J. GUENIFFET & J. NICAULT.

CIGARETTE TUBE AND MOUTHPIECE MACHINE.

APPLICATION FILED OCT. 13, 1909.

1,090,472.

Patented Mar. 17, 1914.

14 SHEETS—SHEET 1.

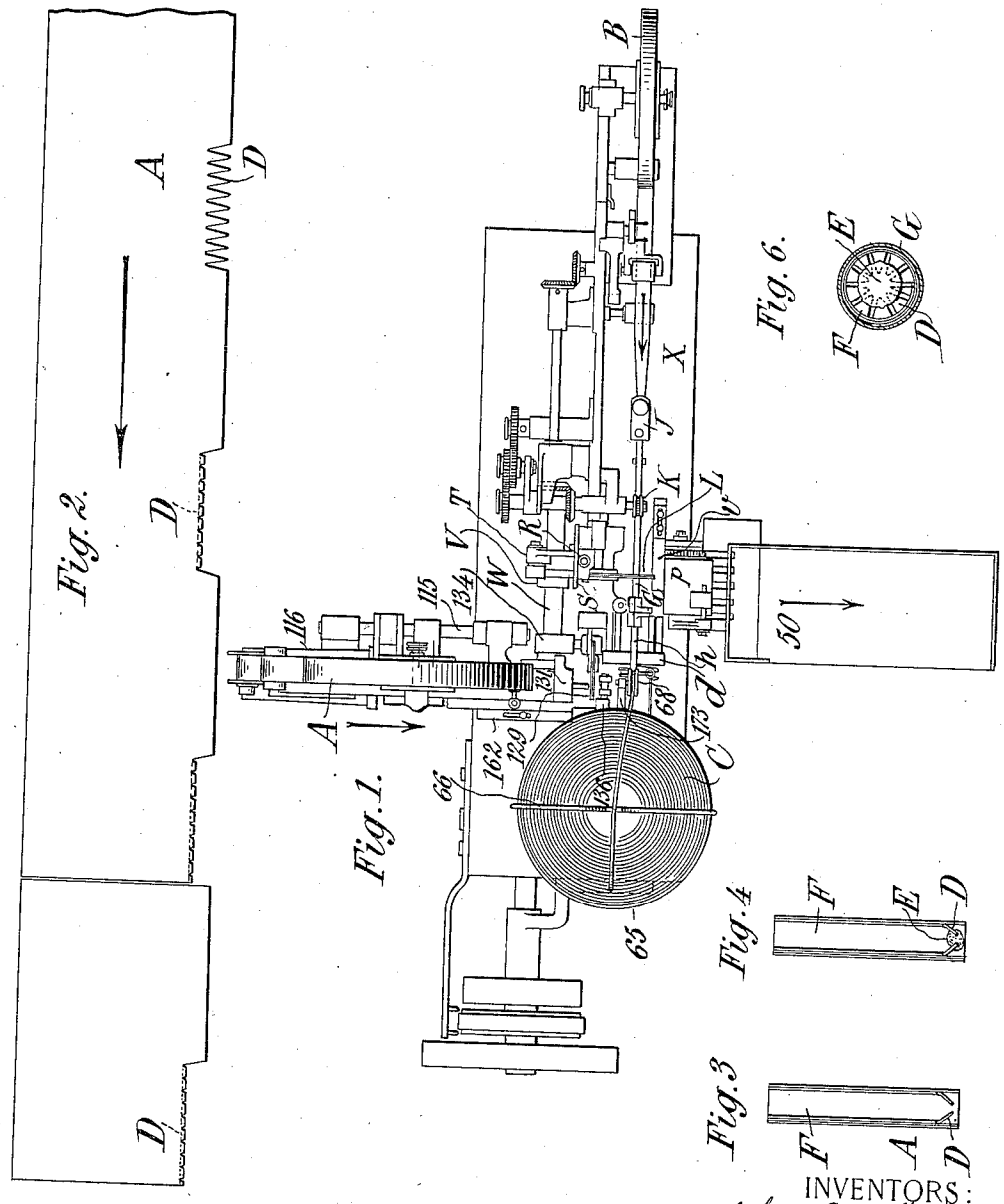


Fig. 6.

Fig. 4.

Fig. 3.

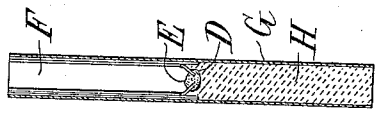


Fig. 5.

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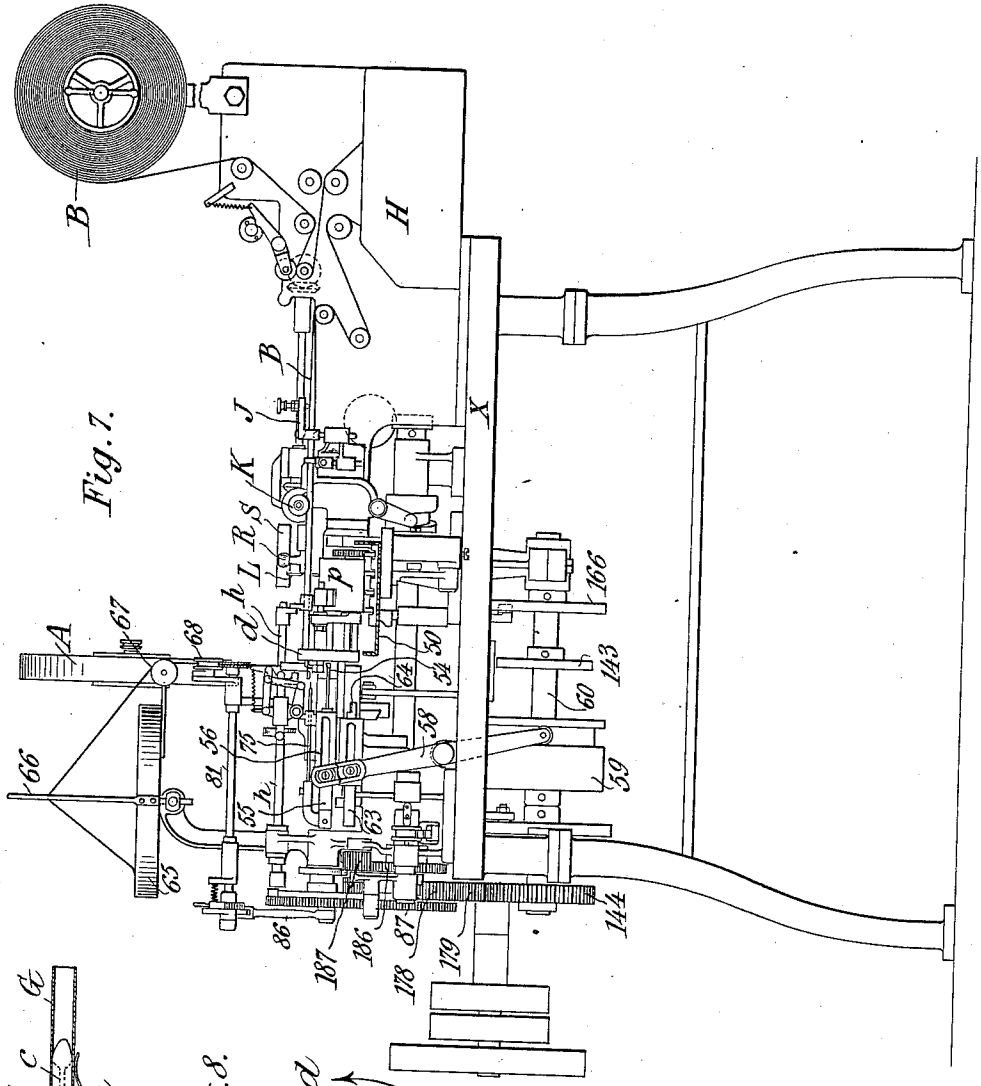


Fig. 7.

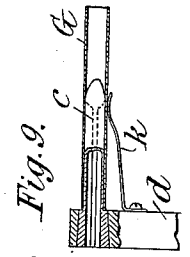
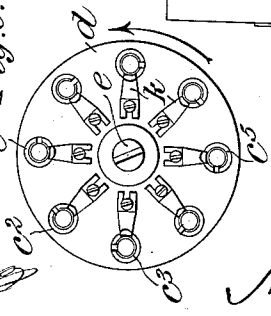


Fig. 9.



c' Fig. 8.

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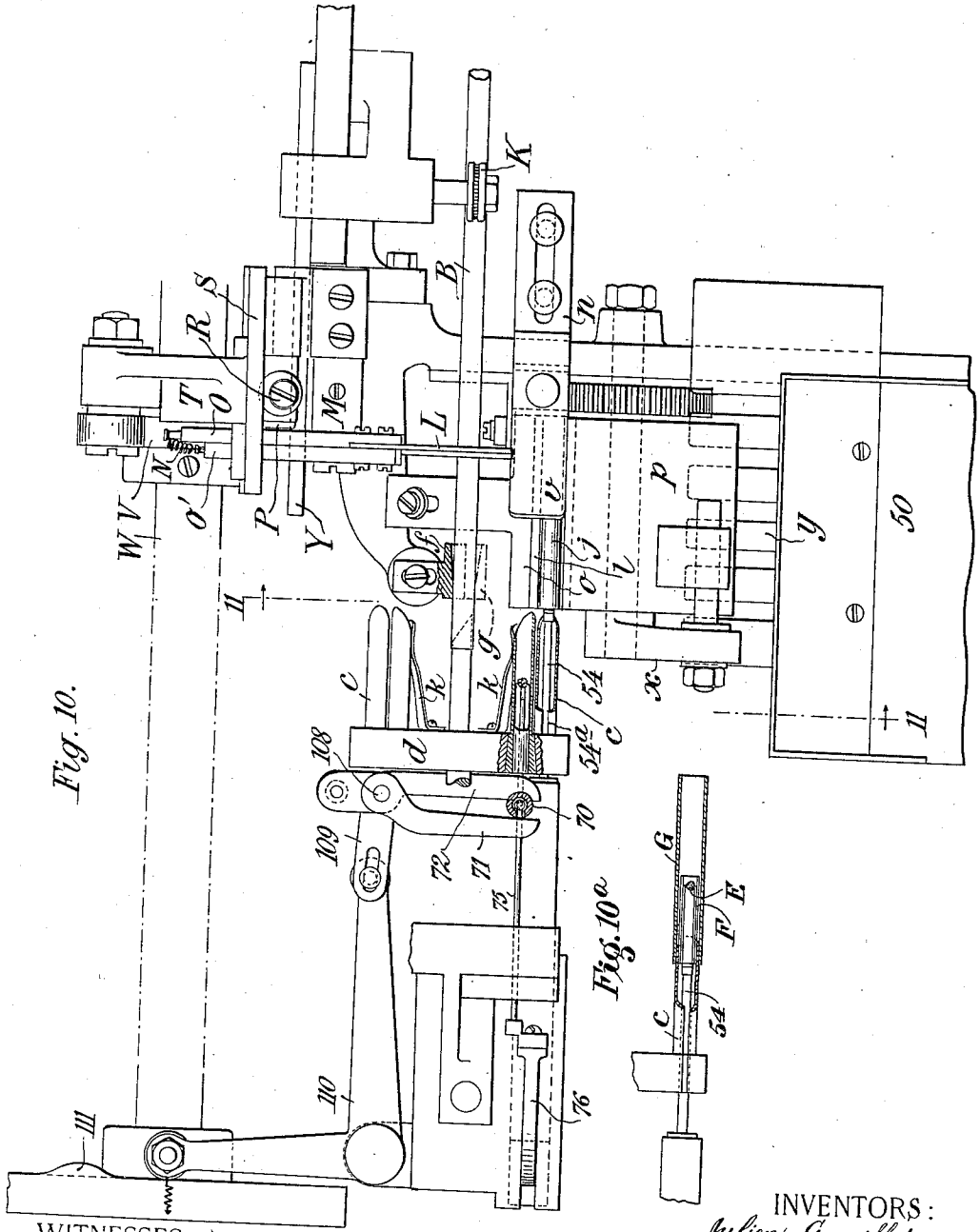


Fig. 10.

