No. 779,430. PATENTED JAN. 10, 1905.

P. A. LAWLESS.

CIGARETTE MACHINE.

APPLICATION FILED APR. 20, 1903.

6 SHEETS—SHEET 1.

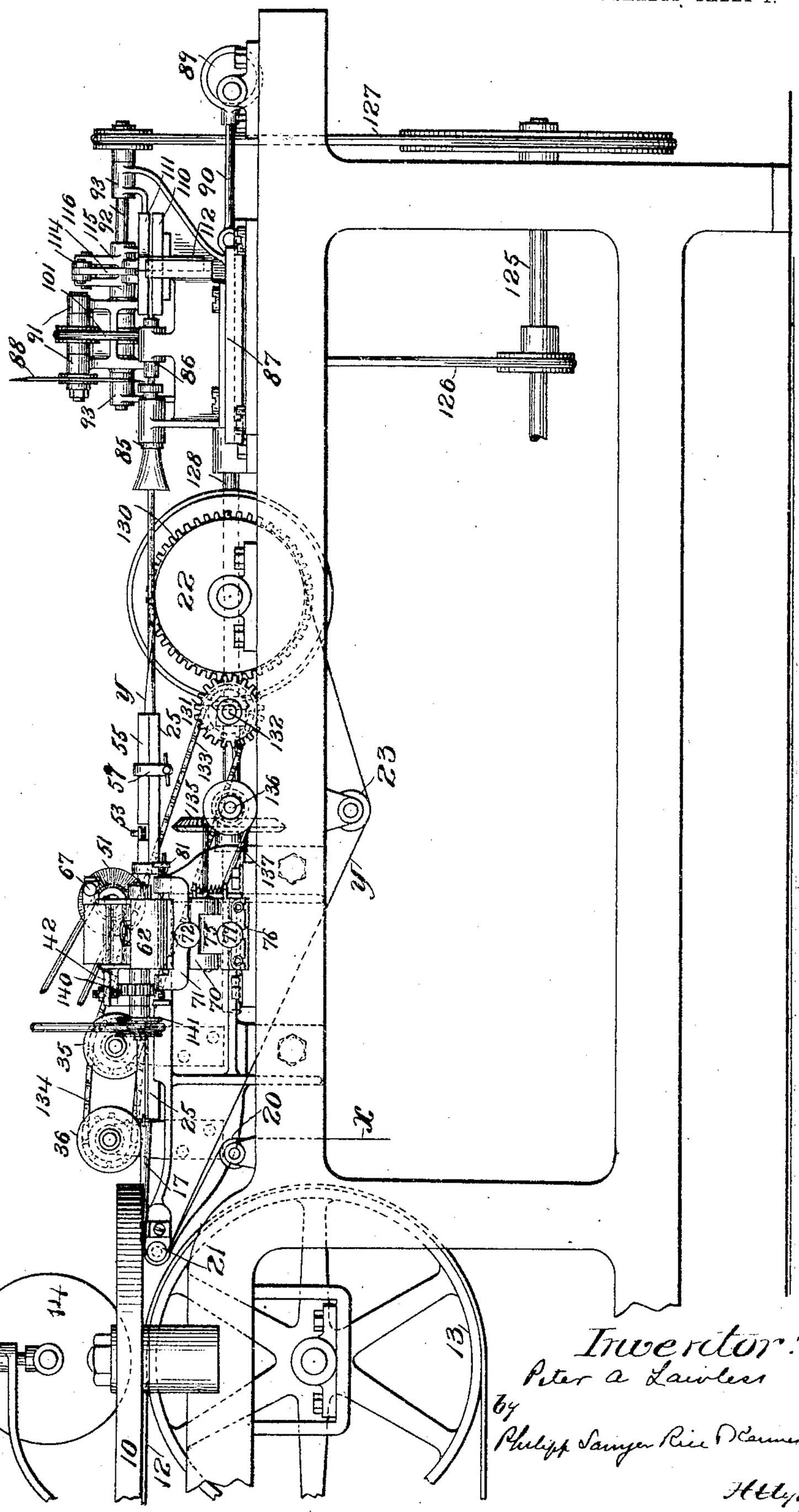

Fig. 1.

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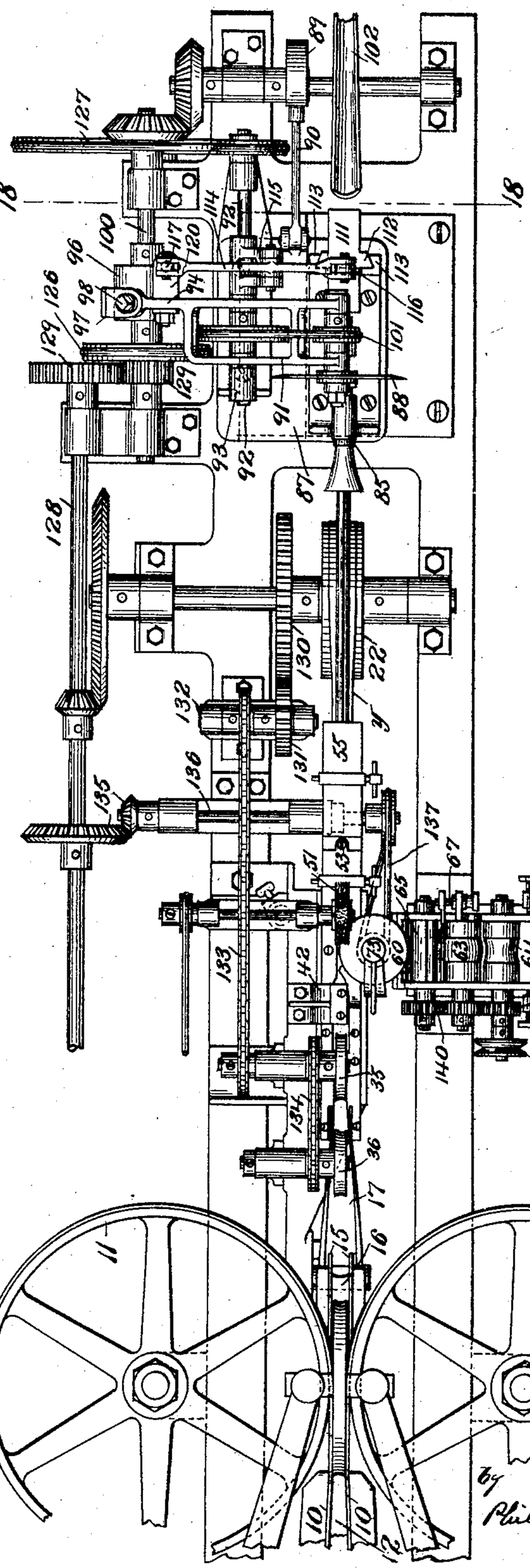

Fig. 2.

