

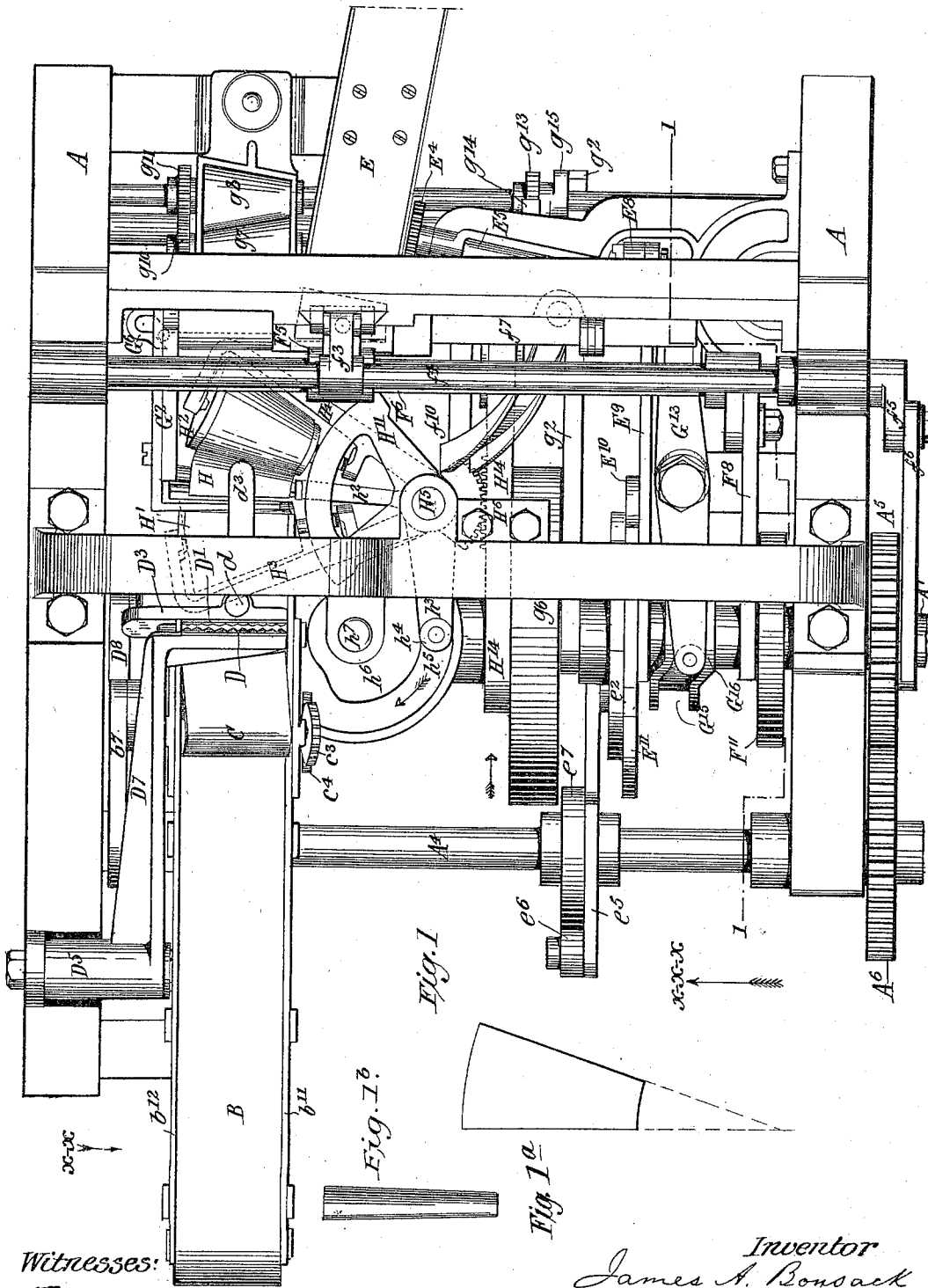
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10 Sheets—Sheet 1.

J. A. BONSAACK.
CIGARETTE MACHINE.

No. 585,254.

Patented June 29, 1897.



Witnesses:

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(No Model.)