Fig. 10a

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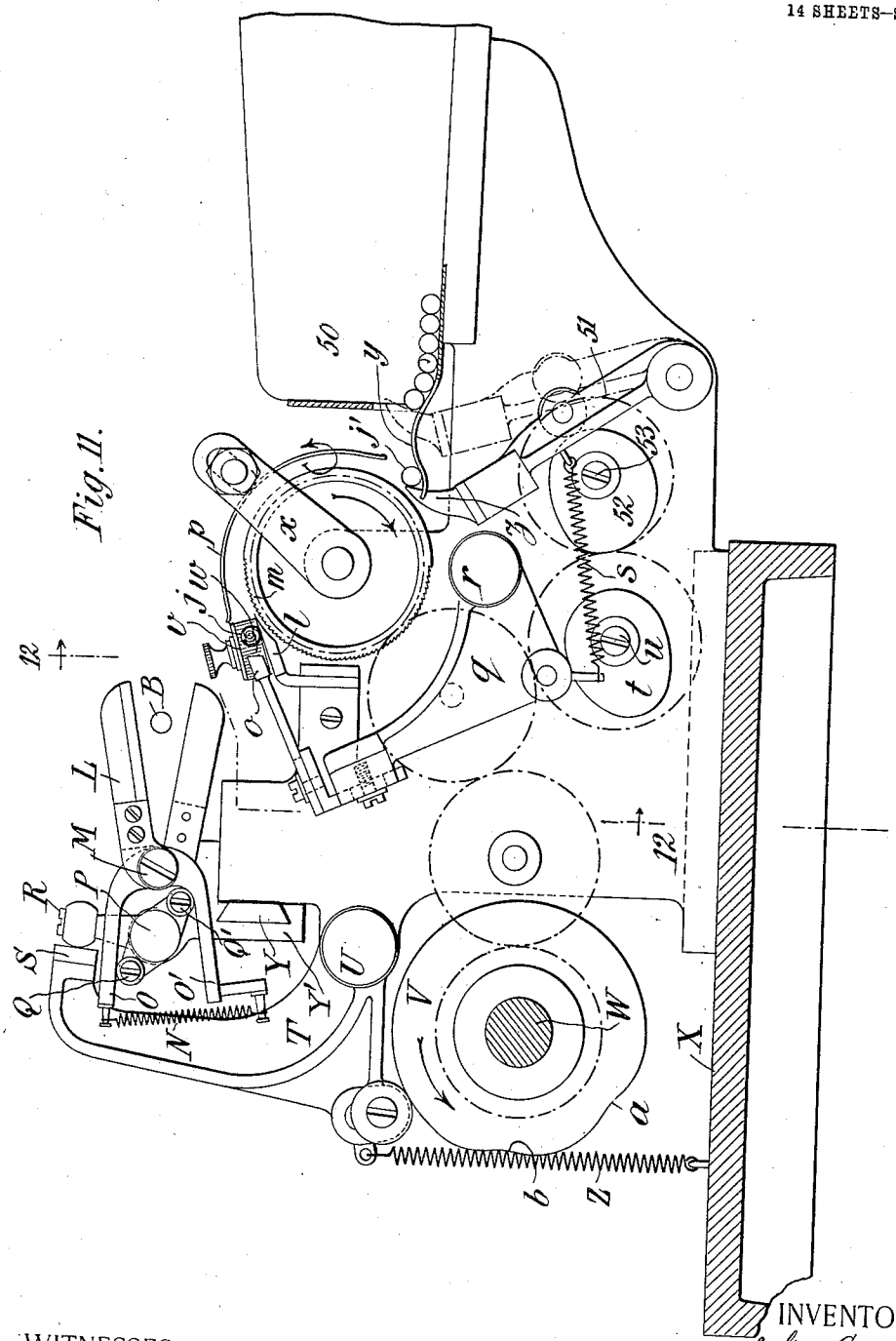
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14 SHEETS—SHEET 4.

Fig. 11.



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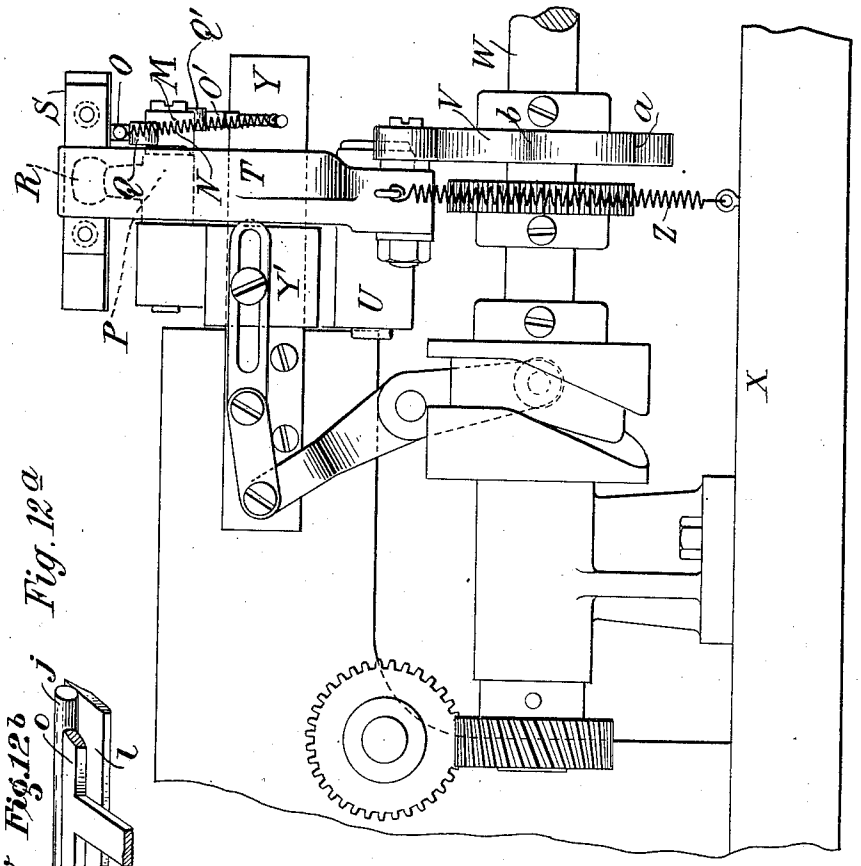


Fig. 12a

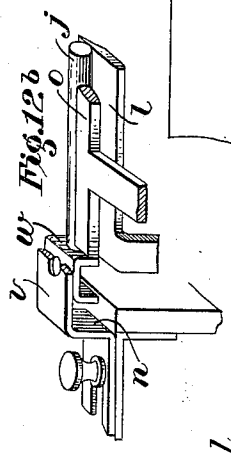


Fig. 12b

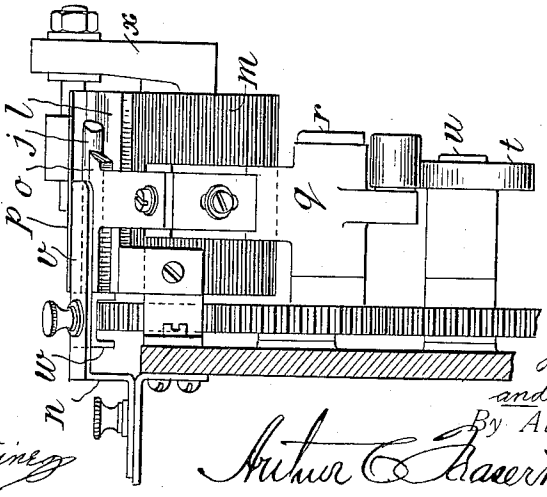


Fig. 12.

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14 SHEETS—SHEET 6.

Fig. 14.

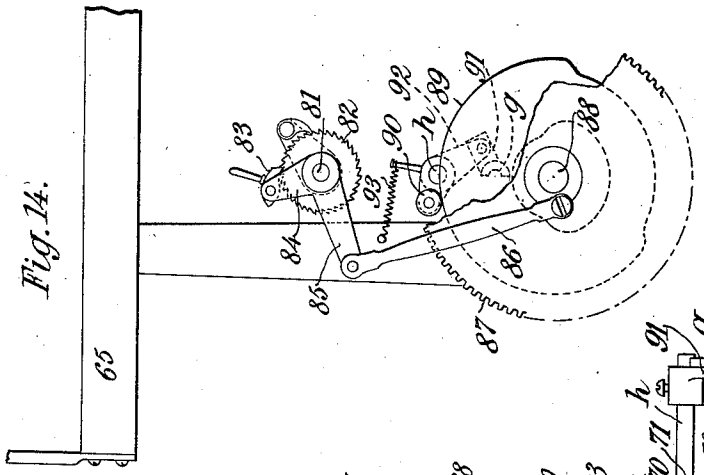


Fig. 13.

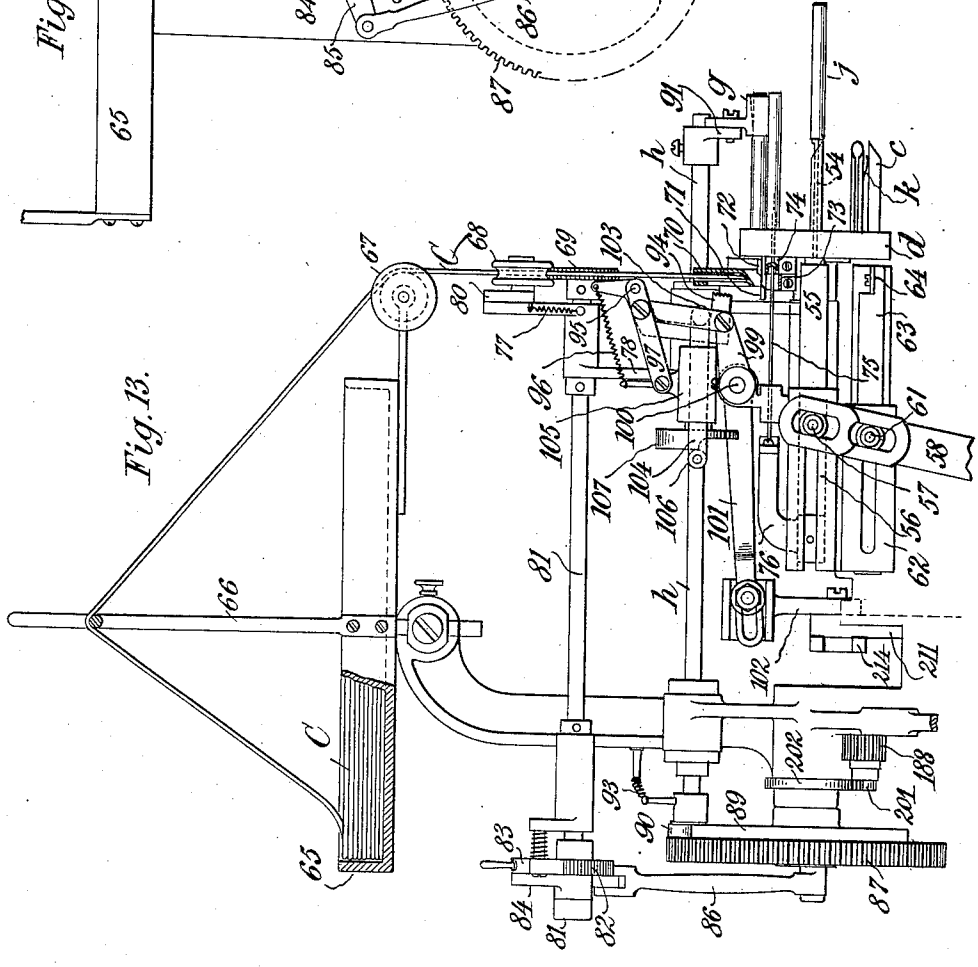
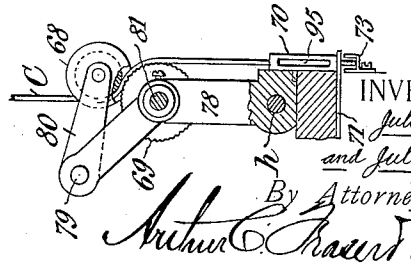


Fig. 15



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14 SHEETS—SHEET 7.