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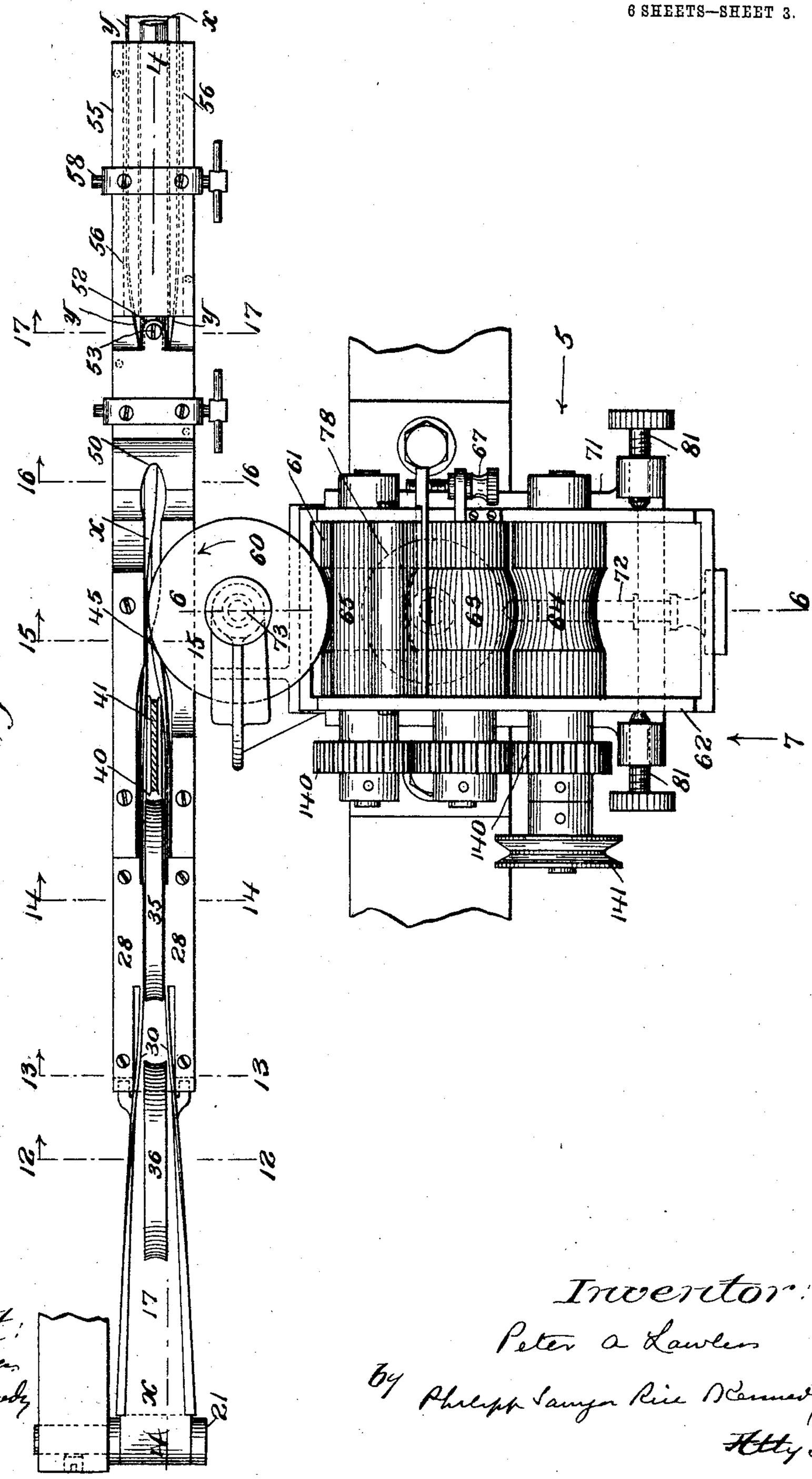

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6 SHEETS—SHEET 4.

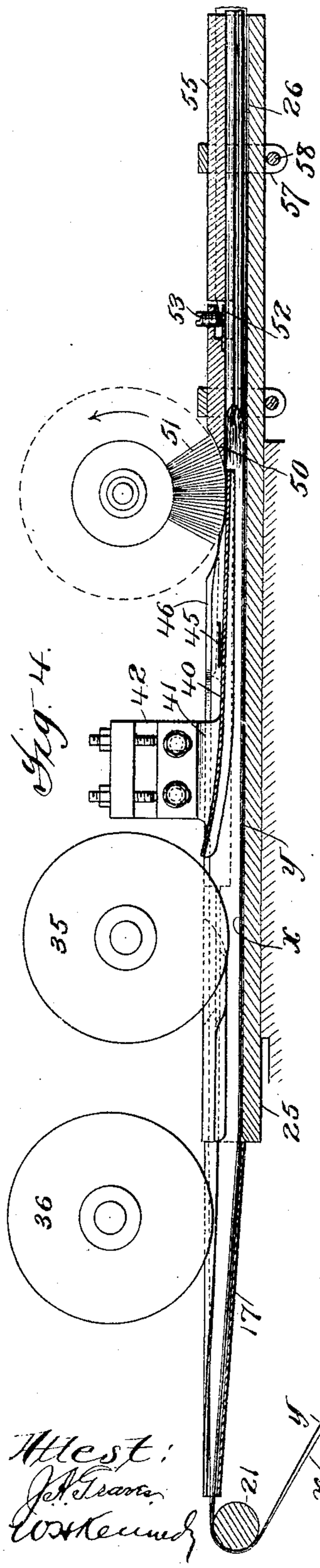

Fig. 4.

