

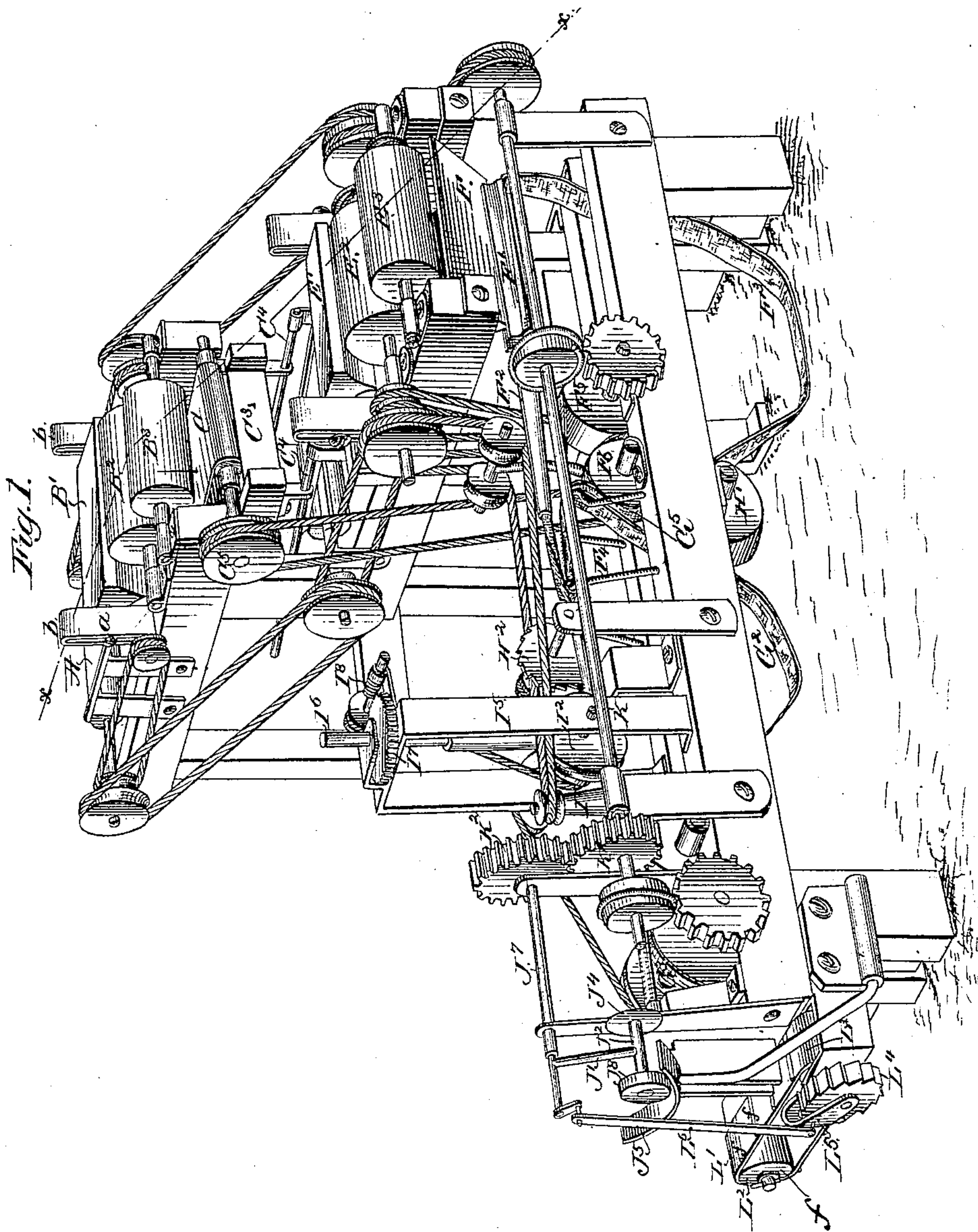
(Model.)

5 Sheets—Sheet 1.

J. A. BONSAK.
Cigarette Machine.

No. 238,640.

Patented March 8, 1881.