Fig. 16.

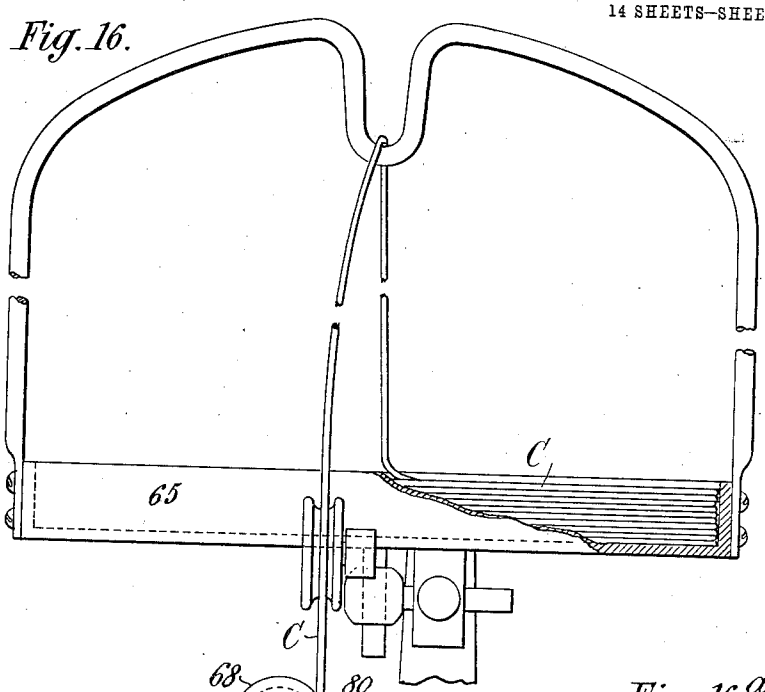


Fig. 17.

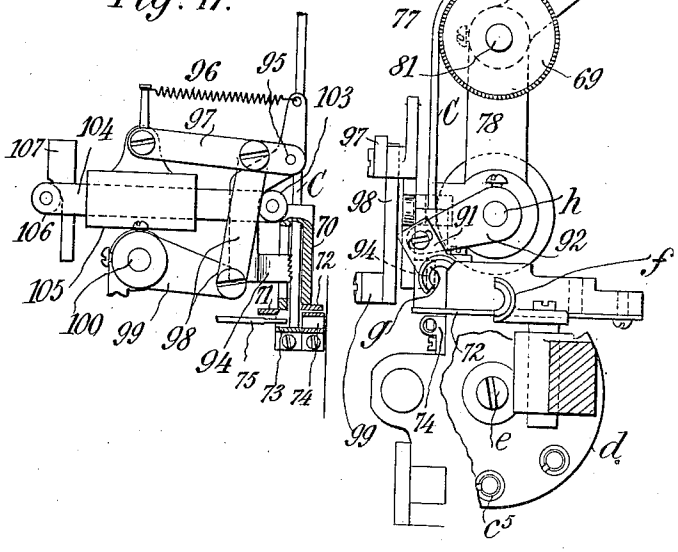


Fig. 16a

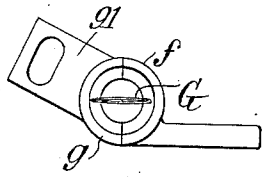
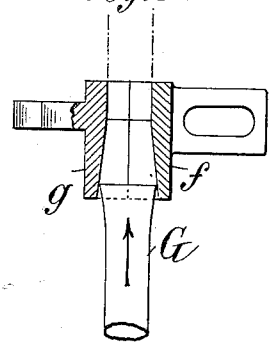


Fig. 16b



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14 SHEETS—SHEET 8.

Fig. 18.

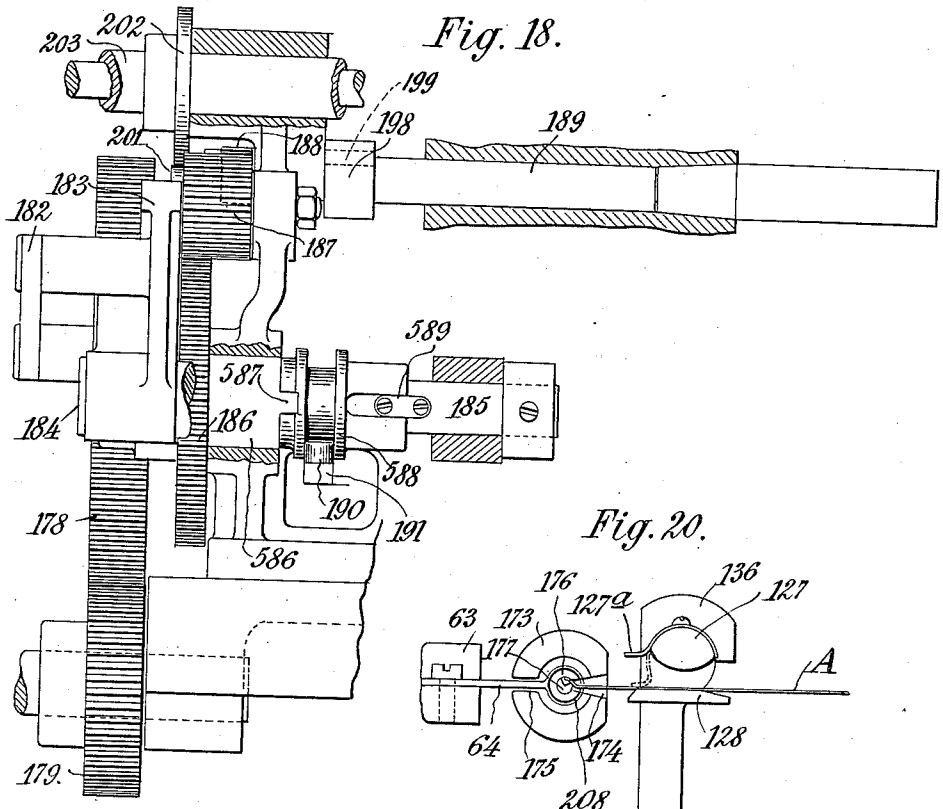


Fig. 20.

Fig. 19.

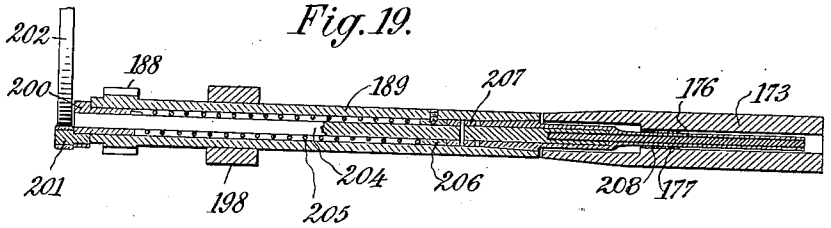
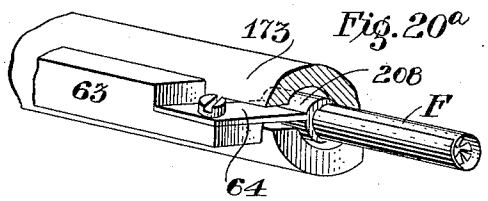


Fig. 20a



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14 SHEETS—SHEET 9.

Fig. 21.

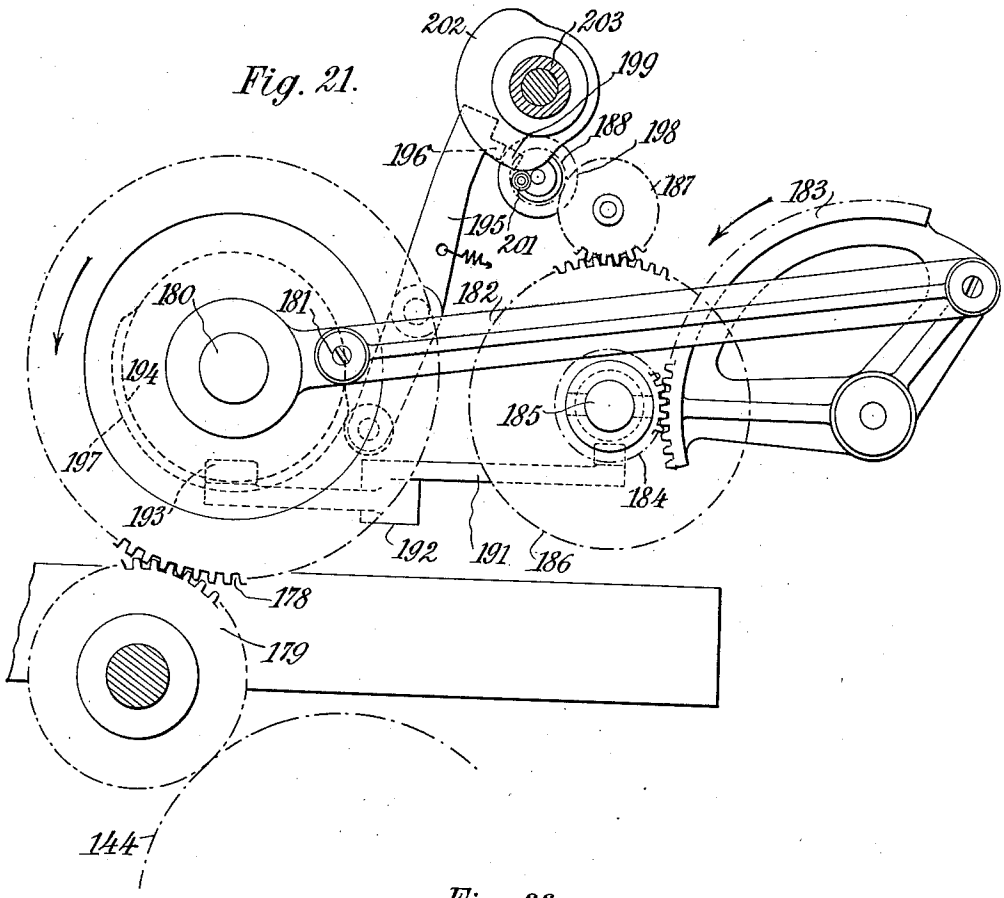
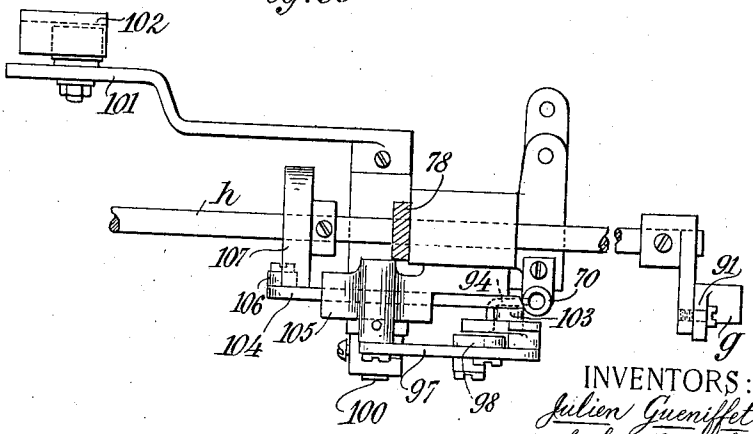


Fig. 33



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14 SHEETS—SHEET 10.

