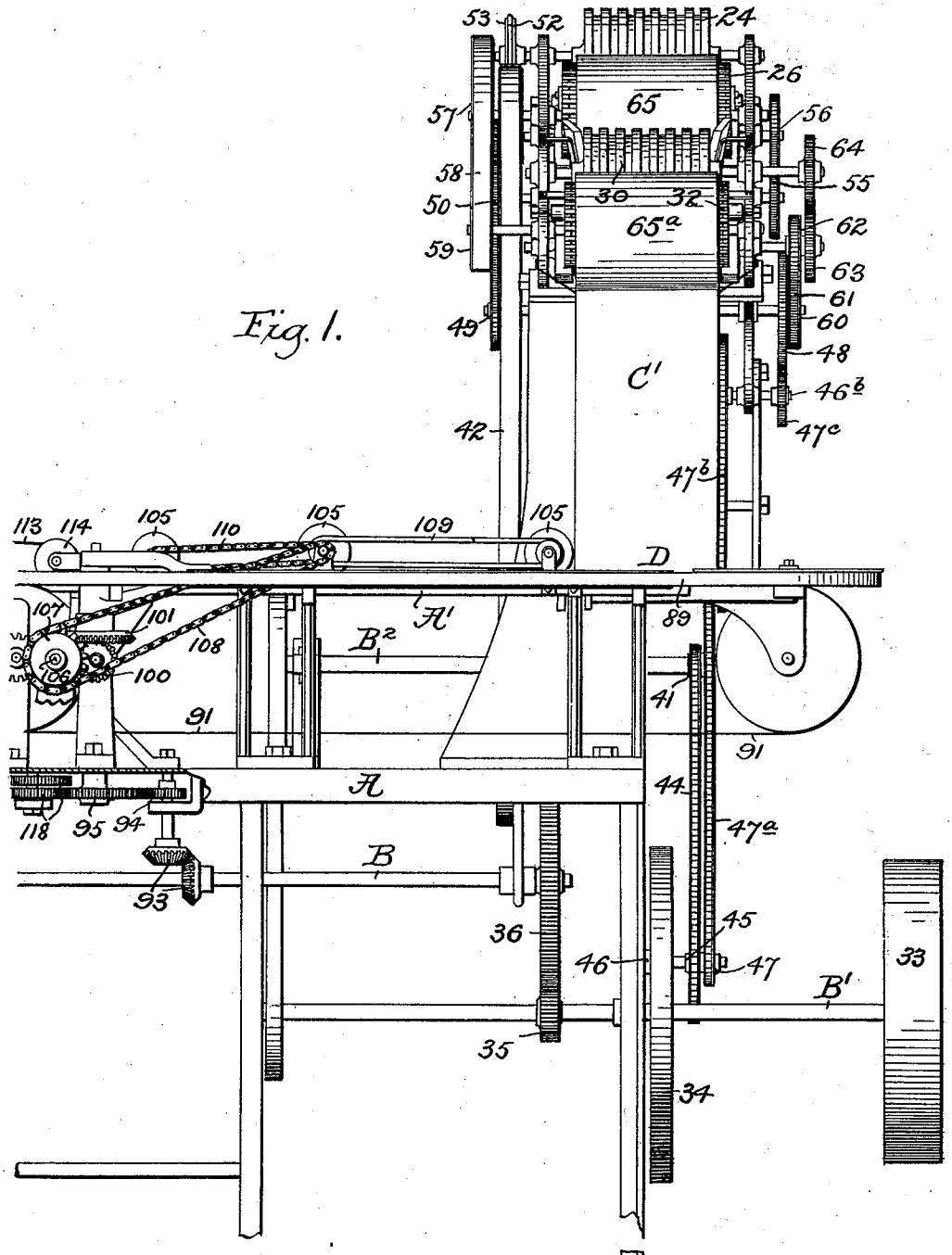
(No Model.) 12 Sheets—Sheet 1.

A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

Fig. 1.



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Geo. H. Graham

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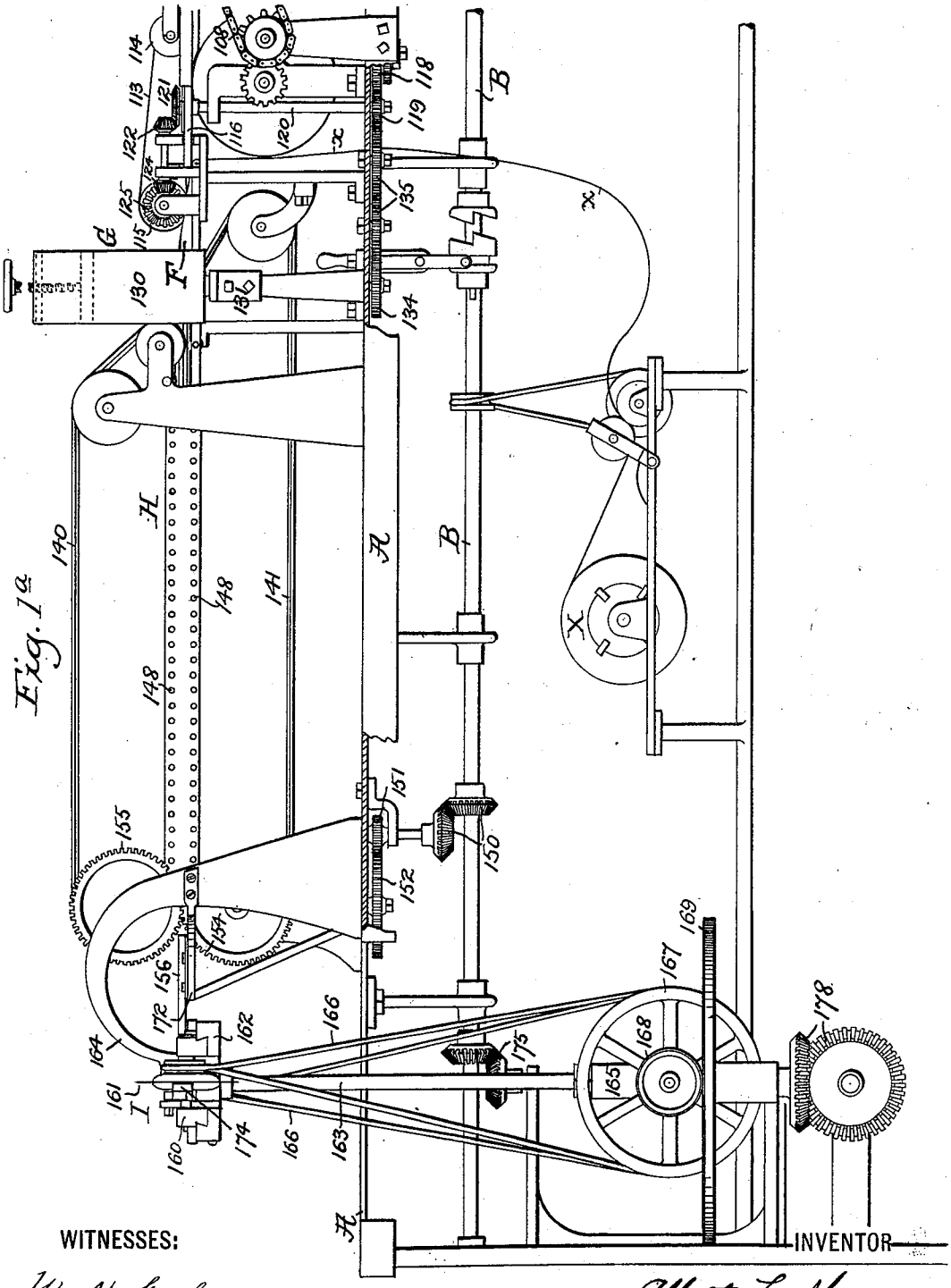
(No Model.) 12 Sheets—Sheet 2.

A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.



WITNESSES:

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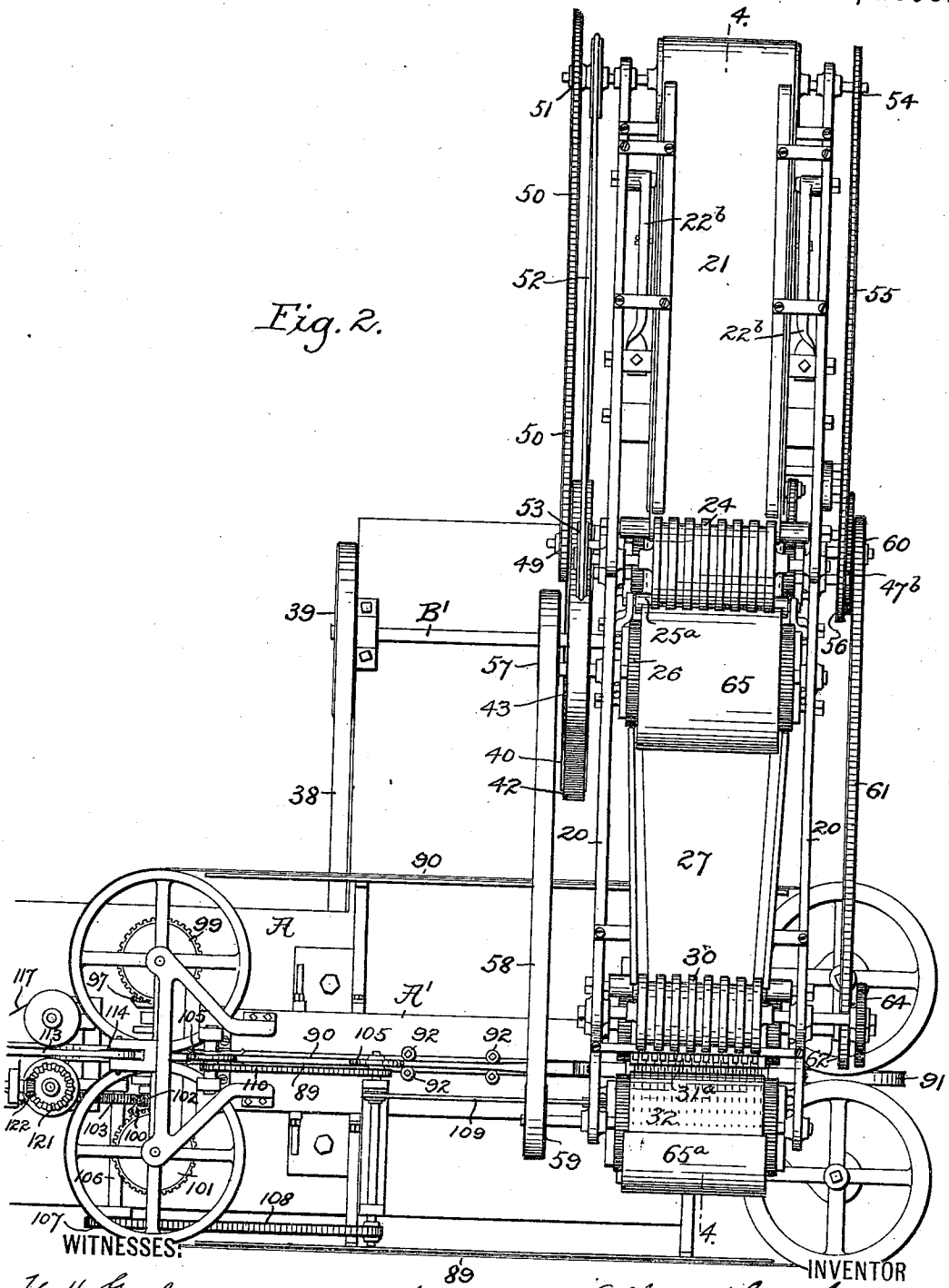
12 Sheets—Sheet 3.