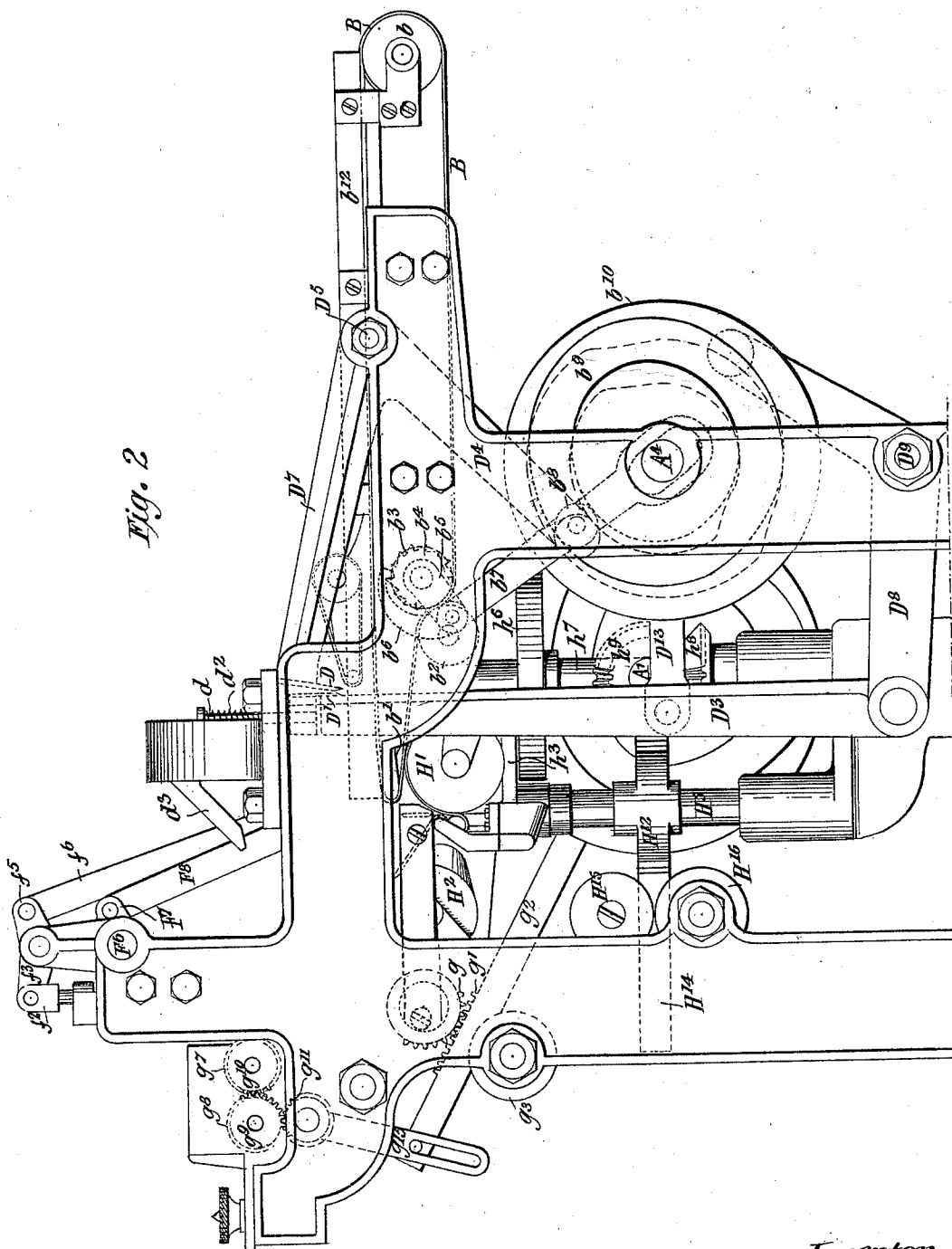
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J. A. BONSAACK.
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Fig. 2