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BY *Allen M. C.*
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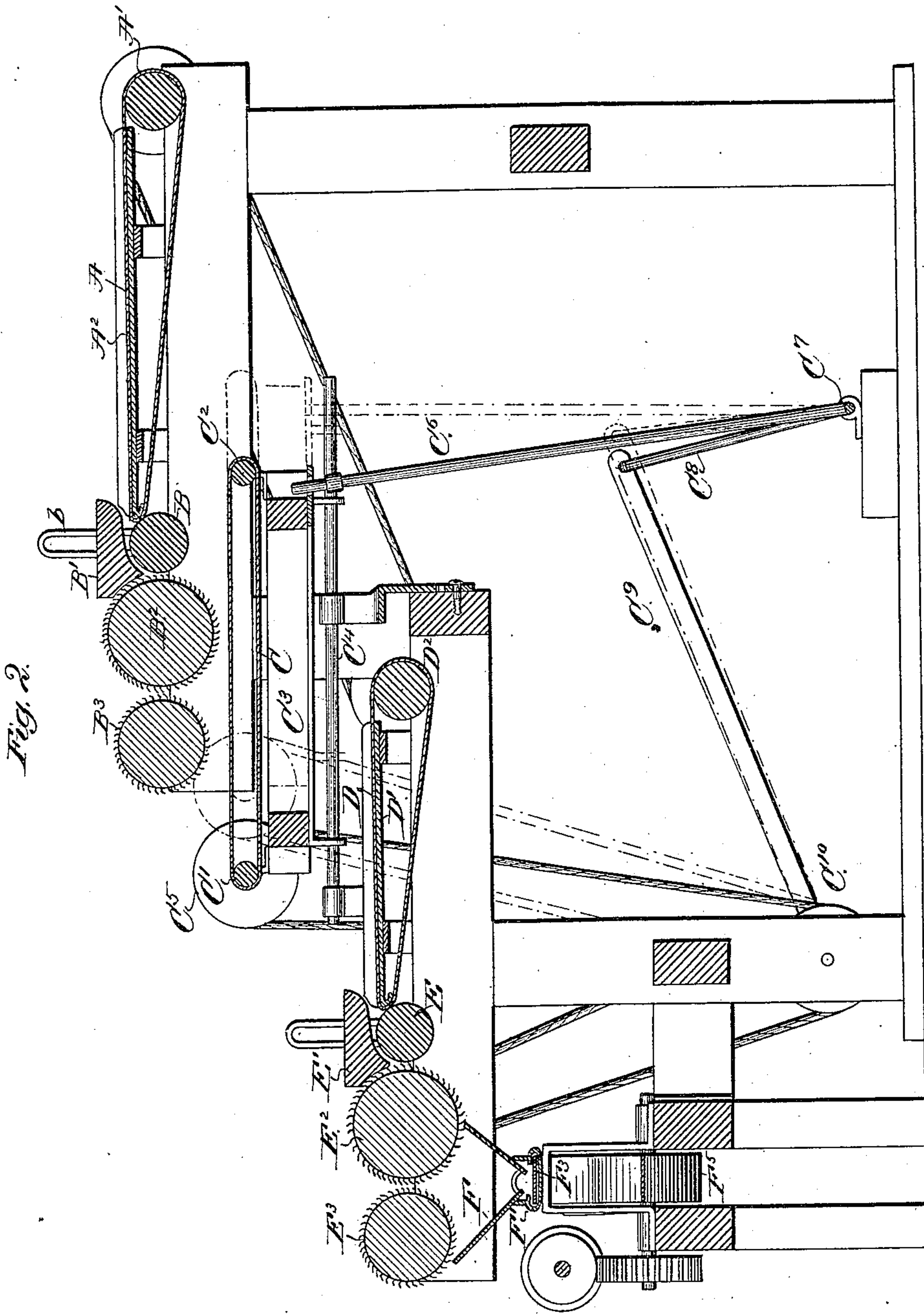
(Model.)

5 Sheets—Sheet 2.

J. A. BONSACK.
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Patented March 8, 1881.



Witnesses.

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(Model.)

5 Sheets—Sheet 3.

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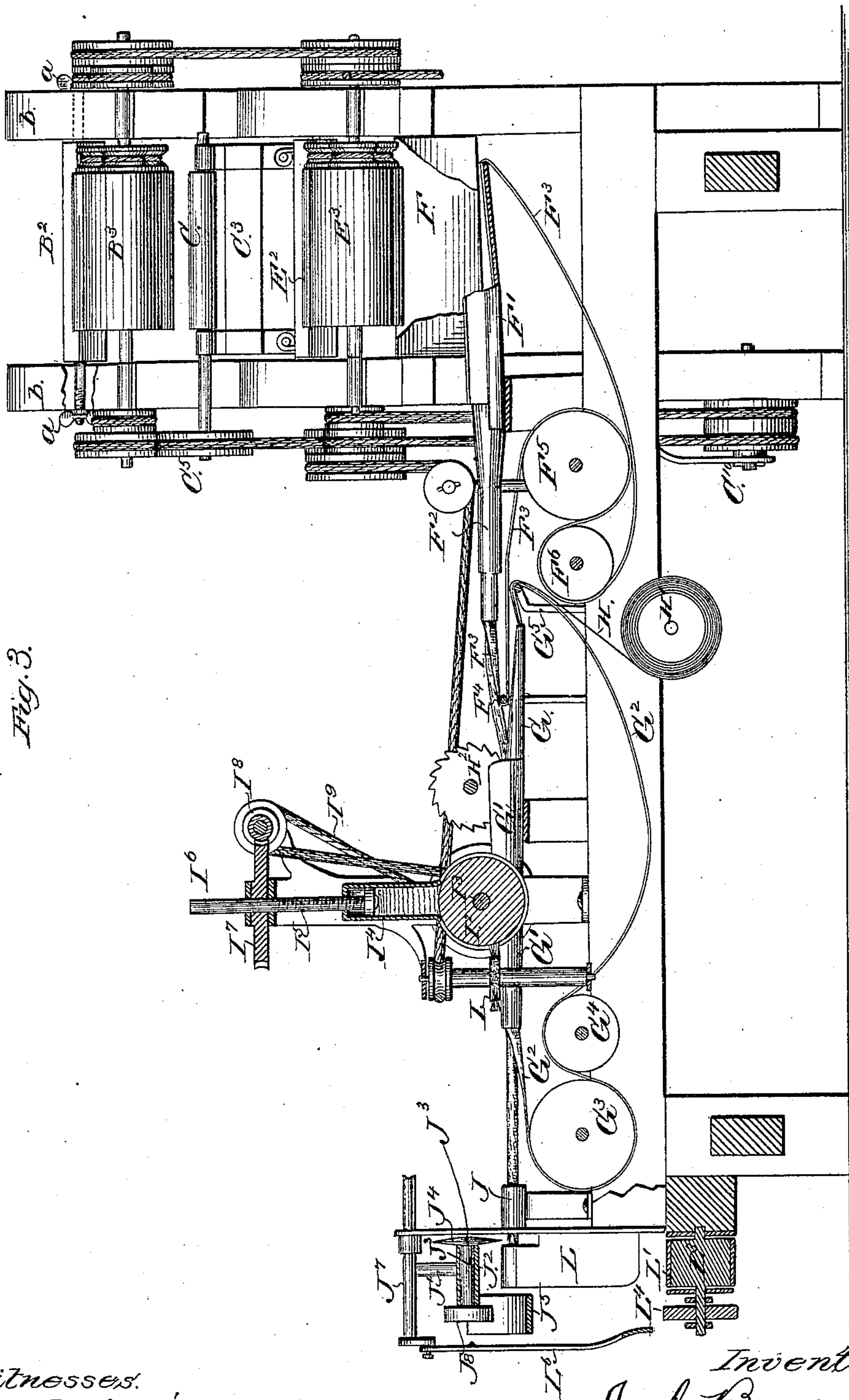