A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

Fig. 2.



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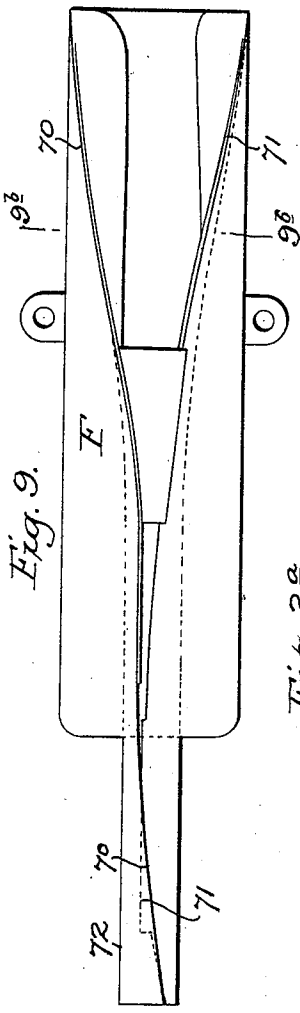
(No Model.)

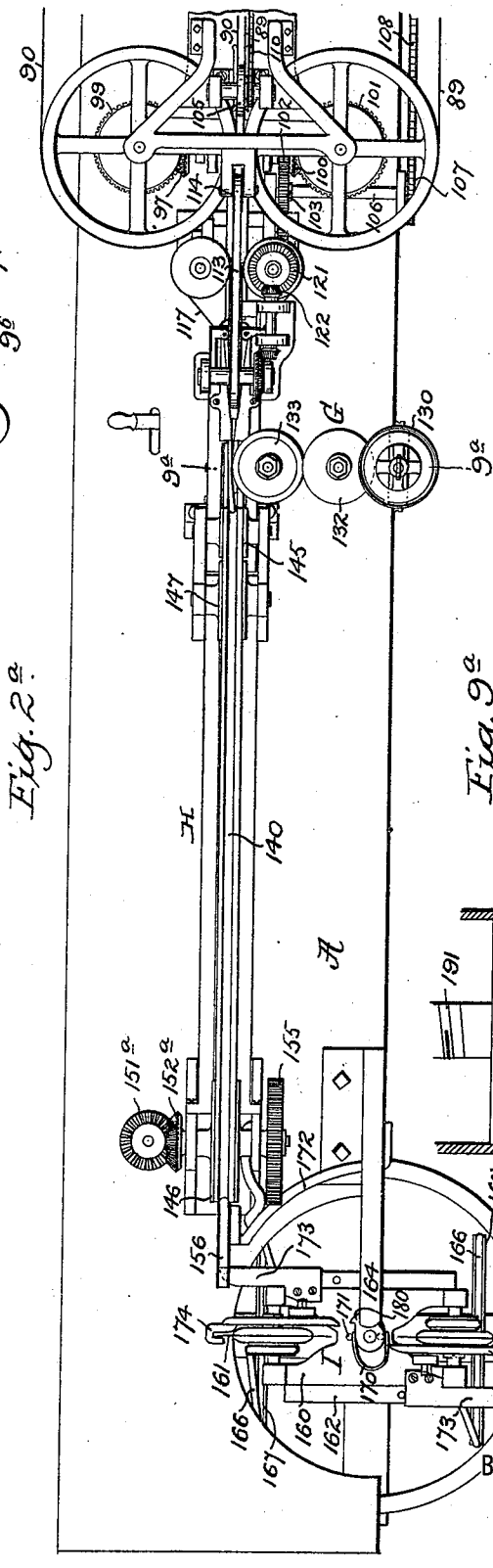
12 Sheets—Sheet 4.

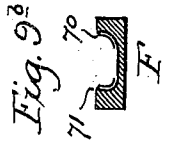
A. L. MUNSON.

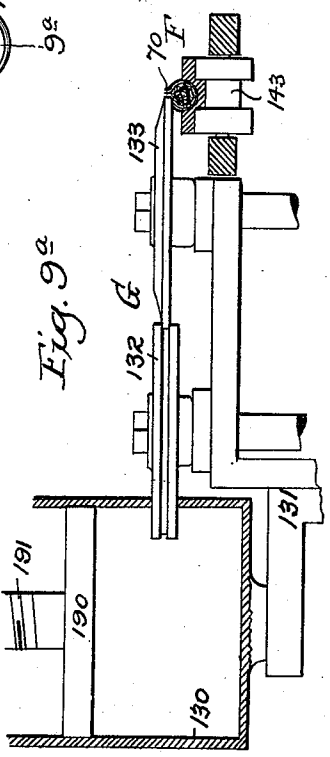
CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.









WITNESSES:

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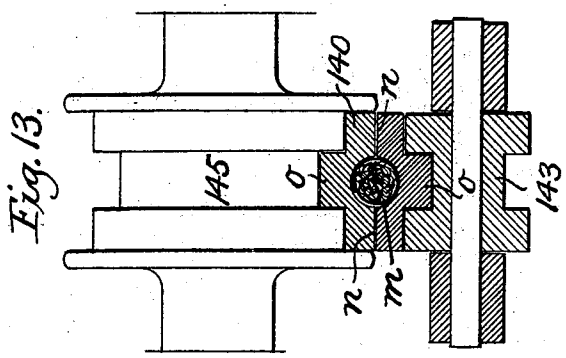
(No Model.) 12 Sheets—Sheet 5.

A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.



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A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

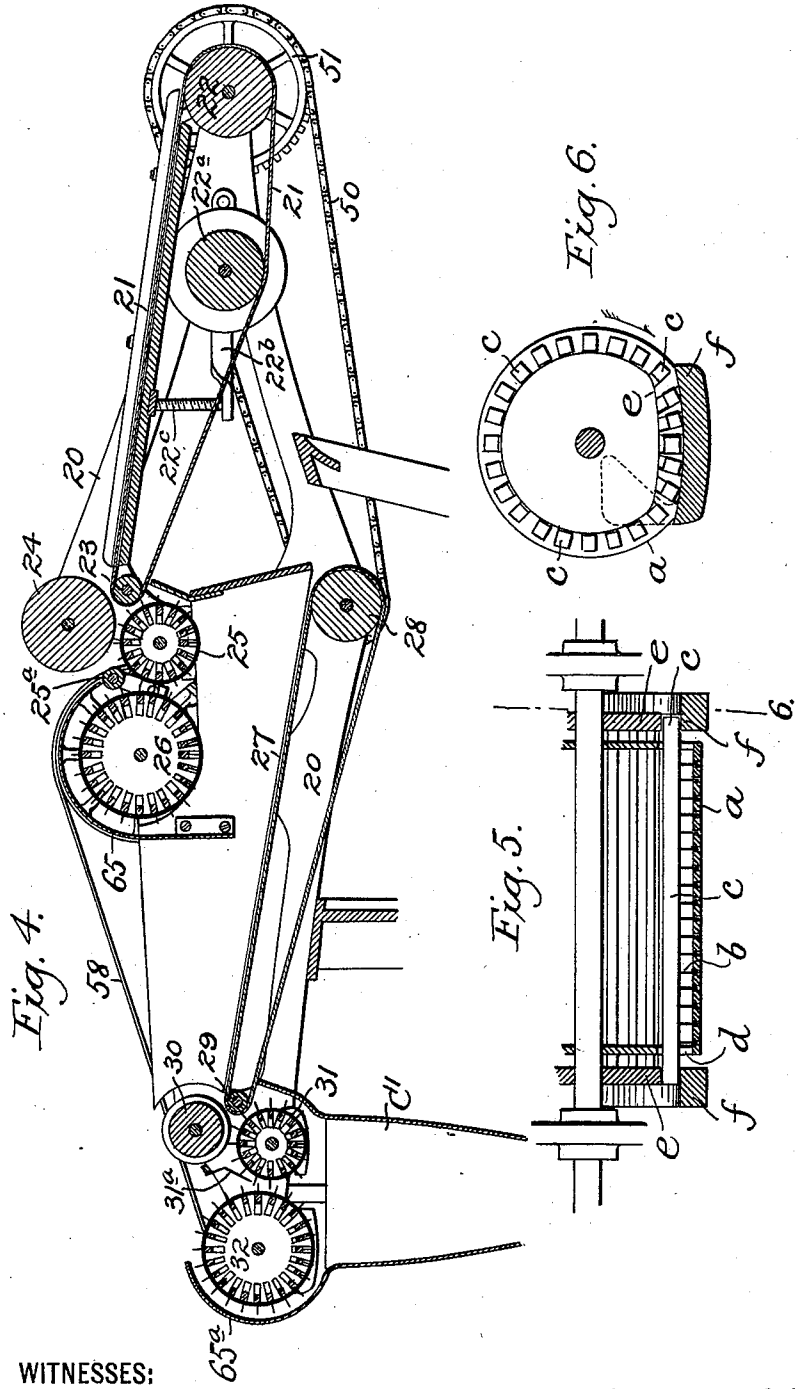

Fig. 4.