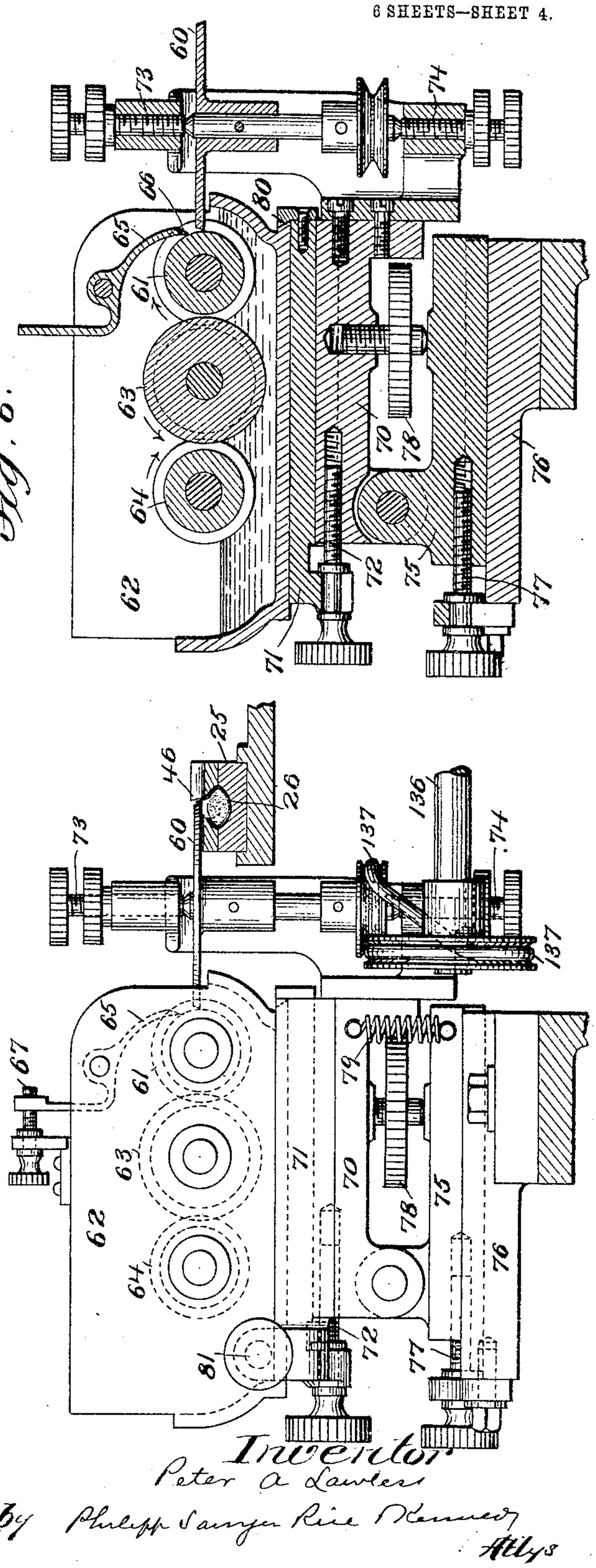

Fig. 6.

Fig. 5.

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No. 779,430.

PATENTED JAN. 10, 1905.

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6 SHEETS—SHEET 5.

Fig. 7.

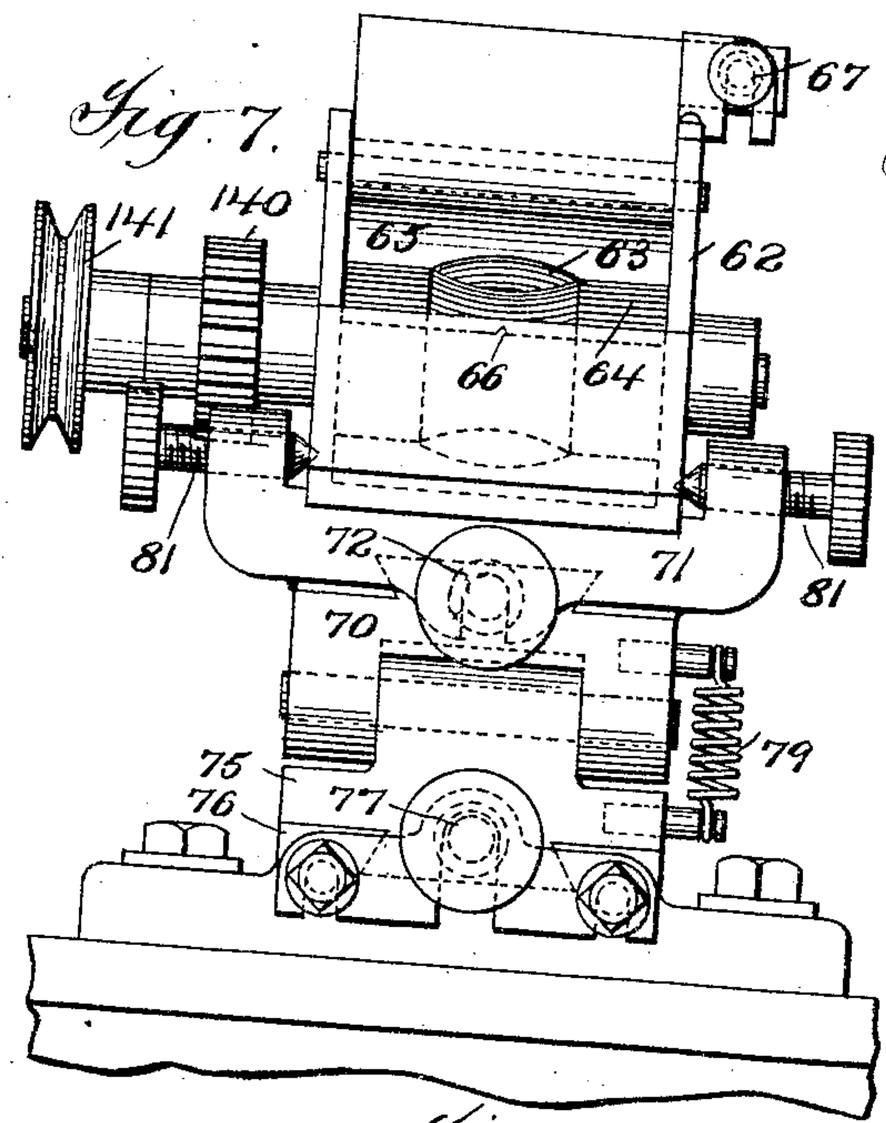


Fig. 12.

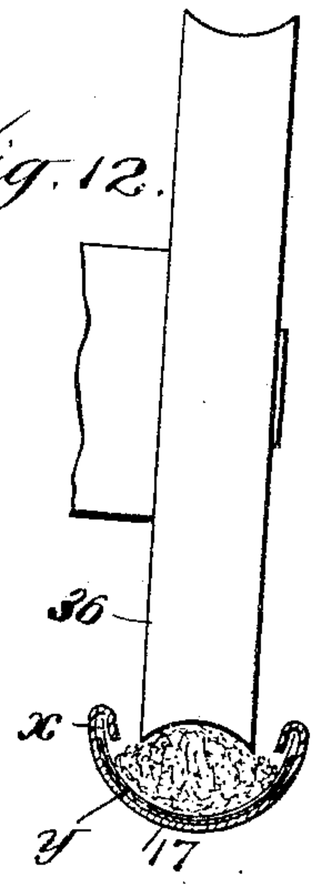


Fig. 14.

