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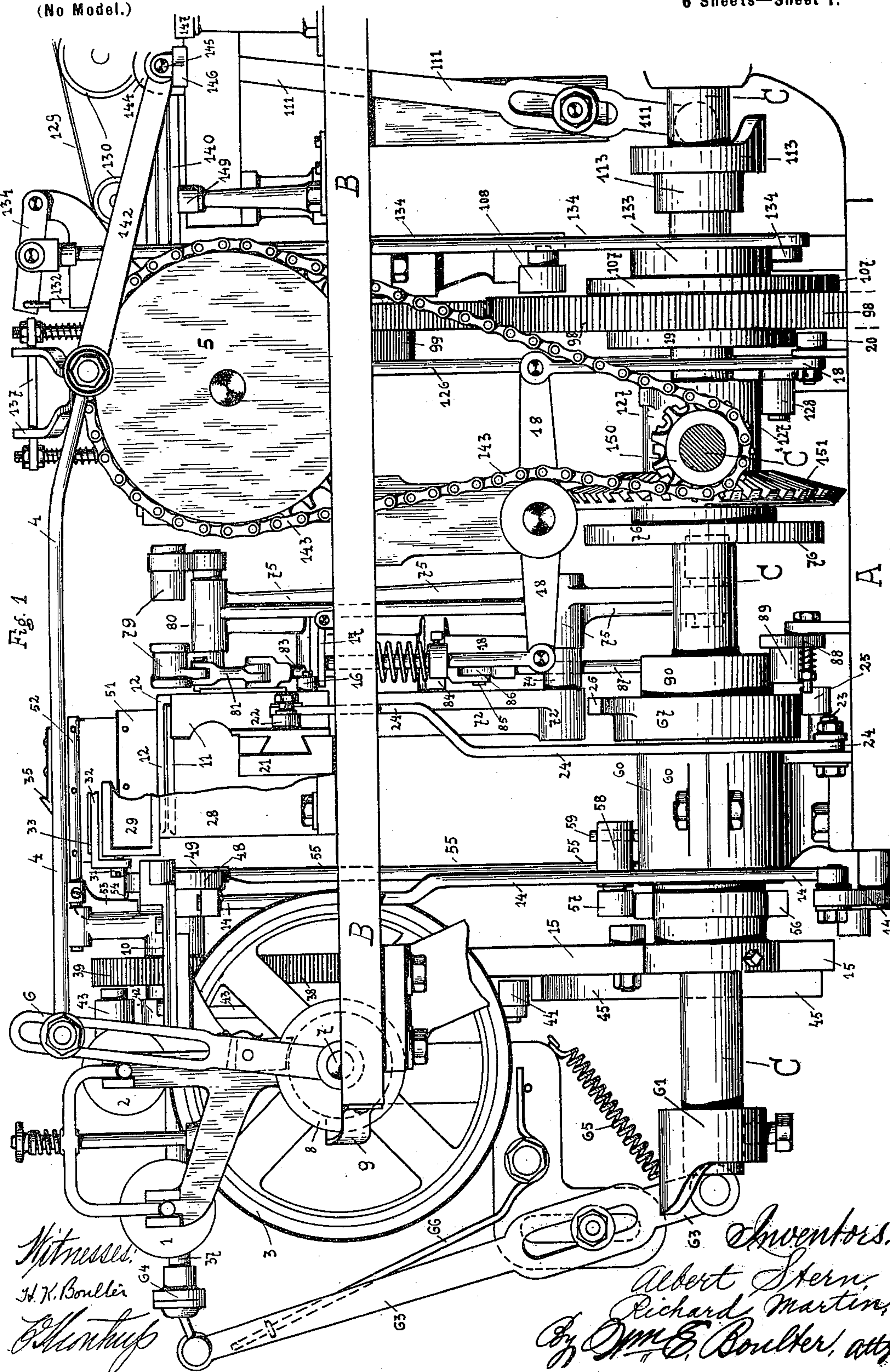
Patented Feb. 12, 1901.

A. STERN & R. MARTIN.
CIGARETTE MACHINE.

(Application filed July 28, 1898.)

6 Sheets—Sheet 1.

(No Model.)



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6 Sheets—Sheet 3.