Fig. 6.

Fig. 5.

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A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

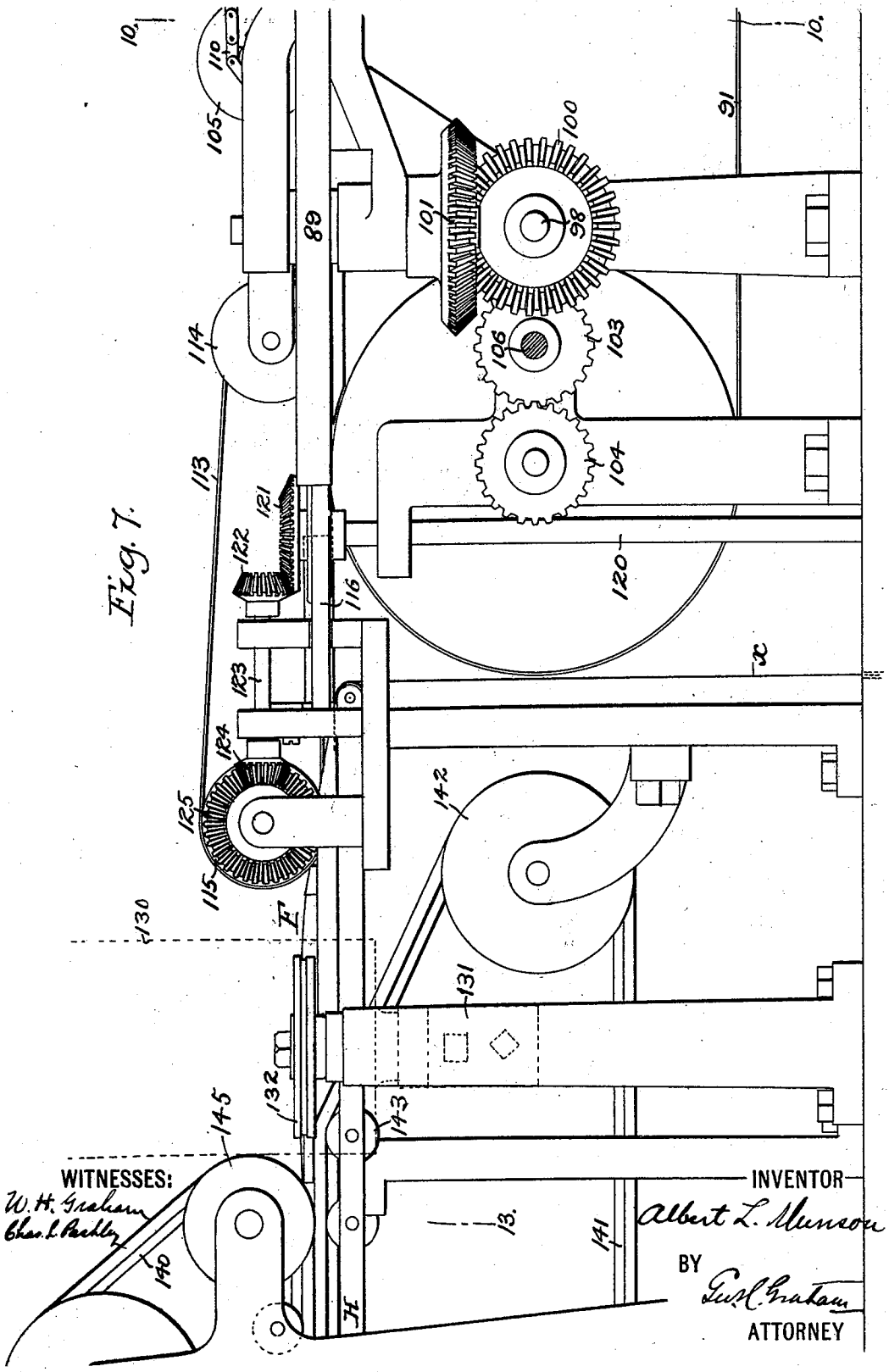

Fig. 7.

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(No Model.)

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CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

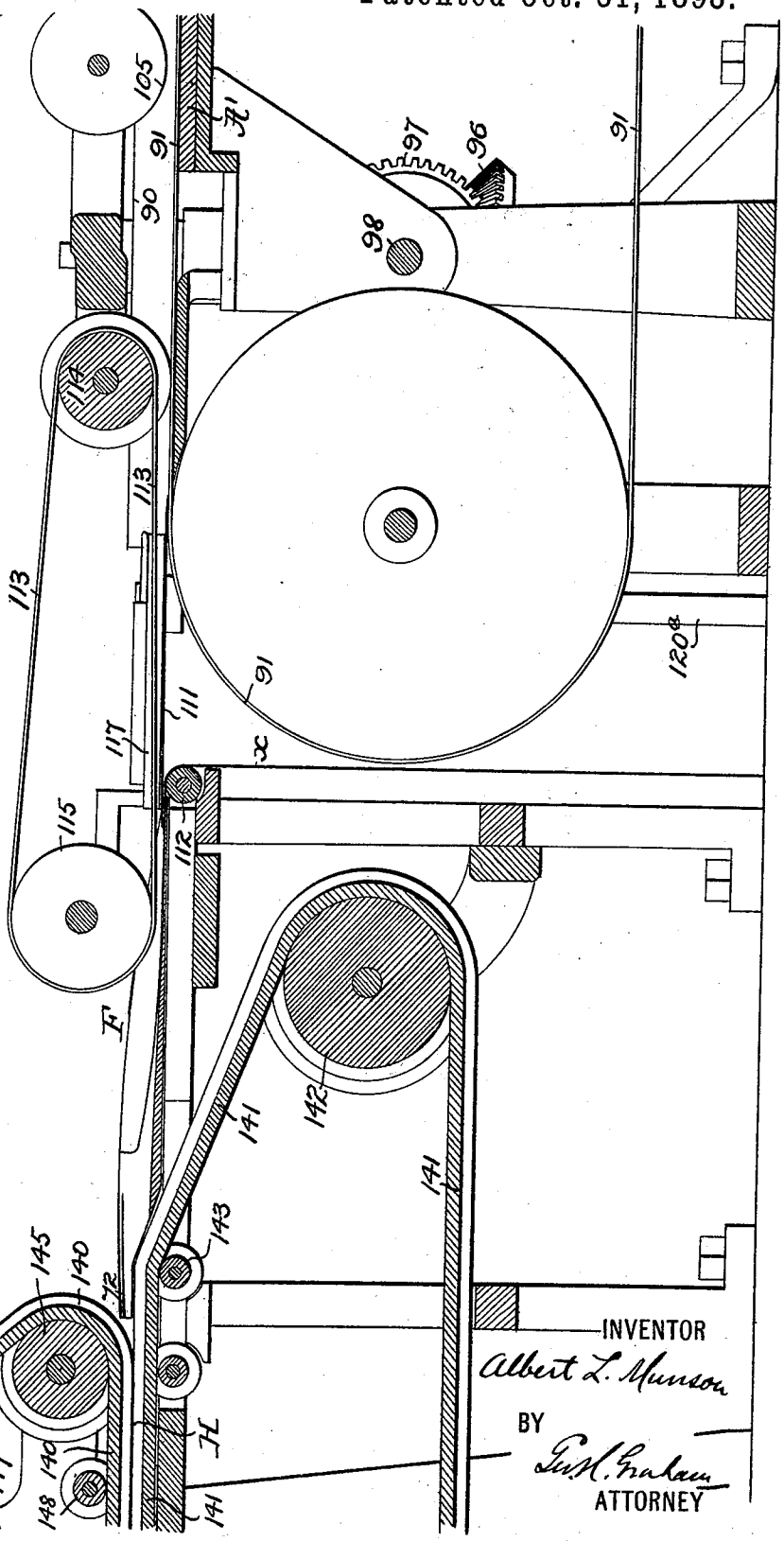

Fig. 8.