Fig. 3.

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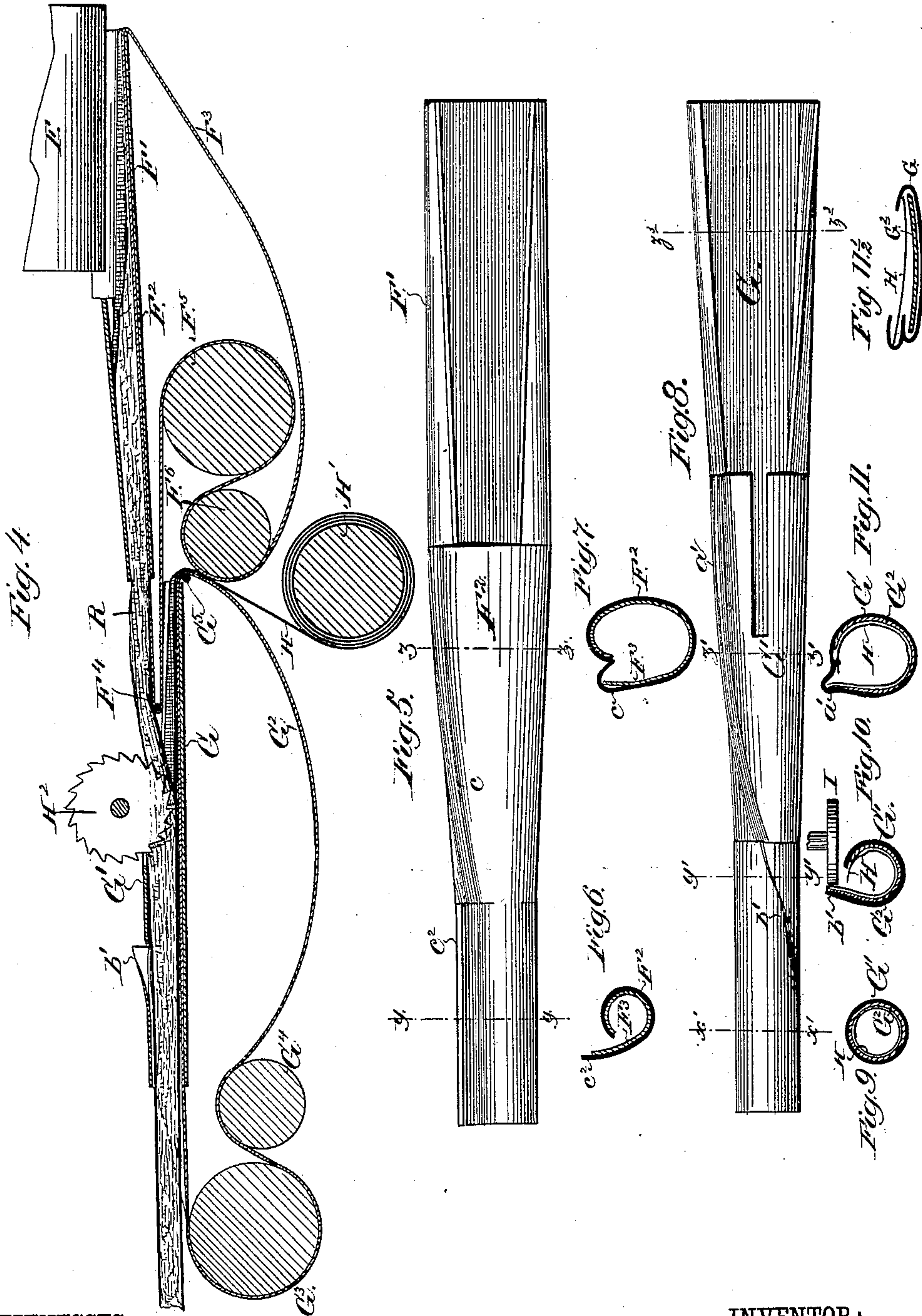
(Model.)

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J. A. BONSACK.
Cigarette Machine.

No. 238,640.

Patented March 8, 1881.



