(No Model.)

4 Sheets—Sheet 1.

P. EVERITT.

CIGARETTE MACHINE.

No. 274,746. Patented Mar. 27, 1883.

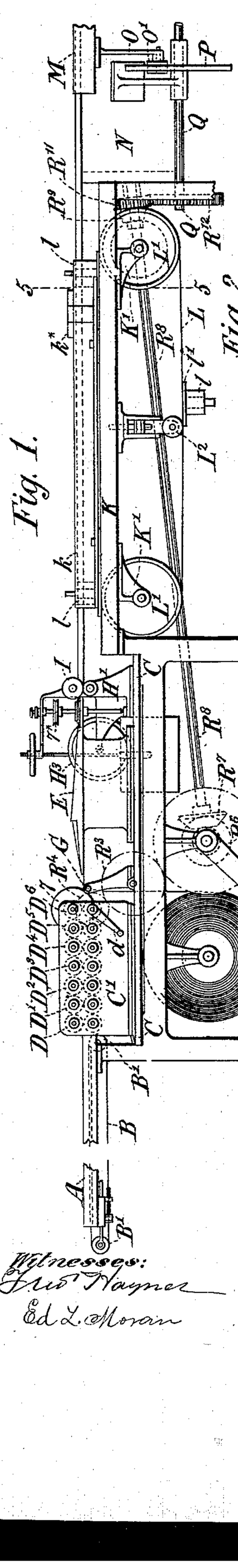

Fig. 1.

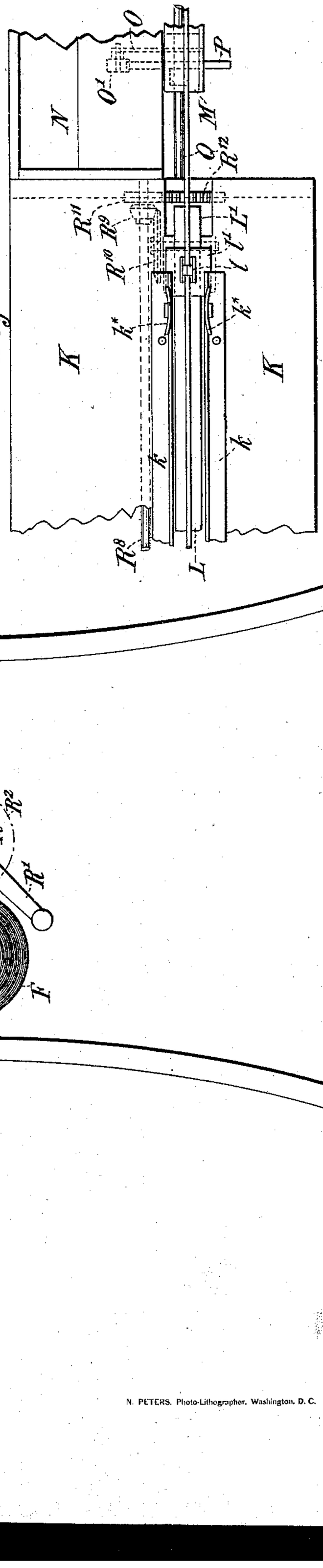

Fig. 2.

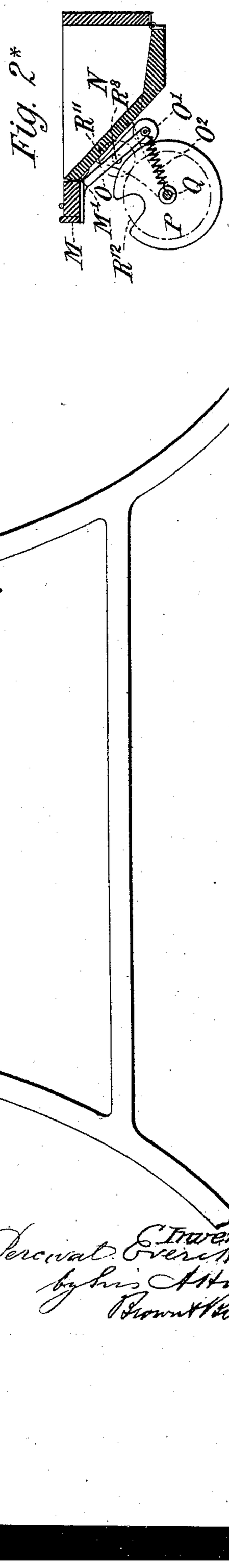

Fig. 2*.

Witnesses:
Fred Haynes
Ed L. Morain

Inventor:
Percival Everitt
by his Attorneys
Brown & Brown

(No Model.) 4 Sheets—Sheet 2.

P. EVERITT.

CIGARETTE MACHINE.

No. 274,746. Patented Mar. 27, 1883.