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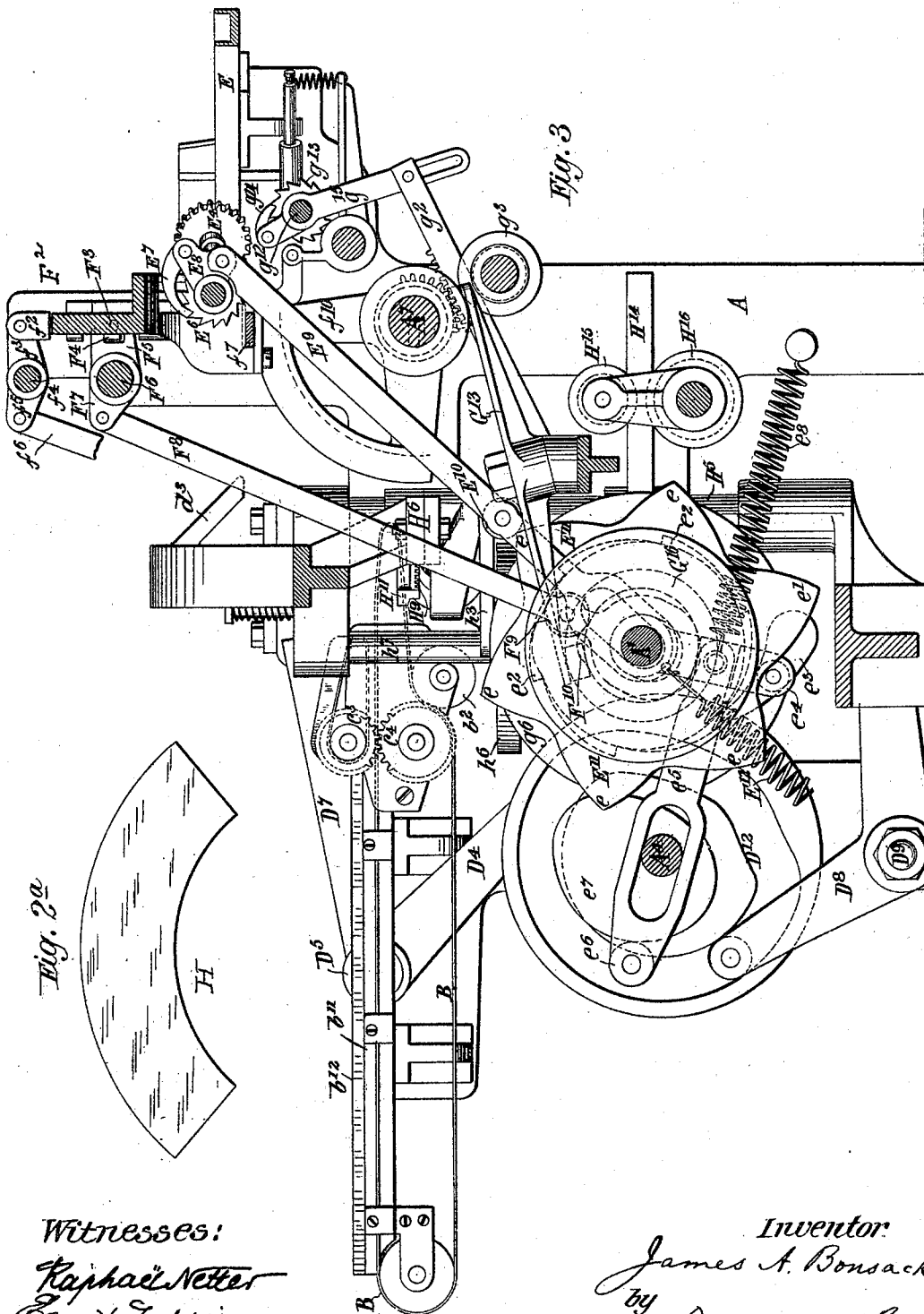
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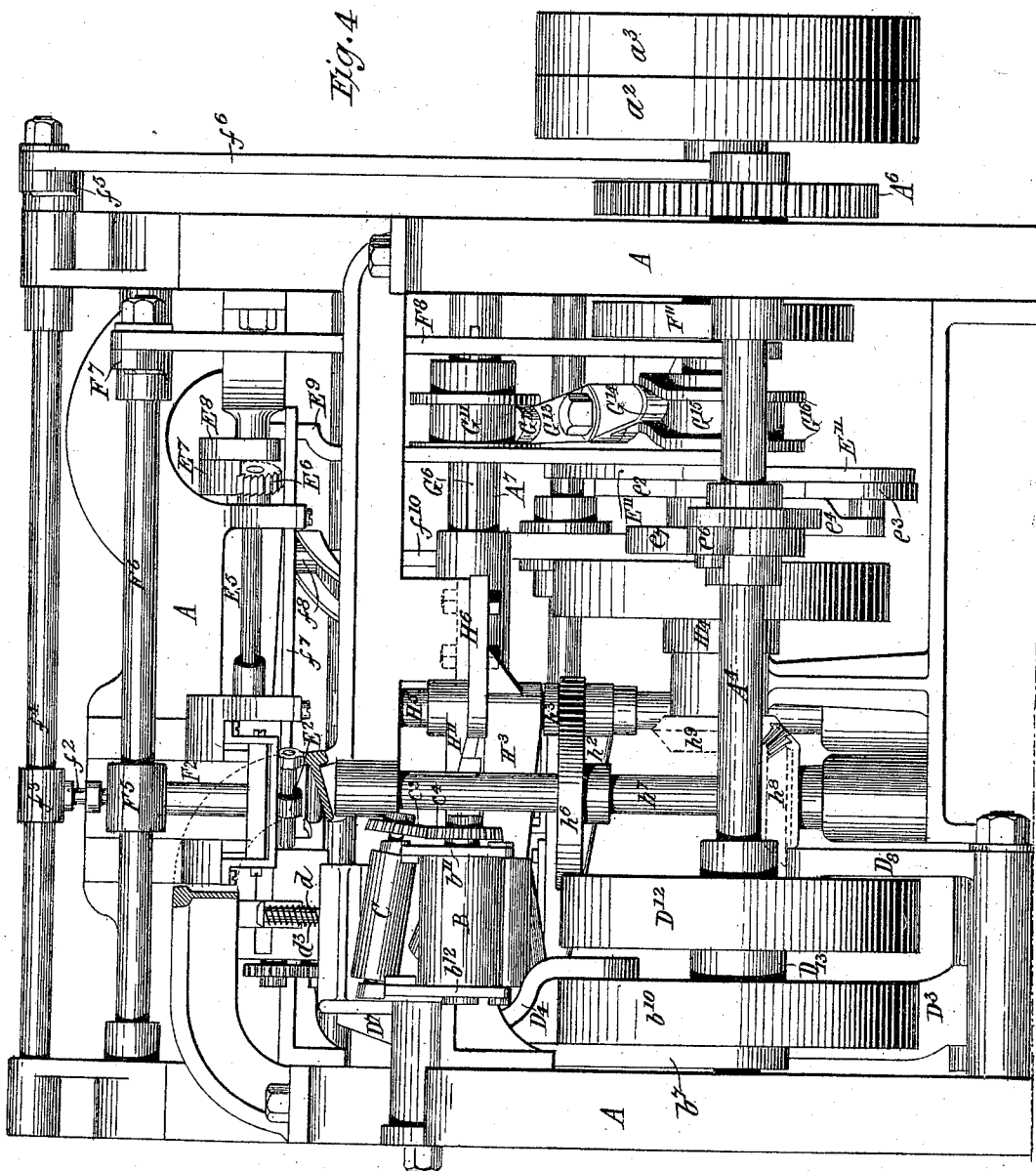