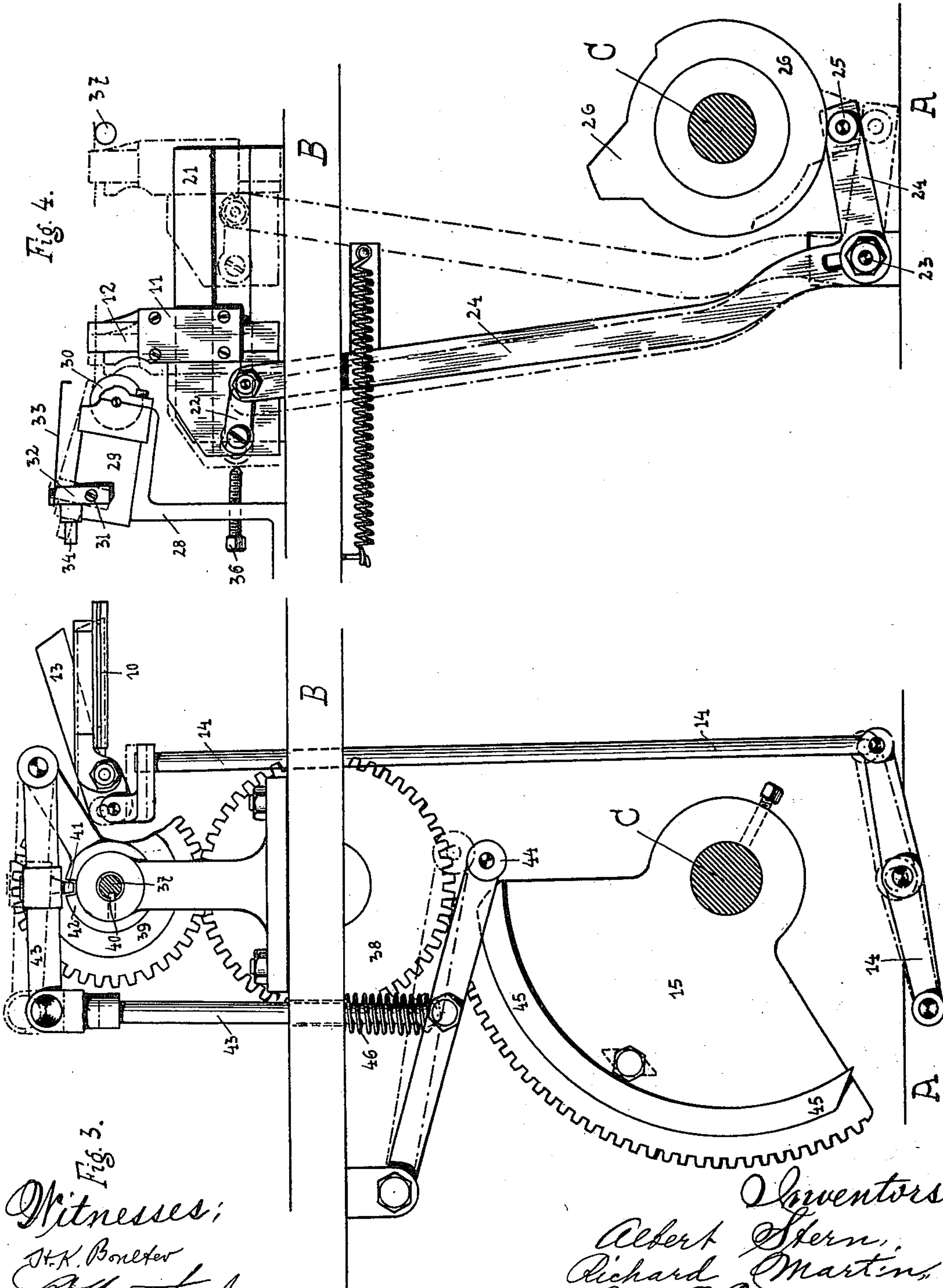


Fig. 3.
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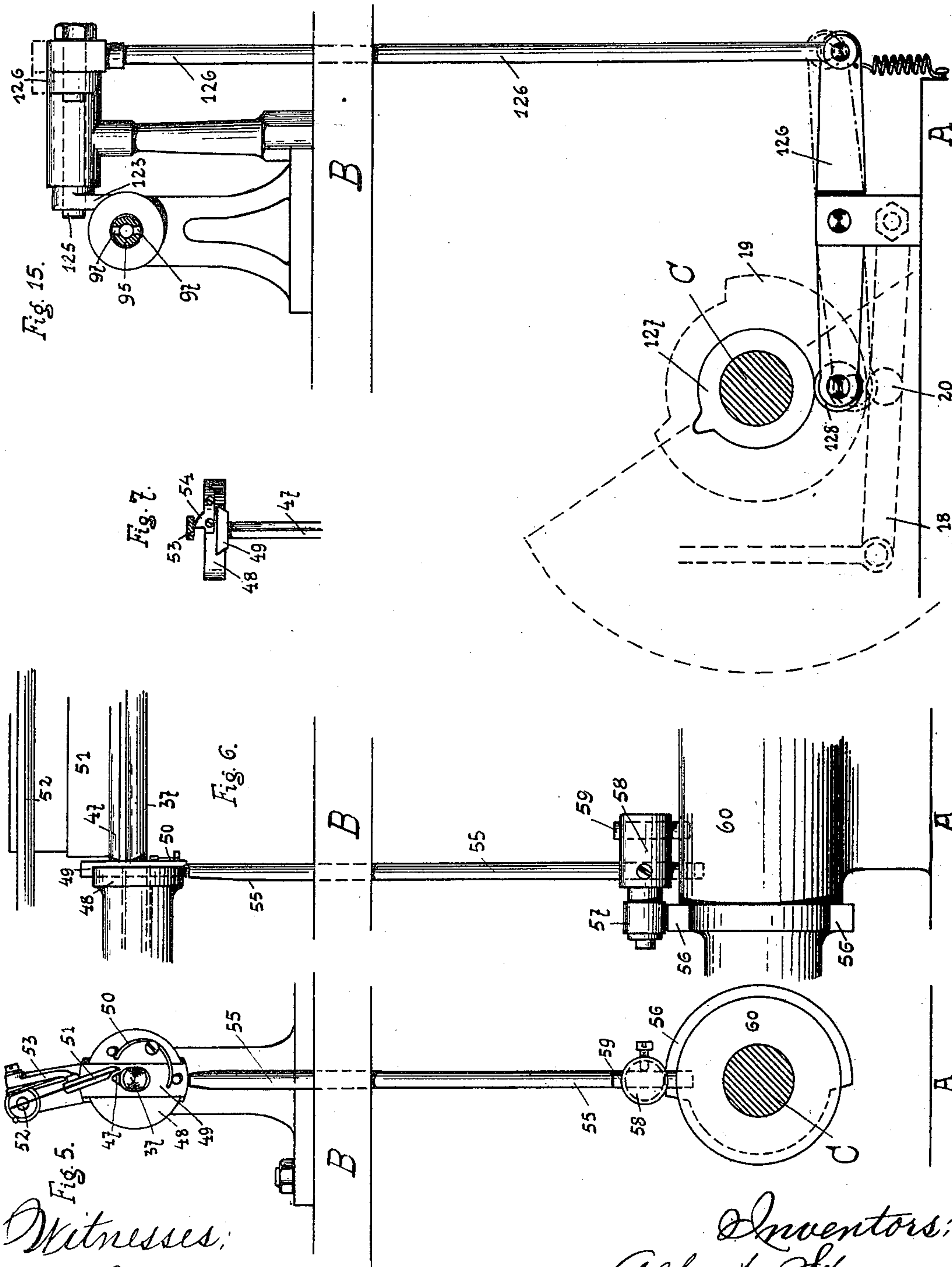
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CIGARETTE MACHINE.