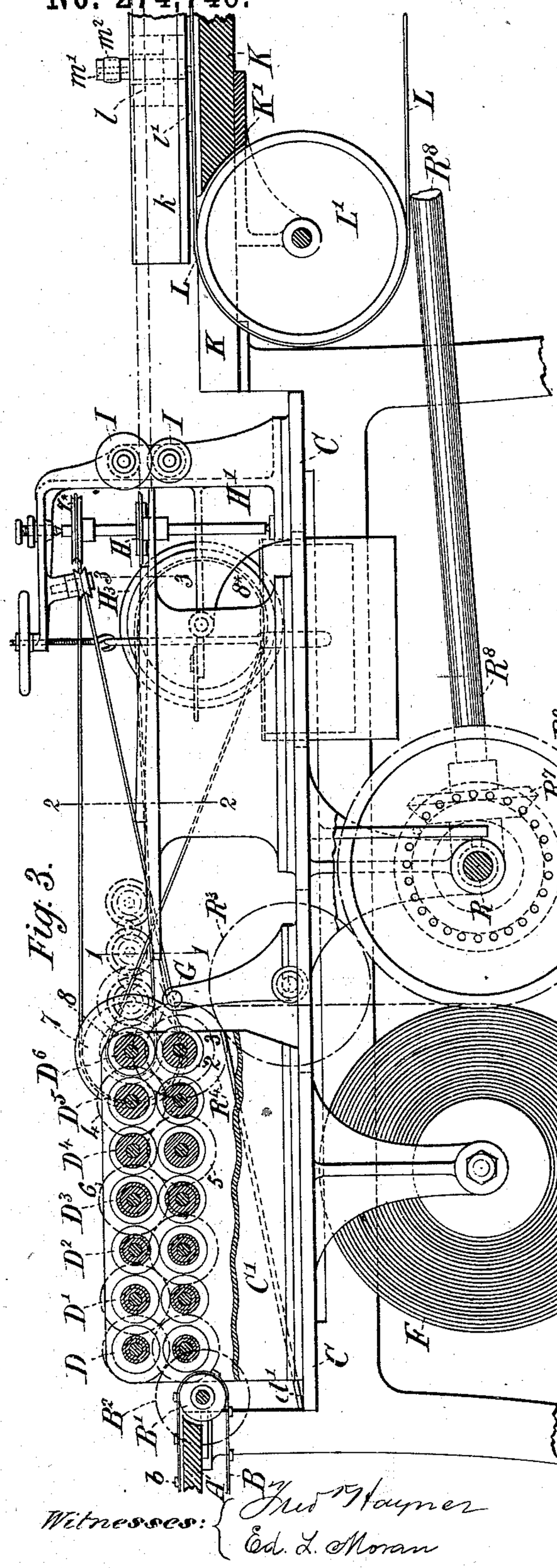

Fig. 3.

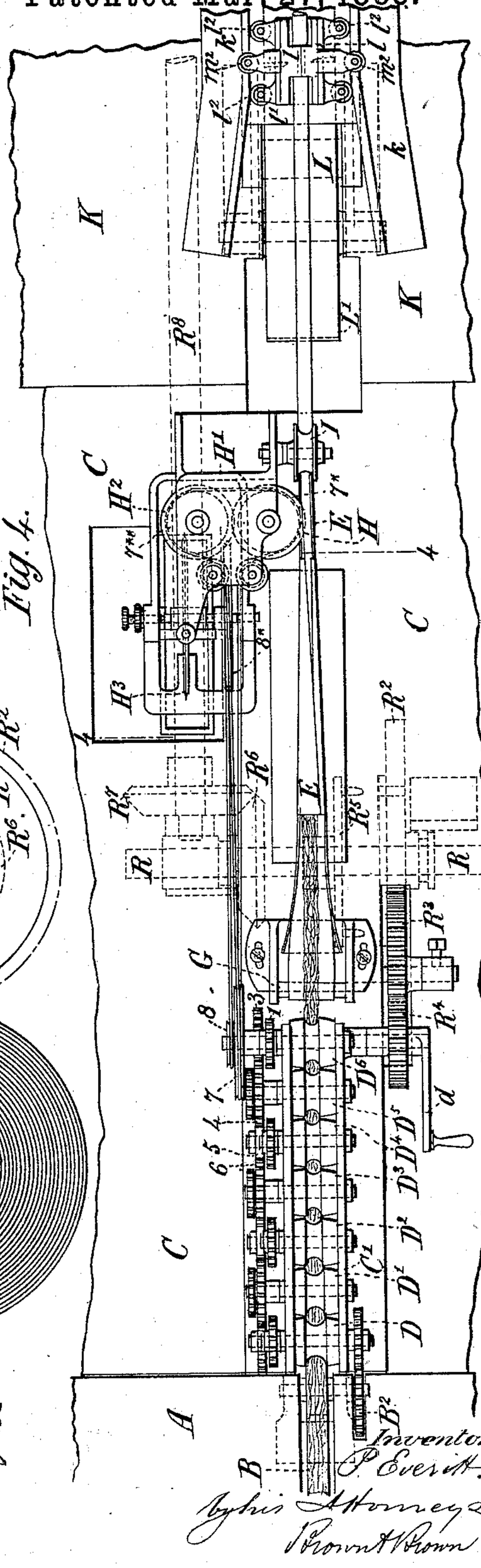

Fig. 4.

Witnesses:
Fred Haynes
Ed. L. Moran

Inventor:
P. Everitt.
By his Attorneys
Brown & Brown

(No Model.) 4 Sheets—Sheet 3.

P. EVERITT.

CIGARETTE MACHINE.

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Fig. 5.

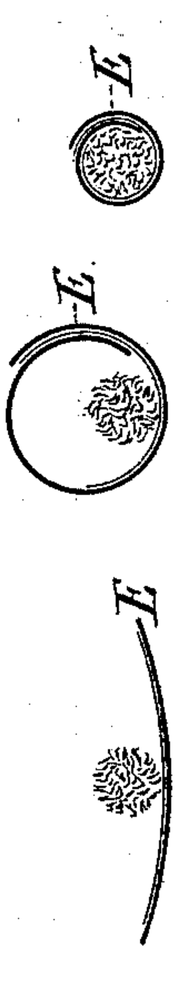


Fig. 7.