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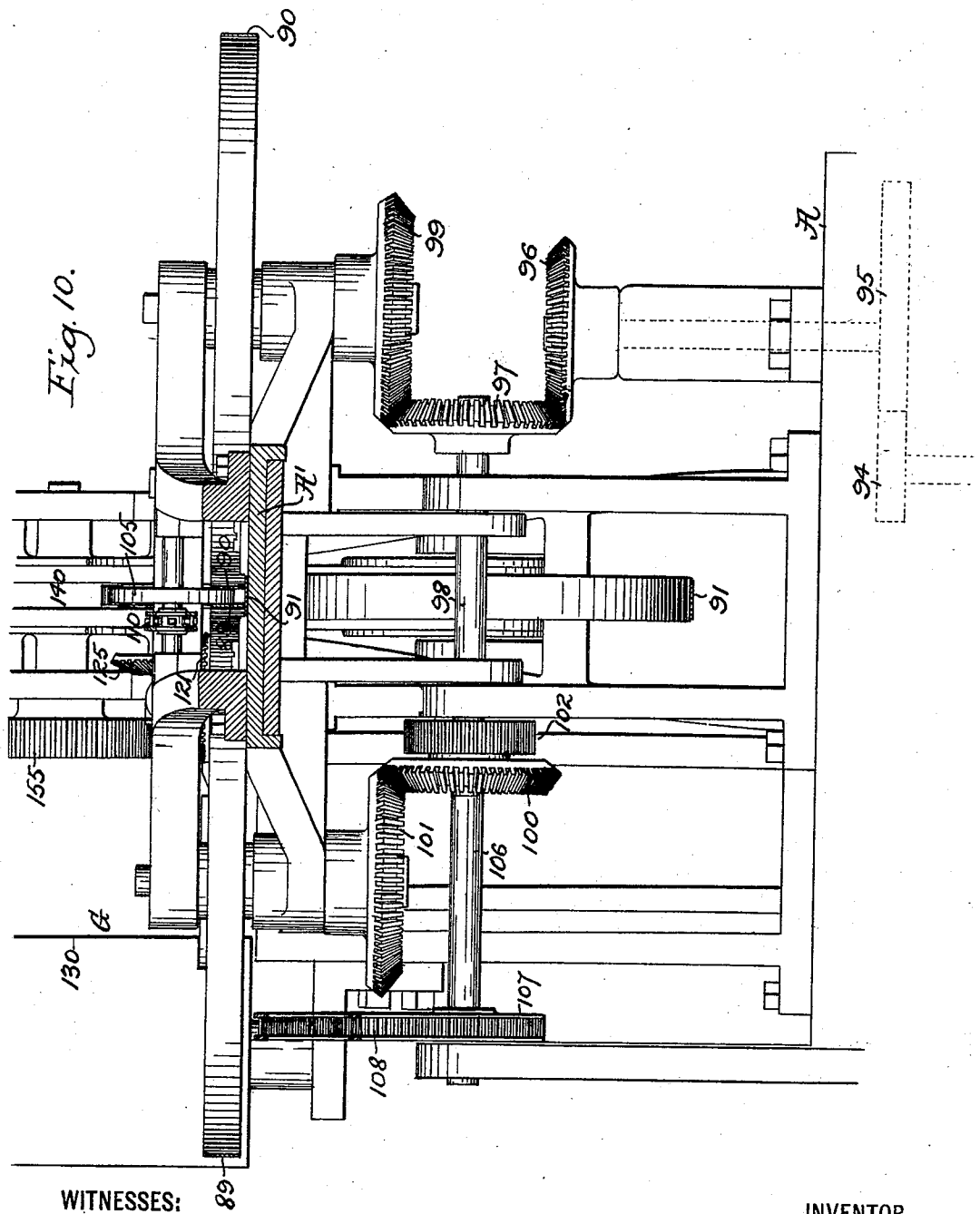
12 Sheets—Sheet 9.

A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

Fig. 10.



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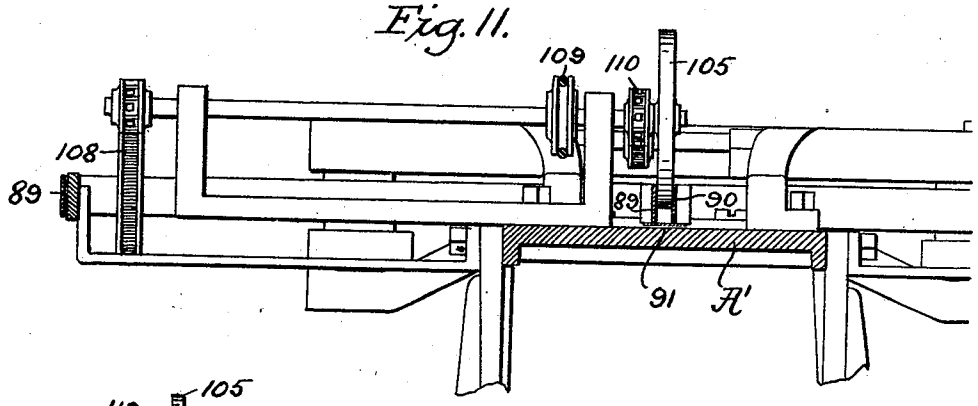
A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

Fig. 11.



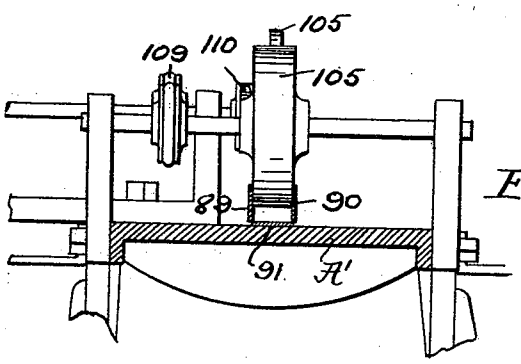
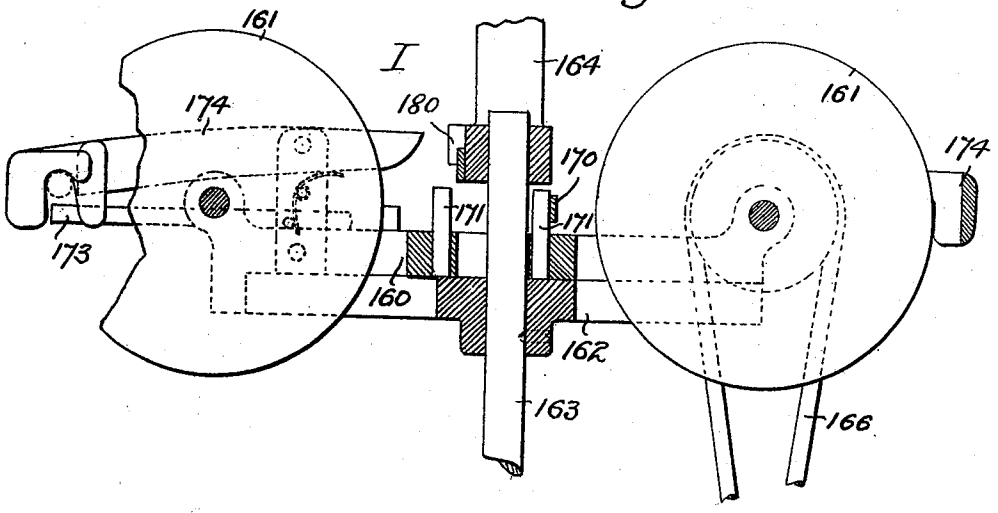


Fig. 12.

Fig. 13.



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(No Model.) 12 Sheets—Sheet 11.

A. L. MUNSON.

CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

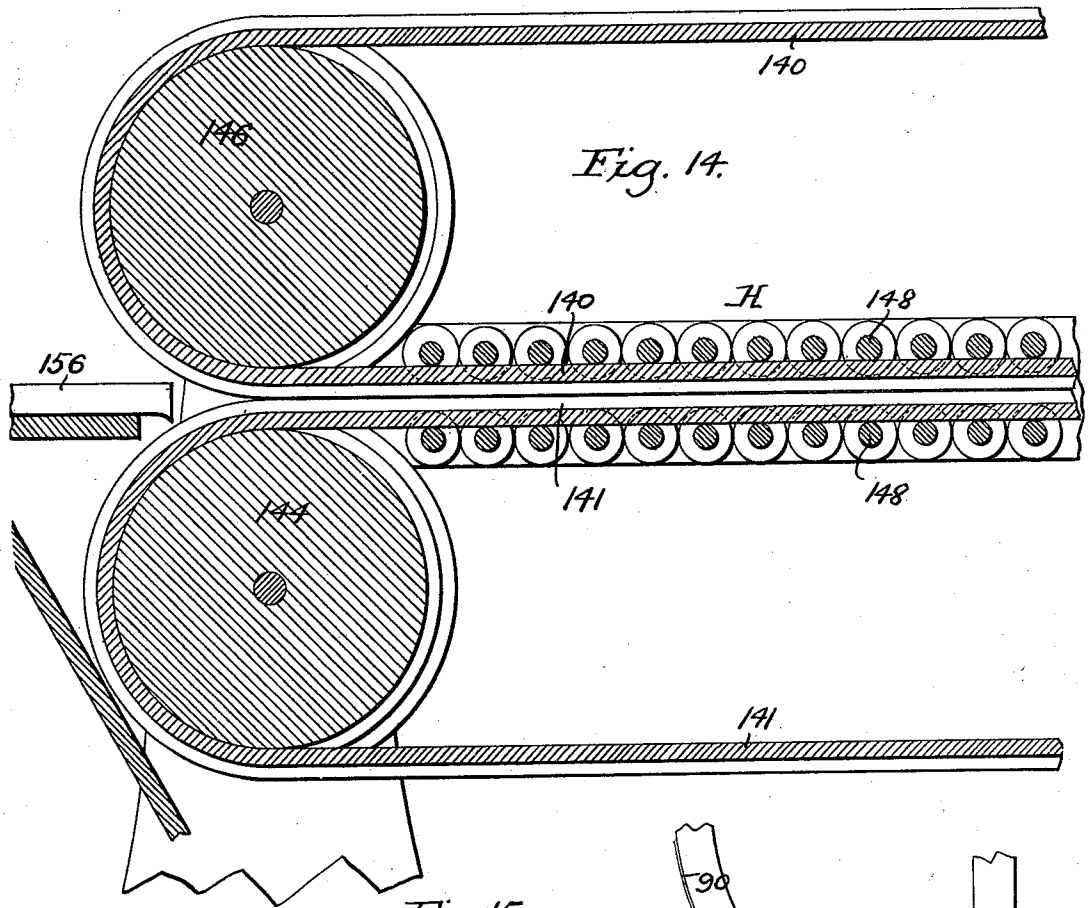

Fig. 14.