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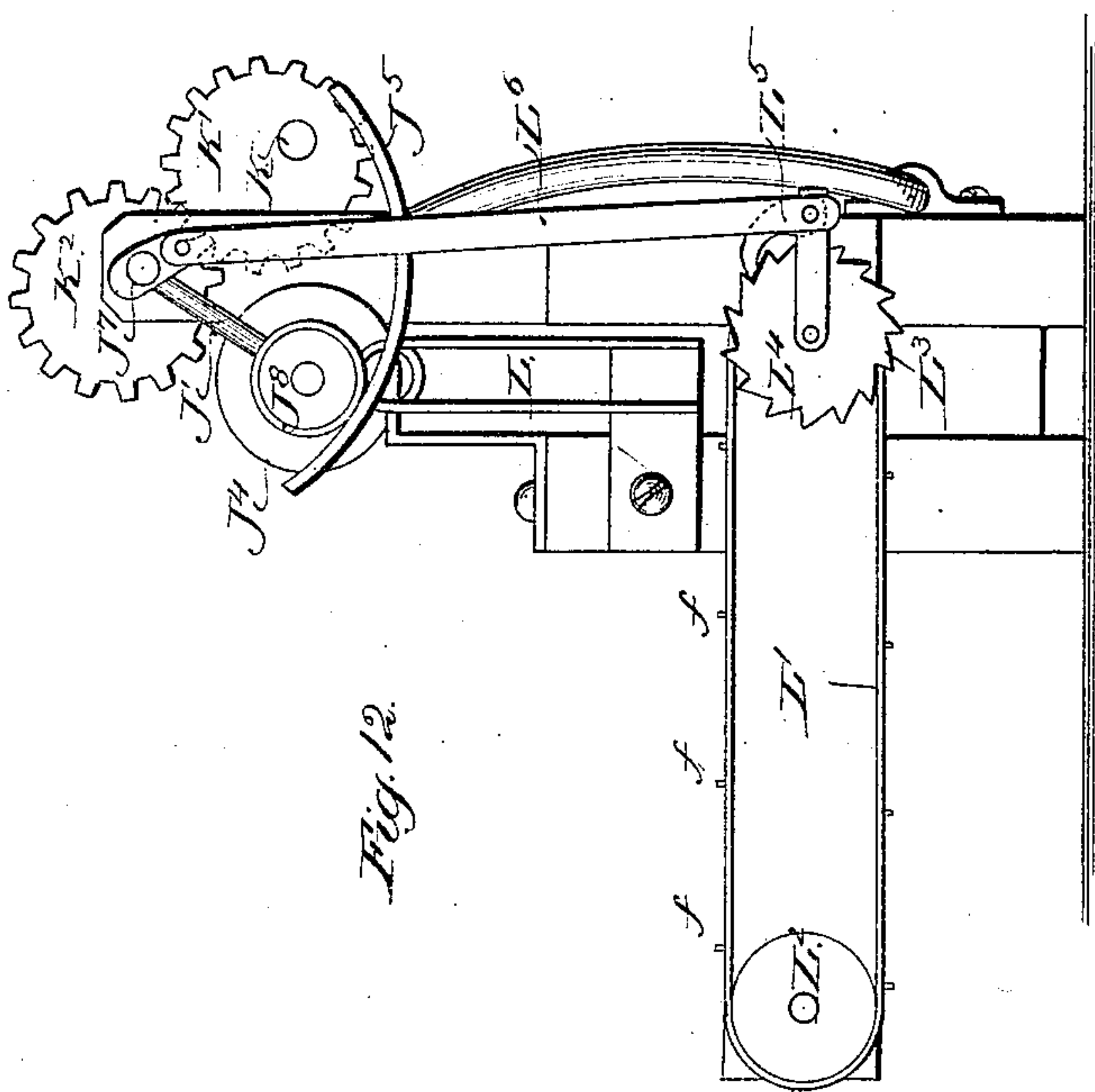
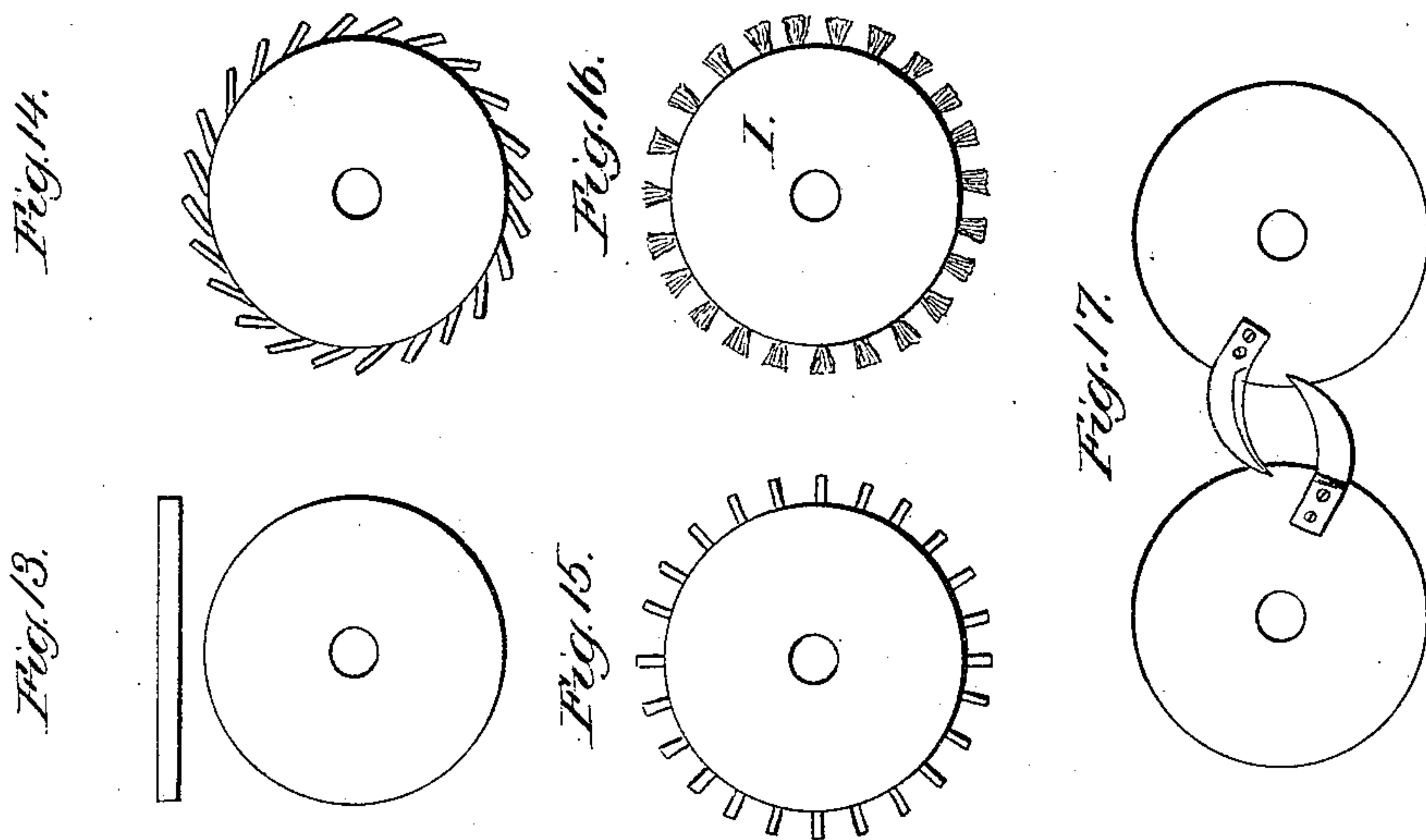
(Model.)