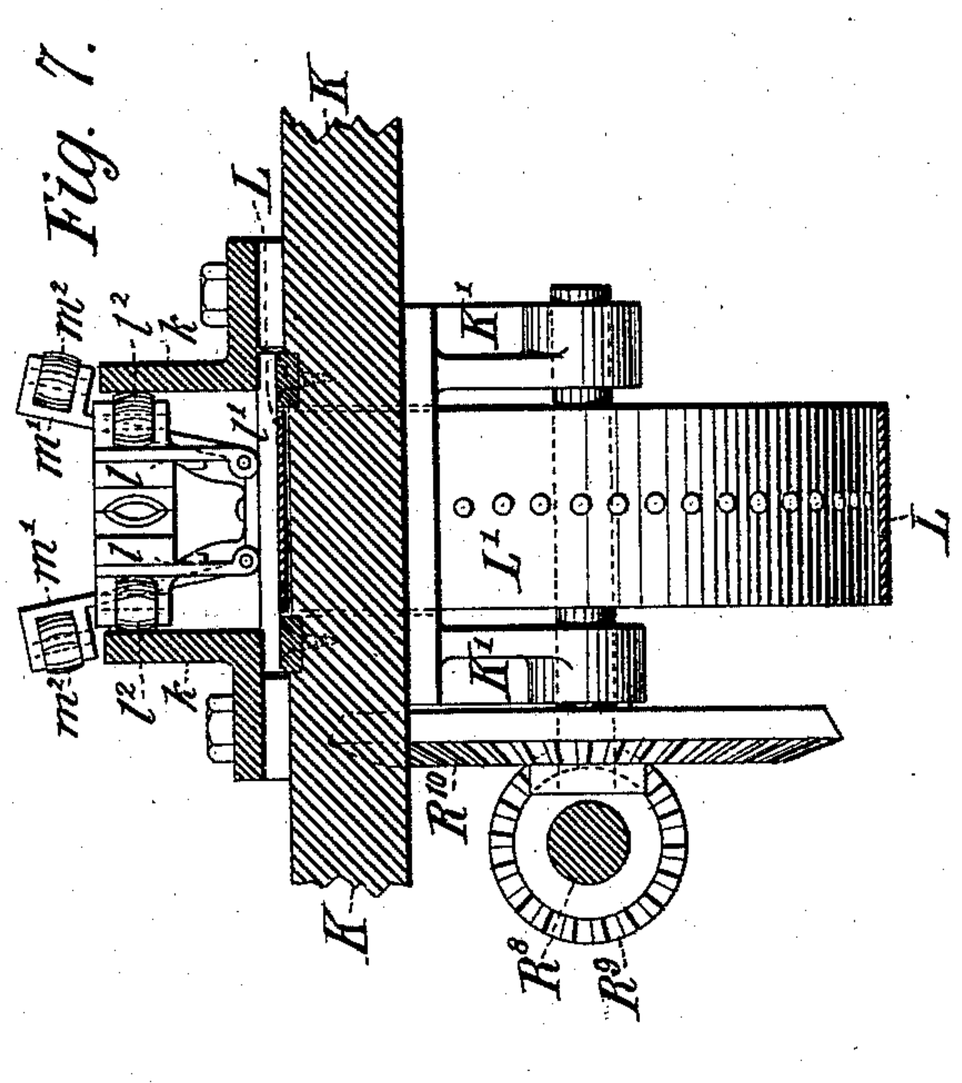
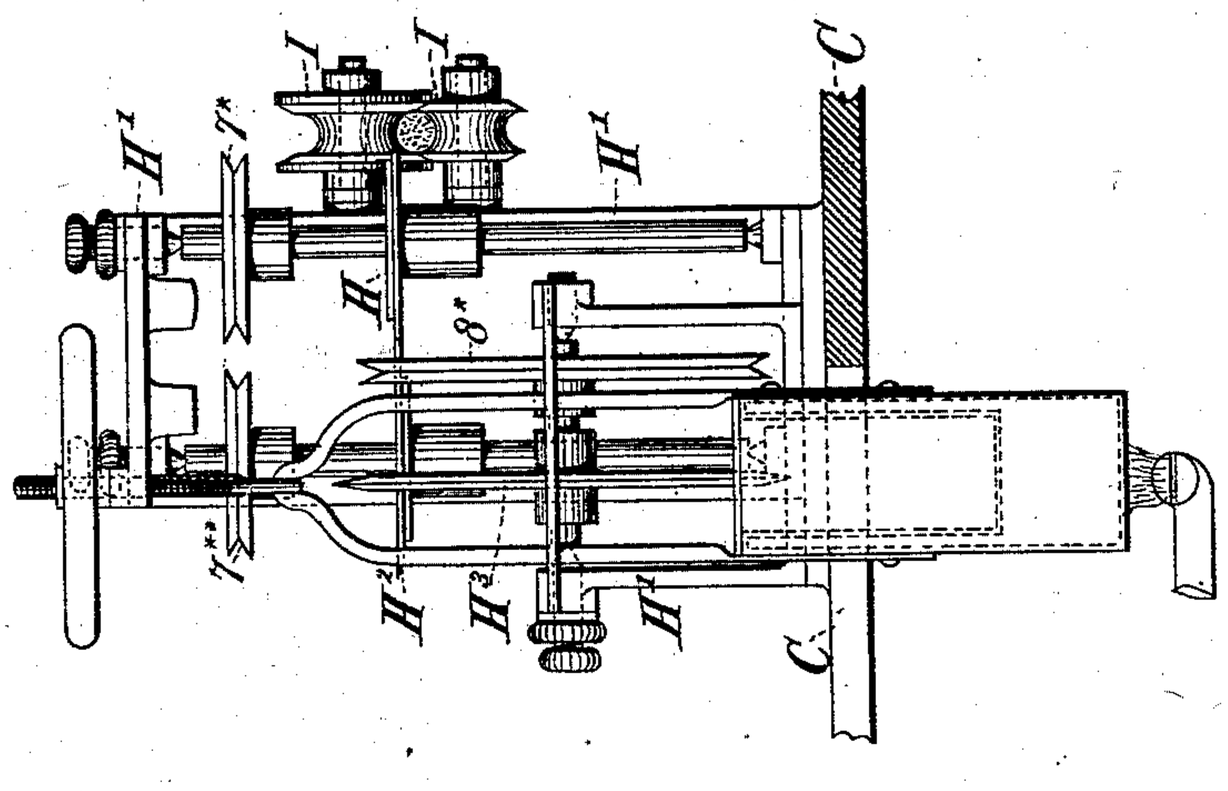


Fig. 6.