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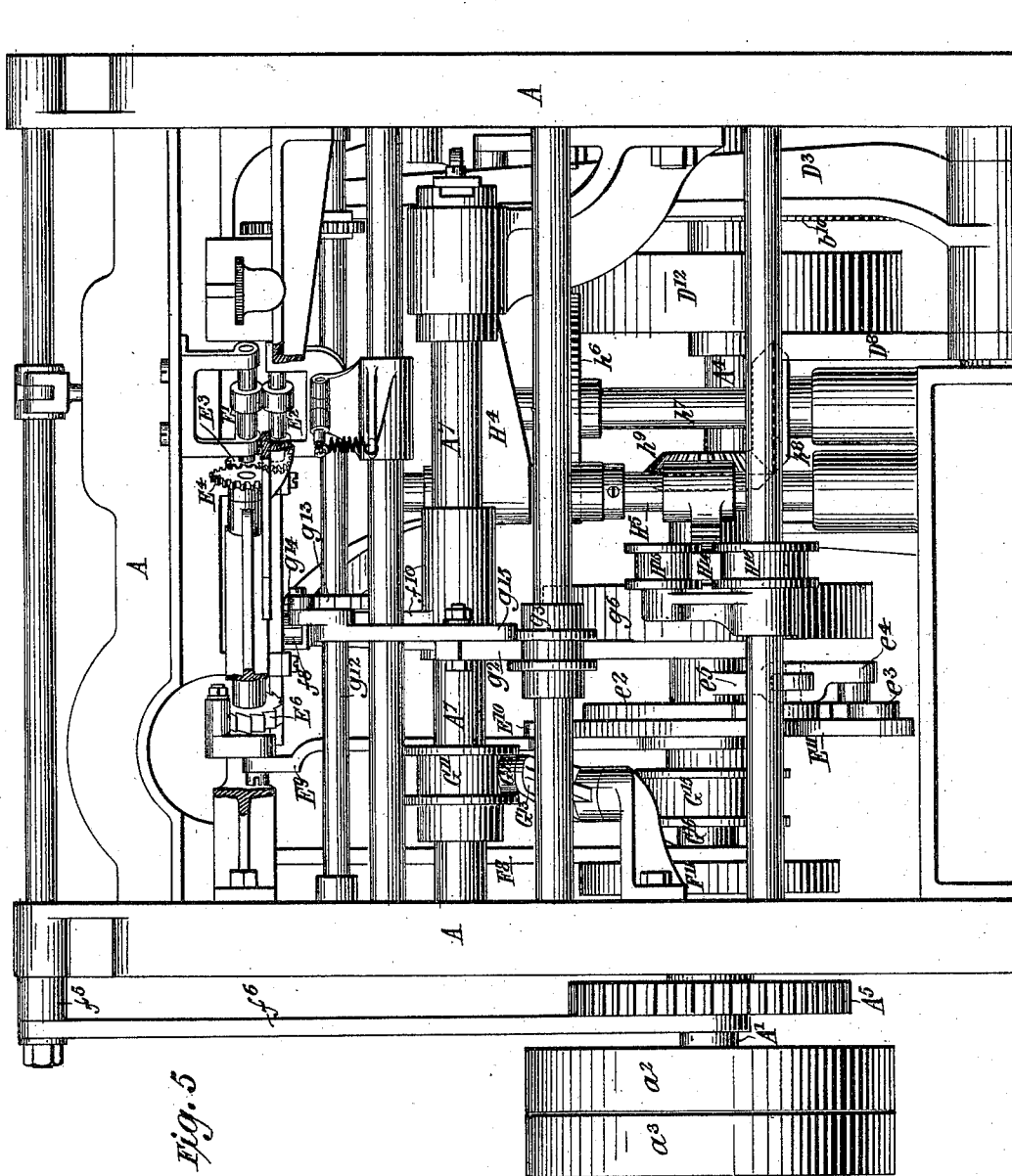
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10 Sheets—Sheet 6.