5 Sheets—Sheet 5.

J. A. BONSAK.
Cigarette Machine.

No. 238,640.

Patented March 8, 1881.



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UNITED STATES PATENT OFFICE.

JAMES A. BONSACK, OF BONSACK'S, VIRGINIA.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 238,640, dated March 8, 1881.

Application filed September 4, 1880. (Model.)

To all whom it may concern:

Be it known that I, JAMES A. BONSACK, of Bonsack's, in the county of Roanoke and State of Virginia, have invented a new and Improved Cigarette-Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a general perspective view of the whole machine. Fig. 2 is a vertical section through the line xx of Fig. 1. Fig. 3 is a front elevation of the cigarette-forming mechanism, partly in section, showing on the right an end elevation of the feeding and distributing mechanism. Fig. 4 is an enlarged detached sectional view of the cigarette-forming mechanism, showing its rolling and wrapping tubes and belts. Fig. 5 is a plan view of the rolling-tube. Figs. 6 and 7 are cross-sections of the same through the lines yy and zz . Fig. 8 is a plan view of the wrapping-tube. Figs. 9, 10, and 11 are cross-sections of the same through the lines $x'x'$, $y'y'$, and $z'z'$. Fig. 11½ is a cross-section through line z^3z^3 of Fig. 8. Fig. 12 is an end view of the cigarette-making section, showing the counting-belt and means for operating it. Fig. 13 is a plain wooden or rubber paste-wheel; Fig. 14, an inclined-tooth soft-rubber paste-wheel; Fig. 15, a straight-tooth soft-rubber paste-wheel; Fig. 16, a pasting-brush. Fig. 17 shows a modified form of knife for cutting off the cigarettes.

The object of my invention is to provide a machine which shall uniformly feed and distribute the tobacco upon a continuous paper ribbon, then form the same into a continuous roll, then paste the paper around it, and, finally, cut off the same into definite lengths, all in a series of consecutive operations. This general result has heretofore been attempted, but so far as I know with but little success.

My invention is designed to provide such a construction of machine as will successfully accomplish the above result, and I have produced such a machine, which, in practical operation, has exhibited a capacity of one hundred thousand cigarettes per day of ten hours.

The several general features of my invention consist, first, in the combination of devices for feeding the tobacco to a distributing

apparatus; secondly, in the means for carding the tobacco into a homogenous condition; thirdly, in a means for further distributing the tobacco as it is transferred from one belt to another, to which end a reciprocating carrier or spreader is employed; fourthly, in the peculiar means for rolling the tobacco into a filler and then wrapping and pasting the paper around it; fifthly, in devices for distributing and applying paste, operating, in connection with the wrapping-tube, to apply paste to the edge of the slip of paper to cause it to adhere around the roll of tobacco; and, sixthly, in a peculiar construction and arrangement of knife for cutting off the continuous roll into cigarettes of definite lengths, all as hereinafter more fully described.

For the sake of greater clearness I will commence to describe the machine at its feed end and follow it through in the normal direction of movement of the materials operated upon. I shall not describe any particular form of frame-work, as it is obvious that this must be made to conform to the construction and relation of the working parts, and may be varied without departing from my invention.