Witnesses:
Geo. T. Haynes
Ed. L. Moran

Inventor:
Percival Everitt
by his Attorneys
Brown & Brown

(No Model.)

4 Sheets—Sheet 4.

P. EVERITT.

CIGARETTE MACHINE.

No. 274,746. Patented Mar. 27, 1883.

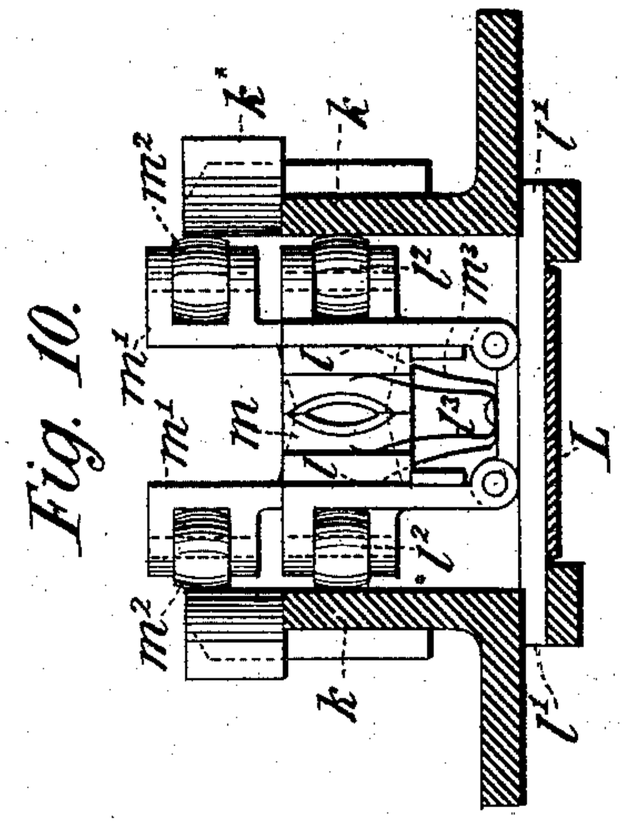


Fig. 10.

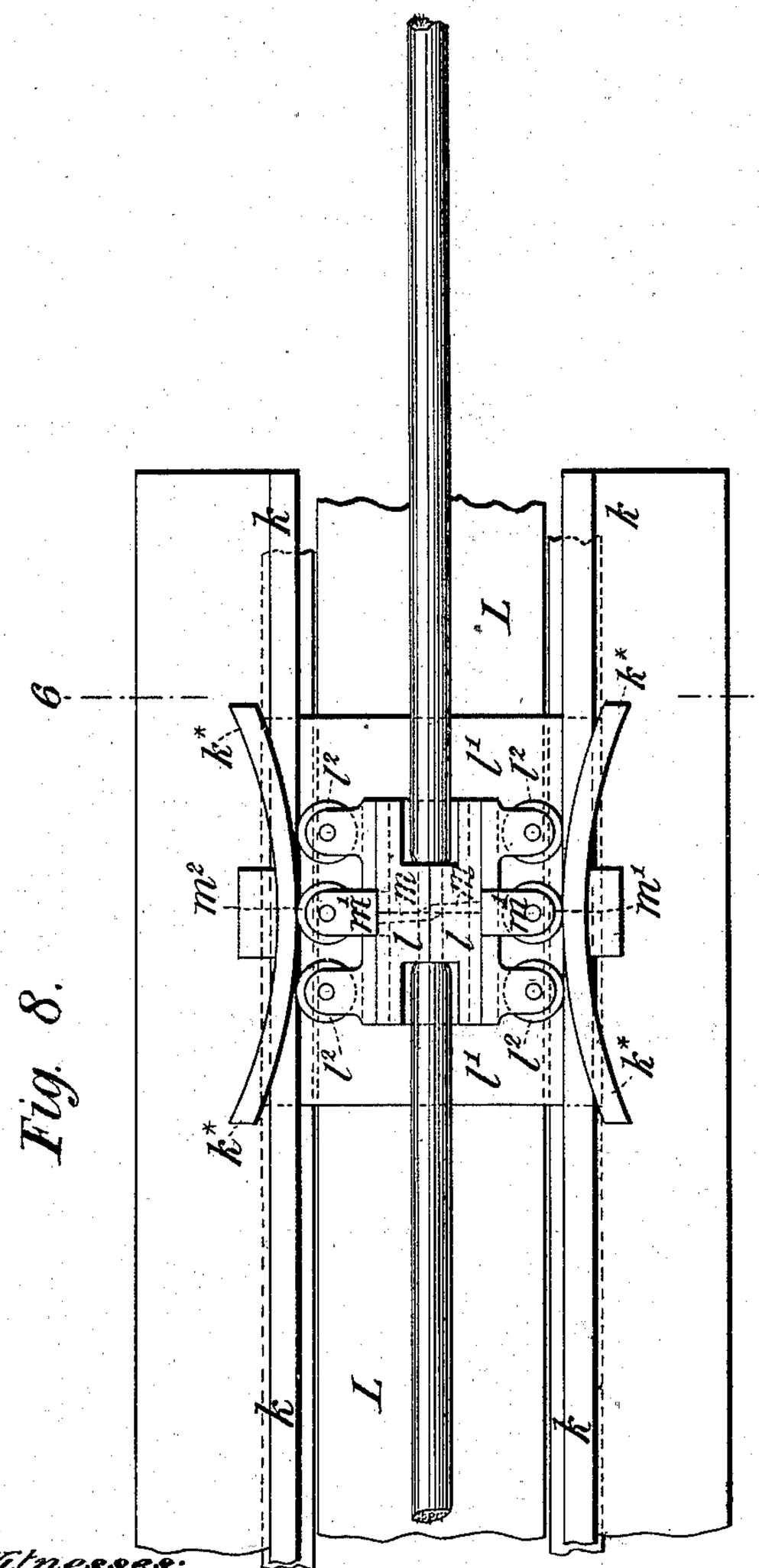


Fig. 8.