(Application filed July 28, 1898.)

(No Model.)

6 Sheets—Sheet 4.



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Fig. 10.

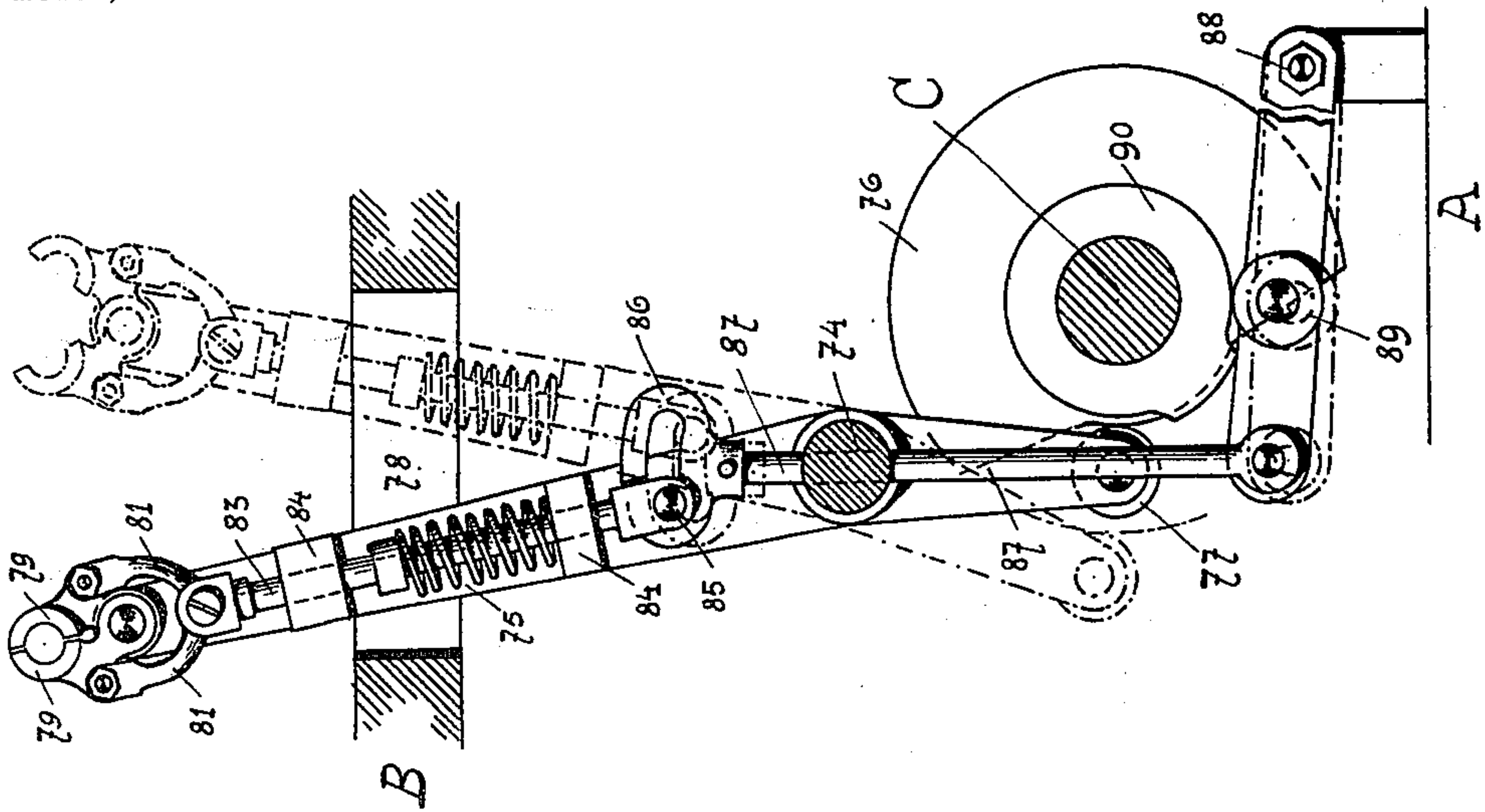


Fig. 9.