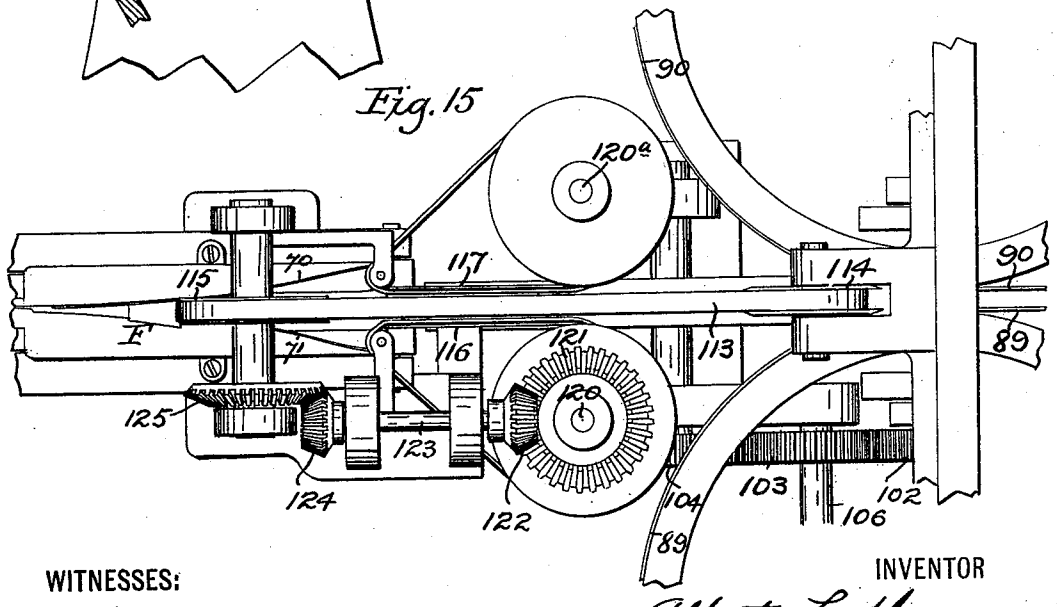

Fig. 15

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(No Model.) 12 Sheets—Sheet 12.

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CIGARETTE MACHINE.

No. 507,631. Patented Oct. 31, 1893.

Fig. 17.

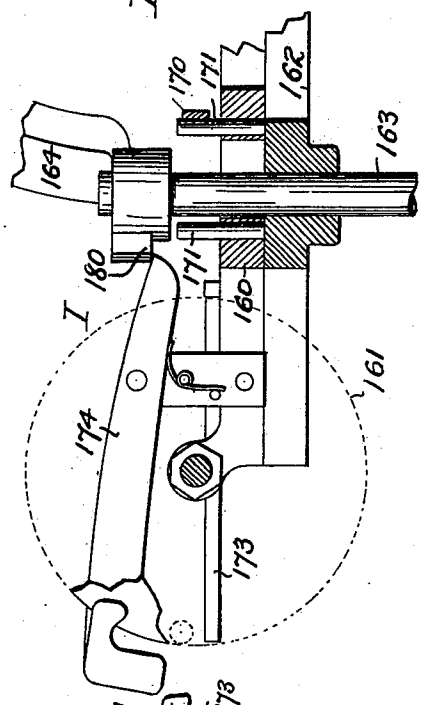


Fig. 18.

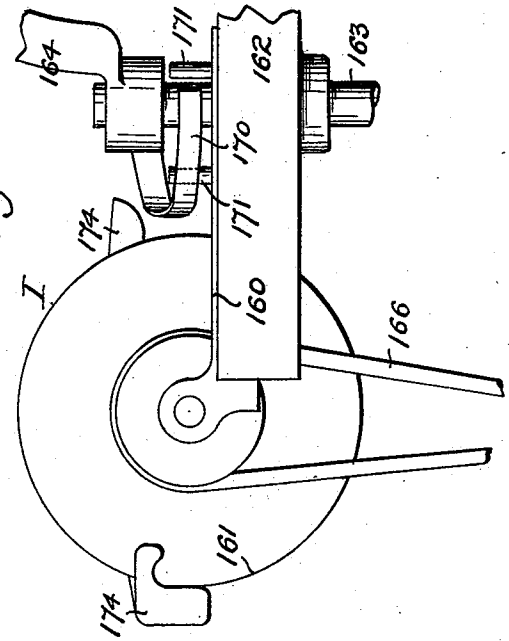
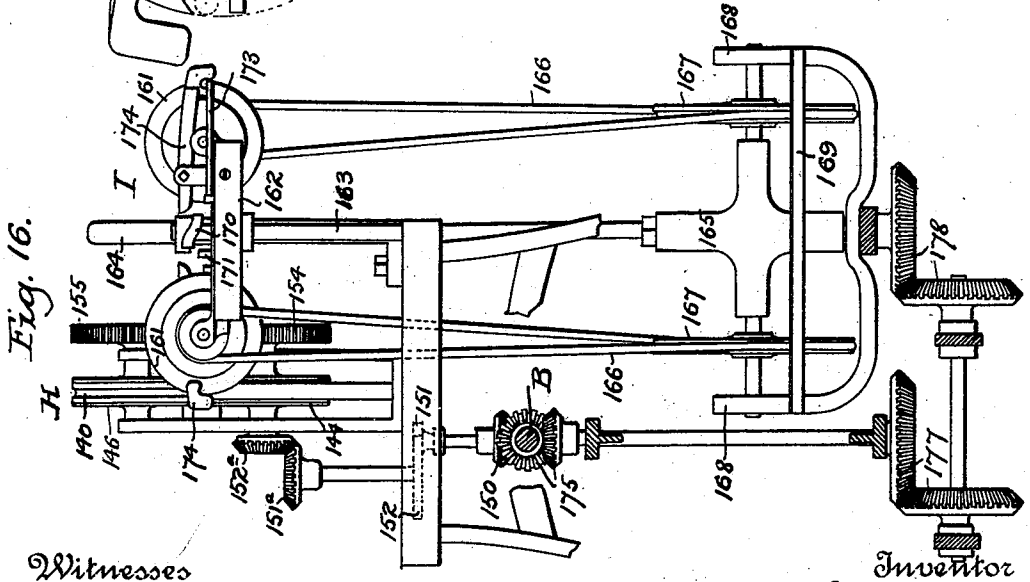


Fig. 16.



Witnesses
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Chas. L. Pashley

Inventor
Albert L. Munson
By his Attorney
Geo. H. Graham

UNITED STATES PATENT OFFICE.

ALBERT L. MUNSON, OF NEW YORK, N. Y., ASSIGNOR TO THE TOBACCO COMPANY, OF SAME PLACE.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 507,631, dated October 31, 1893.

Application filed April 18, 1893. Serial No. 470,925. (No model.)

To all whom it may concern:

Be it known that I, ALBERT L. MUNSON, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Cigarette-Machines, of which the following is a specification.

This invention relates generally to machines for making cigarettes; and particularly to that class of such machines wherein the tobacco in the form of a continuous filler is enveloped by a continuous wrapper strip to one edge of which a line of cement is applied so that when the edges of the strip overlap and meet they will unite completely enveloping the filler to form a continuous cigarette ready to be severed into short lengths or cigarettes.

The object of the present invention is, among other things, to provide an automatically operating machine for the production of cigarettes, and by which cigarettes are speedily and economically made; and to this end the invention consists in the novel structure, arrangement and combination of parts hereinafter fully set forth.

In the accompanying drawings which illustrate a practical embodiment of the present improvements:—Figures 1 and 1ª together form a side elevation of the complete machine, a portion of the parts in one figure being duplicated in the other. Figs. 2 and 2ª together form a plan view of the complete machine, a portion of the parts in one figure being duplicated in the other. Fig. 3 is an end view of the complete machine looking from the side of the tobacco feeding device. Fig. 4 is a longitudinal vertical section on the line 4, 4, of Fig. 2, showing the tobacco feeding device. Fig. 5 is a vertical section through one of the picker rolls of the tobacco feeding device. Fig. 6 is a vertical section on the line 6 of Fig. 5 showing the cams for operating the movable pickers of the picker roll. Fig. 7 is an enlarged side elevation of the parts intermediate of the filler forming devices and the cigarette carrier. Fig. 8 is a vertical central section of the same. Fig. 9 is a plan view of the wrapper former or guide. Fig. 9ª is a cross section on the line 9ª of Fig. 2ª. Fig. 9ᵇ is a cross section on the line 9ᵇ of Fig. 9. Fig. 10 is a cross sectional elevation taken on the line 10, 10, of Fig. 7. Fig. 11 is a similar view taken on the line 11 of Fig. 2. Fig. 12 is a similar view taken on the line 12 of Fig. 2. Fig. 13 is a similar view taken on the line 13 of Fig. 7. Fig. 14 is a longitudinal section of a portion of the cigarette carrier. Fig. 15 is an enlarged plan view of the intermediate forwarding belts arranged between the wrapper former and the filler forming belts. Fig. 16 is an end elevation of the delivery end of the machine showing particularly the severing device. Figs. 17, 18 and 19, are enlarged vertical sectional details of a portion of the severing device showing the parts in different positions.

Before entering into a detailed description of the construction and operation of the various instrumentalities which go to form the complete organization illustrated, it may be stated that such organization embraces first, a means by which the tobacco is prepared and fed in condition to be operated upon by the cigarette forming devices, and hereinafter called the tobacco feeding devices, which includes a vertical tobacco conduit, channel or passage way; second, means by which the loose tobacco fed to the machine is prepared in the form of an endless filler and fed forward, and hereinafter called the filler-former or filler forming devices; third, means by which a wrapper strip is fed in position to be fed forward from a roll or other source of supply in position to meet the filler to envelop the latter, and hereinafter termed the wrapper strip paying off or feeding devices; fourth, means by which the wrapper strip is curved and turned over the continuous filler to envelop the same, and hereinafter termed the wrapper former or guide, which also includes the cigarette former; fifth, means by which a line of paste is applied along the edge of the wrapper strip, and hereinafter called the pasting device; sixth, means by which the continuous cigarette or wrapper strip with inclosed filler is fed or carried positively forward, and hereinafter called the cigarette carrier; and seventh, means by which the continuous cigarette is severed into cigarette lengths, and hereinafter called the severing device. As herein combined the above mentioned several devices co-operate to feed the loose tobacco to the machine, prepare such

tobacco in the form of a continuous cigarette-filler, feed said filler forward to the wrapper strip, feed the wrapper strip forward to meet the filler, partially envelop the filler, with the wrapper strip, apply a line of paste to one edge of the wrapper strip, complete the wrapping of the wrapper strip around the filler, carry the continuous cigarette thus made forward and sever it into cigarette lengths forming complete cigarettes ready for the market.