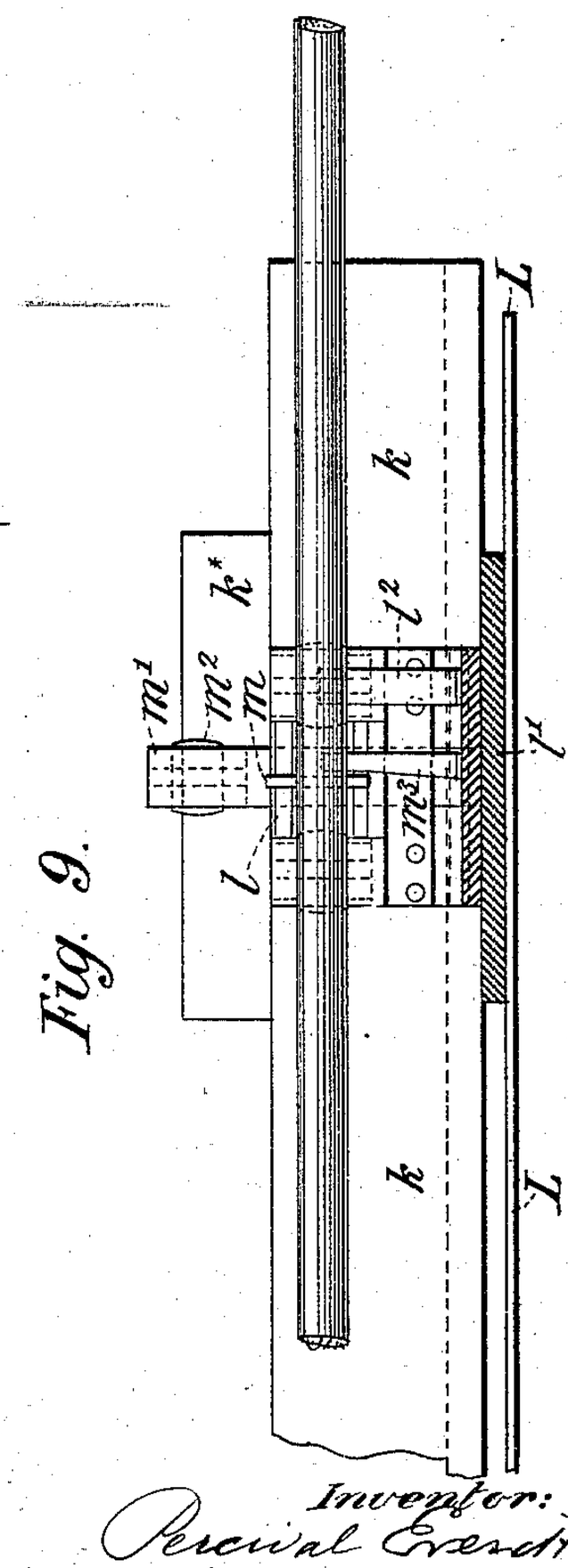


Fig. 9.

Witnesses:
Jno. T. Wagner
Edd. L. Moran

Inventor:
Percival Everitt
by his Attorneys
Brown & Brown

UNITED STATES PATENT OFFICE.

PERCIVAL EVERITT, OF LONDON, ENGLAND.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 274,746, dated March 27, 1883.

Application filed December 21, 1882. (No model.) Patented in England April 6, 1882, No. 1,672.

To all whom it may concern:

Be it known that I, PERCIVAL EVERITT, of Queen Victoria Street, in the city of London, England, have invented certain Improved Machinery for Manufacturing Cigarettes, of which the following is a specification.

The object of this invention is to provide a simple and efficient arrangement of mechanism for manufacturing cigarettes, suitable for use not merely by large manufacturers, but also by retailers of tobacco. To this end, in place of molds and dies, as heretofore employed for bringing the tobacco to shape in a compressed state, the tobacco is fed by means of an endless band to the first pair of a series of grooved compressing-rollers. The tobacco, as it is forced into the grip of this first pair of rollers, is condensed into, say, a cylindrical form. It then passes to a second pair of grooved rollers, the grooves of which are of reduced gage, and so on throughout the series of compressing-rollers, which deliver it onto a narrow web of paper led up from a supply-bobbin. This paper is led into and drawn through a tapering tube or "former" open from end to end, and as it carries with it the compressed tobacco, now in a cylindrical form, the taper tube will lap the paper around the tobacco, leaving, however, one edge of the paper to stand out through the longitudinal opening in the taper tube. Near the contracted end of the tube or former a gumming-wheel is provided, which, rolling in contact with the inner face of the overlapping edge of the paper as it passes forward, imparts a line of gum thereto. The gummed edge is then pressed down by passing the compressed tobacco inclosed in the paper wrapper into the nip of a pair of grooved rollers situated immediately in front of the open tube. To insure the travel of the tobacco with its wrapper through the taper tube, a series of clips is provided for seizing upon it and drawing it forward out of the machine. These clips carry cutters for severing the continuous cigarette, and they are mounted on a traveling band, and caused in succession to grip the new-formed cigarette as it leaves the rollers and release the severed portions as they are severally advanced to a tipping table, which delivers them into a suitable receptacle.