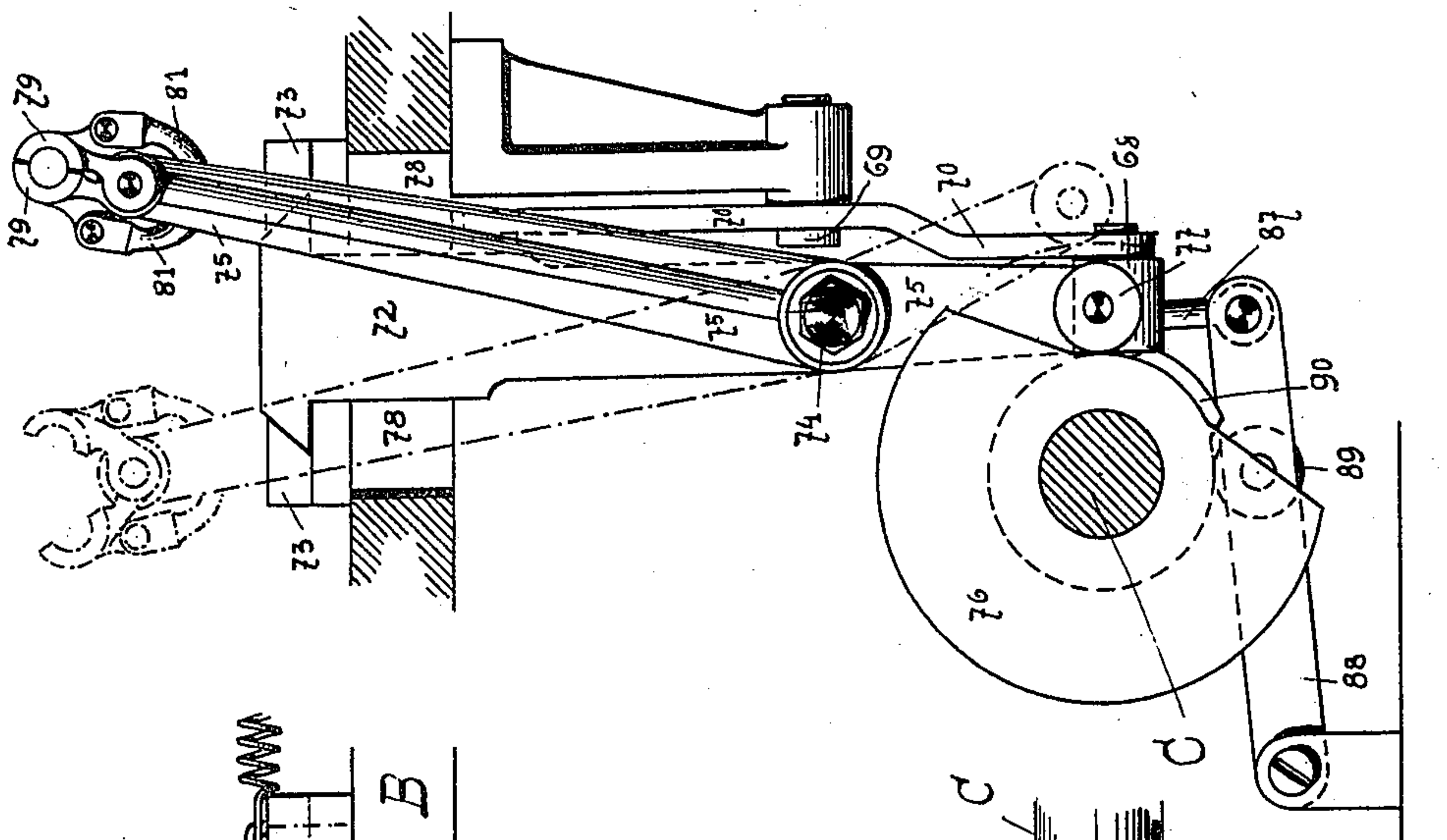
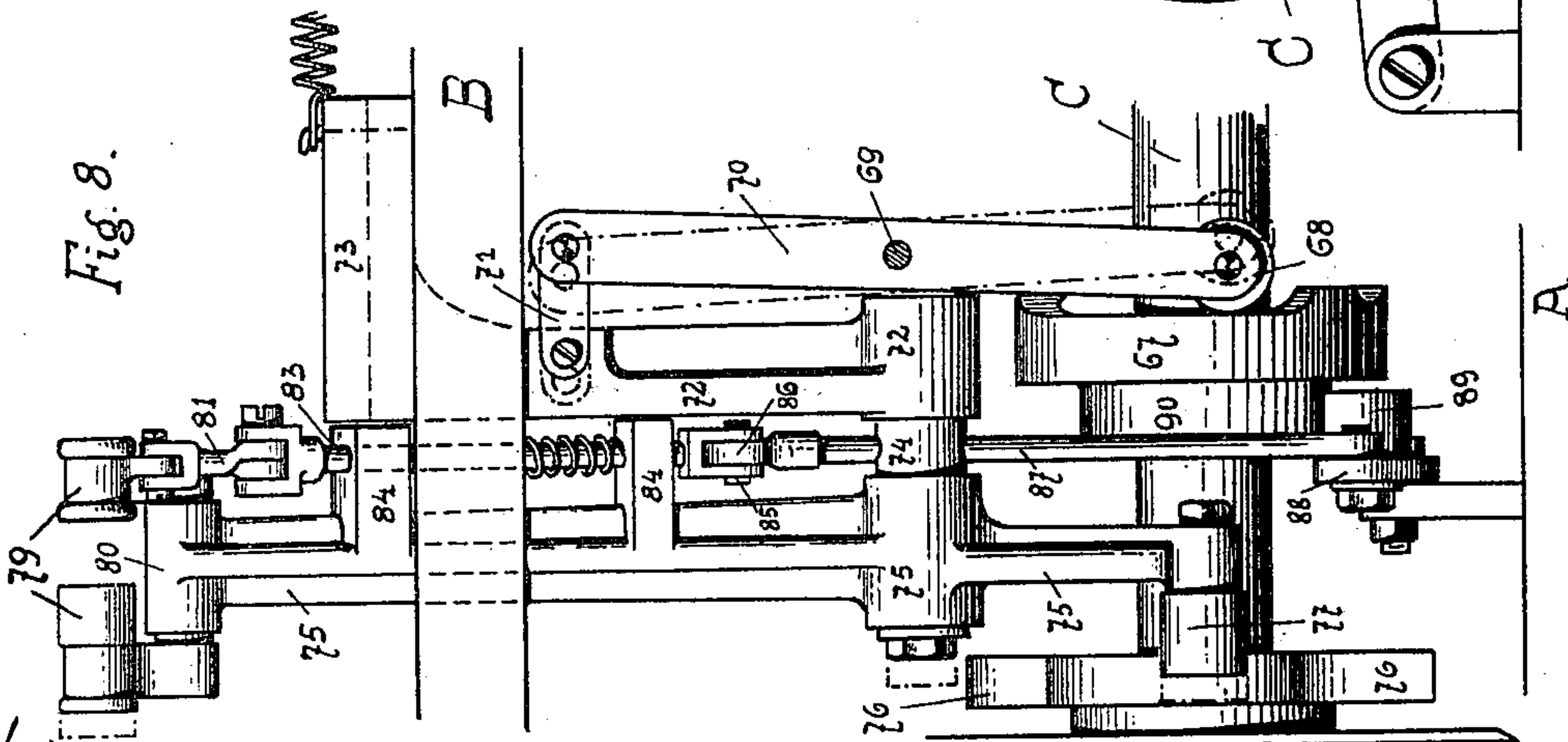


Fig. 8.