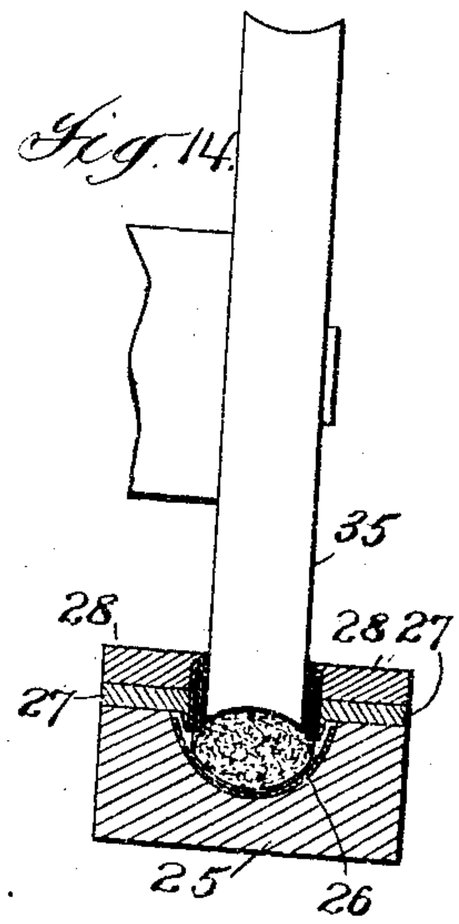


Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

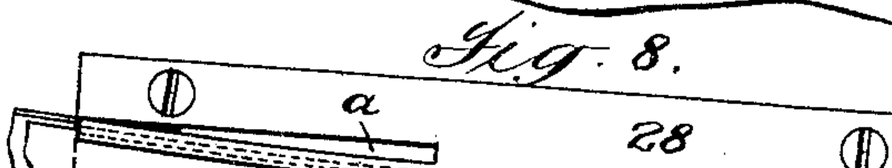


Fig. 13.

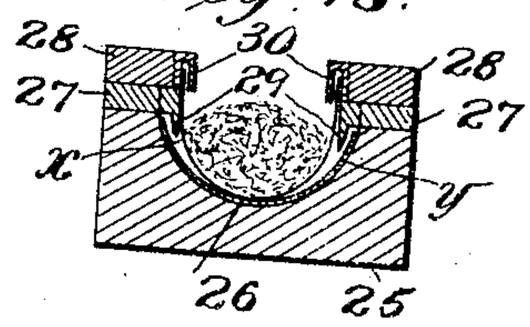


Fig. 15.

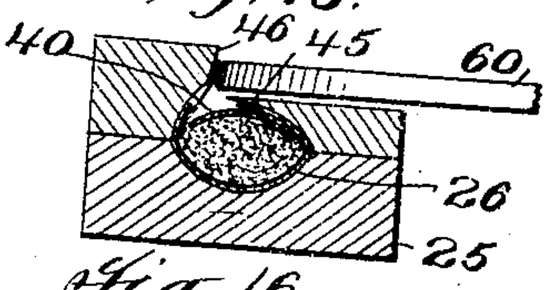


Fig. 16.

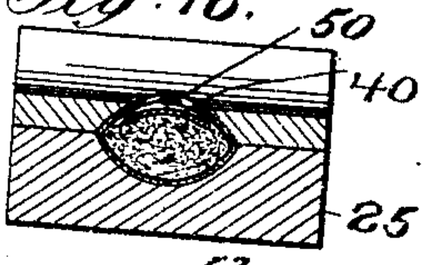
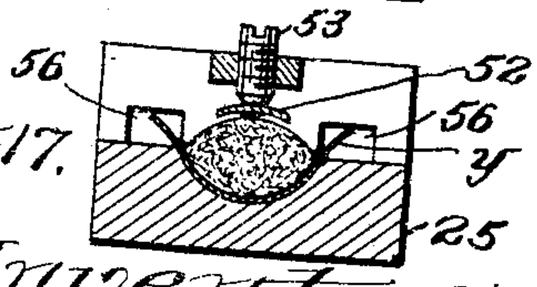


Fig. 17.



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6 SHEETS—SHEET 6.

Fig. 18.

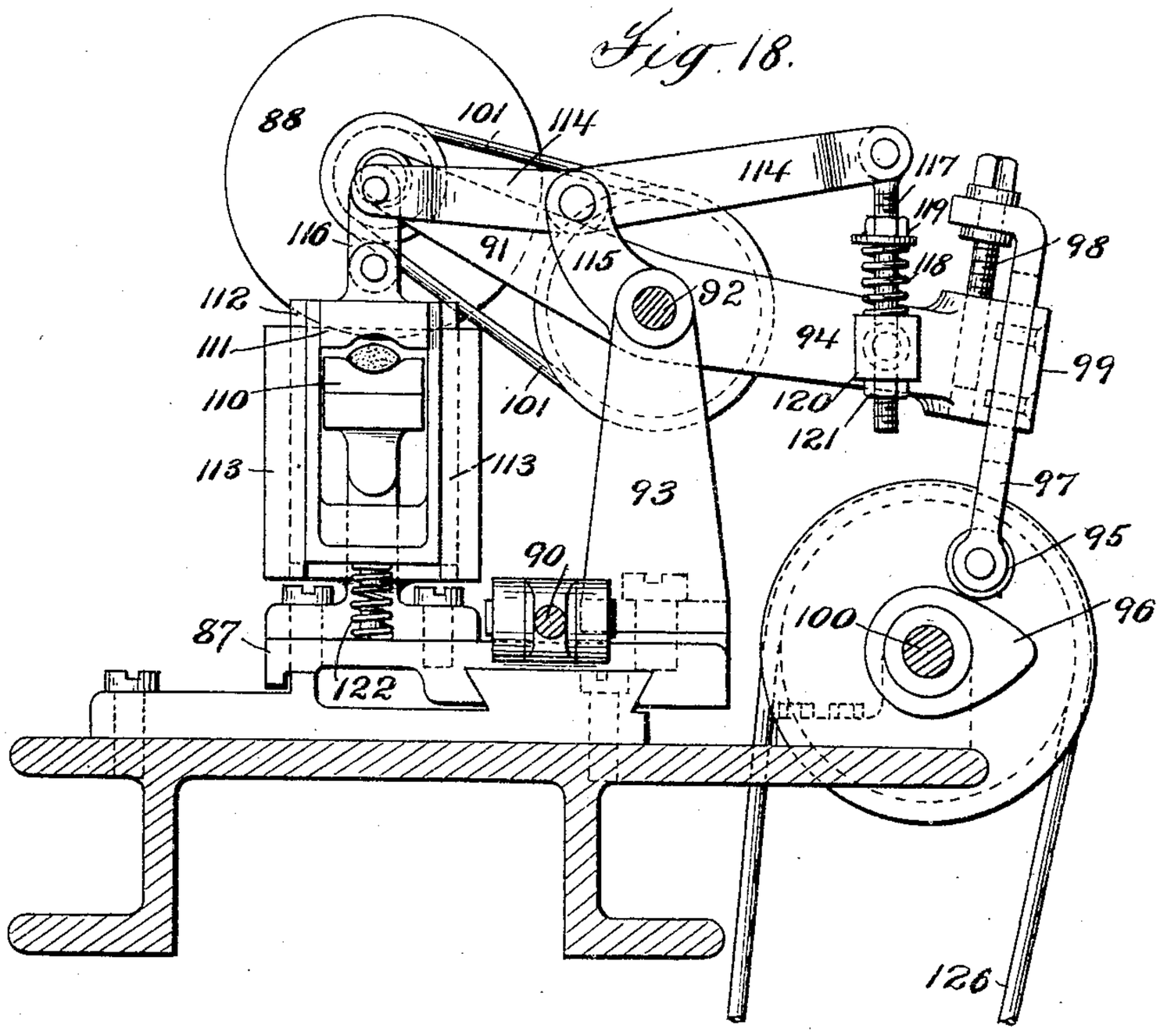


Fig. 19.