A, Figs. 1 and 2, is the first feed-belt, upon which the shredded tobacco is placed by hand or otherwise. This belt passes around a roller, A' , at the back end of the machine, then over a sheet-metal table, A^2 , having upturned sides to hold the tobacco on and keep the belt in place, and at its front end is strained or stretched against a curved edge of the table, so that it may approach close to and rest well nigh the top of the first feed-roller, B, to secure the better delivery of the tobacco to the roller. This belt is preferably spaced into transverse divisions of equal size, and over each of these divisions is scattered, by hand or otherwise, an equal weight of tobacco, so that equal areas of the belt will always have delivered to them an equal quantity of tobacco, and there will be no danger of feeding either too much or too little stock. As the tobacco is fed from the first belt, A, it passes first between the roughened surface-roller B and the concave B' , then is delivered to a roller, B^2 , clothed with card-cloth, and is then stripped from B^2 by a stripping-roller, B^3 , whose card-teeth are arranged to throw the tobacco from the roller B^2 down

upon a carrier, C, which delivers it to another feed-belt, D. The object of the concave B' is to hold the tobacco well down upon the roller B until the latter is most nearly tangential to the roller B², thereby preventing the tobacco from being pulled over in clots or bunches, and preventing it also from stringing across from the periphery of B to B² and breaking or sticking irregularly upon the surface of the card-teeth. The concave, it will be seen, by filling the space between the rollers B and B², causes the card-teeth to take the tobacco uniformly and press the latter well down upon said card-teeth. This concave is adjusted to or from the rollers by set-screws *a* in vertical slots or guides *b*.

The carrier C is made in the form of an endless belt revolving around rollers C' C², which are journaled in bearings in a frame, C³, which slides on guide-rods C⁴ fixed to the frame-work. This endless belt of the carrier receives the tobacco from the stripper above and delivers it to the second feed-belt, D, below, and it has a rotary motion imparted by pulley C⁵, and a reciprocating motion, which is imparted to the carriage or frame through the arm C⁶, extending from rock-shaft C⁷, which is operated by a crank, C⁸, and connecting-rod C⁹, from a prime moving-wheel, C¹⁰. The object of the reciprocating carrier, interposed between the discharge end of one feed-belt, A, and the receiving end of the other feed-belt, D, is to secure a more uniform distribution of the tobacco and the more perfect disintegration of agglomerated masses, so that the filling for the cigarettes may be more uniform. This the reciprocating movement more perfectly accomplishes, for, if there be a lump, clot, or agglomerated mass of tobacco when it is dropped off the end of the carrier, instead of being dumped on the second feed-belt, D, in a single spot, it is strewn over the surface of the same a distance equal to the reciprocating movement of the carrier. I do not confine myself strictly to the peculiar form of reciprocating carrier or spreader, as various modifications of it may be made.

The second feed-belt, D, is arranged on a flanged table, D', and passes around a roller, D², at the back end, and around a curved edge of the table at the front end, and delivers to a roughened surface-roller, E, concave E', card-cloth roller E², and stripper E³, which set of devices correspond to the first-described set A B B' B² B³, and serve to further even and distribute the tobacco, it being very necessary that the tobacco should be perfectly uniform in its distribution, so as to make the cigarette all of the same transverse dimensions. The stripping-roller E³ delivers the tobacco to a hopper, F, which has a longitudinal outlet in its bottom, opening into a subjacent trough, F', at right angles to the line of movement of the feed-belts, which trough is extended in a straight line in the form of a compressing-tube, F², Figs. 3 and 1. Through this trough, and also through the compressing-tube F²,

passes the roll-making belt F³, which latter passes in at one end of the trough, receives the tobacco upon it, then passes into the compressing-tube, where the belt is rolled up longitudinally and the tobacco compressed into a roll therein, after which the tobacco roll is delivered to the wrapping devices, and the belt returns around a guide, F⁴, passes thence around a pulley, F⁵, thence back over a pulley, F⁶, and then to the entering end of the trough again. This trough has its edges curved upwardly, so as to turn up the edges of the belt to centralize the tobacco thereon, and tapers with a gradual convergence to the compressing-tube, (see Figs. 5 6 7,) which latter is made also in tapering form with a spiral guide-groove, *c*, on one side that receives the lapping edge of the belt, (see Fig. 7,) which groove, as it nears the end of the tube, opens in the form of a longitudinal flange or lip, *c*², (see Fig. 6,) which allows the belt to gradually straighten out laterally again. As the tobacco on the belt passes through the compressing-tube it will be seen that it is compressed into a rope-like form, (see Fig. 4,) which constitutes the filler of the cigarette, about which the paper is to be subsequently wrapped and pasted.

With respect to the operation just described, I would state that I am aware that it is not new to feed tobacco on a belt then pass the belt through a tapering tube, to curl up the belt and roll the tobacco into a continuous filler. Heretofore, however, the tapering tube has been made without a spiral groove terminating in a longitudinally-slitted and flanged end, and hence a belt could only be used whose transverse dimensions were equal to the circumference of the cigarette, and such width of belt is entirely insufficient to receive a proper quantity of tobacco without allowing the tobacco to extend over the edges of the belt and be caught between the edges when curled up. Now by making my tapering tube with a spiral groove, *c*, leading from the side guide of the trough F' and terminating in a longitudinally slitted and flanged section, *c*², I am enabled to use a greater width of belt than the circumference of the cigarette, since the belt is curved upon one side principally, and the groove *c* and flanged opening *c*² receives the lap of the belt and causes the filler to be rolled tightly at one edge of the belt, as shown in Figs. 5, 6, and 7.