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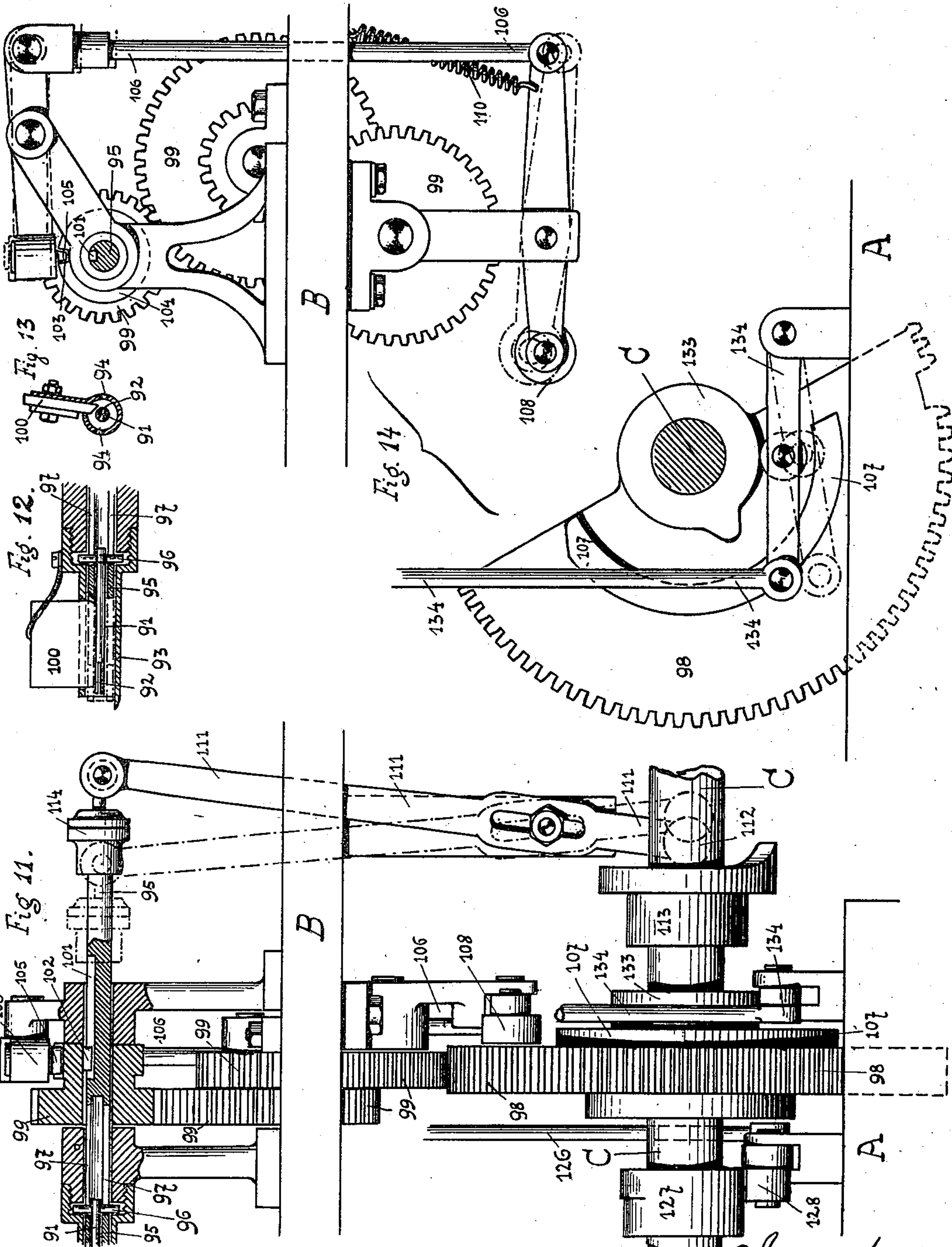
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CIGARETTE MACHINE.

(Application filed July 28, 1898.)

(No Model.)

6 Sheets—Sheet 6.



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UNITED STATES PATENT OFFICE.

ALBERT STERN AND RICHARD MARTIN, OF DRESDEN, GERMANY, ASSIGNORS
TO GEORG CALBERLA, OF SAME PLACE.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 667,802, dated February 12, 1901.

Application filed July 28, 1898. Serial No. 687,113. (No model.)

To all whom it may concern:

Be it known that we, ALBERT STERN and RICHARD MARTIN, subjects of the King of Saxony, residing at Dresden, Saxony, Germany, have invented certain new and useful Improvements in or Relating to Cigarette-Making Machines, (for which application for Letters Patent has been made in Great Britain, No. 1,800, dated the 22d day of January, 1898,) of which the following is a specification.

This invention relates to improvements in cigarette-making machines for manufacturing cigarettes with mouthpieces in which the paper is unwound from a roll, cut, and treated both for making the cigarette-tubes and the mouthpieces.

The invention consists in the novel construction, arrangement, and combination of parts, as hereinafter fully described, illustrated in the drawings, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of the machine constructed according to this invention. Fig. 2 is a plan. Fig. 3 is a front elevation of the mechanism for driving the core or mandrel for rolling up paper tubes and the cutter for cutting off the paper. Fig. 4 is a rear view of the mechanism for holding and transporting the cut off sheet of paper for the paper tubes, as well as for applying the gum or adhesive material. Figs. 5 and 6 show the device for rolling up the paper tube in front elevation and side elevation, respectively. Fig. 7 is a detail view. Figs. 8, 9, and 10 show the device for transporting the finished paper tube in side elevation, front elevation, and rear elevation, respectively. Fig. 11 illustrates the device for rolling up mouthpieces in side elevation, partly in section. Figs. 12 and 13 are detail views of the mandrel for rolling up the mouthpieces in side and front sectional elevations. Fig. 14 shows the gearing for driving said mandrel, and Fig. 15 shows the device for operating the cutter.