Fig. 23.

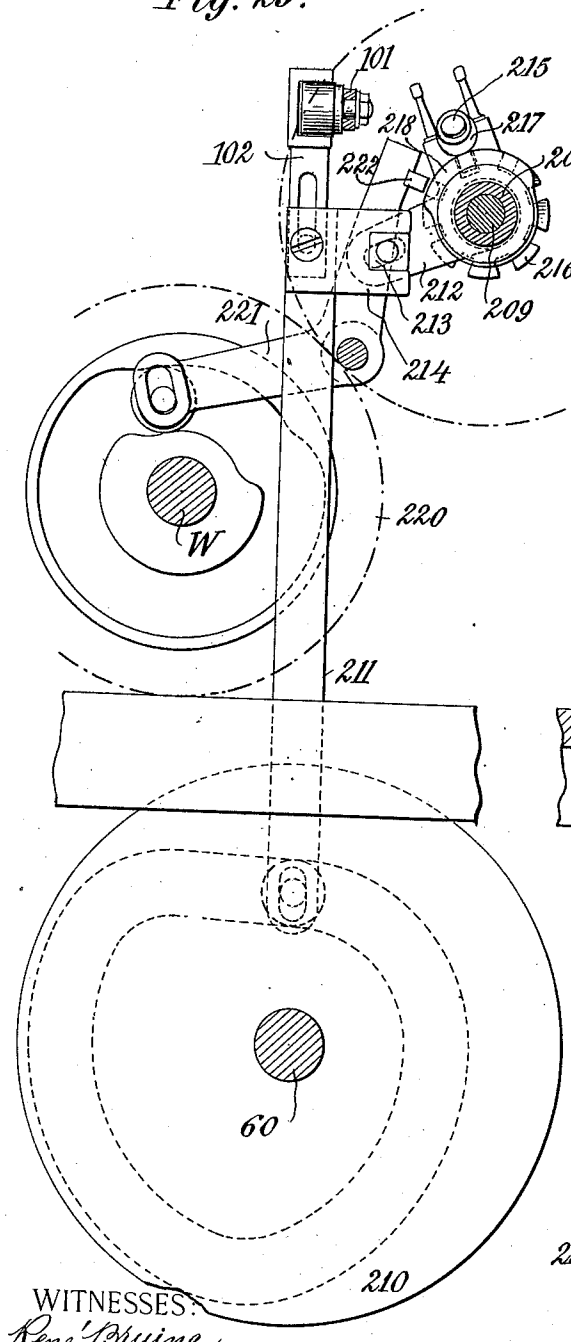
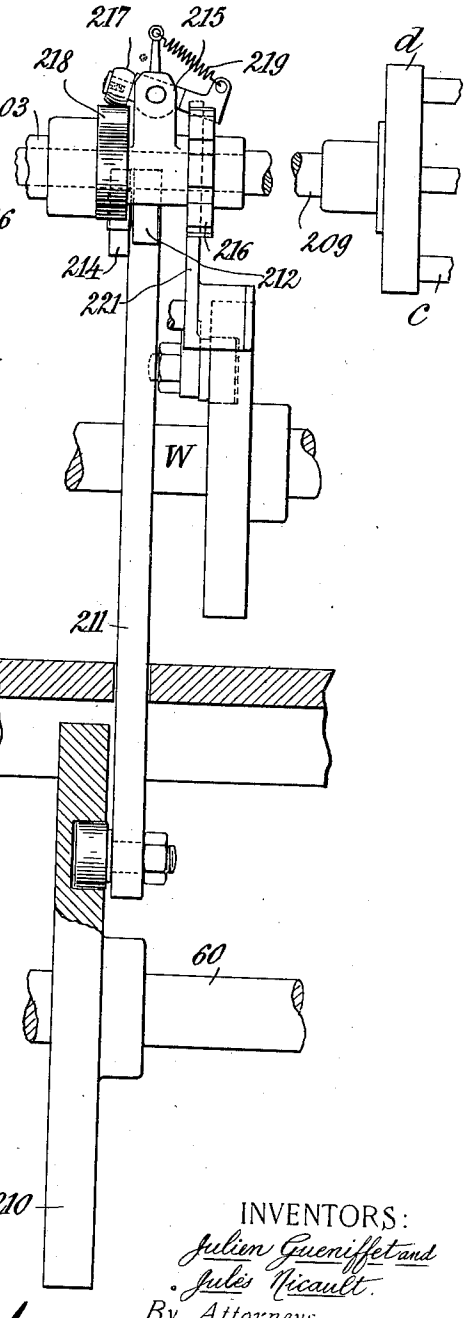


Fig. 22.



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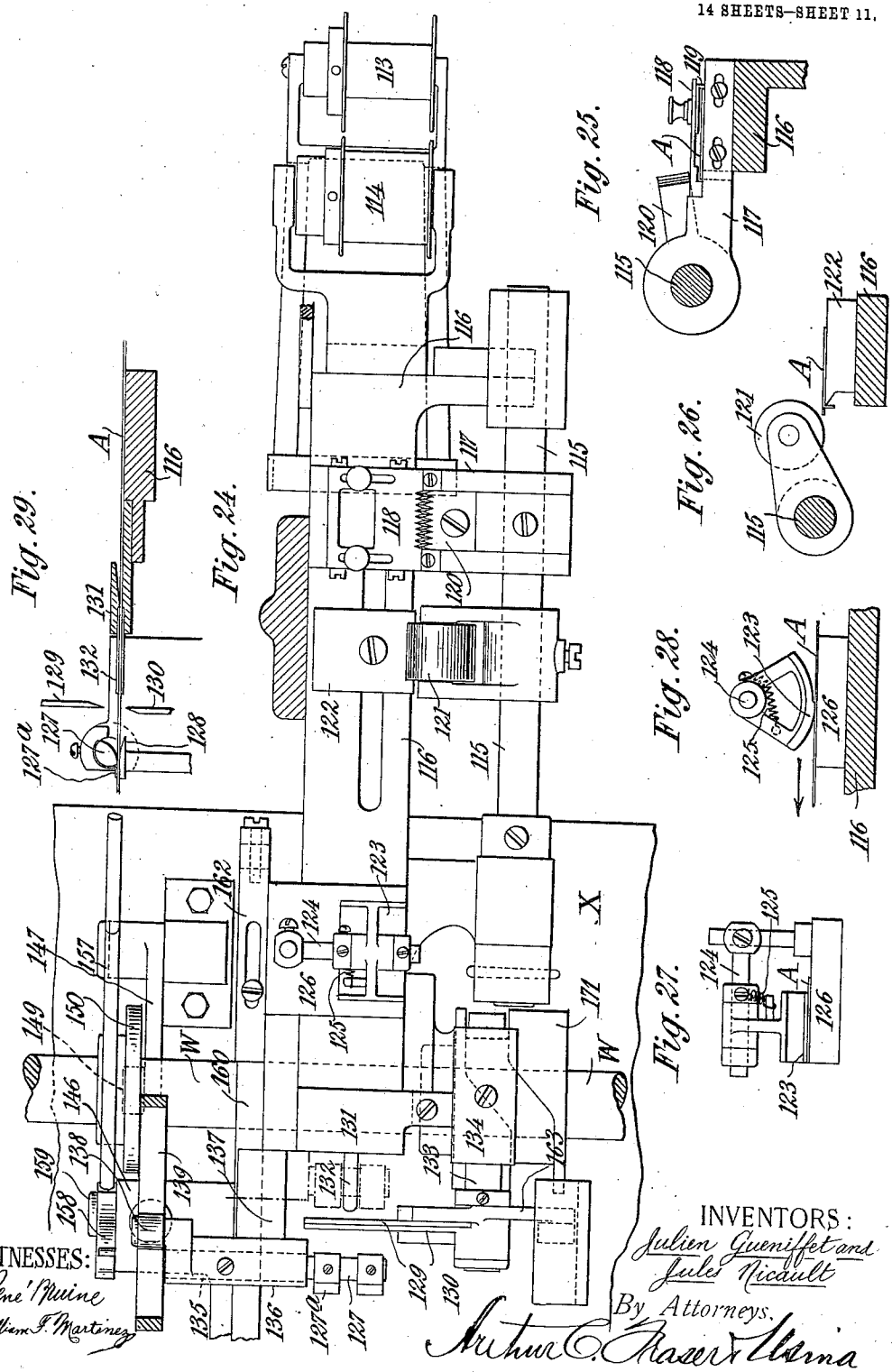
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14 SHEETS—SHEET 11.



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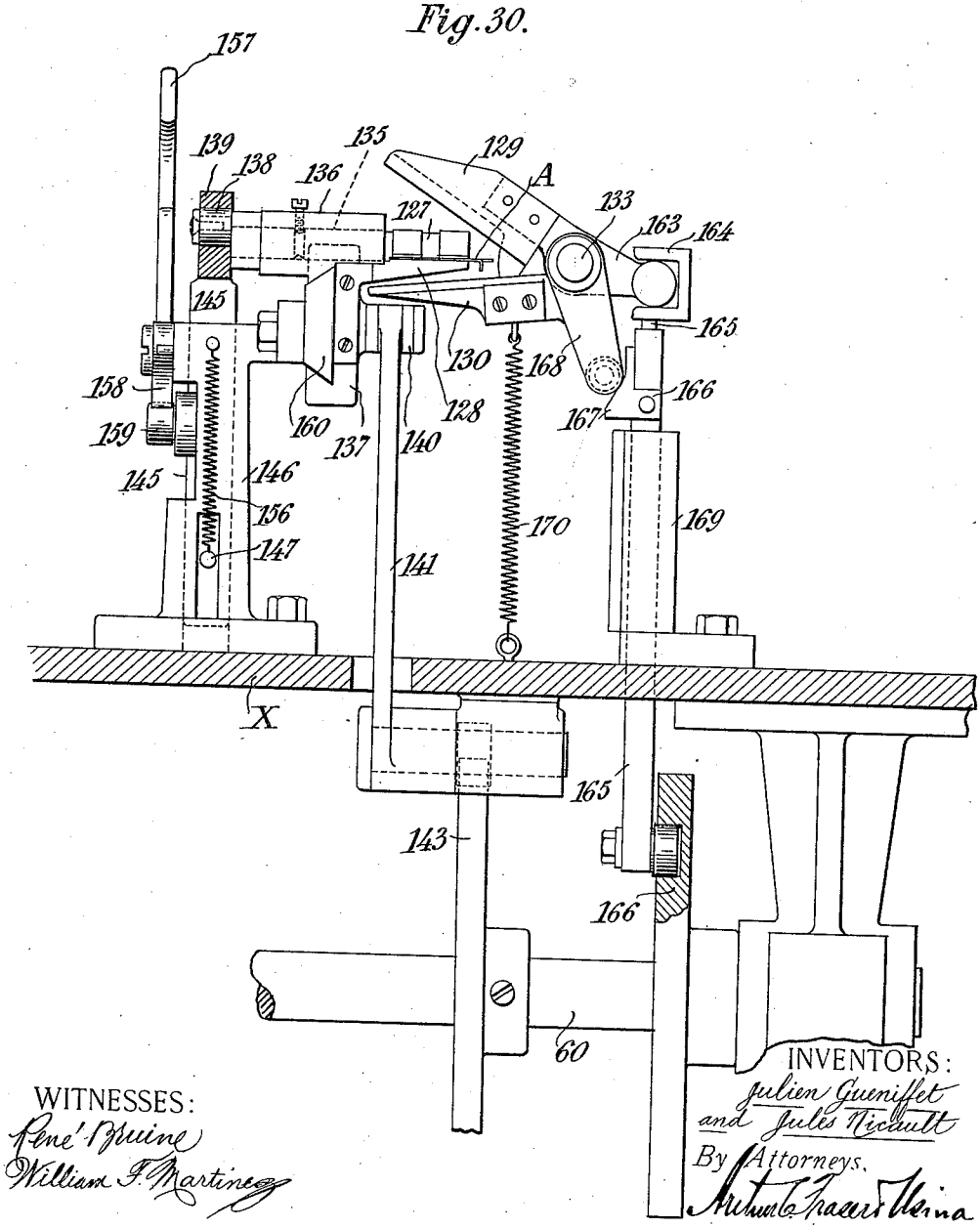
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Patented Mar. 17, 1914.