In Sheet I of the accompanying drawings, Figure 1 shows my improved machine in side elevation. Fig. 2 is a plan view of the delivery end of the same; and Fig. 2* is an elevation of the delivery end of the machine, the receiving-box and the tipping table which guides the severed cigarettes thereto being represented in section. In Sheet II, Fig. 3 shows in side elevation, partly in section, on an enlarged scale, the middle part of the machine; and Fig. 4 is a plan view of the same. In Sheet III, Fig. 5 shows sections of the taper tube or envelope former which laps the paper around the compressed tobacco, the sections being taken in the lines 1 1, 2 2, 3 3 of Fig. 3, looking toward the right hand. Fig. 6 is a cross-section taken in the line 4 4 of Fig. 4, and showing in side elevation the arrangement of gumming apparatus employed. Fig. 7 is a cross-section taken at the line 5 5 of Fig. 1, and showing the construction of the clip and the means for actuating it. In Sheet IV, Fig. 8 is a partial plan view of the cutting-table. Fig. 9 is a longitudinal central section of the same, and Fig. 10 is a partial cross-section taken in the line 6 6 of Fig. 8.

Referring now to Sheet I, A is the feeding-table, in which a groove is made from end to end thereof to receive the previously-prepared tobacco, which is to be converted into cigarettes. This groove is fitted with a feeding-band, B, which passes around band-pulleys B′, mounted in brackets at opposite ends of the table A. C is a bed-plate set in line with feeding-table A, but on a somewhat lower level, the object of which will be presently understood. Bolted to this bed-plate are two cast-metal frames, C′, fitted with bearings to receive the axles of a series of pairs of compressing-rollers, D D′ D^2 D^3 D^4 D^5 D^6. These rollers are formed with semicircular grooves, the grooves of the first pair, D, being somewhat larger than those of the second pair, D′, the grooves of the second pair being somewhat larger than those of the third pair, D^2, the grooves of the third pair being somewhat larger than those of the fourth pair, D^3, and the grooves of the remaining rollers being of corresponding diameter of the fourth pair. This arrangement, which is clearly illustrated in the partial sectional elevation, Fig. 3, insures the tobacco, which is presented to the com-

pressing-rollers by the traveling band B, being gradually compressed until it has passed the fourth pair of rollers, when the compression which it has received will be maintained by the remaining rollers until it is delivered to the web of covering-paper. The grooves of the first four pairs of compressing-rollers may be lined with india-rubber, if thought desirable, as illustrated at Fig. 3, to prevent the tobacco from slipping in the bite of the rollers; but this provision is not essential. By sinking the bed-plate C below the level of the feeding-table A the bite of the rollers D D′, &c., will be brought on a level with the groove in the feeding-table, and the rollers being set in line therewith, the tobacco will be delivered in a continuous stream to the bite of the compressing-rollers. The tobacco, when filled into the groove of the feeding-table, is pressed down by the attendant to give it some degree of cohesion, and to facilitate the feeding forward of the tobacco the band B is provided with cross strips or ribs *b*, set equidistant from each other, as shown in Fig. 3. In a line with the series of compressing-rollers a tubular former, E, which is intended to lap the paper around the compressed tobacco, is situated, it being carried by a bracket on the bed-plate C. This envelope-former, which is shown in longitudinal section at Fig. 3, and in transverse sections at Fig. 5, is made tapering and with an overlapping lip, which provides a longitudinal opening in the former from end to end thereof. The proportions of this tubular former, it will be understood, are such as to facilitate the entrance of the strip of paper which is to constitute the cigarette-envelope, and to insure a free passage for both the compressed tobacco and its envelope to the gumming apparatus. At the same time this former is required to lap the paper around the compressed tobacco, and to present the overlapping edge of the paper to the gumming apparatus as the paper travels through the machine. The front end of the tubular former is bent downward, that it may offer no obstruction to the passage of the strip through it (the former.) This paper is drawn from a reel or bobbin, F, mounted in brackets below the bed-plate C, and is passed up through a slot formed in the bed-plate for that purpose. The paper is then led over a guide-bar, G, which is carried by an adjustable frame so arranged as to hold the guide-bar on the skew, and thus give the paper a tendency to take the right course through the former. The adoption of this contrivance is important, as without its use it is difficult to insure the paper taking an equal tension or strain at its opposite edges, and without the equalizing of this strain over the breadth of the paper the tearing of the paper would occur, and defective work would be produced. As the paper passes with the overlying rod of compressed tobacco into the tubular former, the paper will be caused to lap around the rod, its edges being bent upward and over as the paper and tobacco are drawn forward through the former, thereby completely enveloping the tobacco in a continuous paper wrapper. In some cases I may find it desirable to introduce between the former E and the last of the compressing-rollers a series of guide-rollers, as shown by dots in Fig. 3, which rollers will serve to prevent the compressed rod from rising by its own elasticity, and thereby causing the production of bad work. These rollers should, like the compressing-rollers, be driven, the gearing for which is indicated in Fig. 3. The forward motion of the inclosed tobacco is obtained, as has been already stated, from traveling clips, the construction of which will be presently described.