The whole machine is mounted on a bed-plate A, provided with a plate or table B. The various parts are driven from a main shaft C, to which motion is transmitted from a motor

by means of pulleys or toothed wheels and belts or chains or in other suitable manner.

To enable the working of the machine and the coöperation of its parts to be better understood, it is best to divide the description of the whole working into three parts—rolling up the paper tube, transporting it to the tobacco-filling device, which latter forms no part of this invention, and therefore will not be described, and finally rolling up the mouthpieces, the parts effecting these operations being at the same time fully described.

Rolling up the paper tube.—The manufacture of paper tubes from tissue paper or the like is effected by unrolling paper from a supply-roll and passing it through a guide to the cutter, which cuts off the desired lengths. A clamping device then carries the sheet of paper cut off to a roller, which applies a narrow strip of gum or adhesive material to one edge of the paper, whereupon the rolling-up mandrel seizes the paper and rolls it into a tube, the gummed edge being strongly compressed by a special device. By lateral movement of the mandrel the finished tube is brought outward in order to be removed by a suitable device from the returning mandrel. The intermittent feeding of the paper from the supply-roll is effected by rollers 1 and 2, Figs. 1 and 2, which frictionally engage with a pulley 3, the broad rim of which has a layer of rubber, felt, or similar surface. The movement of the pulley 3 for feeding the paper is effected, according to the example illustrated, by a rod 4, connected at one end to the edge of a sprocket-wheel 5 and adjustably mounted at the other end in a slot of a lever 6, loose on the shaft 7 of the friction-pulley 3. To this shaft is keyed a pulley 8, having a grooved rim, which coöperates with a brake-block 9, mounted on the frame by means of a spring for preventing a backward rotation of the friction-pulley 3. The rocking motion communicated to the latter by the rod 4 effects an intermittent advance of the paper, the extent of said advance being capable of being varied by adjusting the rod 4 in the slot of the lever 6 according as it is desired to make shorter or longer paper tubes. The paper passes first through a guide consisting

of two plates 10, connected together with a small interval between them, and then, Fig. 3, after a length has been cut off by a pivoted cutter 13, operated by a rod 14 from a toothed segment 15, the strip is seized by a clamping device consisting of a block 11, Fig. 1, with a bracket 12 placed over it and sliding in guides. On the bracket there is a sliding roller 16, resting on a pivoted plate 17. To open and close the clamping device, said plate is raised and lowered by pivoted levers 18 18 18, acted upon by a cam 19, mounted on the driving-shaft C, roller 20, attached to the lever 18, traveling on said cam. The closed clamping device brings the sheet of paper first to the roller which applies the gum and then to the rolling-up mandrel. To enable it to be moved laterally, the clamping device is arranged in a guide in a fixed part 21, Fig. 4, and connected by a link 22 with a double-armed lever 24, pivoted about a pin 23, a roller 25 on the short arm of said lever engaging with a cam-disk 26 on the driving-shaft C. On a support 28 is arranged the gum-reservoir 29, having a spreading-roller 30. In order to apply the gum only in a narrow strip at the edge of the paper, there is arranged on the gum-reservoir 29 a bracket 32, pivoted about a pin 31 and provided at the top with a thin plate 33, having a downwardly-bent front edge. At the back of this bracket projects a pin 34, Figs. 2 and 4, under which passes a projection 35 on the connecting-rod 4 during the advance of the latter and strikes said pin, whereby the bracket 32 is caused to turn on its pivot, so that the projection or plate 33 presses the paper against the gumming-roller for a short time. The movement of the clamping device 11 toward the gum-reservoir 29 can be regulated by means of a screw 36 in order to provide a more or less wide strip of paper with gum. In its next movement to the opposite side the clamping device 11, Fig. 4, brings the sheet of paper to the rolling-up mandrel 37, which is rotated from the driving-shaft C by means of the toothed segment 15 and the two toothed wheels 38 and 39, Figs. 2 and 3. This mandrel is mounted in the latter wheel 39 by means of a pin 40 engaging in a longitudinal groove in said mandrel, so that it can move in the wheel longitudinally, but cannot rotate. In order to keep it locked for a certain time, a pin 41 engages in a recess in a disk 42, secured to the toothed wheel 39. The withdrawal of the locking-pin is effected by means of levers 43 from the toothed segment 15, a roller 44 on a pivoted arm cooperating therewith, traveling on a projecting arc 45 on the segment 15. The pin 41 slides on the disk 42 and is caused to engage in the recess in the disk by the spring 46 in the rotation of the disk. To press the paper against the rolling-up mandrel, Figs. 5 and 6, a bar 47, triangular in cross-section, is mounted on a slide-block 49, applied to a disk 48, and pressed down, together with the said block, by a spring

50 as soon as the paper has arrived between the rolling-up mandrel and the bar. During this time a spring-controlled plate 51, held in a clamp 52, slides on the paper, and at the moment when the gummed edge of the latter comes into position on the bar 47 pressure is exercised by a bell-crank lever 53, Figs. 5, 6, and 7, one arm of which lies in the path of a projection 54, carried by the disk 48, and when said projection strikes the arm of lever 53 the opposite arm will be forced against the plate 51, which acts to close the gummed seam along its entire length. The raising of the slide 49, Figs. 5 and 6, for the purpose of raising the bar 47 from the mandrel 37 is effected by means of a roller 57 on a rod 55 engaging with a cam 56. The roller 57 is secured to a guide 58, which is guided on a pin 59 of a plumber-block 60. The advance of the mandrel 37 in a longitudinal direction for the purpose of delivering the finished paper tube is effected by a cam 61, Fig. 1, and an adjustable lever 63, provided with a friction-roller in contact with the cam and connected by a ball-and-socket joint 64 with the mandrel. Springs 65 and 66 return the parts to their position of rest.