14 SHEETS—SHEET 12.

Fig. 30.



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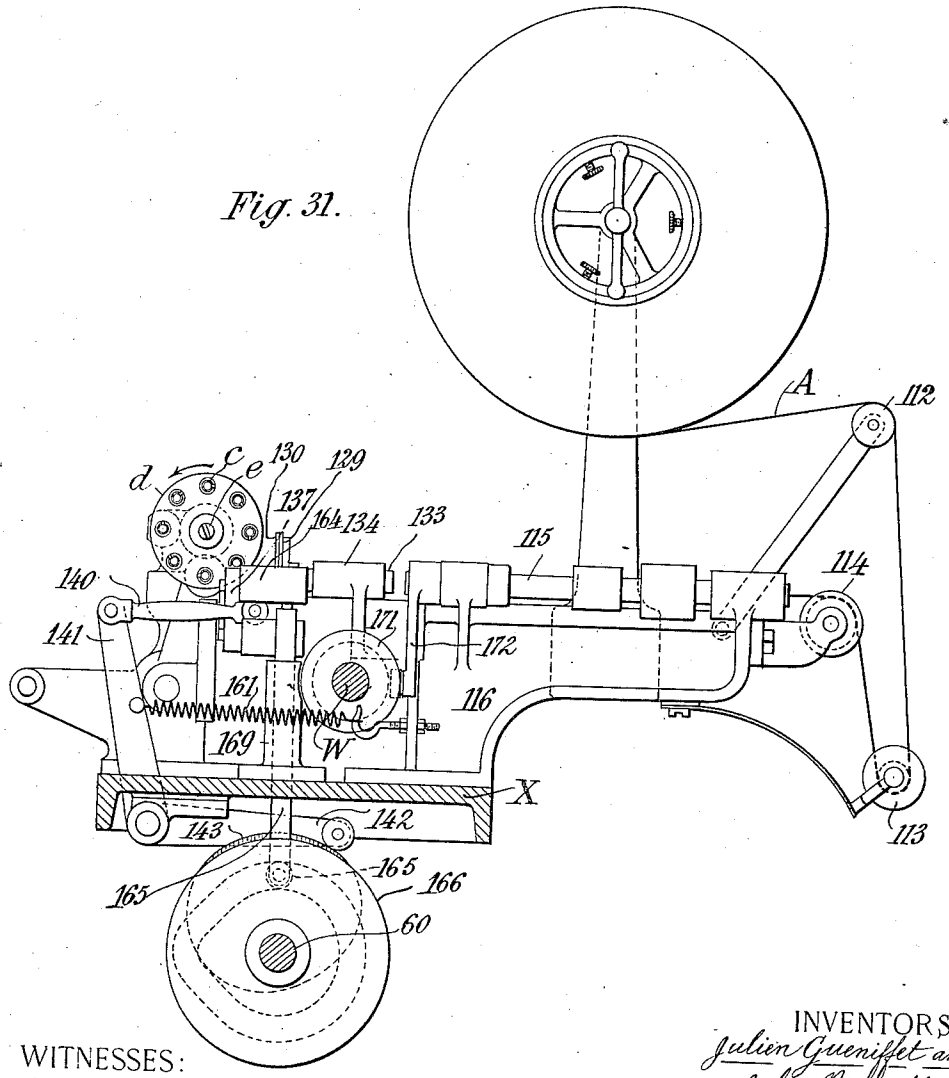
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14 SHEETS—SHEET 13.

Fig. 31.



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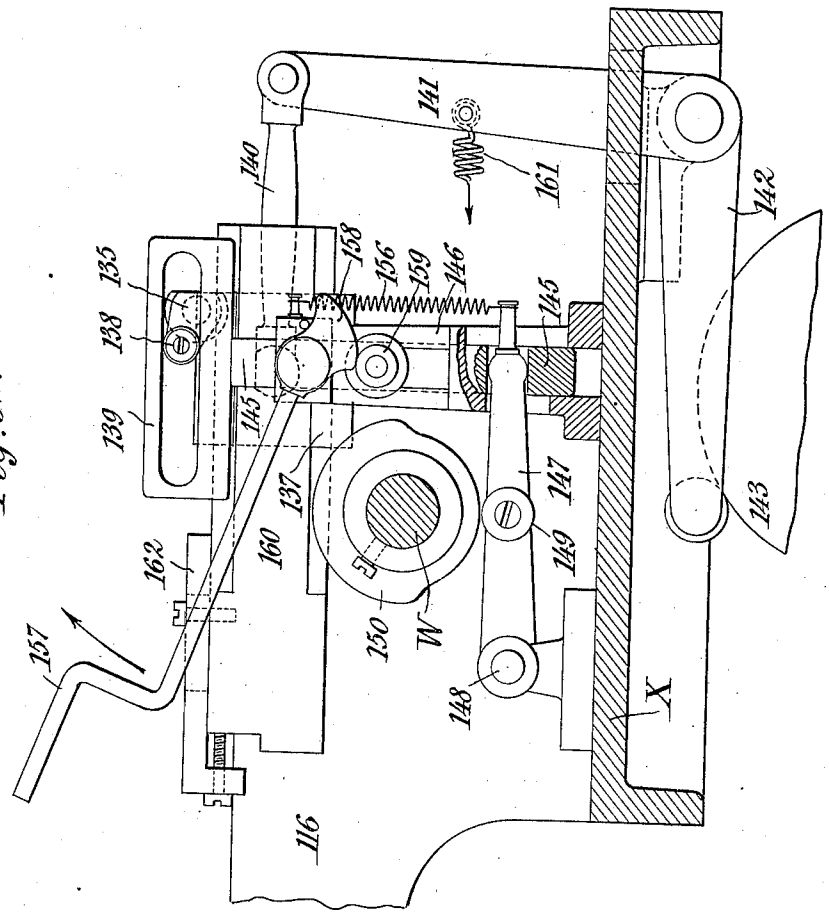
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14 SHEETS—SHEET 14.

Fig. 32.



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UNITED STATES PATENT OFFICE.

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CIGARETTE TUBE AND MOUTHPIECE MACHINE.

1,090,472. Specification of Letters Patent. Patented Mar. 17, 1914.

Application filed October 13, 1909. Serial No. 522,410.

To all whom it may concern:

Be it known that we, JULIEN GUENIFFET and JULES NICAULT, citizens of the Republic of France, residing in Paris, France, have invented certain new and useful Improvements in Cigarette Tube and Mouthpiece Machines, of which the following is a specification.

This invention aims to provide an improved machine for making mouthpieces of a peculiar character and fitting them to cigarette tubes so as to form complete tubes with mouthpieces in place, ready for the subsequent insertion of the tobacco.

The machine makes an excellent mouthpiece of a style hereinafter described in detail, at a very high rate of speed or output, and the mechanism is of the greatest reliability and simplicity consistent with the operations to be performed.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a plan. Fig. 2 is a diagrammatic view of the mouthpiece paper showing the several operations to which it is in turn subjected before being rolled. Figs. 3 and 4 are sectional views showing the mouthpiece rolled, and fitted with a cotton plug. Fig. 5 shows the mouthpiece in a cigarette tube, in longitudinal sectional view. Fig. 6 is a transverse sectional view of the mouthpiece in the cigarette on an enlarged scale. Fig. 7 is an elevation from the front of the machine. Fig. 8 is a face elevation of a rotating carrier, of which Fig. 9 is a detail in section. Fig. 10 is a plan on an enlarged scale, of the rotating carrier of Fig. 8 and adjacent parts, for transferring the rolled mouthpiece into the end of the tube and unrolling and delivering it. Fig. 10^a is a detail of Fig. 10 in perspective. Fig. 11 is a vertical section approximately on the line 11—11 of Fig. 10, showing the scissors for cutting off the tubes and the unrolling and delivering devices. Fig. 12 is an elevation of a stop at the far end of the unrolling cylinder, the view being approximately on the line 12—12 of Fig. 11. Fig. 12^a is a rear elevation of the scissors of Fig. 11. Fig. 12^b is a detail of Fig. 12 in perspective. Fig. 13 is a front elevation on an enlarged scale of the mechanism for rolling the mouthpiece, introducing it into the rotating carrier, and inserting the cotton thereinto. Fig. 14 is a detail of the cotton-feeding mechanism. Fig. 15 is a view from the left of the mechanism controlling the rollers through which the cotton passes. Fig. 16 is an elevation from the right of the same rollers together with the devices above and below them. Figs. 16^a and 16^b are enlarged details. Fig. 17 is a view similar to Fig. 13, showing certain parts thereof in a different position. Fig. 18 is a view partly in front elevation and partly in section of the mouthpiece-rolling mechanism. Fig. 19 is a longitudinal section of the gripping device within the barrel of the rolling mechanism. Fig. 20 is an elevation of the barrel and gripping device, and of the forwarding device for the cut pieces of mouthpiece paper. Fig. 20^a is a detail of the same in perspective. Fig. 21 is a left hand side elevation of the gearing of Fig. 18. Figs. 22 and 23 are respectively a front and a left hand side elevation, partly in section, of the mechanism for producing the intermittent movement of the rotating carrier. Fig. 24 is a plan on an enlarged scale of the mechanisms operating successively on the mouthpiece paper before it is rolled. Fig. 25 is a vertical transverse section of the device for cutting teeth on the edge of the mouthpiece paper. Fig. 26 is a similar view of the device for bending the teeth. Figs. 27 and 28 are respectively a front and a side elevation of a device for holding the strip against the backward pull of the tension device. Fig. 29 is an end elevation of the shears for cutting the mouthpiece paper, and adjacent parts. Fig. 30 is a front elevation of the shears and adjacent parts. Fig. 31 is a right hand side elevation of the rear end of the table carrying the mouthpiece roll and the mechanisms which act successively on the strip of mouthpiece paper. Fig. 32 is a left hand side elevation partly in section of the mechanism of Fig. 30. Fig. 33 is a plan of the principal mechanisms of Fig. 13, the tray at the top being removed.

Referring to the embodiment of the invention illustrated, the paper for forming the mouthpiece is drawn from a roll A, that for forming the cigarette tube from a roll B, and a sliver of cotton is drawn from a horizontal coil of cotton C. The mouthpiece paper, which is of moderate thickness, as shown at Fig. 2 is first cut along its edge to

form teeth D, pointed for a purpose hereinafter described. As the strip of mouthpiece paper advances the teeth D are bent downward to the position shown. Thereafter the strip is cut into lengths each sufficient for one mouthpiece, as shown at the left-hand end of Fig. 2; and these lengths are coiled or rolled so as to bring the teeth D inward to form a partial diaphragm across the mouthpiece in the manner indicated in Fig. 3. Thereafter a plug of comparatively loose filtering cotton is forced into the mouthpiece to the position of Fig. 4, the spring of the teeth D causing them to enter the cotton plug E so as to hold it in place. The mouthpiece which I designate as a whole by the letter F, is then introduced into the cigarette tube G of the usual thin or of any other suitable paper, and the tobacco H is inserted through the outer end of the tube, pressing and holding back the plug E of cotton and causing the teeth D of the paper to enter the cotton more firmly. The teeth D when the mouthpiece is first rolled, preferably incline slightly toward the outer end of the cigarette, so as to be forced into the cotton as shown in Figs. 5 and 6, when the cotton is pushed toward the inner end by the tobacco.