By referring to the sectional views, Fig. 5, which are drawn to a larger scale than Fig. 3, it will be seen how the lapping of the paper around the compressed rod of tobacco is carried on. When the lap is completed the upper and overlying edge of the paper comes into contact with a gumming-wheel, H, carried by a vertical spindle, which is free to rotate on centers carried by a bracket, H′, bolted to the bed-plate C. This wheel H (see the sectional view, Fig. 6) is chamfered on its upper face, and running in contact with this chamfered portion is a second wheel, H^2, on a vertical spindle mounted on centers carried by the bracket H′. This wheel overlaps the wheel H, and is chamfered to correspond therewith, its object being to impart a liquid cement or gum to the gumming-wheel H. The liquid gum or cement it receives from a wheel, H^3, carried by a horizontal spindle mounted on centers on the bracket H′. This wheel H^3, which underlies the wheel H^2, runs in a gum-pot attached to the bracket H′. The gum-pot is made adjustable, to enable it to be raised as the gum is used, and thereby keep the wheel H^3 in contact with the supply of gum. Rotary motion is imparted to the three gumming-wheels in the manner to be hereinafter described.

I I show a pair of grooved pressing-rollers, mounted on studs projecting from the side of the bracket H′, and between these rollers the covered rod of tobacco passes to permit of the gummed edge being pressed down into its place. This completes the formation of the cigarette, and it now only remains to bring it under the action of a cutter, which will sever it into lengths.

K is the cutting-table, on which is mounted an endless metal band, L, for carrying a series of clips, by which a traverse motion is imparted to the covered cigarette. The band passes over a pair of pulleys, L′ L′, mounted in brackets K′, attached to the table K. A third pulley, L^2, below the table, serves to put the requisite tension on the band and prevent it from slipping, it being aided by pins on the pulley L′, which enter a line of pin-holes formed in the metal band L. Slots are cut in the table to allow of the pulleys L′ projecting upward and guiding the band from and to the tension-pulley. The clips (see the sectional view, Fig. 7) consist each of a pair of jaws, *l l*,

hinged to a plate, l', which is riveted to the band L. The parts of these jaws which are in line with the cigarette are hollowed out slightly and coated with soft leather or equivalent material. The plates l' travel along guides made for them on the table K. These guides are formed of strips of angle-iron, k, which are blocked up to provide a space for the ends of the plates l' to slide in, and are held firmly down on the table K. The vertical portions of the strips act as elongated cams to hold the jaws of the clips in action. For this purpose the hinged pieces l are each provided with a bowl, l^2, which bears against the strips k under the pressure of a U-shaped spring, l^3, riveted to the plate l', and to facilitate the traverse of the clips the rear ends of these strips or those nearest the rollers I are bent outward, so as to widen the space between them at the part where the clips enter in their horizontal traverse. It will now be understood that so soon as a covered portion of tobacco is advanced into the space between the strips k, which, at the starting of the machine, must be done by hand, the clips, as they rise into position, will seize the cigarette and draw it forward until they reach the end of the guides k, when they will severally drop out of action, a following clip having meanwhile taken hold of the cigarette and traveled forward with it. In this way a continuous length of cigarette is formed, the feeding of the tobacco being kept up by the attendant, and the action of the several parts of the mechanism above described being maintained by means of gearing, as will be hereinafter described.

When it is desired to sever the continuous length of cigarette into short lengths in the machine, I provide the cutting apparatus, which I will now proceed to describe.

Each clip I provide (see Figs. 8, 9, and 10) with a pair of shearing-blades or cutting-edges, and these cutters I operate by vertical extensions of the guides, which close the jaws of the clips. The hinged jaws l are slotted vertically at the middle of their length to allow of a pair of shearing-blades or cutters, m m, working freely through them for the purpose of severing the cigarette at the part gripped by the jaws. These cutters are carried by a pair of levers, m' m', which are recessed into the back of the jaws, and have the hinge-pin of the clip for their fulcrum. The levers extend upward above the clip, and are provided with bowls m^2, for the purpose of meeting extensions k^* of the guides k, which, acting as cams, will press the levers together, and thus cause their cutters to shear off a length of cigarette. When by the travel of the clip-band these levers have passed over the extension-pieces k^* of the guides, they are thrust apart by means of a U-shaped spring, m^3, inserted between them, and the cutters are thereby withdrawn from contact with the cigarette. The grip on the severed portion of the cigarette is, however, still maintained for the purpose of enabling it to advance the severed portion and push it onto a table, which is arranged so as to tip up and cause the severed portion of the cigarette to roll into a receiver.

M, Figs. 1, 2, and 2*, Sheet I, is a tipping table having its fulcrum at M', and lying in front of a receiver, N. Attached to the under side of this table is an arm, O, carrying a bowl, O', which bears on the periphery of a cam, P, mounted on a horizontal shaft, Q, to which a continuous rotary motion is imparted by gearing, as will be hereinafter explained. The cam P is so cut that it will maintain the table M in a horizontal position until the severed cigarette is placed fairly upon it, and it will then, by withdrawing its support from the arm O, allow the table to tip and discharge the cigarette into the receiver N. A space is left between this table and the clipping table to allow of the severed cigarette being followed up by the continuous length of cigarette, and being thereby thrust into the required position which it is to take on the tipping table before its discharge therefrom is effected. To insure the proper action of the tipping table, a coiled spring, O^2, is employed for holding down the bowl of the arm O in contact with the rotating cam P.

I will now explain the means whereby motion is imparted to the several parts of the machine, which serve to feed in the tobacco, compress it to a rod, cover it with paper, gum the paper, close the joint of the covering, draw forward the formed cigarette, and deliver it, when severed, into the receptacle N.