Referring now to the drawings, it is to be understood that these various instrumentalities are all mounted upon or carried by a supporting table A, from which is also supported a main driving shaft B that imparts the necessary movements to the operative parts of the machine.

As a detailed description of the construction, arrangement and operation of the various devices forming the machine illustrated may be best had by describing each of the devices hereinafter mentioned forming the complete organization, such method of description will be adopted, at the same time indicating at the proper times the relation of each of said devices with the others and their manner of co-operation in the construction and function of the entire organization.

The tobacco feeding devices.—The tobacco feeder C is mounted in a suitable frame work, see Figs. 1, 2 and 4, rising from the machine table at the left hand of the machine and is arranged to prepare and feed the loose tobacco forward at right angles to the ultimate direction the prepared filler, wrapper-strip and completed cigarette move. These devices consist of two aprons and their respective picker rolls, the aprons being arranged somewhat inclined to carry the tobacco which may be placed thereon and deliver it into the picker rolls. The primary apron 21 is stretched around a pair of rolls 22, 23, journaled in the framework 20, the inner roll 23 being shown of less diameter than its companion roll 22, and there is provided a stretcher roll 22^a that is mounted in a pair of pivoted arms 22^b adjusted and held in their adjusted positions by an adjusting screw shaft 22^c. There is also provided a grooved upper roll 24 immediately beyond the inner end of the apron with its surface just below the upper surface of the primary apron 21 adapted to coact with the apron to carry the tobacco onto the picker roll 25 of a pair of picker rolls 25, 26. These picker rolls by their peculiar picking operation and by their peculiar construction, to be hereinafter explained, separate or loosen the tobacco fed to them by the primary apron so that in falling therefrom onto the secondary apron 27, it will be loosened with the fibers more or less separated preparatory to be formed into the cigarette filler. The secondary apron 27 is located immediately below the picker rolls 25, 26, and is stretched around rolls 28, 29, that are mounted in the framework 20, and at the upper inner end of said apron there is provided a grooved roll 30 and immediately below it and beyond the end of the apron there is mounted a pair of picker rolls 31, 32, which take and act upon the tobacco fed to them by the secondary apron and separate and further loosen the tobacco and permit it to fall or deliver it into a vertical passage way C′ that leads at its lower end to the filler former hereinafter described. The grooved rolls 24 and 30 allow the picker pins of the picker-rolls to enter beyond their periphery so as to take the tobacco that may cling to their surfaces and thus enable the tobacco to be laid evenly and solidly onto the picker rolls in the best shape for the picking action of such rolls. Suitable motion, in the present case, continuous motion, is imparted to these aprons and rolls from a counter driving shaft B′ mounted in bearings at the left hand end of the machine, and carrying a driving pulley 33 and a balance wheel 34. Said shaft is also provided with a driving pinion 35 that meshes with a gear wheel 36 on the end of the driving shaft B, through which said shaft is driven. The counter shaft B′ is also provided with a pulley 37 from which, through a belt 38 stretched around said pulley 37 and another pulley 39, motion is imparted to an intermediate shaft B^2 that is mounted in bearings rising from the machine table A and to which said latter pulley is secured. This intermediate shaft carries a pulley 40 and a sprocket wheel 41; from the pulley 40 there is stretched a belt 42 which passes around a pulley 43 secured to the picker roll 26; and from the sprocket wheel 41 there passes a chain 44 that is stretched around a sprocket wheel 45 mounted on a short shaft 46 that also carries another sprocket wheel 47 around which is stretched another chain 47^a, thence to a sprocket wheel on another shaft 46^a which carries a second sprocket wheel around which is stretched another chain 47^b, thence to a sprocket wheel secured to another shaft 46^b to which shaft is secured a gear 47^c that meshes with a gear wheel 48 secured to the end of the shaft of the secondary apron roll 28. The shaft to this apron roll at its opposite end carries a pulley 49 from which a chain 50 is stretched around a sprocket 51 secured to the end of the primary apron roll 22, and from the same end of the shaft of this roll 22 there is secured another pulley from which is stretched a cross belt 52 that passes around a pulley 53 secured to the end of the shaft of the grooved roll 24. At the opposite end of the shaft of the roll 22 there is provided a sprocket wheel 54 around which passes a chain 55, to a sprocket 56 on the end of the shaft of the picker roll 25. Upon the opposite side of the frame work 20, the shaft of the picker roll 26 is provided with a second pulley 57 from which passes a belt 58 which is stretched around a pulley 59 secured to the end of the shaft of the picker roll 32; and the shaft of the secondary apron roll 28, which also carries the gear wheel 48, carries a sprocket wheel 60 from which is

stretched a chain 61 that passes around a sprocket 62 on the end of the shaft of the picker roll 31. The same end of the shaft of the picker roll 31 carries a gear 63 that meshes with a similar wheel 64 secured to the end of the shaft of the roll 20. The motion of the counter driving shaft D′ is transmitted to the intermediate shaft B^2 and from thence by the several chains and sprocket wheels to each of the aprons 21, 27, and to the several rolls and picker rolls, so that the tobacco that is spread upon the primary apron by the attendant is fed forward beneath the roll 24 onto the picker roll 25 and thence into the bite of said roll and its companion picker roll 26 which pick, loosen and otherwise operate upon the tobacco so that it will fall in a separated or loosened state upon the secondary apron 27 and this tobacco will be again fed forward by said secondary apron beneath the roll 30 onto the picker roll 31, and thence into the bite of said roll and its companion roll 32 and by them again picked and loosened and delivered therefrom into the passageway or channel C′. Owing to the scattering action of the pairs of picker rolls the picker roll 26 is provided with a shield 65 and the other roll 32 is similarly provided with a shield 65^a, thereby confining the tobacco to the machine. The picker rolls 25, 26, may be provided with an intermediate deflecting roll 25^a which tends to direct the tobacco downward into their bite, and the other picker rolls 31, 32, may be provided with an intermediate deflecting plate or fingers 31^a for a similar purpose. The general construction of the picker rolls as herein shown is substantially the same, and as shown in Figs. 4, 5 and 6 consists of a hollow cylinder or shell *a* provided with openings in its periphery to permit the protrusion and withdrawal of rows of picker pins *b*. The picker pins *b* are secured to and project from a multiplicity of cross rods *c*, the opposite ends of which project through slots *d* in the ends of the hollow cylinder or shell *a*, for contact with a pair of cams *e*, *f*, carried by the frame work at each end of the roll. The shape of the cams *e*, *f*, is such that as the picker roll rotates in the direction of the arrow Fig. 6, the protruding ends of the cross rods *c* successively leave the concentric portion of the cam *e* which normally holds the pins protruding to bear against the inner surface of the cam *f*, which moves said cross rods inwardly toward the axis of the roll so as to withdraw the pins to a point within its periphery and thus effectually strip or clean such pins of any tobacco that may cling thereto, and permit it to fall either onto the secondary apron 27 or into the vertical passage way C′. As the picker roll rotates and the ends of the cross rods *c* successively leave the cam *f*, they meet the under surface of the cam *e* and are again moved outwardly so as to project their pins from the periphery of the roll ready for the succeeding picking operation. While, as before stated, this construction of the picker-roll applies to each one of the two sets of picker rolls 25, 26, and 31, 32, it is obvious that it might apply to either of said rolls or to a single pair. The vertical passageway or channel C′ into the upper end of which the loose tobacco from the secondary apron is delivered, is supported in any suitable manner from the frame work 20, in position to direct the falling tobacco from the picker rolls 31, 32, into the conduit forming the filler former now to be described.

The filler former.—The filler forming devices D are located immediately below the exit of the vertical passageway or channel C′ so as to receive the tobacco delivered therefrom. In construction and operation this filler former is substantially like that shown in the Trowbridge patents, Nos. 99,372 and 143,545, and, therefore, need no specific description. It may be stated, however, that these devices consist of three endless belts 89, 90 and 91, preferably of metal stretched around, guided and supported by suitable rolls so as to form a horizontal trough or channel the sides of which are formed by the active portions of the belts 89, 90, and the bottom thereof by the belt 91. The operative portion of the belts forming the sides of the channel are kept to duty and prevented from spreading by rolls 92 located at intervals between the supporting rolls of the respective belts, as shown in Fig. 2; and the belt forming the bottom of the channel is supported by and moved over a supplementary table A′, see Figs. 1, 2 and 8. The tobacco as before explained continuously delivered into the vertical passageway C′ is received by the horizontal conduit forming the filler former so that it is carried onward toward the wrapping devices in the onward movement of the filler forming belts. This movement of the filler forming belts which is a continuous one, is derived from the main driving shaft B through a pair of bevel wheels 93, one of which is secured to said driving shaft and the other to one end of a short vertical shaft that carries at its upper end a gear wheel 94 that meshes with a similar wheel 95 on the end of a vertical shaft to the upper end of which is secured a beveled wheel 96. The beveled wheel 96 gears with a similar wheel 97 mounted at one end of a horizontal cross shaft 98 which wheel in turn meshes with another beveled wheel 99, secured to the end of one of the supporting rolls carrying the belt 90. The cross shaft 98 carries at its opposite end another beveled wheel 100 that meshes with a similar wheel 101 fixed to the shaft of one of the supporting rolls carrying the belt 89, and by this gearing from the main driving shaft B the two belts 89 and 90 are driven continuously and in unison. The other belt 91 is similarly driven from the cross shaft 98 from a gear wheel 102 fast to said cross shaft meshing through an intermediate 103 with a gear wheel 104 fast to the shaft of one of the supporting rolls carrying the belt 91. The ar-

rangement of the gearing driving the three belts 89, 90and 91 is such that said belts travel in unison at the same surface speed carrying the tobacco delivered from the vertical passageway C′ forward toward the cigarette forming devices. The tobacco carried along by these belts is pressed or otherwise shaped into rod-form by one or more presser rolls 105, the peripheries of which extend into the conduit between the belts 89, 90, to bear upon the tobacco being carried forward by said belts. As herein shown, and in the preferred construction, these presser rolls are positively driven from any proper part of the machine, as, for instance, from the shaft carrying the intermediate gear wheel 103. This shaft 106 carries a sprocket 107 around which passes a chain 108, passing thence around a sprocket wheel on the end of the shaft carrying the center one of the three pressing rolls 105, and from this shaft the other two pressing rolls are driven, the one by a belt 109 and the other by a chain 110.