The mechanism for making the cigarette tube illustrated is of a known type. The paper B therefor comes from the roll shown at the right of Fig. 7, passes through a printing mechanism H for printing thereon a monogram or other device in any desired number of colors, and passes thence to a former J and a crimping roller K and to a pair of shears L by which it is cut into suitable lengths indicated individually by the letter G. The tubes G are then supplied successively with mouthpieces tightly rolled and the combined tubes and mouthpieces are passed through the unrolling mechanism which loosens or spreads out the mouthpiece until it grips the inner surface of its tube firmly, after which the thus completed tubes with mouthpieces are discharged.

The shears L have their blades mounted on a pivot M and pressed together by a spring N between the arms O and O′ of the shears. For opening the shears a short shaft P is used which is provided with arms carrying opposite rollers Q Q′ which spread the arms or allow them to come together as the shaft is oscillated. The shaft P is oscillated by means of an arm R carrying a roller which bears against a longitudinally extended plate S carried on the upper end of an arm T, which is fixedly pivoted at U and which carries a roller in engagement with a cam V mounted on a shaft W extending from right to left above the table X. The shaft M of the shears and the shaft P for opening them, are mounted on a slide Y′ which travels from right to left along a guide Y, the roller on the arm R, however, being always in contact with the elongated plate S, so as to be capable of operation thereby. When the cam V rotates with its circular portion engaging the roller on the arm T, this arm is held up, the plate S is held forward and the shears are held open. At the low points of the cam, however, the spring Z pulls down the arm T and releases the opening device so as to allow the shears to close under the action of the spring N. At the same time that the alternate opening and closing of the shears are taking place, they are reciprocated so as not to interfere with continuous forward movement of the paper B or of the completed tube G. The cam V has two successive depressions *a* and *b*, between which is a slight elevation of less radius than the main portion of the cam, which serves to clear the blades from the paper; the blades remaining sufficiently close together to engage the rear end of the cut-off tube and push it forward. During the operation of the scissors the forward end of the cigarette tube is engaged upon the guide tubes hereinafter referred to.

From the shears the tubes G are successively introduced upon guide tubes *c* of thin sheet metal which are mounted, eight of them, upon a carrier *d* on a central rotating horizontal shaft *e*. The tube G is introduced upon the guide tube *c* which is at the highest point of the rotating carrier. The guide tubes *c* have beveled outer ends as shown to facilitate the application of the cigarette tubes thereupon. Between the shears L and the ends of the guide tubes *c* is a stationary guide comprising a half ring *f* adjustably fixed on the frame of the machine, and a forward half ring *g* which is mounted on a depending arm on a shaft *h* (Fig. 13) which is oscillated at frequent intervals to remove the forward half ring *g* when the carrier *d* is to advance with the cigarette tube G. When the tube G arrives on its guide tube *c*, there is already within the guide tube a coiled mouthpiece without cotton. In the next position to which the tube is turned the cotton is introduced into the mouthpiece. In the third position the cigarette tube and the mouthpiece are ejected to the right, the completed tube in its ejected position being shown at *j*. The guide tubes *c* are provided with light springs *k* pressing against their outer faces to hold the cigarette tubes thereon with slight friction. The ejected tubes *j* rest upon a table or support *l* adjacent to the unrolling cylinder *m*. The position to which they are moved in being ejected is limited by a stop *w* carried by the member *n* at the opposite end, and which is adjustably mounted upon the fixed portion of the machine. From the support *l* the tube *j* is advanced by means of a pusher *o* into the space between the unrolling cylinder *m* and an approximately con-

centric unrolling plate p. The pusher o is mounted on an arm q, the pivot r of which is mounted on the fixed portion of the machine; the arm q is retracted by means of a spring s connected to said arm and to the arm of an ejector hereinafter referred to; and is advanced by means of a cam t on a shaft u. The member n is of the bent shape shown in Fig. 12, and carries an overhanging part v for preventing the tube from jumping up, and also a stop w which is adjustable along the member v to limit the lengthwise movement of the tube.

The unrolling drum m is rotated continuously in the direction shown by the arrow in Fig. 11, and has a roughened surface to grip the tube. The unrolling plate p is mounted on an arm x on the fixed shaft of the drum, and is adjustable toward and from the drum for tubes of different diameters. The cigarette tube is advanced into the space between the drum and the plate and turns backward on its own axis as it is carried forward; the distance between the plate and the drum being made larger at the entrance to facilitate introduction of the tube. The plate p terminates at the lower forward side of the drum, and the tubes j' with the mouthpieces unrolled so as to fit tightly in them, drop on a supporting plate y provided with slits in which reciprocate fingers z. Each tube is first dropped between the retracted fingers z and an elevated central portion of the plate y. The fingers thereupon advance and push or roll the completed tube into the bottom of the box 50. Introducing them into the bottom of the box insures their being placed in regular parallel positions as indicated, so as to facilitate the handling of them. The fingers are carried on arms 51 fixedly pivoted at their lower ends, retracted by a spring s and advanced by means of a cam 52 on a shaft 53.

The mechanisms for rolling the mouthpiece, for introducing the cotton, for inserting the mouthpiece into the rotating carrier d and for ejecting the mouthpiece and tube from said carrier, are located at the angle between the lines of travel of the mouthpiece paper and the tube paper as indicated in Fig. 1, the principal parts of these mechanisms being covered by the receptacle carrying the coil C of cotton.

In Fig. 8 the tubes which I designate generically by the letter c are lettered c' c^2 c^3, &c., as indicating the successive positions which they assume in the intermittent rotation of the carrier. The cigarette tube, as already stated, is applied to the guide tube c'. Simultaneously cotton is introduced into the guide tube c^2; the tube, mouthpiece and cotton are ejected at c^3, and a new mouthpiece without cotton is introduced at c^5.

The ejector from the rotary plate d consists of a rod 54 (Figs. 7, 10 and 13) enlarged at the end within the guide tubes c and having an upwardly projecting fin which passes through a slit 54^a in the guide tube a sufficient distance to engage a cigarette tube and push it off the guide tube. The slit in the guide tube c comes uppermost in the ejecting position and the ejecting rod 54 is advanced and retracted while the rotary carrier is stationary. The rod 54 is mounted at its rear end on a slide 55 which has a laterally projecting pin passing through a slot in the guide 56 in which the slide moves, this pin 57 being engaged by a slot in the upper end of an arm 58 (Fig. 7) which is pivoted in the middle and has its lower end provided with a roller running in a cam groove on the drum 59 which is rotated by a shaft 60 arranged below the table, and carrying cams for other purposes hereinafter referred to. The same arm 58 has a second slot in which lies a pin 61 projecting through a slot in a guide 62, and connected to a slide 63 running in said guide, and this slide carries at its end a blade 64 which projects into a slot in the side of the mouthpiece-rolling barrel so as to eject the mouthpiece from said barrel after the mouthpiece is rolled, as hereinafter described more in detail.

The coil C of cotton is carried in a pan 65 loosely and leads outward therefrom first over an upright guide 66 at the center, thence downward over a guide roll 67 and between a pair of brake or tension rolls 68—69 and into a vertical tube 70 having a slot at its left hand side through which enters a gripping device which draws the cotton forward a determined length. The length of cotton thus projected out of the bottom of the tube 70 is cut off by a pair of shears 71, 72. This cut-off piece of cotton constitutes the plug which is to be pushed into the mouthpiece. It rests when cut off upon a ledge 73 at the entrance to a short tube 74 in line with the guide tube into which it is to be introduced. A pusher 75 consisting of a rod small enough to enter the rolled mouthpiece easily, is supported at its rear end from a bracket 76 which is attached to the slide 55 which carries the ejector 54, so that the rod 75 advances and retreats simultaneously with said ejector. The length of the rod 75, however, is such that in its advanced position its end merely engages the cotton plug and advances it to the position of the teeth in the mouthpiece as hereinbefore described.

The roller 68 is grooved and the roller 69 is roughened on its edge and arranged to press the sliver of cotton C into the groove in the roller 68; the two rollers being held or drawn together by means of a spring 77. The lower roller 69 is mounted upon a fixed upright 78, which is provided with an oblique upward extension, in the end of

which is a shaft 79 carrying an arm 80 which supports the roller 68. The shaft 81 is given an intermittent rotation for feeding or permitting the forward feed of the lower end of the cotton. This shaft extends to the left hand side of the machine as shown in Fig. 13, where it is provided with a ratchet wheel 82 actuated by a pawl 83 on the end of an arm 84 mounted loosely on the shaft 81 and oscillated by an arm 85 connected to a link 86 which is connected to a crank pin on a gear 87 on a continuously rotating shaft 88. The pawl 83 is provided with a handle by which it may be thrown back to inoperative position, thus stopping the feed of the cotton and allowing the machine to make mouthpieces without cotton.

The shaft *h* which operates the movable half ring *g* of the supplemental guide through which the cigarette tubes are guided on to the guide tubes *c*, is actuated also from the same shaft 88. Mounted on the back, or right hand side, of the gear 87, is a cam 89, on the top of which rests a cam roller on an arm 90 carried on the shaft *h*. The half ring *g* is carried directly on a short arm 91 which is pivotally and laterally adjustable upon the end of an arm 92 on the shaft *h*, so that the half ring may be adjusted accurately to the desired position. When the arm 90 on the left hand end is raised by its cam, the half ring is moved down to close the guide, and vice versa. The shaft is turned backward to open the guide by means of a spring 93 connected to an arm on the shaft, and to a fixed part of the machine.

The cotton sliver C at its lower end enters the vertical tube 70 and is drawn down through said tube by means of a roughened grip or blade 94, which enters through the upper part of a slot 95 therein, grips the cotton within the tube by pressing it against the opposite face of the tube, and then moves downward carrying the cotton with it and forcing the lower end of the sliver out of the tube; after which the gripping blade is withdrawn, lifted and reapplied at the top as before. The upper position of the blade before entrance into the tube, is shown in Fig. 13 and its position after entrance and downward movement, is shown in Fig. 17. The blade extends upwardly, is pivoted at 95 and has above its pivot an arm which is connected by a spring 96 with a fixed point, so that the lower effective end of the blade is pressed forward by the spring. The pivot 95 of the blade is in the free end of an arm 97 which is oscillated by means of a link 98 connected to the outer end of an arm 99 on a shaft 100 which has an opposite arm 101 which is given a vertical oscillation by means of a rod 102.

The forward edge of the gripping blade 94 is engaged by a roller 103 on a slide 104 which slides through a bearing 105 fixed on the table and which at its rear end is provided with a roller 106 engaging the face of the cam 107 which rotates on a shaft parallel with the slide. The cam is timed to pull back the slide 104 and to retract the gripping blade when the latter is lowered, after which the arm 99 rises, lifting the blade and the cam 107 releases the slide and permits the spring 96 to press the blade in again into engagement with the cotton, whereupon the arm 99 moves downward carrying the blade with it, and the previous operations are repeated.