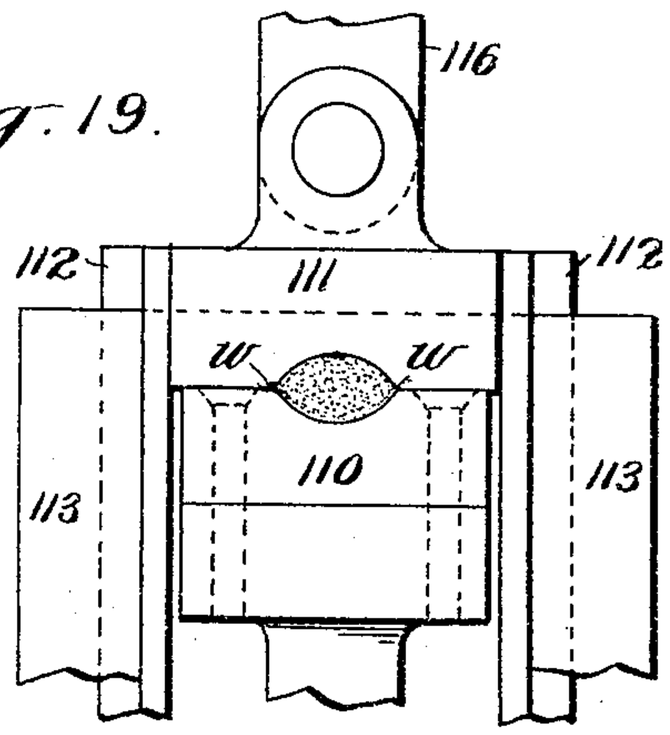
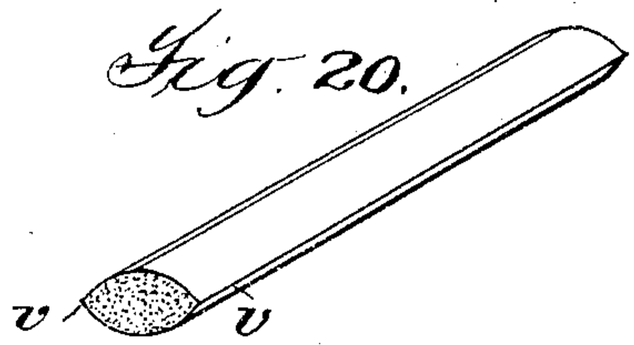


Fig. 20.



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No. 779,430. Patented January 10, 1905.

UNITED STATES PATENT OFFICE.

PETER A. LAWLESS, OF NEW YORK, N. Y., ASSIGNOR TO THE AMERICAN TOBACCO COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 779,430, dated January 10, 1905.

Application filed April 20, 1903. Serial No. 153,483.

To all whom it may concern:

Be it known that I, PETER A. LAWLESS, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Cigarette-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to cigarette-machines of that class by which a continuous wrapper-strip is wrapped about a continuous filler-rod of tobacco and the edges joined together to form a continuous cigarette-rod, which is afterward cut into cigarette lengths.

More particularly, the invention relates to improvements in the devices for forming the filler-rod and wrapping and sealing the wrapper-strip about the same and cutting and compressing mechanism for severing cigarette lengths from the continuous cigarette-rod and compressing the severed cigarettes to the desired shape.

A full understanding of the invention can best be given by a detailed description of the preferred construction embodying the various features thereof, and such a description will now be given in connection with the accompanying drawings.

In said drawings, Figure 1 is a side elevation of so much of a cigarette-machine constructed in accordance with the invention as is concerned with the invention. Fig. 2 is a plan view of the machine. Fig. 3 is a plan view, on an enlarged scale, of the filler-forming and wrapping mechanism and pasting mechanisms. Fig. 4 is a section taken on line 4 of Fig. 3. Fig. 5 is a view of the pasting mechanism looking in the direction of the arrow 5 of Fig. 3. Fig. 6 is a section on line 6 of Fig. 3. Fig. 7 is a view of the pasting mechanism looking in the direction of the arrow 7 on Fig. 3. Fig. 8 is a detail plan view of a portion of the filler-forming mechanism with one of the side wrapper-guides removed. Fig. 9 is a side view of the parts shown in Fig. 8, but with the side guide in place. Fig. 10 is a longitudinal sectional view of the parts shown in Fig. 8. Fig. 11 is a detail face view of one of the edge guides for the feeding tape or belt by which the wrapper-strip and cigarette-rod are carried through the wrapping-tube. Figs. 12, 13, 14, 15, 16, and 17 are sectional views taken, respectively, on lines 12, 13, 14, 15, 16, and 17 of Fig. 3. Fig. 18 is an end view of the severing and compressing mechanism, taken on the line 18 of Fig. 2. Fig. 19 is an enlarged detail view of the compressing-dies. Fig. 20 is a perspective view of the finished cigarette as it leaves the machine.

Referring to the drawings, the tobacco is fed to the filler-rod forming and wrapping devices by side feeding-belts 10, which turn about horizontal wheels 11, a bottom feeding-belt 12, turning about wheel 13, and a top feeding and compressing disk 14, as usual in machines of this class. The tobacco is advanced in a continuous stream or partly-compacted rod between side guides 15 of a bridge-piece 16 to a tapering trough 17, which forms the entrance portion of the filler-rod forming and wrapping mechanism, generally known in the art as the "wrapping-tube." This trough 17 is, as usual, formed substantially flat at its entrance end and has its sides gradually bent up until at its forward end the trough is substantially semicircular in shape, as shown in cross-section in Fig. 12. The side edges of this entrance-trough are turned inward, as shown in Fig. 12, to form edge guides for the wrapper-strip *x*. The wrapper-strip, which may be led from a suitably-mounted web-roll, as usual, passes over a guide-roll 20, thence to a guide-roll 21, supported just beyond the end of the trough 17, and thence passes forward through the entrance-trough and through the length of the wrapping-tube to be wrapped about the filler-rod therein.

