movement through the lever to the knives each time the cigarette-rod feeds a distance equal to the length of two cigarettes. The formation of the rear face of the cam 94, in which the groove 93 is formed, is substantially parallel to the walls of the cam-groove, which causes the sliding movement of the slide, so that the pin 92 does not leave its groove. The oscillating frame is made up of two members, both of which have pivotal bearings upon the cylindrical portion 88 of the slide, while the lower member, which embodies the lever 91, has an upward extension for fastening to the upper member, the connection being adjustable therewith through the medium of slot-and-screw connection 91^a to provide for the advancement of the knife as it wears and maintains its relation to cut-off tubes.

95 represents the slide member, constructed in the form of triangular shoes connected by the intermediate turned portion 88. The bases of these shoes have sliding bearings upon tracks 96, and the shoes are secured upon their tracks with freedom to reciprocate by means of angular caps 97, suitably bolted to the frame of the machine. One of the shoes 95 is in practice incorporated with the turned portion 88, while the other shoe is removably attached by means of a screw fitted in the end of the slide and serves to hold in place the bearings of the two members of the oscillating frame. The removable shoe might be dispensed with entirely by leaving the turned portion of 88 as long as the removable shoe is and by simply letting the round portion work into a suitable box with a cap; but my preferred form is to have two shoes, as shown.

98 represents the roller-stud which projects downwardly from a vertical socket in the slide 88, in which it may be secured by a set-screw or other suitable means, and this roller-stud extends into a vertical cam-groove 99 in the cam 94 and imparts the reciprocating motion to the slide, the forward stroke of this reciprocation corresponding to the feed

of the cigarette-rod, so that the knives will cut the cigarette-rod perfectly transversely.

Knives 86 are driven by a belt 100, running from a large pulley 101, driven by multiplying-gear 102 on shaft 103, said belt 100 passing over and under an idler 104, suitably mounted on the slide, and around pulleys 105 106, of which the former is journaled on the turned portion of slide 88 and confined in a recess between the bearings of the lower member 91 of the oscillating frame, while the pulley 106 is fixed upon the shaft of the knives 86.

Pulley 101 is mounted in a standard radially adjustable about the center of gear 102, being clamped upon a turned portion of a bearing for the shaft of said gear in a manner to be readily adjustable to take up slack of the belt 100.

I have made no special reference to the general driving connections in this present machine, as these parts do not form features of my present invention. They may be constructed and arranged substantially as set forth in my previous Letters Patent of April 2, 1901, already referred to.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a tobacco-feeding mechanism, for cigarette-machines, the combination of the apron upon which the tobacco is delivered, the main compressing-roller beneath which the tobacco is passed, and the auxiliary compressing-roller adjustably mounted by a frame swinging about the axis of the main compressing-roller; said rolls being both spirally grooved.

2. In a tobacco-feeding mechanism for cigarette-machines, the combination of the apron upon which the tobacco is delivered, the main compression-roll, the swinging frame pivotally mounted upon the axis thereof, the auxiliary compression-roll mounted in the outer swinging end of the said frame and a screw for regulating the height of the auxiliary compression-roll above the feeding-apron.

3. In a tobacco feeding and carding mechanism, for cigarette-machines, the combination of the feeding means, the picker-roll, and the stripper-roll; said picker-roll having radial teeth of lesser length than the circular pitch at which they are placed, and the stripper-roll having relatively longer teeth slightly meshing therewith, whereby the tobacco is removed from the picker without breaking the fiber.

4. In a tobacco-carding mechanism for cigarette-machines, a short-toothed picker-roll in combination with a long-toothed stripper-roll, the short teeth of the said picker-roll enmeshing throughout the greater part of their length with but the extreme ends of the teeth of the said stripper-roll.