The belt F³, after passing around the guide F⁴, delivers the continuous roll of tobacco to a set of paper wrapping and pasting devices consisting of a trough, G, (see Figs. 3 and 4,) wrapping-tube G', and another endless belt, G². This belt G² carries both the paper strip and the compressed tobacco-roll, and it passes first into the trough G, then through wrapping-tube G', then around pulley G³ and over pulley G⁴ back to a guide, G⁵, and then into the trough again. The paper ribbon or strip H is wound upon a spool, H', and it passes up around the guide G⁵ on top of the belt G² and just beneath the belt F³, and as soon as it gets

into the trough G it receives the tobacco roll R, Fig. 4, upon it, and this roll and the subjacent paper strip and belt G² then pass together into the tapering wrapping-tube G'. To prevent the tobacco roll from choking as it passes into the wrapping-tube, a positive feed is given to it just as it passes from the trough to the tube, by means of a toothed wheel, H². Now, as the tobacco roll and paper strip pass on the belt into the trough the curved edges of the latter give the incipient curve to the paper, and after they have entered the tapering tube the curving and wrapping of the paper around the roll proceed upon one side only, by reason of the spiral guide-groove a', Fig. 8, for the edge of the belt. As soon as the complete circumference is made the guide-groove a' opens in the form of a longitudinal flange or lip, b', which allows the upper or lapping edge of the paper to be exposed long enough to receive paste on its underneath edge from a paste wheel or brush, (shown in Fig. 10,) after which the tube closes again, as in Fig. 9, to force the pasted and lapping edge down upon the body of the cigarette.

In order to permit the pasting to be successfully accomplished the paper strip H must be wider than the belt by the distance of the lap in the cigarette, and this increased width must be on the inner edge of the paper, (see Figs. 10 and 11,) so that when the upper and outer edge of the paper is pasted and forced down it will come in contact with the margin of the paper projecting beyond the belt, and will complete the paper wrapper instead of lapping down with its pasted edge upon the edge of the belt.

In defining more clearly the novelty of the feature just described, I would state that heretofore the paper and tobacco roll have been carried through the pasting-tube unassisted by a belt. My novelty consists in using an independent belt for this purpose, which is of less width than the paper strip, the trough G being made with double guides on one side, to accommodate this difference, as shown in Fig. 11½, so as to make the paper lap on the proper side, and also in the positive feed-wheel and in the peculiar construction of the spirally-grooved and flanged tube, as heretofore described.

For applying the paste a soft-rubber disk, Fig. 13, soft-rubber toothed wheel, Figs. 14 and 15, wooden disk, or brush I, Figs. 16, 3, and 10, is arranged in such a plane and at such proximity to the flange b' of the wrapping-tube that it strikes against the underneath edge of the paper strip resting against said flange. This paste wheel or brush is rotated by a belt, as shown, at right angles to and in contact with a concaved wheel, I², Fig. 3, arranged on a horizontal shaft, I³, driven by suitable gear or belting, as shown. Vertically above the wheel is arranged a paste-reservoir, I⁴, sustained by an upright frame, I⁵, in which reservoir is a screw-plunger, I⁶, which is gradually forced down by the threads

of the plunger-stem to force the paste out the lower end of the reservoir onto the paste-wheel I². This plunger is rotated by a worm-wheel, I⁷, which is fixed to the stem of the plunger, so as to revolve rigidly with it, but permit loose longitudinal movement to allow for the descent of the plunger. This worm-wheel meshes with and is driven by a worm, I⁸, on a horizontal shaft carrying a pulley, which latter is connected to the shaft below by a belt, I⁹. At the lower end of the paste-reservoir I preferably place a netting to cut up the lumps in the paste.

After the cigarette is rolled, wrapped, and pasted it passes out in a continuous roll, and it enters a holding-tube, J, Figs. 3 and 1, which is arranged in line with the wrapping-tube, and at the outer edge of which a knife passes to cut the cigarette into definite lengths. As the issuance of the continuous cigarette is very rapid a very quick movement in the knife is required to prevent the cigarette from doubling up and bursting during the passage of the knife by abutting against the same. A very clear, sharp, positive cut is also desirable to avoid ragged ends on the cigarette. For this purpose I have devised the following special cutting devices:

J⁷ is a horizontal shaft arranged in bearings above the holding-tube, and having a crank-arm J', carrying an elongated tubular bearing, J². In this tubular bearing is arranged a short shaft, J³, carrying at one end a sharp rotary cutting-disk, J⁴, arranged in the plane of the outer end of the holding-tube, while at the other end a friction or gear wheel, J⁸, is fixed, which runs upon a segmental track, J⁵, just as the cutting-disk comes in contact with the cigarette-roll, and whose function is to cause the cutting-disk to revolve in the opposite direction to the movement of the crank carrying it, thus giving a double motion and a shear cut which severs the cigarettes smoothly.

To secure the rapid passage of the cutting-disk past the cigarette, to give clearance to the issuing end of the newly-made section, I cause the cutting-disk to pass the cigarette at a very high speed, while it passes through the balance of the revolution at a reduced speed. This I accomplish by gearing the shaft J⁷ (see Figs. 1 and 12) to a horizontal actuating-shaft, K, by means of the eccentric and differential gear-wheels K' K², so relatively arranged that when the cutting-disk is passing the holding-tube the longer side of wheel K' is at that time acting upon the short side of K², as in Fig. 12, to give an increased leverage for a rapid movement, while during the rest of the revolution the relation of the wheels is reversed for a slower motion.