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Fig. 9

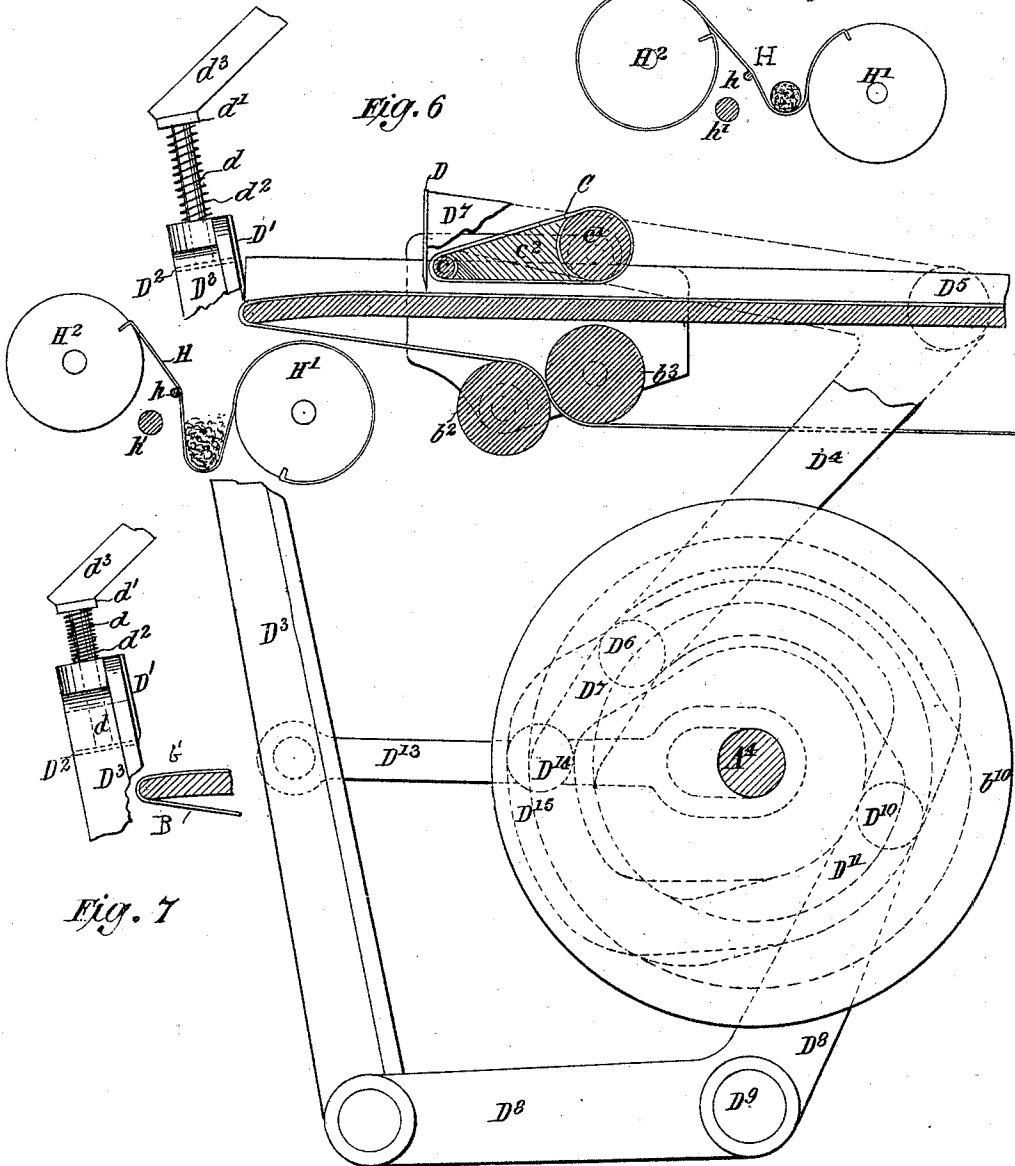


Fig. 6

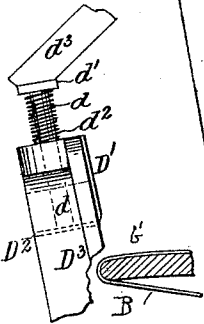
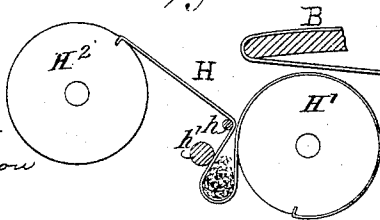