Transport of the paper tube.—The transporting device serves to receive the finished paper tube from the mandrel 37 and to bring it to the tobacco-filling device, where the charge of tobacco is introduced into the empty tube. Then the transport device brings the filled tube to the mouthpiece-rolling device, the mouthpiece being placed into the filled paper tube. Finally the transporting device opens and releases the finished cigarette. On the driving-shaft C, Figs. 1 and 8, is mounted a cam 67, in contact with which is a roller 68 at the end of a double-armed lever 70, pivoted about a pin 69 and engaging at its other end, by means of an arm 71, with a part 72, moving the latter laterally in its dovetailed guide 73, Fig. 9, on the table B, the lever 70 being opposed by a spring attached to the part 72 and having a tendency to return the latter into its original position. The part 72 supports all the other parts of the transport device by means of a spindle 74, secured to the part 72. The lateral movement of the device serves to transfer the paper tube from the paper-tube-making device to the tobacco-filling device. The reciprocation of the latter toward and from the mouthpiece-rolling apparatus is effected by a second double-armed lever 75, pivoted to the spindle 74 and having a friction or other roller 77 in contact with a cam 76 on the driving-shaft C, by which it is operated. This lever oscillates in a recess 78 of the table B, Figs. 9 and 10. The lever 75 carries at its upper end a head in the shape of pivoted tongs 79, the jaws of which are connected together by connecting-pieces (socket-and-pin) in the casing 80 and are opened and closed by a pair of pivoted links 81. This opening and closing of the jaws 79 by means of the links 81 is effected by a two-part rod,

the upper part 83 of which is guided in holes in the projections 84, the lower bifurcated end sliding by means of a pin 85 in a slotted guide 86 at the top of the lower part of the rod 87. This rod is guided in a hole in the spindle 74 and is connected at the bottom with a lever 88, provided with a roller 89, traveling on a cam 90 on the main shaft C. This sectioning of the rod for opening and closing the jaws 79 and the connection of its parts by means of a slide is necessary, as the upper part 83 must participate in the oscillations of the lever 75, while the lower part 87 is only allowed to have a vertical movement in order to produce a sharp blow against the small cam 90 on the shaft C. The arrangement described of the separate driving parts of the transport device on the main driving-shaft is such that in the position of rest the tongs are near the paper-tube-making device, with the jaws open, the finished tube being seized by the jaws closing upon it and drawn off the mandrel and brought to the groove of the tobacco-rolling apparatus by a lateral movement of the whole device, where it is filled with tobacco and carried by the return movement of the transport device to the mouthpiece-rolling apparatus in order finally to insert the mouthpiece and to release the finished cigarette by opening the jaws, which then return into their original position.

Forming the mouthpieces.—For this purpose a piece of paper of suitable length is cut off from a roll of paper in an oblique manner, so as to obtain a point with which the rolling begins. This is effected by a slotted former on which moves a plate for clamping or holding the paper. The finished mouthpiece is removed from the former by means of a ring and inserted into the filled paper tube and held to the last by the sliding plate, so that it cannot unroll before being introduced into the paper tube. The rolling-up former 91, Figs. 11 and 12, into the slot 92 of which the paper is introduced by a device hereinafter described, is surrounded by a sleeve 93, having double slots 94, Fig. 13, and is carried in a partially-hollow shaft 95, in the rotation of which it is caused to participate by a pin 96, guided in a double slot 97 in the shaft 95, thus preventing a lateral movement of the core during the movement of the shaft in its longitudinal direction. The shaft 95, with the former 91, is caused to rotate at a great speed from the main driving-shaft C by means of a toothed segment 98 and toothed gearing 99, the former 91 rolling up the paper introduced into its slot 92, a spring-controlled plate 100, Figs. 12 and 13, in contact with the former pressing the paper and maintaining the rolled-up mouthpiece in shape. The shaft 95 passes loosely through the upper toothed wheel 99 and is connected to it by a tooth-shaped projection 102 engaging with a longitudinal groove 101 in it, so as to enable the shaft 95 to move freely in a longitudinal direction. To stop and hold the shaft 95 sta-

tionary at a desired moment, a tooth 105, Fig. 14, engages with a recess 103 of a disk-shaped projection 104 of the toothed wheel 99, said tooth 105 being secured to a lever 106, which is intermittently raised by its roller 108 coming in contact with an arc or cam 107 of the toothed segment 98 and slides along the disk 104 and is caused by the spring 110 to spring into the recess 103 when it comes opposite to it. The longitudinal movement of the shaft 95 for removing the mouthpiece from the former 91 and inserting it into the paper tube filled with tobacco is effected by a double-armed lever 111 adjustable in guide-slots, a friction-roller 112 on the lower end of said lever sliding on a cam 113 on the main shaft C, the upper end of the lever 111 being connected by a ball-and-socket joint 114 with the shaft 95. The latter is thus intermittently advanced and retracted. Consequently the circular front part which surrounds the former 91, Fig. 11, removes the mouthpiece and pushes it out of the sleeve 93.

A very important feature of the device is the feeding and cutting off of the paper from the main roll, which is effected only when the mouthpiece has been made by means of two cutters 123 and 124, placed at an acute angle to each other in such manner that one cutter cuts off the finished mouthpiece in a straight line, while the other cutter, placed obliquely, cuts the paper obliquely for the next mouthpiece, so that a triangular piece of paper is cut out and falls out from the machine. The paper is arranged in a movable guide 115, Fig. 2, covered by a fixed plate 116, and is caused in a suitable manner—in this case by a stop 117 on the oscillating part 75 of the transport device—to take part in the movement until a pin or rod 119 strikes a projection 120 of a movable clamping-bar 121, whereby the paper strip, which was held fast up to that moment, becomes released, said strip having been already introduced into the slot 92 of the former 91 and rolled up several times. The guide 115 is withdrawn by a spring 118 and returns empty and only at the end of its travel again clamps the strip. The two cutters 123 and 124, connected by an angle-iron 122, then descend simultaneously and cut off the paper from the mouthpiece in the manner described. The lowering of the cutters, one (123, Fig. 15) of which is pivoted to the shaft 125, is effected by levers 126, actuated by a cam 127 acting on a friction-roller 128 in contact with it.