The mounting and operation of the shears 71, 72 are indicated in Fig. 10. The blade 72 is fixed. The blade 71 is pivoted at 108 and has an arm 109 which is actuated by the angle lever 110, the opposite end of which bears against the face of the cam 111, on the shaft W previously referred to. The mouthpiece paper A passes first as shown in Fig. 31 over a guide roller 112, a spring supported tension roller 113, and a second guide roller 114, and thence along the top of the table in the direction of the arrow, Fig. 1. At the side of this table extending parallel therewith, is a shaft 115 parallel thereto, the portion of the table supporting this strip being designated by the numeral 116. The paper A does not rest directly on the strip 116 but upon successive blocks elevated slightly above the table to facilitate application of the tools to their work. The first block (Fig. 25) is accurately spaced relatively to the longitudinal shaft 115 by means of arms 117 extending from said shaft over the table 116. These arms carry also a cover piece 118 which overlies the paper A and which carries in turn a stop or guide 119 adjustable transversely of the table so as to determine the position of the edges of the paper. The cutter 120 is provided with pointed teeth and is fastened on the shaft 115 and actuated thereby, the cover plate 118 and the block on which the paper is held being provided with a serrated edge similar to the teeth of the cutter 120, so that the cutter and block act like the blades of a pair of shears and cut out the triangular pieces between the points. The next tool is a rubber roller 121 mounted on an arm of the shaft 115 and used for bending down the teeth over the sharp edge of a block 122 which is screwed directly upon the table 116. The paper A thence passes under a holding device so as to prevent its retraction by the tension spring after it has been advanced by the feeding device hereinafter described. This holding device is an approximately arc-shaped piece 123 loosely mounted on a short shaft 124 extending across the table, the arc-shaped piece or foot 123 being pressed backward by a slight spring 125, and being of less radius at its rear portion than at its forward portion. Now when the paper A

is carried forward, in the direction of the arrow, the arc-shaped foot allows it to pass freely. The foot remains, however, in contact with the paper and the least backward movement of the paper causes a corresponding backward movement of the foot and a gripping of the paper between the foot 123 and the block 126 above which the foot is located.

The mouthpiece paper is advanced by a device which grips it near its end, advances it until its end enters the rolling mechanism and then releases it, the proper length being cut off by a pair of shears, and the advancing gripper being then returned to position for the next operation. The advancing gripper includes an oscillating eccentric or arm 127 and a supporting plate 128, the arm 127 being provided with springs 127[a] adapted to press the paper A against the table when the arm is swung downward by the rotation of its shaft, as shown best in Fig. 20, the mouthpiece paper A being gripped near its end as indicated in dotted lines, and the eccentric and plate being both advanced toward the rolling mechanism. Fig. 20 shows the advanced position and Fig. 24 shows the retracted position in dotted lines and an intermediate position in full lines. Fig. 30 shows how the gripper may pass between the open blades of the stationary shears for cutting off the mouthpieces. The shears and gripper are arranged beyond the end of the table 116 and upon the end of the table is a projecting guide 131 with light springs 132 (Figs. 24 and 29) holding up the end of the paper A in convenient position for cutting by the shears. The shaft 133 of the shears extends backward into a fixed bearing 134 mounted on the table and in which it can be adjusted longitudinally. The eccentric 127 is on a shaft 135 which is mounted in a bearing 136 on a slide 137 reciprocating longitudinally on the guide 160 fixedly attached to a post 146 mounted on the table X, the shaft being provided at its outer end with a crank pin 138 which as the slide is reciprocated moves backward and forward in a longitudinal slot in a member 139, which at intervals is raised and lowered to turn the shaft and grip the paper. The slide 137 is reciprocated by means of a link 140 connecting it with the vertical arm 141 of an angle lever, the other arm 142 of which rests upon a cam 143 on a shaft 60 previously referred to and which runs from right to left under the main table X. The plate 128 is L-shaped, as shown in Fig. 30, and is fastened on the end of the slide by means of its vertical portion, while its horizontal portion projects out into the line of the table 116 along which the paper A is fed, so that the lower blade 130 of the shears may swing below it to a position between the plate 128 and the point of attachment of the link 140 to permit the reciprocating movement of the plate and the clamping arms between the open blades of the shears.

The slotted member 139 is raised to effect the clamping of the paper when the gripping device is retracted, and is held in raised position while the gripping mechanism carries the paper forward, and until the end of the paper is gripped by the rolling mechanism, whereupon the slotted member 139 is lowered to open the gripping mechanism and hold it open while it is retracted to its starting point. For effecting these movements the slotted member 139 is mounted on the top of a slide 145, which is guided in a hollow vertical post 146, and which is reciprocated by means of a lever 147 carrying a roller engaging a transverse slot in the slide 145, the lever being pivoted at 148 and provided with a roller 149 at an intermediate point of its length, which roller is in the path of a cam 150 mounted on the continuously rotating upper shaft W. The arm 147 is normally drawn upward by means of a spring 156, so that the clamp is operated with a spring pressure and is positively raised by the action of the cam. By rendering this clamping mechanism ineffective the apparatus may continue to work making only cigarette tubes; as the mouthpiece paper will not be fed to the rolling mechanism the other parts of the apparatus will move without effect, the main shafts continuing to operate as before. This result is obtained by throwing the hand lever 157 in the direction of the arrow, Fig. 32. This hand lever operates a cam 158 which bears down on a roller 159 projecting laterally from the slide 145, and thus holds the spring 156 extended and holds the lever 147 beyond the influence of the cam 150. The holding of the post 145 down holds down the crank on the shaft 135 of the movable member of the clamp, and thus holds the clamp open so that it may reciprocate without effect.

For varying the length of the pieces of mouthpiece paper which are cut off, the movement of the slide 137 which carries the clamping mechanism is limited adjustably. The slide travels upon a guide 160 fixed at the side of the post 146 and is advanced, as previously explained, by means of the arm 141 which is thrown forward by means of the cam 143. This arm and the slide 137 are moved backward by means of a spring 161, and the backward movement is limited by a stop 162 which is fastened adjustably upon the top of the guide 160; so that as the spring 161 pulls the slide 137 backward the latter moves until it strikes the stop 162, and the location of this stop determines the retracted point at which the gripping mechanism takes hold of the paper. The cam 143 is designed for the maxi-

mum length, and minimum and intermediate lengths are insured by the forward adjustment of the stop. Both blades 129 and 130 of the shears are actuated. The upper blade 129 has a rearwardly projecting arm 163, the rounded end of which lies in a slotted member 164 carried on the top of a vertically moving post 165, which post carries also a sleeve 166 provided with a cam 167 at the side which bears against a roller on the end of the outer arm 168 of the lower blade 130 of the shears. The post 165 is guided through a hollow column 169 mounted on the table, and has at its lower end a roller running in a groove in a cam 166 mounted on the lower shaft 60. When the post 165 moves upward it presses the shear arm 168 inward and the arm 163 upward, so as to bring the two blades together, and this operation takes place when the gripping mechanism has carried the paper to the most advanced point. The upper blade 129 of the shears is positively lifted by means of its slotted member 164. The lower blade 130 is pulled down by a spring 170 when released by its cam. The shaft 115 which carries tooth-cutting and bending mechanisms, is oscillated by means of the cam groove in the edge of a cam 171, Fig. 31, engaging a roller on the end of an arm 172 carried on the forward end of the shaft 115.

The rolling of the mouthpiece and its ejection into the rotating carrier, are accomplished by the mechanism illustrated chiefly in Figs. 18 to 21. The rolling is accomplished within the fixed barrel 173 open at both ends. At the rear the barrel is provided with a slot 174 through which the end of the mouthpiece paper A is inserted. At the front there is a slot 175 through which passes the plate 64 of the ejector previously described. Within the fixed barrel 173 is a hollow rod 176 with a slot which in the position of rest faces the slot 174 of the barrel, and within the hollow rod is a gripping rod 177 having also a slot or groove facing the slot 174 in the position of rest. The mouthpiece paper is thrust through the slot 174 of the barrel and through the rod 176 into the groove in the central rod 177. The latter is then given a short initial turn which grips the edge of the paper in the manner shown in Fig. 20, after which both the central rod 177 and the hollow rod 176 are rotated sufficiently to wind the mouthpiece and to carry them farther to the position shown in Fig. 20, the ejector being then in the rear of the rolled mouthpiece. The central rod 177 is then turned backward to bring its groove into register with the slots in the other parts, which movement releases the grip on the inner edge of the mouthpiece. The ejector then moves forward carrying the mouthpiece into the appropriate tube of the rotating carrier, and returns to its retracted position, after which the operations are repeated.

The rotating movements of the gripping and rolling mechanisms are produced from a gear 178 which is driven by a pinion 179 rotated by a gear 144 on the shaft 60. The gear 178 is fixed on the extremity of a shaft 180, and carries a crank pin 181 connected by a rod 182 to the toothed sector 183, which is thus oscillated. The sector 183 engages a pinion 184 fixed on the shaft 185 which carries a gear 186 driving a pinion 187, which in turn drives a pinion 188 which is on the end of a rotary tube 189 which at its right hand end is connected with the hollow tube 176 of the rolling mechanism; the connection being such as to permit ready assembling and separation of the parts. The gear 186 is loose on its shaft 185, but is free to slide thereon and may be clutched thereto, the connection being effected by means of a feather 589 mounted on the shaft and entering a longitudinal slot in a clutch sleeve 588 engaging tenons 587 carried on the hub 586 of the gear. This connection permits the sleeve 588 to be separated from engagement with the tenons 587. The movement of the sleeve 588 in an axial direction is effected by means of a roller 190 engaging a groove which extends around the sleeve, connected to a lever 191 pivoted at 192, and having at its opposite end a roller 193 engaged in a peripheral cam groove in the cam 194.

The mouthpiece is rolled during a forward movement of the sector 183, and the hollow tube 176 and its actuating tube 189 are held stationary during the return movements of the sector. The rolling tubes are locked by means of a lever 195 furnished at its upper end with a finger 196, and controlled by the cam 197 fixed on the shaft 180. The tube 189 is provided with a ring 198 fixed thereon and provided with a notch 199 adapted to receive the finger 196 of the locking lever. When the lever 195 is actuated by the high part of the cam 197 the rolling tube 189 is released; when the low part of the cam is in position the lever is drawn forward by a spring to cause the finger 196 to enter the notch and lock the tube.

The gripping rod 177 which lies within the mouthpiece rolling tube, is extended through the tube, as shown at 204 in Fig. 19, and provided on its rear end with a disk 200 upon which is fixed a crank pin 201 carrying a roller, which lies in the path of a cam 202 upon a continuously rotating shaft 203. About the rear extension 204 of the gripping rod is coiled a spring 205 fixed at the left hand end to the disk 200 which is fixed on the rear end of the rod, and connected at its opposite end to a ring 206 which is fastened by a screw to the outer tube 189. Alongside of the ring 206 is a second ring 207 connected to the central

rod by a pin passing through the sleeve in the rod, this ring serving to prevent axial movement of the rod relatively to the tube. The spring 205 constitutes a yielding connection between the tube and the central rod so that when the tube is rotated the rod tends to rotate with it. The cam 202 acting on the crank pin 201 however, while the outer tube is locked, as above described, causes a movement of rotation of the rod sufficient to bring the groove in the gripping rod 177 into register with the slot in the rolling tube 176. When the cam is inactive the spring holds the gripping rod with a slight pressure in the position of Fig. 20, gripping the edge of the paper thus during the entire rotation of the rolling tube.

The mouthpiece paper is introduced while the cam holds the gripping rod with its opening registering with that of the rolling tube. Immediately thereafter the cam 202 presents its smaller diameter to the crank pin 201, permitting the latter to rotate completely without interference. The spring 205 causes the gripping of the edge of the paper lightly and the rolling tube is rotated in the following manner. The crank pin 181, fixed on the gear 178, starts from the position shown in Fig. 21. The cam 194 holds the lever 191 in such a position that the clutch ring 588 brings the hub 586 (and the gear 186 fixed on the end of this hub), into engagement with the shaft 185 and pinion 184. The finger 196 of the lever 195 is disengaged from the notch 199 by means of the cam 197, so that the rolling tube is free to turn. The gear 178, rotating thus in the direction of the arrow effects, in its first half-revolution, a forward movement of the sector 183 sufficient to make a complete rotation of the shaft 185 which through the gearing shown gives to the pinion 188 on the rolling tube five complete turns. Thus in the first half-revolution of the gear 178 the mouthpiece paper is rolled about the rolling tube 176 and within the fixed barrel 173 approximately five times, which is sufficient to take in the full length desired.