Fig. 7

Fig. 8



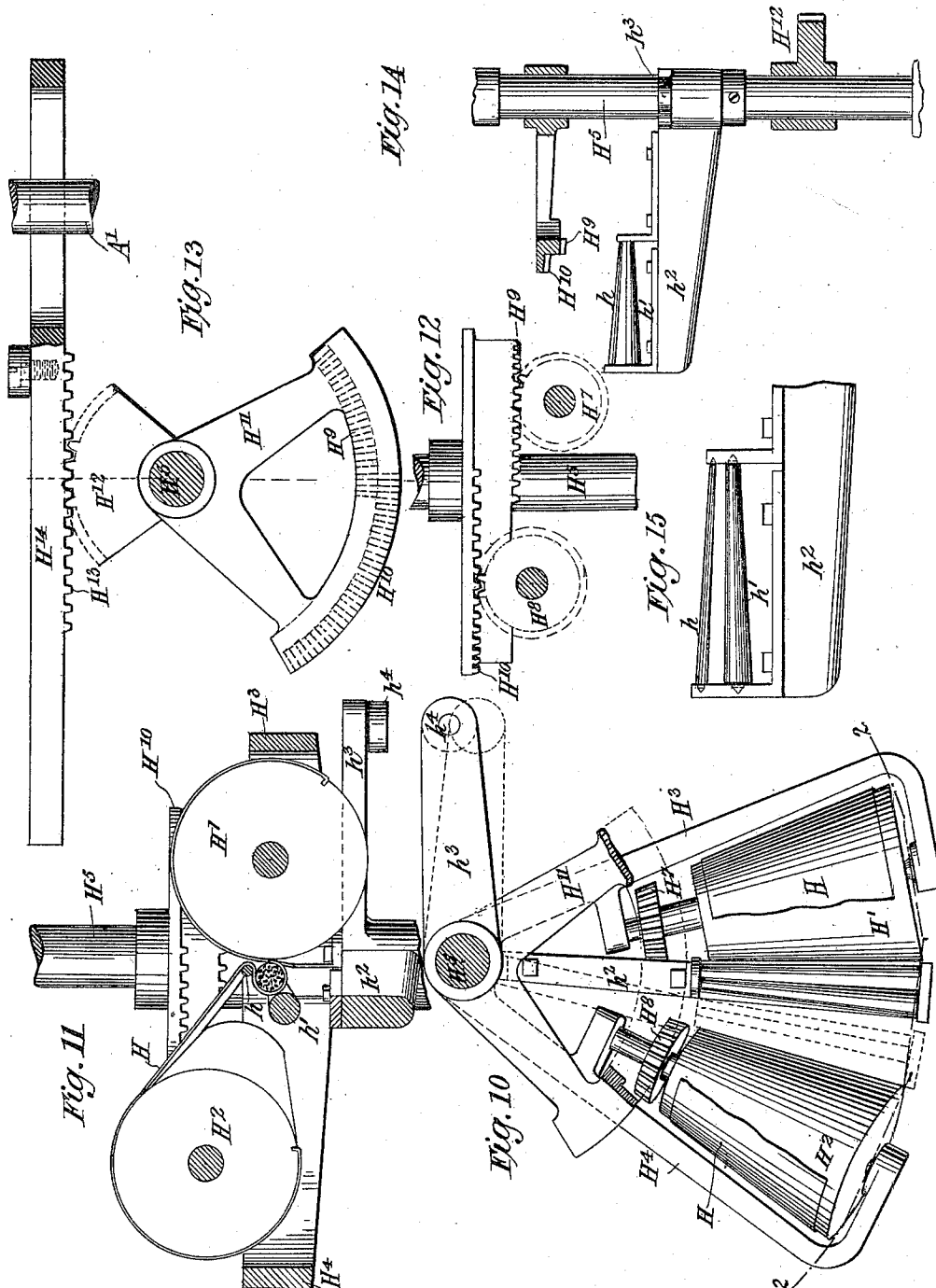
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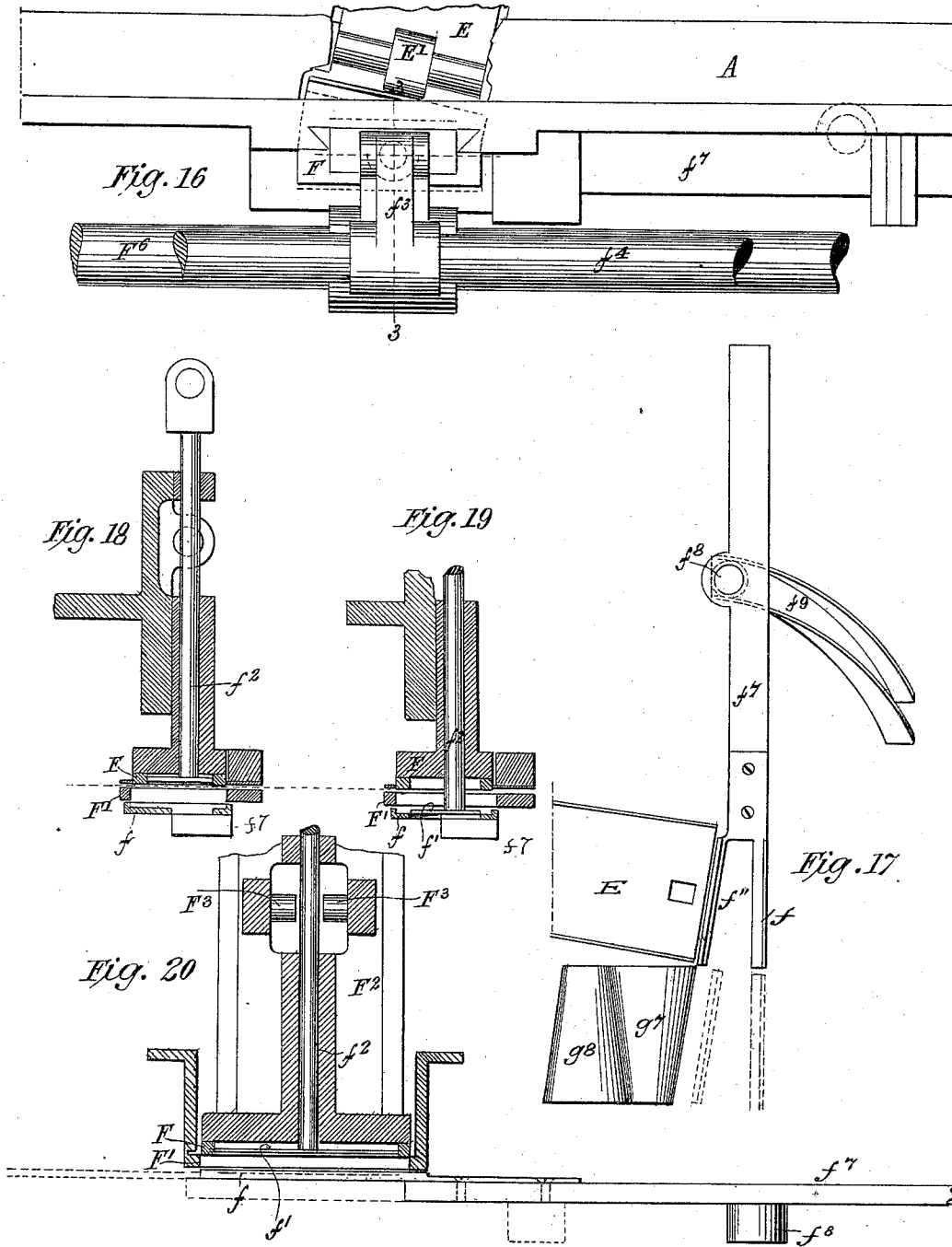
(No Model.)