As the cigarettes are cut into definite lengths they drop down a chute, L, to a traveling belt, L', and are counted in the following way: This belt is provided with spacing-plates f, which divide the belt into equal sections, and said belt is distended about rollers L² L³, one of which has a ratchet-wheel, L⁴. Over this ratchet-

wheel plays a pawl, L^5 , held in an arm connected to the axis of the ratchet-wheel, and which pawl is vibrated by connection with a pitman, L^6 , which at its upper end is connected to a crank on the knife-driving shaft. Now, it will be seen that at every revolution of the knife and cutting off of a cigarette the ratchet-wheel is moved one tooth and the belt caused to travel one space, and as the belt is divided off into aliquot spaces formed into groups by the division-plates it is only necessary to know the number of teeth required to move the belt from one division-plate to the next to know how many cigarettes have been deposited upon the belt between said plates, and these numbers are just sufficient for a package of cigarettes.

In the description of the working parts of my machine I have not specifically referred to the driving belts, shafts, and counter-shafts for actuating the various parts, for the reason that this has no special reference to my invention, and various other driving mechanism besides the system of belts shown may be supplied by the mechanic in more or less modified forms, to suit the varying conditions of use of the machine.

In modifying my invention I may make the following changes:

In order to make the feed part of the machine deliver into the cigarette-making portion (set at right angles) the interposed hopper F causes the feed part of the machine to be placed at an inconvenient altitude. I may, therefore, for the sake of bringing the feed-belt into more convenient position, dispense entirely with the hopper F and substitute therefor a horizontal belt to transfer the tobacco to the subjacent trough.

I may also find it desirable to use a different form of knife for cutting off the cigarette, such, for instance, as shown in Fig. 17, in which two curved shear-blades are attached to disks that simply revolve, and which shear-blades come together upon opposite sides of the cigarette.

I may also arrange the knife so as to have a lateral movement, or a movement in line with the feed of the cigarette-roll, so as to compensate for the continuous feed of the roll and prevent the roll from feeding up against the knife and bending, bursting, or doubling up while the knife is cutting.

Having thus described my invention, what I claim as new is—

1. A feed device for a cigarette-machine, consisting of an endless traveling belt, a roller distending the outer end of this belt, and a subjacent table having a curved lip for distending the other end of the belt, combined with the receiving-roll B , and situated above the horizontal axis of the latter, as shown and described.

2. A device for transferring, carding, and distributing the tobacco in a cigarette-machine, consisting of a roughened-surface feed-roller, a roller covered with card-cloth, ar-

ranged beside the first, a concave fitting down into the space above the tangential point of these rollers, and a stripping-roller, all combined with each other and with a feeding device, substantially as shown and described.

3. The combination, with a traveling receiving-belt, D , of a reciprocating carrier and operating mechanism, the said carrier being situated above said belt and adapted to transfer the tobacco, by a spreading or scattering action, upon the same, substantially as described.

4. The combination, with a traveling receiving-belt, D , of a reciprocating frame situated over it and carrying an endless transferring-belt, C , and mechanism for reciprocating said belt, substantially as described.

5. In a cigarette-machine which rolls a continuous cigarette in an endless belt by passing through a tapering tube, the combination of an open trough having side guides for the belt, and a tapering tube forming a continuation of the trough, and having a spiral groove extending from one of the side guides of the trough, to allow the belt to be curled up upon one side more than it is upon the other, as and for the purpose described.

6. In a cigarette-machine which rolls a continuous cigarette in an endless belt by passing through a tapering tube, the combination of an open trough having side guides for the belt, a tapering tube having a spiral groove extending from one of said side guides, and a terminal section to the tapering tube, having its edges lapped past each other, but not united, so as to form a flange continuous with the spiral groove, substantially as and for the purpose described.

7. In a cigarette-machine which rolls a continuous cigarette in an endless belt by passing through a tapering tube, the combination of an open trough having side guides for the belt, a tapering tube having a spiral groove extending from one of the side guides of the trough, and a terminal section having its edges separated to form a flange, b' , to give access to the paste-wheel and then closed again, as and for the purpose described.

8. In a cigarette-machine, the combination, with an endless belt and tapering tube for forming the tobacco roll or filler, of a tapering tube and pasting device and a second independent endless belt made narrower than the paper strip and arranged to carry the tobacco roll directly through the pasting-tube, substantially as and for the purpose described.

9. The combination, with the belt and paper wrapping-tube having slit with flange b' , of a pasting wheel or brush, I , a right-angled paste-delivering wheel, I^2 , a paste-reservoir, I^4 , located above the same, and having a screw-plunger, and the worm-gears I^7 I^8 actuating the plunger to force out the paste, as described.

10. The cutting device consisting of a holding-tube, J , circular knife J^4 , and mechanism, substantially as described, for giving to said knife an intermittent revolution about its own

axis, and a secondary revolution about an independent axis, as described.

11. The combination, with the revolving cutting-knife, of a set of differential gears and
5 suitable driving mechanism for actuating the knife with a more rapid movement while cutting than during the rest of its stroke, as set forth.

12. The combination, with the holding-tube
10 J, of the shaft J⁷, having arm J', tubular bear-

ing J², shaft J³, cutting-disk J⁴, driving-wheel J⁸, and segmental track J⁵, substantially as and for the purpose described.

The above specification of my invention
signed by me this 14th day of August, 1880. 15

JAMES ALBERT BONSAK.

Witnesses:

EDW. W. BYRN,
CHAS. A. PETTIT.