R is a transverse shaft, underlying the bed-plate C, and carried in bearings fitted in the bed-plate casting. This shaft is rotated by means of a crank-handle, R', and transmits motion to the several parts of the mechanism which perform the operations just indicated. Mounted loosely on this shaft is a spur-wheel, R^2, which gears into an intermediate wheel, R^3, and through it drives a pinion, R^4, on the axle of the lower roller of the foremost pair, D^6, of the compressing-rollers. This roller is geared with its upper roller by pinions 1 and 2 of equal pitch, and on the axle of the lower roller is a pinion, 3. This pinion drives a pinion, 4, on the axle of the top roller of the next adjacent pair, D^5. On the axle of this same roller is a second pinion for driving the lower roller. The pinion 4 gears also with a pinion, 5, on the axle of the next lower roller of the pair, D^4, and these rollers are alike geared together. The next pair of rollers, D^3, tracing the course rearward, is driven by the pinion 5 taking into a pinion, 6, on the axle of the top roller, these rollers being geared together, as in the other examples. In this way all the rollers of the series are driven, a pinion on the lower axle gearing with a pinion on the upper-roller axle of the next adjacent pair, and vice versa, throughout the series.

Coming now to the first pair of compressing-rollers, D, a pinion on the axle of the upper roller of this pair gears with a spur-wheel, B^2, on the axle of the foremost of the band-pulleys

B′. Thus rotary motion for traveling the feeding-band is derived from the shaft R and transmitted through the gearing of the compressing-rollers. I have said that the spur-wheel R^2 is loose on the shaft R. This is to facilitate the disengagement of one part of the mechanism from the other, and thus permit of one part being driven while the other remains stationary. To provide for the rotation of the compressing-rollers when the wheel R^2 is thrown out of action, a winch-handle, *d*, is fitted to the axle of the lower roller, D^6. In the side of the wheel R^2 a ring of holes is formed to receive the pins of a clutch, R^5, which is keyed to the shaft R. When, therefore, these clutch-pins engage with the holes in the side of the wheel it will be locked to its shaft R; but when that shaft is shifted endwise in its bearings the spur-wheel will be disengaged, and the rotation of the shaft will therefore not affect it or the gearing with which it is connected. To prevent this spur-wheel moving laterally when its shaft is moved longitudinally, an annular groove is cut in the boss of the wheel, and a fixed pin, projecting from a bracket-piece screwed to the under side of the bed-plate, enters this annular groove, and thus prevents the lateral shifting of the wheel.

Fitted to a feather on the shaft R is a bevel-wheel, R^6, which is held in position in a similar manner to the spur-wheel R^2. This bevel-wheel gears into a bevel-wheel, R^7, keyed to a longitudinal shaft, R^8, which turns in bearings provided for it at the under side of the bed-plate C and of the cutting-table K. Keyed to this shaft, near its forward end, is a bevel-pinion, R^9, which gears into a bevel-wheel, R^{10}, on the axle of the forward band-pulley, L′, of the clip-band L. By driving this band through the forward pulley the clips are moved forward between their guides by a direct horizontal pull, and at the same time, taking a firm hold of the covered tobacco, they will draw it forward between the rollers I I, which rotate by friction of contact with the traveling envelope, and thereby secure its gummed edge, as already explained. The motion for driving the gumming apparatus is taken from the axle of the upper compressing-roller, D^6, on which two band-pulleys, 7 8, are keyed, a gut band from the pulley 7 passing over a pulley, 7*, on the spindle of the gumming-wheel H, and also over a pulley, 7**, on the spindle of the gum-transmitting wheel H^2. From the pulley 8 a crossed gut band passes to a pulley, 8*, on the spindle of the wheel H^3, which rotates in the gum-pot, and, as it rotates, lays gum on the under side of the wheel H^2, which gum is then transferred to the chamferred portion of the wheel H, ready to be imparted to the paper envelope as its raised or lapping edge is drawn over the wheel H. To prevent the undue supply of gum, a scraper is provided, which regulates the amount carried up by the wheel H^3.

To maintain the fluidity of the gum, it may be convenient to fit the gum-pot in a kettle, and to maintain the heat of the water in the kettle by a gas-jet. This arrangement is shown at Figs. 3 and 6. Underlying the series of compressing-rollers D is an inclined plate, *d*′, for receiving any fine particles of tobacco that may drop, during the passage of the tobacco, through the series of compressing-rollers. This plate inclines toward the front edge of the bed-plate C, and thus serves to collect the tobacco as it falls and deliver it into a receptacle below.

A spur-pinion, R^{11}, on the shaft R^3, gears into a spur-wheel, R^{12}, keyed on the shaft Q, and through this gearing rotary motion is imparted to the cam P, which controls the action of the tipping table.

Having now explained the nature of my invention, I wish it to be understood that I claim—

1. In a cigarette-machine in which an open taper tube is used for lapping a web of paper around the tobacco, a series of compressing-rollers for converting the loose tobacco into a rod and delivering it to the paper by which it is to be covered.

2. In combination with a series of compressing-rollers and a tubular former, an adjustable guide-bar for equalizing the tension put upon the paper as it is drawn into and through the tubular former.

3. In a cigarette-machine in which a tubular former is used for wrapping a web of paper around the tobacco, a traveling endless band and a series of clips mounted thereon for the purpose of gripping and carrying the formed cigarette, and means for opening and closing the said clips, substantially as herein described.

4. In combination with the hinged traveling clips *l*, the shearing cutters *m*, carried by rock-levers, and actuated by means of cam-guides, as described.

5. The combination of a grooved feeding-table, furnished with a traveling band, a series of grooved compressing-rollers in line therewith, a tubular former, open from end to end, for receiving a web of paper from a bobbin and wrapping it around the compressed tobacco, a gumming apparatus and rollers for pressing down the cemented edge of the paper wrapper, a traveling band of clips for drawing forward the formed cigarette, a cutting apparatus for severing into lengths the cigarette presented to it, and a tipping table for discharging the severed lengths into a receptacle, the moving parts of the mechanism being actuated from a transverse shaft capable of sliding endwise in its bearings to disconnect one part of the apparatus from the other.

PERCIVAL EVERITT.

Witnesses:
JOHN DEAN,
J. WATT,
Both of 17 *Gracechurch Street, London.*