As usual in machines of this class, an endless belt or tape *y* is provided for carrying the wrapper-strip with the tobacco therein through the wrapping-tube. This belt, as shown, turns about the guide-roll 21 beneath the wrapper-strip passes thence through the wrapping-tube, and turns downward about a

feeding-pulley 22, by which it is driven, and returns thence about a guiding and tension roll 23 to the guide-roll 21.

The wrapping-tube beyond the entrance-trough 17 is formed, preferably and as shown, by means of a rod or bar 25, having a longitudinal groove 26 in its upper side and provided with overlying guide-pieces and cover-pieces formed to turn the two side edges of the wrapper-strip inward to overlap on the tobacco and to press and smooth the cigarette-rod thus formed. The groove 26 at and near the front end of the bar 25 is formed tapering, with its entrance end corresponding in form to the rear end of the entrance-trough 17, and the bar is provided at this portion with side pieces 27 and 28 on each side of the groove, the pieces 27 being formed to extend slightly inward beyond the edge of the groove and having downwardly-extending guide-flanges 29, thus forming at either edge of the groove a guiding-slot for the edge of the feeding-tape *y*, as shown in Figs. 13 and 14. The pieces 28 lie upon the pieces 27 and extend inward slightly beyond the inner edges of the pieces 27 and are provided at their inner edges with guiding-flanges 30, so as to form guiding-slots for the edges of the wrapping-strip, as shown in Figs. 13 and 14. The inner edges of the front portions of these pieces 27 and 28 are formed tapering, so as to provide tapering guide-slots to correspond with the form of the groove 26. This form of the side pieces 27 and 28 is preferably secured by cutting in each of the side pieces a vertical slot *a*, parallel with its edge and adjacent to the guiding-flange, said slots extending from the end of the side piece a distance corresponding to the desired tapering portion of the side pieces. The ends of the free portions thus formed are then bent toward the main portions of the side pieces and secured, as by soldering. The rearward portions of the strips 27 and 28 have their opposing inner edges formed parallel to receive between them a compressing-disk 35, by which the tobacco is pressed down onto the wrapper-strip, as shown in Fig. 14. The guide-flanges 30 are preferably extended downward adjacent to the disk 35, as shown in Figs. 10 and 14, for the purpose of protecting the sides of the wrapper-strip from the edges of the disk and for forming a compressing-chamber of substantially the width of the disk to prevent the tobacco from rising about the sides of the disk. A compressing-disk 36 is also preferably provided for compressing the tobacco as it passes through the trough 17. (See Figs. 3 and 12.) Both of these disks preferably have concave peripheries, and the disk 36 will preferably have a wider pressing-face than the disk 35, and the disk 35 will be set to exert greater pressure on the tobacco than disk 36. These disks 35 and 36 are also preferably driven disks having a surface speed corresponding to the movement of the feeding-tape *y*. They thus act to aid in securing the proper feed of the tobacco with the wrapper-strip.

Beyond the compressing-disk 35 a tongue 40 is provided to bear on the top of the tobacco rod which has been formed by the compressing action of the disks 35 and 36 and to maintain the tobacco under compression while the edges of the wrapper-strip are folded and lapped over the same. This tongue is preferably inclined slightly downward in the direction of the feed and has a greater incline at its entrance portion, as shown in Fig. 4. It is supported near its front end by means of an upwardly-extending plate 41, secured to a bracket 42, the forward end and main portion of the tongue being unsupported, so as to permit the edges of the paper to be folded over it. It is also preferably adjustably supported as by means of the slots and set-screws and adjusting-screws, as shown in Fig. 4. Beyond the plate 41 one edge of the wrapper is turned inward and down over the tongue 40 by means of a side folding-guide 45, having a progressively-curved wrapper-engaging face, (see Figs. 3 and 15,) a pasting-guide 46 being provided on the opposite side of the groove 26 to support the opposite edge of the wrapper-strip in position to receive a line of paste. These guides 45 and 46 are preferably formed by the inner portions of bars secured to the upper side of the bar 25, as shown. After receiving the paste the upstanding edge of the wrapper-strip is folded down over the tongue 40 and against the previously-folded edge of the wrapper-strip, and the cigarette-rod thus formed enters beneath a guide 50, formed, preferably, by a grooved cap, as shown in Fig. 16, which with the groove 26 forms a completely-closed channel-way.

A rotating rubber 51 is preferably provided for turning down the upstanding edge of the wrapper-strip just before it enters beneath the guide 50 and for pressing the edges of the wrapper together against the tongue 40, thereby insuring the formation of a strong, smooth, and even seam. This rubber is preferably formed by a circular brush, as shown, and is preferably driven to move with the cigarette-rod at the point of contact therewith, but at a slightly greater speed. This brush also serves to take up any superfluous paste and to brush away any loose tobacco. At its rear end the guide 50 is preferably provided with a pressure-tongue 52, adjustable, as by means of a screw 53, for bearing with a greater or less pressure on the seam as the cigarette-rod issues from beneath the guide 50. (See Figs. 4 and 17.) The groove 26 preferably extends beyond the guide 50 and is covered by a grooved cap-piece 55 to form a setting-channel to maintain the cigarette-rod and the overlapping edges of the wrapper under proper pressure for sufficient time to insure the setting of the paste with the machine operating at a very high rate of

speed. The cap-piece 55 is also provided with side grooves 56 to form passage-ways for the edges of the feeding-tape *y*, as shown in Fig. 17, the edges of the tape being turned outward away from the cigarette-rod as the cigarette-rod passes from the guide 50 to the cap-piece 55. The cap-piece 55 is removably secured in position in the bar 25 by means of arms 57, extending downward on either side of the bar 25 and formed with openings to receive a tapered clamping-pin 58, extending beneath the bar 25. The cap-piece may thus be readily and quickly removed for cleaning or other purpose.

With a wrapping-tube formed as described and shown a cigarette-rod having a closely-fitting filler and a smooth evenly-folded wrapper and with a very narrow seam may be formed with the machine running at very high speed.