The wrapper strip and cigarette forming devices.—The wrapper and cigarette former F is mounted in line with the direction of movement imparted to the tobacco filler by the filler forming belts 89, 90 and 91, previously described, so that the filler in passing from said belts will be received by the former F to be incased in the wrapper strip to form the cigarette. The former, F, see Figs. 9, 9ª. 9ᵇ, in the preferred construction as herein shown consists of a metal guide, the edges 70, 71, of which from the entrance end of the guide are doubled as in Fig. 9ᵇ and gradually curve and bend inwardly toward each other until they merge into a substantially tubular portion 72, the edge 70 overlying the opposite edge 71 as shown in Fig. 9; the doubled edges terminating short of the tubular portion. This former is of a shape adapted to gradually curve the wrapper strip from a substantially flat condition in which it enters the former, (the longitudinal edges of which are received within the doubled edges thereof,) to a circular or tubular condition in cross section with one edge of the strip temporarily standing vertically in position to lap over onto the other edge as shown in the detailed cross section, Fig. 9ª. From this point this edge 70, of the former curves downwardly to direct its edge of the wrapper strip over the underlying edge of said strip and finally merges into the tubular portion 72 to carry the one edge of the wrapper strip into firm contact with the underlying portion of the wrapper, thus having entirely incased the tobacco-filler. The space between the termination of the filler-former formed by the belts 89, 90 and 91, and the entrance end of the cigarette former F, see Fig. 8, is bridged by a plate 111 supported from some part of the machine, one edge of which plate overlies the belt 91 and its forward edge overlying but not touching the end of the former F, so that the tobacco-filler is properly supported in its passage from the end of the filler-former onto the wrapper strip passing onto the former F. At the entrance end of the former F immediately below the forward end of the bridge plate 111 there is provided a roll 112 over which the wrapper strip is led and from which it passes into the former F beneath the forward end of the bridge plate 111. In this manner the wrapper strip is presented and passes onto the former F separated by the end of the bridge plate 111 from the tobacco-filler that is being conducted along said plate onto the wrapper strip. In order to aid the movement of the tobacco filler from the filler-former into the cigarette former, there is provided an intermediate carrying belt, 113, see Figs 7, 8 and 15, that is stretched around a grooved roller 114 mounted immediately at the exit end of the filler former and also around a pulley 115 mounted immediately above and somewhat in advance of the entrance of the former F. The active portion of this belt 113 is slightly inclined from the filler-former to the cigarette-former so that its pressure upon the tobacco-filler gradually increases as it advances away from the filler-forming belts as is shown in Fig. 8, and thus feeds the filler positively onward. This same belt 113 extending over onto the former F also serves to positively draw the wrapper strip onto the former and hence relieves said strip of the drawing action of the completed cigarette carrier hereinafter described. There is also provided at this point a pair of intermediate side belts 116, 117, which extend on opposite sides of the belt 113 and aid in properly forwarding the tobacco-filler into the former F. These intermediate carrying belts are properly driven continuously from the main driving shaft B from the gear wheel 105 before referred to through a pair of intermediates 118 meshing with a wheel 119 secured to the lower end of a vertical shaft 120 the upper end of which carries the pulley of the belt 116 and also a bevel gear 121 that meshes with a beveled pinion 122 at the end of a short longitudinal shaft 123 whose opposite end carries a similar pinion 124 and gears with a bevel wheel 125 fast to the shaft of the roll 115. A second vertical shaft 120ª carrying the roll of the other belt 117 is similarly driven from said intermediate wheel 118.

The paste applying devices.—These devices so far as the other features of invention of the present construction are concerned may be of any preferred form, but as herein shown, the paster G consists of a vertical fountain 130 supported at the upper end of a bracket 131 rising from the table A. Near the lower end of the paste fountain there is an opening in its side in which lies a portion of an intermediate paste roll 132 that has a grooved periphery running continuously in contact with the periphery of the paster roll 133, the periphery of which latter roll 133 runs in contact with the longitudinal edge of the

wrapper strip presented by the upturned edge 70 of the cigarette former F. The entrance of the roll 132 substantially fills the opening in the side of the paste fountain so that there shall be no escape of the paste therefrom, but there may be provided suitable wipers bearing against the periphery of the roll to regulate the amount of paste that is permitted to adhere to the periphery of said roll to be carried and fed to the periphery of the paster roll 133 to be by it applied to the edge of the wrapper strip. As the roll 132 is grooved the wiper may be arranged to leave the paste in its groove, so that the depth of said groove will determine the quantity of paste supplied to the paster roll 133, the peripheral edge of said roll 133 being small enough to take into the groove. The paster roll 133 is continuously rotated in contact with the edge of the wrapper strip and with the grooved periphery of the intermediate roll 132 by a gear 134 secured to the lower end of its shaft which is driven by a pair of intermediates 135 and the wheel 119 before referred to. To effect the proper supply of paste to the roll 132, the fountain is provided with a follower 190 above the paste therein to continually force the paste into contact with said roll. This follower may be moved downward either continuously from some moving part of the machine, or by hand through the screw rod 191. The wrapper strip as it passes along through the former F with the tobacco filler lying thereon and being fed at the same surface speed as the wrapper strip is carried will be first partially wrapped around the filler, whereupon one longitudinal edge of said strip will be supplied with a line of paste from the paster roll 133 and said pasted edge of the strip in passing into the tubular portion 72 of the former will be folded down or lapped over the underlying edge of the strip so as to be united thereto and thus completely inclose the filler which issues from the end of said tubular portion of the former F fully wrapped in the condition of a continuous cigarette.

The cigarette carrying devices.—The cigarette carrier H is mounted immediately beyond the end of the former F and in position to receive the completely formed and continuous cigarette and to grasp and carry the same forward in a straight line with the filler-former and cigarette-former previously described. This cigarette carrier H consists essentially of a pair of endless elastic carrying belts 140, 141, the lower one of which is stretched from a roller 142, thence over one or more guide rollers 143, thence in contact for a considerable distance with the companion belt 140 and returns around a belt 144 back to the roller 142. The upper roller is stretched from a roller 145, thence along in contact for a considerable distance with the companion belt 141 and returns around a roller 146 over a roller 147 to the roller 145. Each of these belts is so formed as to provide a longitudinal semi-circular recess *m*, throughout the length of the belt, the recess of one belt coacting with that of the other belt to form a continuous and unbroken cigarette grasping and carrying tube. Each semi-circular recess *m* is bounded longitudinally on its opposite sides by flat surfaces *n*, which coact with similarly flat surfaces on the companion belt throughout the active portions thereof to form abutting and meeting surfaces which support the semi-circular recess and prevent too great a pressure on the cigarette that is being grasped between and carried by the belts. The several supporting rollers of these two belts 140 and 141, are flanged to keep them in alignment and the under surface of each belt is provided with a central rib *o*, extending longitudinally throughout the length of the belt which likewise passes or enters recesses in the several supporting rolls as is shown in Fig. 13. This longitudinal center rib *o* serves the important function of stiffening the belt cross-wise at the point where it is weakened by the presence of the recess *m* and prevents any tendency of the belt curling inwardly to disrupt the contour of its recess. Intermediate between the entrance end of the carrier H and its exit end each of the belts along their active portions is supported and held with their longitudinal flat surfaces *n* in contact one with the other with the walls of the recesses grasping the continuous cigarette, by an interposed series of rolls, 148, which are so positioned and adjusted with respect to said active portions of the belts as to cause such belts to grasp the cigarette with sufficient firmness as to carry it onward without destroying its shape and at the same time draw forward the wrapper strip from the web or other source of supply. The under carrying belt 141 meets the under side of the completed cigarette slightly in advance of the upper belt 140 as is shown in Fig. 8. The two endless elastic carrying belts provide an exceedingly effective means for carrying the finished and continuous cigarette forward and obviously may grasp such cigarette evenly and uniformly throughout a long length thereof so that the strain of its carrying movement is distributed over a long length of the cigarette and thus obviate any danger of disrupting the same. The cigarette being confined between these two belts for some time the line of paste uniting the two longitudinal edges of the wrapper strip has a chance to become more or less dry so that when the cigarette ultimately issues from the exit end of the carrier H it will not only be perfectly formed but will be smooth and free from wrinkles. By making each of these carrying belts of some elastic material they may not only be readily stretched around rollers so as to form a continuous cigarette-carrier, but the cigarette receiving and grasping recesses therein are unbroken and free from all joints which have heretofore been present in a continuous carrier of non-elastic

material. By reason of the absence of all joints in the carrier belts and the continuous character of the recesses therein no objectionable creases are imparted to the completed cigarette and no liability of the wrapper being inadvertently caught or pinched between abutting sections as in sectional carriers. The carrying belts may be formed in a suitable mold which will provide the continuous semi-circular recess *m* bounded on opposite sides by the continuous flat surfaces *n*. The carrying belts 140, 141, are driven continuously at proper speed and in unison with the speed of the belts of the filler former from the main driving shaft B through a pair of bevel gears 150, one secured to said main shaft and the other to the lower end of a short vertical shaft, the upper end of which shaft carries a bevel wheel 151ª in mesh with a similar wheel 152ª secured to the shaft of the roll 144 of the lower carrying belt 141; and the two belts are caused to move in unison by a pair of meshing gear wheels 154, 155.