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J. A. BONSAACK.
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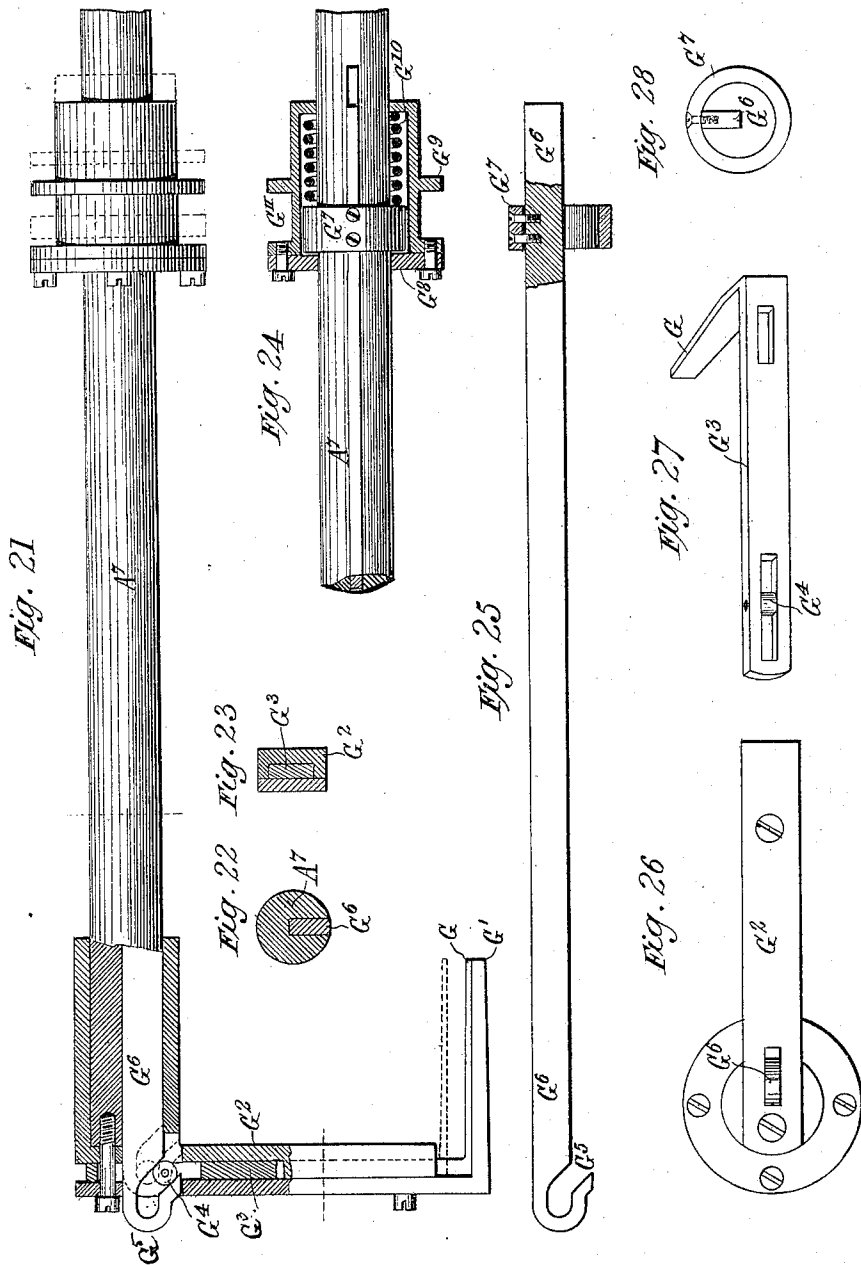
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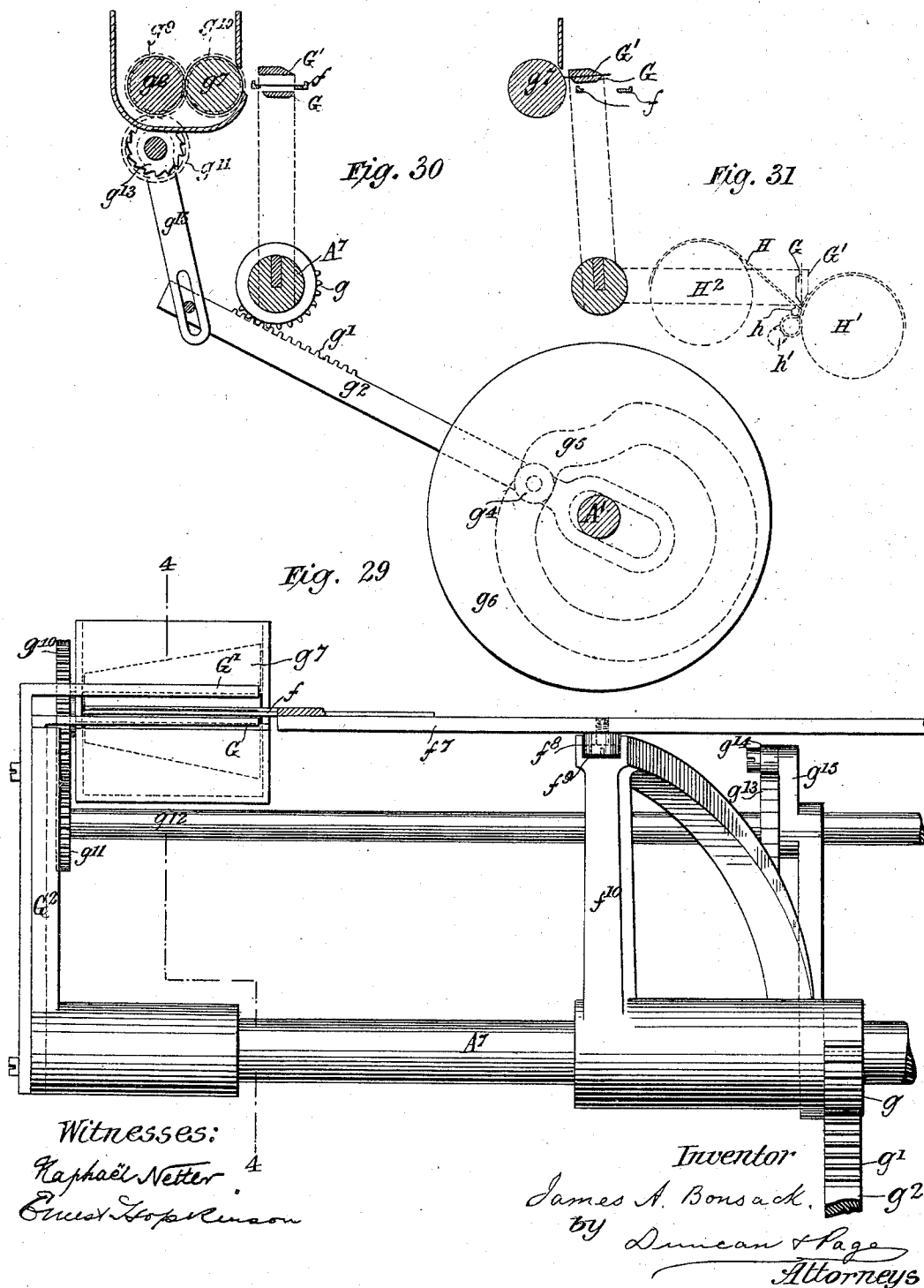
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CIGARETTE MACHINE.