Any suitable apparatus might be used for applying the line of paste to the edge of the wrapper-strip. The drawings show a preferred form of pasting apparatus. Such apparatus comprises in its preferred form a horizontally-rotating pasting-disk 60, which takes paste from a vertically-rotating roll 61, mounted in a suitable paste-receptacle, as 62, and cooperating with a grinding-roll 63, which in turn coöperates with another grinding-roll, 64, the two rolls 63 and 64 rotating downwardly toward and from each other, as indicated by arrows on Fig. 6, and the roll 61 rotating upwardly toward and from the roll 63. The roll 61 has a concave or circumferentially-grooved periphery to conform to the periphery of the pasting-disk 60, and the roll 63 is formed with a convex periphery corresponding to the grooved roll 61, and the roll 64 has a concave periphery to correspond with the convex periphery of the roll 63. The rolls 63 and 64 are preferably roughened to secure a better grinding action. A doctor-blade 65 is provided for the roll 61 and is formed with a central notch 66 (shown in Fig. 6 and in dotted lines of Fig. 7) for causing a circumferential line of paste to be carried by the roll 61 to the pasting-disk 60. This doctor-blade 65 is preferably adjustable, as by being pivotally supported, as shown, and adjusted by means of a screw 67. The edge of the pasting-disk 60 is preferably beveled upward, as shown.

While it may not in all cases be necessary to provide the grinding-roll 64, yet the arrangement shown, having the two grinding-rolls 63 and 64 in addition to the roll 61, is preferred and forms a feature of the invention. With this construction and with the rolls mounted to rotate vertically and the rolls 63 and 64 preferably rotating downwardly toward and from each other a very thorough grinding of the paste is secured and all necessity of grinding the paste before placing it in the paste-receptacle is avoided.

It is desirable to provide means for accurately adjusting the pasting-disk 60 with relation to the wrapping-tube and the edge of the wrapper-strip and also to provide for the relative adjustment between the pasting-disk and the paste-roll 61. The construction shown provides well for such adjustment. As shown, the paste-fountain 62 and the pasting-disk 60 are carried by bracket 70, the paste-fountain being secured to a slide 71, mounted on the bracket 70 and adjustable thereon toward and away from the pasting-disk, as by means of a screw 72. The pasting-disk is carried by a spindle mounted in screw-bearings 73 and 74, which may be adjusted to elevate or lower the pasting-disk with relation to the paste-roll 61. The bracket 70 is carried by a slide 75, supported by a bracket 76 and adjustable thereon, as by a screw 77, to move the pasting apparatus to carry the pasting-disk 60 toward or away from the wrapping-tube and the edge of the wrapping-strip, and the bracket 70 is pivotally mounted at its outer end and may be swung upward or downward to raise or lower the pasting-disk with relation to the wrapping-tube and the edge of the wrapping-strip by means of an adjusting-screw 78 acting against the tension of a spring 79. The paste-fountain 62 is preferably removably secured to the slide 71, as by being held at one end by means of an undercut flange 80 and at the other end by means of side holding-screws 81. By loosening the screws the fountain may thus be readily removed from the slide 71.

The cigarette-rod passes from the setting-channel to a guide formed of two parts 85 and 86, carried by a longitudinally-reciprocating carriage 87, which carriage also carries a circular rotating knife 88, mounted and actuated to sever a cigarette-rod into cigarette lengths between the guides 85 and 86. From the guide 86 the severed cigarettes pass to the compressor, also mounted on carriage 87, and from the compressor the finished cigarettes pass through a chute 102 to suitable receiving or delivery devices. The carriage may be reciprocated by any suitable means. As shown, it is reciprocated by an eccentric 89, the strap of which is connected, by means of rod 90, with the carriage. The knife 88 is carried by a shaft journaled on a double-armed lever 91, mounted to rock on a shaft 92, journaled in brackets 93, and the rearwardly-extending arm 94 of said lever carries an antifriction-roll 95, running in contact with a broad-faced cam 96 on a shaft 100, by which the lever is oscillated to intermittently project the knife 88 across the path of the cigarette-rod. The cam-roll 95 is adjustably mounted on the lever-arm 94, as by being carried by a bracket 97, carried by the lever-arm and adjustable thereon by means of a screw 98 and secured in any desired position of adjustment by means of a clamping-plate 99. The knife 88 is rotated by means of a

belt 101, passing about pulleys on the knife-shaft and the shaft 92, respectively. The cam 96 is timed to rock the lever 91 to project the knife across the path of the cigarette-rod while the carriage is making its forward movement, so that the knife while it is cutting through the cigarette-rod will move forward therewith and will make its return movement after it has been withdrawn from the path of the cigarette-rod. The compressor is formed by a pair of die-plates 110 and 111, each having a longitudinal groove corresponding to the form of the finished cigarette. The machine shown is intended especially for making elliptical cigarettes, and when intended for this purpose the grooves of the dies will each be of half-elliptical form. The stationary die-plate 110 is mounted on a suitable support on the carriage 87, and the movable die-plate 111 is mounted so as to be capable of being reciprocated vertically, as by being provided with vertical side strips 112, sliding in guides 113, and is reciprocated toward and away from the stationary plate 110 by means of a lever 114, pivoted on a bracket 115 and having one end connected to the die-plate 111 by means of a link 116 and having the other end connected to the lever-arm 94 by means of a rod 117. A spring 118 is preferably interposed between a nut 119 on the rod 117 and a block 120, pivotally mounted on the lever-arm 94, the rod 117 passing through said block and being held in position by means of a nut 121. By this construction the movable die-plate may be adjusted by means of the nut 121, and the spring serves as a relief-spring to prevent injury to parts of the machine if the movable die-plate should be set too much toward the stationary plate. The tension of the spring 118 may be adjusted by means of the nut 119. A spring 122 is preferably provided for constantly pressing the movable die-plate upward, so as to take up all possible lost motion and insure against any delay in the upward movement of the die-plate.

By this construction for each cutting movement of the knife the upper die-plate acts to press to its final form a previously-cut cigarette which has been moved into position between the die-plates. It is desirable that the cigarettes shall be finished with side creases, as shown at *v* in Fig. 20, and to secure this result the grooves of the die-plates are formed with slightly-rounded edges, as shown at *w* in Fig. 19.

The various operating parts of the machine may be driven in any suitable manner. As shown, the main driving-shaft 125 drives the shaft 100 through a belt 126 and drives the shaft 92 through a belt 127. The shaft 100 drives a shaft 128 by means of gears 129, and this shaft 128 drives, by means of beveled gears, the shaft which carries the belt-pulley 22. This latter shaft carries a gear 130, which meshes with a gear 131 on a shaft 132, from which the compressing-disk 35 is driven by means of a sprocket-chain 133, turning on sprocket-wheels on shaft 132 and the shaft of the disk 135, respectively. The compressing-disk 36 is driven by means of a sprocket-chain 134, running on sprocket-wheels on the shafts of the disks 35 and 36, respectively. The shaft 128 also drives, by means of beveled gears 135, a cross-shaft 136, from which the pasting-disk 60 is driven by means of a belt 137, running on pulleys on the shaft 136 and on the shaft of the pasting-disk, respectively. The shafts of the paste-rolls 61, 63, and 64 carry intermeshing gears 140 and are driven from any suitable part of the machine by means of a belt running on a pulley 141 on the shaft of the roll 64.