The severing device.—As the continuous cigarette issues from between the carrier belts 140 and 141, of the cigarette carrier it is received and temporarily supported by a short semi-tubular guide 156, see Figs. 2ª and 14, near the extremity of which is mounted the severing device I. This severing device is in position and operates to sever the continuous cigarette into cigarette lengths as the continuous cigarette moves onward from between the carrying belts. So far as other features of the present invention are concerned, the severing device may be of any of the well-known forms, but the novel construction herein shown provides an efficient means by which the continuous cigarette is severed without disfiguring or buckling the cigarette lengths. As herein shown in Figs. 2ª, 16 to 19, the severing device consists of a rotary and laterally reciprocating cutter-carriage 160, in which is mounted one or more preferably rotary cutters 161. The carriage 160 is carried in guideways on the upper end of a rotary support 162 that is secured to a vertical shaft 163 supported in upper and lower bearings 164, 165. Where two cutters are employed they will be mounted to rotate in bearings on diametrically opposite sides of the carriage 160, the distance of travel from one cutter to the other representing the length of the ordinary cigarette supposing that the speed of revolution of the carriage 160 and the travel of the cutters are substantially the speed of movement of the continuous cigarette; and each cutter will be driven by a belt 166 extending around a pulley on its shaft and thence around a pulley 167 secured to a cross shaft mounted in bearings near the lower end of the vertical shaft 163. Rotary motion is communicated to the pulleys 167 and thence to the cutters during the revolution of the carriage 160 by means of a stationary disk 169, the upper surface of which is borne upon by a frictional wheel 168 secured to the cross-shaft of the pulley 167. The revolution of the carriage 160 is imparted from the main driving shaft B through a pair of bevel wheels 175, one secured to said shaft and the other to the upper end of a vertical shaft 176. From this shaft 176 motion is communicated to the vertical shaft 163 of the cutter carriage by two pairs of bevel gears 177, 178, one of the latter gears being secured to the lower end of said shaft 163. The cutter carriage 160 during its revolution is forced laterally—to cause one or the other of the cutters in succession to sever the cigarette—by a spring 170 acting upon one or the other of a pair of pins 171 projecting from the upper side of the cutter carriage. The action of this spring is controlled by a stationary cam 172 secured to the bracket 164 which extends in the path of an arm 173 one for each cutter 161 projecting from the cutter carriage 160, which, as the carriage is revolved restrains the action of the spring until the instant it is desired to throw the rotary cutter 161 laterally across the path of the continuous cigarette. The moment the cutter arrives in proper alignment with the cigarette the arm 173 leaves the cam 172 and the spring suddenly projects the carriage 160 and the cutter laterally so that the latter immediately severs the cigarette while it is moving along in the same direction and speed as the cigarette. In order to confine the cigarette to the cutter at the time it was being severed, the carriage 160 carries adjacent each cutter a cigarette support which consists of a spring pressed finger 174 pivotally mounted to the cutter carriage alongside of the cutter 161 with its forward end bifurcated to straddle the active portion of the cutter and also to partially surround the cigarette on both sides of the severing point. The inner end of the finger 174 during the revolutions of the carriage 160 moves under a cam 180 fixed at the end of the bracket 164 of such shape that the instant the cutter and carriage are moved laterally to throw the cutter across the cigarette the finger is released from the cam and its outer end immediately embraces the cigarette to steady it and confine it to the cutter as it is being severed thereby. The severed cigarette length falls from the finger and cutter into any proper receiver or receptacle. As the carriage revolves the inner end of the finger 174 again arrives under the cam 180 and is moved to its upper rocked position, Fig. 17, ready to be again tripped to embrace the cigarette at the point of the next severance. The finger 174 of the other cutter acts in a similar manner.

The wrapper strip feeding devices.—It is obvious that the wrapper strip *x* may be supplied to the former F in any suitable manner and hence no detailed description thereof is necessary. As herein shown in Fig. 1ª, it is supplied from a roll X payed off positively, slightly in advance of the feed of the intermediate belt 113, and the carrying action of

the cigarette carrier H, so that no undue tension is exerted on said strip.

The operation of the improved machine in detail has been stated in describing the several parts, and hence no further description of the same is deemed necessary. It will be understood, however, that the operation of the machine is continuous, that is to say, the tobacco prepared by the feeding devices is fed continuously into the vertical passageway C' and thence delivered into the conduit formed by the continuously moving filler forming belts to be formed into rod-form, adapted to form the filler of the cigarette; from such belts the tobacco filler is continuously moved onto the wrapper strip and incased thereby in passing through the former F; is continuously carried onward by the carrier H in the form of a continuous cigarette, and is finally severed into proper cigarette lengths by the severing device I ready to be assembled in packages for the market.

What is claimed is—

1. The combination of the tobacco feeding apron, a picker roll mounted at the end of said apron to receive the tobacco therefrom, said picker roll having a perforated shell through which project movable picker pins, means for withdrawing the pins within the periphery of its said shell, and another picker roll coacting with the first named roll to deliver the tobacco received from the apron, substantially as described.

2. The combination of the tobacco feeding apron, the pair of picker rolls, and the grooved upper roll adapted to lay the tobacco onto said picker rolls, substantially as described.

3. The combination of the tobacco feeding apron, the pair of picker-rolls having movable picker pins, and means for withdrawing pins within the periphery of the rolls substantially as described.

4. The combination in a tobacco picker roll, of cross rods mounted therein having pins projecting to the exterior of the roll, and means for moving the cross rods to withdraw the pins within the periphery of the roll, substantially as described.

5. The combination in a tobacco picker-roll having a perforated periphery, of a number of cross rods mounted in said roll having pins projecting through said perforated periphery, and a cam for withdrawing the pins within said periphery, substantially as described.

6. The combination in a tobacco picker roll having a perforated periphery, of a number of cross rods mounted in said roll having pins projecting through said perforated periphery, a cam for withdrawing the pins within said periphery, and another cam for projecting the pins, substantially as described.

7. The combination of the filler former, the cigarette former, the bridge plate bridging the space between said formers, an intermediate upper belt, and intermediate side belts for forwarding the filler onto the wrapper strip, substantially as described.

8. The combination of the cigarette former, the intermediate belt extending onto the former and inclined with respect to the direction of movement of the tobacco filler to exert a gradually increased pressure thereon to feed it positively onward, substantially as described.

9. The combination of the cigarette former, the bridge-plate overlapping the entrance to said former and the intermediate filler forwarding belt extending onto the former beyond the end of the plate to feed the wrapper strip and filler onward in unison, substantially as described.

10. The herein described pair of endless cigarette belts each having the semi-circular recess mounted to provide a continuous recess for the cigarette, the opposite side bearing surfaces and the central rib.

11. The combination with the cigarette former of the paste fountain, the intermediate grooved paste roll and the paster roll receiving paste from the groove of said intermediate roll, substantially as described.

12. The combination with the cigarette former, of the paste fountain, the follower in said fountain, the intermediate grooved paste roll and the paster roll receiving paste from the groove of the intermediate roll, substantially as described.

13. The combination with the cigarette former, of the paste fountain having an opening near its lower end, the intermediate grooved roll projecting into said opening and a paster roll receiving paste from the groove of the intermediate roll, substantially as described.

14. The combination of the continuously moving filler forming belts, the cigarette former, the continuously moving intermediate forwarding belts and the continuously moving elastic cigarette grasping and carrying belts having permanent and coacting cigarette recesses, substantially as described.

15. The combination with the cigarette forming devices, of a revolving head and a laterally moving cutter carried by said head for severing the cigarette into lengths, substantially as described.

16. The combination with the cigarette forming devices, of a revolving head and a laterally moving carriage carried by said head and a rotary cutter mounted in said carriage for severing the cigarette into lengths.

17. The combination with the cigarette forming devices, of a revolving and laterally moving cutter for severing the cigarette into lengths and a finger for holding the cigarette to the cutter at the instant of severance, substantially as described.

18. The combination with the cigarette forming devices, of the movable carriage having a cutter for severing the cigarette into

lengths and an independent movable finger for sustaining the cigarette at the instant of severance, substantially as described.

19. The combination with the cigarette forming devices, of a revolving and laterally moving cutter for the cigarette, a cam for restraining its lateral movement and a spring for imparting said lateral movement at the instant of severance, substantially as described.

20. The combination with the cigarette forming devices, of a revolving and laterally moving cutter for the cigarette, a cam for restraining its lateral movement against the force of a spring, a movable finger for sustaining the cigarette while being severed and a cam for operating the finger, substantially as described.

21. The combination with the cigarette forming devices, of a revolving support, a laterally moving carriage carried on said support and revolved therewith and a rotary cigarette cutter mounted in said carriage, substantially as described.

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

ALBERT L. MUNSON.

Witnesses:

GEO. H. GRAHAM,

E. L. TODD.

Correction in Letters Patent No. 507,631.

It is hereby certified that the assignee, "The Tobacco Company," in Letters Patent No. 507,631, granted October 31, 1893, upon the application of Albert L. Munson, of New York, N. Y., for an improvement in "Cigarette-Machines," should have been described and specified as *The Munson Tobacco Company;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 14th day of November, A. D. 1893.

[SEAL.] JNO. M. REYNOLDS,
Assistant Secretary of the Interior.

Countersigned:

JOHN S. SEYMOUR.
Commissioner of Patents.