5. In a tobacco-carding mechanism for cigarette-machines, the combination of a picker-roll having a central barrel portion a with teeth projecting radially therefrom, and
5 stripper-roll having similar barrel-and-tooth structure, the said rolls being so mounted as to separate the barrels thereof, by a distance approximately equal to the tooth length of the stripper-roll, and to maintain the adden-
10 dum-circles of the aforementioned rolls in approximately tangential relation.
6. In a tobacco-feeding mechanism for cigarette-machines, the combination of the feeding and carding means, and a means for
15 removing the dust from the tobacco during the carding operation.
7. In a tobacco-feeding mechanism for cigarette-machines, the combination of the feeding and carding means, and the exhaust
20 mechanism for drawing off dust from the tobacco during the carding operation.
8. In combination with a tobacco-feeding mechanism having a stripper-roll by which the tobacco is discharged, an air-exhaust for
25 drawing off dust from the tobacco subsequently to its disintegration into finely-divided particles.
9. In combination with a rope-forming belt and tobacco-feeding mechanism having
30 a stripper-roll lying parallel to the rope-forming belt; a dust-exhausting means drawing transversely to the rope-forming belt and to the axis of the stripper-roll.
10. In a cigarette-machine, a rope-forming
35 mechanism comprising an endless belt, the pulleys between which the belt is stretched, the supporting-rollers over which the belt runs at intermediate points, and the pairs of lateral rollers located at intervals and shap-
40 ing the belt into the desired form.
11. In a rope-forming mechanism for cigarette-machines, the combination of the endless belt, the adjustable side members, the paired belt-shaping rollers mounted on the
45 side members, and an adjustable connection between the side members by which their distance apart may be determined at will and an equal displacement of the edges of the belt thereby produced.
- 50 12. In a rope-former for cigarette-machines, the combination of the belt, the adjustable side members, the series of pairs of belt-forming rollers mounted upon the side members, each side member carrying one
55 roller of each pair, means for determining the distance between the side members, and the supporting-rollers each mounted on a side member.
13. A rope-former for cigarette-machines
60 comprising relatively adjustable side members, a series of paired forming-rollers mounted in said adjustable side members, and an endless belt running between and conforming to the shape of the paired forming-rollers.
- 65 14. A rope-former for cigarette-machines comprising the pivoted side members, the adjusting-screw connecting them, the paired forming-rollers mounted in the pivoted side members and an endless belt running between and conforming to the shape of the
70 paired forming-rollers.
15. The combination of the relatively adjustable side members, the paired forming-rollers mounted thereon, the endless belt running between the forming-rollers, the con-
75 densing-wheel, and the adjusting-screw drawing the side members together and pressing the belt, through means of the forming-rollers, against the condensing-wheel.
16. In a wrapper attachment for cigarette-machines, the paper-guide comprising
80 the deflecting part, the freely-swinging part and a means for automatically holding the said swinging part in guiding relation with the paper.
- 85 17. In a wrapper attachment for cigarette-machines, the paper-guide comprising a pivoted cylindrical portion and an open-channeled guide rigid therewith.
18. In a wrapper mechanism, having a
90 paper-feed and a tape, the combination of the adjustable paper-guide and the adjustable tape-guide, the said guides being provided with open-channeled portions and having cylindrical hub portions about which
95 the tape and paper are respectively deflected before the paper is superimposed upon the tape.
19. In a wrapper-applying mechanism for cigarette-machines, the combination of the
100 paper-supply, the tape, and open-channeled guides whereby said paper and tape are respectively deflected before one is superimposed upon the other, each of said guides being independently adjustable.
- 105 20. In a wrapper attachment for cigarette-machines, the combination of the tape-deflecting roller, the guide hinging therefrom, the guide through which the paper passes having a curved part over which the paper is
110 deflected before reaching the tape and the set-screws for adjusting the guides laterally.
21. In a cigarette-machine, the combination with an endless tape, a driving-wheel to propel the same, forming devices to form the
115 cigarette-rod upon the tape, adjustable flanged guides fitted to the edges of tape and wrapper, the one guiding the tape to a deflecting-roller, the other guiding the paper over a stationary ironing and smoothing
120 deflecting end, pins on which the guides are adapted to swing and set-screws to vary the relation of the guides to each other and the forming-tube.
22. In a cigarette-machine, the combination
125 with a paper-supply and a wrapper-applying mechanism, of a pair of crimping or nurling rolls located intermediate to the said paper-supply and wrapper-applying mechanism so as to nurl or crimp the pasting
130

edge of the wrapper before inclosing the filler therein.

23. In a cigarette-machine, the combination with a paper-supply, a paster and a wrapping mechanism, of a means for crimping or nurling the pasting edge of the paper before it reaches the paster.