When the rolling tube completes its last forward turn the collar 198 presents its notch 199 to the locking finger 196, and the finger is thrown into the notch by means of the spring shown, the high part of the cam 197 being withdrawn from the lever. The rolling tube is thus locked. At the same time the lever 191 acts to unclutch the shaft 185 from the gear 186 so as to permit a backward movement of the toothed sector 183 without movement of the gear 186; which back movement is effected during the second half-revolution of the crank pin 181. In this return of the crank pin to its starting point the cam 194 acts again on the clutching lever 191 when the toothed sector has reached its fully retracted position, and the tenons and notches of the clutch members come into register. Also at the end of this return movement of the crank pin the locking finger 196 is withdrawn so that the parts are ready for a second operation. During the return of the crank pin, however, the cam 202 acts on the crank pin 201 of the gripping rod, turning the rod to a position to release the edge of the mouthpiece; and the ejector moves forward to eject the finished mouthpiece and backward again to its starting point. As above stated, the ejector is carried by a sliding rod 63 with a blade 64 passing through a slot in the side of the fixed barrel, and this blade carries at its inner end a ring 208 adapted to slide on the rolling tube 176 so as to engage the mouthpiece at all points in the circumference of its rear edge.

The step by step rotation of the carrier *d* is effected by mechanism adjacent to that just described, Figs. 22 and 23, the carrier being mounted on a shaft 209 extending to the left hand side of the machine. On the shaft 60, arranged below the table is a cam 210 communicating vertical movement to a rod 211. On the shaft 209 of the carrier is articulated a member 212 carrying a crank pin 213 with a squared sleeve on its end lying between the prongs of a fork 214 carried on the upper end of the rod 211, and carrying also an approximately upright arm with a pivoted finger 215 on its upper end, which finger rocks in a plane parallel to the axis of the shaft 209 and has its right hand end adapted to enter in one of eight notches in a notched disk 216 fixed on the end of the shaft. The finger 215 which with the notched disk 216 constitutes a sort of clutch, is furnished at its left hand end with a spherical roller 217 resting on a cam 218 which cam is mounted on the hollow shaft 203 previously referred to and which surrounds the shaft 209 and has a continuous rotary movement. The roller 217 is held against the cam by means of springs 219. When the cam 218 presents its greater diameter to the spherical roller, the clutch finger 215 engages one of the notches in the disk 216 so as to connect the member 212 to the shaft; when the cam presents its smaller diameter to the roller the connection is broken. On the upper shaft W is a cam 220 having a groove in its face which acts on the roller on the end of a bent locking lever 221, the upper end of which carries a locking pin 222 adapted to enter the notch in the plate 216 so as to prevent rotation of the shaft 209 when the clutch finger is disengaged therefrom.

In the initial position the clutch finger enters one of the notches in the plate 216, the cam 220 withdraws the locking pin 222 and the slide 211 is in its lowest position. The action of the cam 210 then lifts the

slide 211 and with it the fork 214 which through the clutch finger gives a movement of one-eighth of a revolution to the shaft. When this eighth of a turn has been completed the cam 220 throws the locking finger 222 into engagement with the notched plate 216 so as to lock the shaft against further movement. At the same time the cam 218 presents its smaller diameter to the spherical roller on the clutching finger and the springs 219 withdraw the latter, whereupon the cam 210 draws the slide 211 down into its starting position and with it the member 212. Slightly in advance of the next upward movement of the slide 211 the locking finger 222 is withdrawn and the clutch finger 215 thrown into engagement.

The guide, composed of the two half-rings *f* and *g* previously referred to, has an especial value in shaping the ends of the cigarette tubes G so that they shall enter easily upon the carrier tubes *c*. See Figs. 16[a] and 16[b]. These half-rings are provided with beveled faces at the right, the side from which the tube approaches, and when the two half-rings are together the opening is slightly larger than the size of the cigarette, so that the latter is permitted to pass through freely if it is of true circular shape. If however, the edges have been flattened by the action of the shears in cutting off the desired length, and it has not resumed its shape sufficiently to enter easily over the end of the carrier tube *c*, then the separated end of the cigarette tube will strike the beveled faces of the half-rings and will be lightly compressed into shape.

The mouthpiece-forming mechanism and the mechanisms for applying the mouthpiece to the cigarette tube and unrolling the mouthpiece therein and delivering the tubes with mouthpieces, are based on the mechanisms of the Gueniffet, Benoit and Nicault application of May 9, 1901, upon which they represent improvements in detail; reference being made to the said application for any fuller information concerning the operation and advantages of the machine. The cotton referred to may be substituted by any other usual or suitable filtering material.

What we claim is:—

1. In a machine of the class described in combination, a tube with a longitudinal slot in one side thereof, a gripping device, a pair of rollers at least one of which is positively driven for supplying a continuous sliver of cotton to said tube, and means for moving said gripping device through said slot and forward to engage and feed the sliver through the tube and then outward and backward in position to reëngage said sliver, the end of the sliver being free during the backward movement of said gripping device.

2. In a machine of the class described in combination, a pair of rollers at least one of which is positively driven for supplying a continuous sliver of cotton, a gripping device for engaging and carrying forward said sliver of cotton, a link upon which said gripping device is pivoted, means for oscillating said link to cause a forward and backward movement of the gripping device, and means for oscillating the gripping device on said link to cause an inward movement of the gripping device at the beginning of its forward movement and an outward movement thereof at the beginning of its backward movement, the end of the sliver being free during the backward movement of said gripping device.

3. In a machine of the class described in combination, a fixed tube, movable means engaging the sliver of cotton in said tube and feeding it therethrough so that its free end projects out of said tube, shears adjacent to the end of said tube for cutting off the projecting portion of the sliver, a support below the end of said tube for the plug formed by the cut-off end of the sliver and upon which said plug may fall freely, and a pusher adapted to be reciprocated across said support and to push said plug into a tube.

4. In a machine of the class described in combination, means for forming a mouthpiece with inwardly projecting prongs, and means for introducing the plug of cotton into engagement with said prongs so as to be held in place thereby.

5. In a machine of the class described in combination, means for forming a tubular mouthpiece with inwardly projecting prongs near its inner end and means for introducing a plug of cotton through the outer end of said mouthpiece so as to press said prongs toward the inner end and cause them to enter and prevent backward movement of the plug toward the outer end.

6. In a machine of the class described in combination, a rotary carrier *d*, means for rolling a tubular mouthpiece and introducing it longitudinally into said carrier, and means alongside of said mouthpiece-rolling means for introducing a plug of cotton into a mouthpiece carried by said carrier at an adjacent point in the rotation of said carrier.

7. In a machine of the class described, an unrolling mechanism including in combination a pair of members adapted to grip the cigarette tube and mouthpiece between them and movable one relatively to the other so as to roll the tube and mouthpiece, the space between said members being less at the outlet than at the inlet so as to increase the grip during the unrolling.

8. In a machine of the class described in combination, a box 50, a slitted supporting plate *y* projecting from the bottom of said box, said box having an opening above said plate, and fingers *z* moving in the slits of

said plate and serving to push a tube from said plate through said opening into the box.

9. In a machine of the class described, a laterally movable circular member, means for applying a tube endwise over said circular member, and means for insuring the circular shape of said tube comprising a circular ring adapted to embrace the end of said tube before the latter is applied to said circular member, said ring including a movable portion to permit the lateral movement of said circular member with the tube applied thereon.

10. In a machine of the class described in combination, members *c*, means for applying cigarette tubes endwise upon said members *c*, means for moving said members transversely to the directions of said tubes, and a guide ring in advance of the position of said members *c* when a tube is to be applied thereto, said guide ring comprising a stationary portion *f*, and a transversely movable portion *g* to permit the escape of the cigarette tube when the member *c* upon which it has been applied is moved transversely.

11. In a machine of the class described, mechanism for feeding the end of a strip of mouthpiece paper, including in combination a supporting plate 128, a shaft 135, laterally projecting members 127ª carried by said shaft over said plate, a crank pin 138 on the opposite end of said shaft, a reciprocating slide carrying said supporting plate and said shaft, a stationary post, a vertically movable slide 145 carried thereby, and a longitudinally slotted yoke 139 embracing said crank pin to raise and lower the same and cause a gripping movement of the members 127ª while permitting a longitudinal movement.

12. In a machine of the class described, mechanism for feeding the end of a strip of mouthpiece paper, including in combination a supporting plate 128, a shaft 135, laterally projecting members 127ª carried by said shaft over said plate, a crank pin 138 on the opposite end of said shaft, a reciprocating slide carrying said supporting plate and said shaft, a stationary post, a vertically movable slide 145 carried thereby, a longitudinally slotted yoke 139 embracing said crank pin to raise and lower the same and cause a gripping movement of the members 127ª while permitting a longitudinal movement, and means for holding said vertically movable slide 145 in position to hold said gripping members 127ª out of engagement with the paper.

13. In a machine of the class described, a mouthpiece paper-feeding mechanism including in combination, a gripper adapted to grip the mouthpiece paper, means for positively advancing said gripper, a spring for retracting said gripper and an adjustable stop for limiting the retractile movement of the gripper so as to adjust the length of feed at each operation.

14. In a machine of the class described, a mouthpiece paper-feeding mechanism including in combination, a feed table, a reciprocating gripper beyond the end of said feed table, a pair of shears for cutting off suitable lengths also beyond the end of said feed table and intermediate between the retracted and advanced positions of the gripper, and light springs 132 extending beyond the table and holding the paper close to the shears, said springs being positioned out of the path of the parts of the gripper so as not to interfere with the retraction of the latter.

15. In a machine of the class described, a mouthpiece rolling mechanism including in combination a fixed barrel 173, a slotted winding tube 176 within said barrel, a grooved gripping rod 177 in said winding tube, a tubular extension 189 of said winding rod, an extension 204 of said gripping rod, a spring 205 carried in said tubular extension of said winding tube and connecting said winding tube and said gripping rod with each other and holding them yieldingly in gripping position with the slot in one out of register with the groove in the other, and means for alternately rotating said winding tube and gripping rod in the gripping position determined by said spring, and giving one of them an angular movement relatively to the other against the pressure of said spring to bring the groove of one into register with the slot of the other so as to release the paper and permit the introduction of the end of the new piece.

16. In a machine of the class described, a mouthpiece rolling mechanism including in combination, a winding tube, a gripping rod carried therein and adapted to grip the paper by an angular movement relatively to the winding tube, a spring holding said rod in gripping position relatively to the tube, a continuously rotating cam acting on said rod when the tube is stationary and turning the rod against the action of the spring to the releasing position, and an intermittently acting gear arranged to rotate said tube in the intervals between the operations of said cam.

17. In a machine of the class described, a mouthpiece-rolling mechanism including in combination, a winding tube, a gripping rod carried therein and adapted to grip the paper by an angular movement relatively to the winding tube, a spring holding said rod in gripping position relatively to the tube, a continuously rotating cam acting on said rod when the tube is stationary and turning the rod against the action of the spring to the releasing position, and an intermittently acting gear arranged to rotate said tube in

the intervals between the operations of said cam, and a locking device adapted to engage and lock said tube in position during the intervals between the operations of said gear.

18. In a machine of the class described, a rotatable carrier and mechanism for rotating the same, including in combination a shaft 209 on which the carrier is mounted, a reciprocating rod 211, an articulated member 212 on the shaft having a crank pin engaging said rod 211, a pivoted finger 215 carried by said articulated member adapted to rock in a plane parallel with the shaft, a notched disk 216 fixed on the end of the shaft, a locking lever 221, means for rocking said finger to bring it alternately into engagement with said notched disk to cause intermittent rotation of the same, and means for actuating said locking lever to engage the disk and lock the shaft against rotation while the rocking finger is withdrawn.

In witness whereof, we have hereunto signed our names in the presence of two subscribing witnesses.

JULIEN GUENIFFET.
JULES NICAULT.

Witnesses:
H. C. COXE,
GENÉ GOGIER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."