While the machine shown is intended for forming elliptical cigarettes, it will be understood that various features of the invention may be employed for making cigarettes of other form. It will be understood also that various features of the invention may be employed independently of other features thereof or in connection with coöperating parts of machines other than that shown. It will be understood also that the invention is not to be limited to the exact construction and arrangements of parts as shown for the purpose of illustrating the invention and to which the foregoing description is mainly confined, but that the invention includes changes and modifications thereof within the claims.

What is claimed is—

1. The combination with feeding devices for advancing a continuous-cigarette wrapper and filler, of an interior tongue, means for applying paste to one edge of the wrapper, and folding devices for folding the wrapper over the filler and tongue and for pressing the overlapping edges of the wrapper against the tongue to form a flat pasted seam, and a pressing device having a pressing-face of a width less than the width of the cigarette-rod for bearing on the wrapper-seam beyond the tongue, substantially as described.

2. The combination with feeding devices for advancing a continuous-cigarette wrapper and filler, of an interior tongue, means for applying paste to one edge of the wrapper, folding devices for folding the wrapper over the filler and tongue and for pressing the overlapping edges of the wrapper against the tongue to form a flat pasted seam, and an adjustable pressing device having a pressing-face of a width less than the width of the cigarette-rod for bearing against the wrapper-seam beyond the tongue, substantially as described.

3. The combination with feeding devices for advancing a continuous-cigarette wrapper and filler, of an interior tongue, means for applying paste to one edge of the wrapper, folding devices for folding the wrapper over the filler and tongue and for pressing the overlapping edges of the wrapper against the tongue to

form a flat pasted seam, and an adjustable tongue 52 having a pressing-face of a width less than the width of the cigarette-rod for bearing against the wrapper-seam beyond the tongue, substantially as described.

4. The combination with feeding devices for advancing a continuous-cigarette wrapper and filler, of an interior tongue, means for applying paste to one edge of the wrapper, folding devices for folding the wrapper over the filler and tongue and for pressing the overlapping edges of the wrapper against the tongue to form a flat pasted seam, a pressing device having a pressing-face of a width less than the width of the cigarette-rod for bearing against the wrapper-seam beyond the tongue, and a substantially closed setting-channel beyond said pressing device, substantially as described.

5. The combination with feeding devices for advancing a continuous-cigarette wrapper and filler, of an interior tongue, means for applying paste to one edge of the wrapper, folding devices for folding the wrapper over the filler and tongue, including a rotating rubber having a yielding face for pressing the overlapping edges of the wrapper against the tongue to form a flat pasted seam, substantially as described.

6. The combination with feeding devices for advancing a continuous-cigarette wrapper and filler, of an interior tongue, means for applying paste to one edge of the wrapper, folding devices for folding the wrapper over the filler and tongue, including a rotating brush for pressing the overlapping edges of the wrapper against the tongue to form a flat pasted seam, said brush being operated to rotate in the direction of movement of the wrapper but at a higher speed, substantially as described.

7. The combination with feeding devices for advancing a continuous-cigarette wrapper and filler, of means for applying paste to one edge of the wrapper, folding devices for folding the edges of the wrapper and lapping them over the filler, and an adjustable pressing device having a pressing-face of a width less than the width of the cigarette-rod for bearing against the wrapper-seam, substantially as described.

8. A cigarette-wrapping tube having means for folding a continuous wrapper and a feeding-belt about a filler-rod, and having a channel beyond the point at which the wrapper is folded about the filler-rod to form the cigarette-rod, and guides for turning the edges of the feeding-belt outward before the cigarette-rod passes through said channel, substantially as described.

9. The combination with means for folding a continuous wrapper and a feeding-belt about a filler-rod, means for applying paste to one edge of the wrapper before it is folded against the filler-rod, an adjustable pressing device for bearing against the wrapper-seam, a channel beyond the pressing device, and guides for turning the edges of the feeding-belt outward before the cigarette-rod passes through said channel, substantially as described.

10. The combination of a feeding-belt for advancing a continuous-cigarette wrapper and filler-rod, an interior tongue, means for applying paste to one edge of the wrapper, folding devices for folding the wrapper and feeding-belt over the filler and tongue and for pressing the overlapping edges of the wrapper against the tongue to form a flat pasted seam, a pressing device for bearing against the wrapper-seam, a channel beyond the pressing device, and guides for turning the edges of the feeding-belt outward before the cigarette-rod passes through said channel, substantially as described.

11. In a continuous-rod-cigarette machine, the combination of a carriage, means for reciprocating the carriage longitudinally of the line of movement of the cigarette-rod, a cutter carried by a lever pivotally mounted on the carriage, said lever, a cam for controlling the movement of said lever for reciprocating the cutter across the path of the cigarette-rod, a cam-engaging member adjustably secured to said lever, a compressor mounted on the carriage and acting to press the cigarette into form, and connections for actuating the compressor from said lever including a yielding member, substantially as described.

12. In a continuous-rod-cigarette machine, the combination of a carriage, means for reciprocating the carriage longitudinally of the line of movement of the cigarette-rod, a cutter carried by a lever pivotally mounted on the carriage, said lever, a cam for controlling the movement of said lever for reciprocating the cutter across the path of the cigarette-rod, a cam-engaging member adjustably secured to said lever, a compressor mounted on the carriage and acting to press the cigarette into form, and adjustable connections for actuating the compressor from said lever including a yielding member, substantially as described.

13. In a continuous-rod-cigarette machine, the combination of a carriage, means for reciprocating the carriage longitudinally of the line of movement of the cigarette-rod, a cutter mounted on the carriage, means for reciprocating the cutter across the path of the cigarette-rod, a compressor mounted on the carriage and acting to press the cigarette into form, and adjustable connections for actuating the compressor from the cutter-reciprocating means including a yielding member, substantially as described.

14. In a continuous-rod-cigarette machine, the combination of a carriage, means for reciprocating the carriage longitudinally of the line of movement of the cigarette-rod, a cutter

mounted on the carriage, means for reciprocating the cutter across the path of the cigarette-rod, a compressor mounted on the carriage and having a reciprocating member for pressing the cigarette into form, connections for actuating said reciprocating member from the cutter-reciprocating means including a yielding member, and means bearing on said reciprocating member for taking up lost motion, substantially as described.

15. A cigarette-machine having a compressor for pressing the cigarettes into elliptical form formed of coacting die-plates having half-elliptical grooves with rounded edges for creasing the side edges of the cigarettes, substantially as described.

16. A compressor for pressing cigarettes into elliptical form formed of coacting die-plates having half-elliptical grooves with rounded edges for creasing the side edges of the cigarettes, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PETER A. LAWLESS.

Witnesses:
J. A. GRAVES,
G. T. YANCEY.