24. In a cigarette-machine in which a paper wrapper is pasted to secure it around the filler, the combination with the paper-supply and the paster, of a pair of paper-drive rolls having crimping or nurling surfaces in line with the pasting edge of the paper as it passes between the rolls.

25. In combination with a paper-cigarette machine, a printing-roll and its platen, and independent paper-drive rolls for the wrapper-paper driven from the same source of power as the printing-roll and having the same surface speed as the printing-roll.

26. In combination with a paper-cigarette machine, drive-rolls for the wrapper-paper, the printing-roll with its platen, and a gear connecting said printing and drive rolls and causing them to travel with the same surface speed and in definite relation to the operation of the cigarette-machine.

27. In combination with a paper-cigarette machine, a plurality of printing-rolls rotating in definite relation to the operation of the cigarette-machine, a pair of paper-drive rolls for the wrapper-paper, and a gear connecting all of said printing and drive rolls and causing them to rotate with the same surface speed.

28. In combination with a paper-cigarette machine, printing-rolls, inking-rolls for said printing-rolls, a bronzing-roll driven from said inking-rolls, paper-drive rolls for the wrapper-paper, and a gear connecting the paper-drive rolls and printing-rolls and causing them to run with equal surface speed.

29. In combination with a paper-cigarette machine, first and second printing-rolls, inking-rolls for said printing-rolls, a pair of paper-driving rolls for the wrapper-paper and a gear common to all of said rolls and driving the printing and paper-drive rolls at equal surface speed.

30. In combination with a paper-cigarette machine, the feed-rolls for the wrapper-paper, the printing-roll, a gear causing said rolls to travel at equal surface speed, the cigarette-cutter, the shaft rotating in definite relation to the cutting operation, and a gear connecting said shaft to the printing-roll.

31. In combination with the wrapping mechanism of a paper-cigarette machine, a printing attachment cooperating with the same, additional printing mechanism constructed to be applied to the machine, an idler-gear to connect one printing means with the other, a drive-shaft, and a gear connecting said drive-shaft to the printing-roll.

32. In combination with the wrapping

mechanism of a paper-cigarette machine having a printing attachment, an additional removable printing means, constructed to be brought into driving relation to the printing attachment, a drive-shaft, and a drive-gear for connecting said shaft to the printing attachment; said gear having an adjustable connection with the shaft, permitting the driven parts to be adjusted relatively to the shaft.

33. In a cigarette-machine, the combination of the cutter, a wrapper-driving mechanism, a printing attachment, a shaft connecting the cutter-operating parts with the mechanism of the printing attachment, a sleeve turning on said shaft, a gear for driving the printing and wrapper-driving mechanisms, supported on said sleeve, a hand-grip also on said sleeve and means carried by the hand-grip whereby the sleeve may be rigidly secured to the shaft.

34. In a cigarette-machine, the combination of the cutter, a shaft in operating connection therewith, a gear detachably secured to said shaft, a compound gear supported in turning relation with the said detachably-secured gear, an idler intermeshing with said compound gear by means of which the wrapper driving and printing mechanisms are simultaneously and correlatively driven and a second gear on the supporting-shaft of said compound gear, by means of which additional printing attachments may be driven.

35. In a continuous-cigarette machine, having a printer to print upon the wrapper before it is delivered to the wrapping mechanism, the combination with the tape and driving-wheel to propel the same, of a printing-roll with type to print the impressions, and a pair of driving-rolls for the wrapper-paper adapted to press and feed the paper between their opposed faces, and means connecting the tape-driving wheel, the printing-roll, and the driving-rolls, so as to feed the paper in unison with the tape.

36. In a continuous-cigarette machine, the combination with tape and means for driving same, of a pair of driving-rolls for feeding the wrapper to the filler, the said driving-rolls being provided with intermeshing grooves and ridges adapted to crimp the wrapper between their opposed faces.

37. In a continuous-cigarette machine having a printer to print upon the wrapper before it is delivered to the tape, the combination with the tape and a driving-wheel to propel the same, of a printing-roll with type to print the impressions and a pair of crimping-rolls provided with intermeshing grooves and ridges adapted to press and stretch the paper between their opposed faces and means connecting the tape-driving wheel, the printing-roll, and the crimping-rolls, so as to feed the wrapper in unison with the tape.