The rest of the parts shown in the drawings serve for producing the "tobacco rope" and introducing it into the paper tube. This part of the machine will be only described as far as is required for the understanding of the whole machine, since the same work could be effected by other devices.

Tobacco is supplied to the angle or pressing device 131 by endless bands 129, passing over wide rotating rollers or disks 130, and is cut off by a cutter 132, operated by levers 134

from a cam 133 on the main shaft. The tobacco cut off is seized by a piece of sheet metal 135, bent at an angle and brought to the discharge groove or opening D, Fig. 2, and pressed into said groove by a device 137, driven from a sprocket-wheel 138 by means of a projection 139 on the latter, and then pushed into the paper tube placed by a rod 140. The whole device for rolling and compressing the tobacco is mounted on a movable plate 141 and is operated by it.

The rod 140 for pushing the tobacco forward is operated by a rod 142, which is pivotally connected at one end to the chain-wheel 5 and at the other end to the slide-block 144. In the slide-block 144 there is arranged a rod 145, which when advancing carries with it the rod 140. For this purpose there is arranged on the rod 145 a part consisting of two cam-faces adapted to come in contact with the roller 147, and thus cause the rod 145 to advance, which rod then engages with the pin 148 of the rod 140 and causes the latter to participate in its movement until the part 146 strikes a roller 149 and draws the rod 145 back and releases the rod 140. The latter is then returned by a spring into its original position. The sprocket-wheel 5 is driven by a chain 143 from the driving-shaft C', on which is mounted the chain-pinion 150. The shaft C' is at right angles to the main driving-shaft C and coupled with it by bevel-wheels 151.

We claim—

1. In a cigarette-making machine, the combination with means for intermittently feeding a strip of paper, and a cutter to divide the strip, of a clamping device comprising co-operating members 11 and 12, the latter member being vertically movable, means for intermittently raising and lowering the member 12, means for intermittently moving the clamping device laterally, means for applying gum to the edge of the strip held in the clamping device when the latter has been moved laterally, and means for receiving the gummed strip and rolling the same into tubular form.

2. In a cigarette-making machine, the combination with means for intermittently feeding a strip of paper, and a cutter to divide the strip, of a clamping device comprising co-operating members 11 and 12, the latter member being vertically movable, means for intermittently raising and lowering the member 12, means for intermittently moving the clamping device laterally, means for applying gum to the edge of the strip held in the clamping device when the latter has been moved laterally, and means for receiving the gummed strip and rolling the same into tubular form, and means for varying the lateral movement of the clamping members toward the gum-applying device for the purpose set forth.

3. In a cigarette-making machine the combination with means for intermittently feeding a strip of paper, and a cutter to divide

the strip, of a clamping device comprising co-operating members 11 and 12, the latter member being vertically movable, a rotatable shaft, a cam thereon, a series of pivoted levers 18, operated by the cam, the pivoted plate 17 adapted to bear against a part on the member 12 whereby to raise the latter intermittently, a part carrying the clamping members, a cam on the said rotatable shaft, a lever adapted to be actuated by the latter cam, and a connection between the latter lever and the part carrying the clamping members, and means for applying gum to an edge of the paper strip held in the clamping device when the latter has been moved laterally, and means for receiving the gummed strip and rolling it into tubular form.

4. In a cigarette-making machine of the kind described, a device for transporting the tube comprising an oscillatory lever, a laterally-movable bearing or support, and pivoted jaws carried by the former, in combination with a sectional rod, the upper section adapted to partake of the oscillations of the lever independently of the lower section and the latter adapted to have a vertical or longitudinal movement only, as described.

5. In a cigarette-making machine of the kind described, the combination with a driving-shaft, and cams 76 and 90 mounted thereon, of a lever 75 adapted to be oscillated by the cam 76, a laterally adjustable or movable support or bearing having a spindle 74, a sectional rod the upper section of which has such connection with the lower section as to permit the former to partake of the oscillations of the lever 75 independently of the lower section, said lower section passing freely through the spindle 74, a lever to one end of which said lower section is connected, said lever being operated upon by the cam 90 to produce a vertical movement of said lower section.

6. In a cigarette-making machine, the combination of a rotatable mandrel adapted to have an endwise movement, of a triangular bar 47, a disk, a slide-block slidably carried by the disk, and supporting the bar 47, a spring operating to press the latter bar against the mandrel, means for closing the gummed edge of the paper held between the bar and mandrel, and means for raising the bar to release the paper, and means for moving the mandrel longitudinally for the purpose set forth.

7. In a cigarette-making machine, the combination of a rotatable mandrel adapted to have an endwise movement, of a bar 47, a disk, a slide-block slidably carried by the disk and supporting the bar 47, a spring operating to press the latter bar against the mandrel, a spring-controlled plate 51, a bell-crank lever 53 adapted to be operated by the disk to thereby operate the plate 51, means for raising the bar 47 and means for moving the mandrel longitudinally.

8. In a cigarette-making machine, the com-

5 bination of a former having a slot, a sleeve
surrounding the former and having double
slots, a hollow shaft containing the former, a
connection between the shaft and the former
10 for producing simultaneous rotation, and a
spring-controlled plate bearing upon the pa-
per strip surrounding the former, and means
for moving the shaft longitudinally, all con-
structed and arranged for coöperation as de-
scribed.

9. The combination of a movable guide 115,
the movable clamping-bar 121, and means for
operating said bar at the ends of the move-
ment of the guide, as described, with cutters

arranged at an acute angle to each other, one 15
being adapted to cut the strip on a straight
line and the other at an acute angle thereto,
and means for operating the cutters simulta-
neously.

In witness whereof we have hereto set our 20
hands in the presence of the two subscribing
witnesses.

ALBERT STERN.
RICHARD MARTIN.

Witnesses:

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