38. In a continuous-cigarette machine, the

combination with the tape and means for driving the same, means for supplying the wrapper-paper and feeding the tobacco thereto, means for forming the cigarette-rod and a cutter for cutting off the cigarettes, of a printer having a printing-roll to print upon the wrapper, a pair of driving-rolls for paper, and a master-gear connecting the printing-roll and feed-roll to rotate them at the same surface speed.

39. In a continuous-cigarette machine, the combination with the tape and means for propelling the same, means of supplying the wrapper-paper and feeding the tobacco thereto, means for forming the cigarette-rod, and a cutter for cutting off the cigarettes, of a printer having a printing-roll to print upon the wrapper, a pair of crimping drive-rolls for paper, and mechanism connecting the cutter to the printing and drive rolls to rotate them in unison.

40. In a continuous-cigarette machine, the combination with the tape and means for propelling the same, means for supplying the wrapper-paper and feeding the tobacco thereto, means for forming the cigarette-rod and a cutter for cutting off the cigarettes, of a printer having a printing-roll to print upon the wrapper, a pair of driving-rolls for paper, mechanism connecting the cutter to the printing and drive rolls to rotate them in unison, gearing connecting the cut-off knife with the tape-driving wheel, and a change-wheel in such gearing to vary the lengths of the cigarettes.

41. In a continuous-cigarette machine, the combination with the tape and means for propelling the same, means for supplying the wrapper-paper and feeding the tobacco thereto, means for forming the cigarette-rod and a cutter for cutting off the cigarettes, of a printer having a printing-roll to print upon the wrapper, a pair of driving-rolls for paper, mechanism connecting the cutter to the printing and drive rolls to rotate them in unison, gearing connecting the cut-off knife with the tape-driving wheel, a change-wheel in such gearing to vary the length of cigarettes, a drive-shaft in such mechanism, a printer drive-gear releasably secured to said shaft by a set-screw, permitting a rotary adjustment of such printing-rolls and drive-rolls, to vary the relation of the printer to the cutter, or to wholly detach the printer from the cutter when required.

42. In a cutter for cigarette-machines, the combination of the knives mounted to oscil-

late about a center across the path of the cigarette-rod, the slide upon which the knives are mounted, and a cam having connections for simultaneously oscillating the knives and reciprocating the slide.

43. In a cutter for cigarette-machines, the combination of the slide, the frame pivoted upon said slide, the knives mounted in the frame, and the cam for oscillating the frame and reciprocating the slide; said frame being formed of two parts relatively adjustable about the center of oscillation in order to adjust the knives toward the path of the cigarette-rod.

44. In a cigarette-machine, the combination of the reciprocating slide, the oscillating frame on said slide formed in two parts, each having a bearing at the center of oscillation, and a slot-and-screw connection between said parts whereby they may be adjusted relatively to bring the cutting-edge of the knives into proper relation to the path of the cigarette-rod.

45. In a cutter for cigarette-machines, the combination of the oscillating frame carrying the knives, the slide upon which the frame is mounted to oscillate, shoes secured to the ends of the slide and having sliding bearings upon the machine and the caps secured to the machine over the shoes and holding the latter in place.

46. In a cutter for cigarette-machines, the combination of the slide-shoe formed with a turned body, the oscillating knife-frame having a bearing on the turned body of the slide, a shoe secured to the end of the turned body and confining the oscillating frame, the caps fitted over the shoes and holding them upon their bearings, the cam-lever depending from the oscillating frame, the roller-stud depending from the slide, and a cam engaging the cam-lever and roller-stud for oscillating the knife-frame and reciprocating the slide.

47. In a cutter for cigarette-machines, the combination with the oscillating knife-lever, the rotary knives mounted thereon and having a pulley for rotating them, a pulley journaled on the center of oscillation of the knife-frame, and a belt passing from an external source of driving power over said pulleys and rotating the knives.

The foregoing specification signed at Cincinnati, Ohio, this 17th day of November, 1904.

NAPOLEON DU BRUL.

In presence of—

H. WHYRICH,
F. BROERMAN.