No. 585,254.

Patented June 29, 1897.



UNITED STATES PATENT OFFICE.

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BONSAK MACHINE COMPANY, OF SALEM, VIRGINIA.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 585,254, dated June 29, 1897.

Application filed January 4, 1892. Serial No. 416,910. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. BONSAK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Cigarette-Machines, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My invention relates to machines by whose operation tapered cigarettes in shape like the frustum of a cone and hereinafter for brevity called "conical" cigarettes are made from tobacco.

A machine containing my invention, as herein described and illustrated in the accompanying drawings, is composed of the following-named mechanisms and means or devices for giving the necessary movements to the parts comprising such mechanisms—namely, first, tobacco forming, feeding, compressing, separating, and delivering mechanisms, by which loose tobacco is formed into a wedge-shaped web or mass, by which such wedge-shaped web is compressed or compacted and a quantity of tobacco sufficient to form an individual cigarette of the shape above mentioned is separated therefrom and delivered to the wrapping-belt; second, paper-feeding and wrapper cutting and carrying mechanism by which strips of paper of sufficient width to form wrappers are fed to cutting devices and wrappers of proper size and shape for wrapping conical-shaped cigarette-fillers are cut and are carried to the pasting device; third, wrapper pasting and delivering mechanism by which one edge of the wrapper is supplied with paste and the wrappers are delivered to the wrapping-belt; fourth, wrapping mechanism by which the wrapping-belt is closed around the tobacco previously deposited thereon and the wrapper is wrapped around the filler to form a cigarette. These mechanisms, as also the means by which their several parts are operated, will be described in order by reference to the drawings, it being here remarked that the movement of most of these parts is intermittent.

In the accompanying drawings, forming a part of this specification and illustrating my invention, Figure 1 is a plan view of a cigarette-machine containing my invention.

Fig. 1^a is a plan view of a wrapper for conical cigarettes. Fig. 1^b is a view of a conical cigarette. Fig. 2 is a side elevation of the machine, looking in the direction of the arrow *xx* on the left of Fig. 1. Fig. 3 is a vertical section on the line 1 1 of Fig. 1, looking in direction of the arrow *xxx*. Fig. 2^a is a plan view of a wrapping-belt for conical cigarettes disconnected from the machine. Fig. 4 is a front elevation of the machine shown in Fig. 1. Fig. 5 is a rear elevation of the same. Fig. 6 is a sectional view of the tobacco feeding and compressing devices, a detail view of the wrapping devices, and a detail view of the tobacco separating and delivering devices and cams for operating the latter. Fig. 7 is a detail view showing the tobacco-delivering device in its upward position directly after delivering the tobacco. Fig. 8 is a detail view of the wrapping devices after the wrapping-apron has been brought around the tobacco and before the slack of the apron has been all taken up. Fig. 9 is a detail view of the same devices, showing the position of these devices after the cigarette has been wrapped and released from the fold of the apron. Fig. 10 is a plan view of the wrapping devices, the wrapping-apron being broken away to show the small rollers. Fig. 11 is a vertical section of the same on the line 2 2 of Fig. 10. Figs. 12, 13, 14, and 15 are detail views of the parts of the wrapping devices. Fig. 16 is a plan view of the paper-feeding wrapper cutting and delivering devices. Fig. 17 is a plan view of a portion of the paper-feed table, the wrapper-carrier, and the pasting-rolls, showing the relative position of these parts. Fig. 18 is a vertical section through the line 3 3 of Fig. 16 of the wrapper-cutting and stripping devices. Figs. 19 and 20 are sectional views of the same devices. Fig. 21 is a view of the wrapper-delivering devices, showing the gripping-fingers. Figs. 22, 23, 24, 25, 26, 27, and 28 are detail views of the same devices. Fig. 29 is a front elevation of the pasting device, wrapper-carrier and wrapper-delivering devices, and mechanism for operating the same. Fig. 30 is a sectional view on the line 4 4 of Fig. 29, showing cam for operating the pasting device and wrapper-delivering devices. Fig. 31 is a

sectional view showing the wrapper when in contact with pasting-roll and portion of wrapper-delivering devices when delivering the wrapper to the wrapping devices.

5 In the drawings, A represents the frame of the machine. A' is the main shaft of the machine, provided with fast and loose pulleys A² and A³, to which the necessary power is applied. The various movements of the machine are taken from the main shaft by devices hereinafter described.

The following is a description, by reference to the drawings, of the operative mechanisms in the order hereinbefore named, namely:

15 *Tobacco feeding, compressing, separating, and delivering mechanism.*—In the drawings and in the preferred form of mechanism for accomplishing the above results, B represents an endless tobacco-feeding belt distended over roller b at its outer end and over the end of table b' at its inner end, the upper portion of the belt being supported by this table throughout its length. This belt is driven intermittently by passing between the rollers b² and b³, which are preferably geared together by gears. (Not shown.) Attached to the roller b³ is a ratchet-wheel b⁴, which is driven by a pawl b⁶, pivoted to an arm b⁵, which in turn is pivoted to the shaft of the roller b³. The outer end of the arm b⁵ is attached to one end of a connecting-rod b⁷, which is provided with a stud and roller b⁸, working in the cam-groove b⁹ of the cam b¹⁰. The opposite end of the arm b⁷ is slotted to embrace the counter-shaft A⁴ and supports that end of the connecting-rod, this counter-shaft being driven by gear-wheel A⁵, attached to main shaft A', meshing with gear-wheel A⁶ on the counter-shaft.

The cam-groove b⁹, with the roller b⁸, gives an endwise movement back and forth to the connecting-rod b⁷, thus causing the arm b⁵, with the pawl b⁶ attached thereto, to first move forward, so that the pawl will engage with the desired tooth of the ratchet-wheel and then, upon the backward movement of the arm and pawl, carry the ratchet-wheel b⁴ and cause the rollers b³ and b² to take on a corresponding movement. The relation of the cam-groove b⁹, the arm, pawl, and ratchet-wheel, and the feed-roller with which they are connected, is such that the belt B will be moved sufficiently to feed the desired quantity of tobacco to form a cigarette at each revolution of the shaft A⁴.

55 The belt B is arranged to travel between guides b¹¹ and b¹², one of which, b¹², is preferably higher than b¹¹, so that the loose tobacco as it is placed upon the belt can be distributed to form a wedge-shaped mass in cross-section with greater ease and uniformity, the tops of these guides acting as gages to assist the operator to obtain this result. These guides are preferably continued to the delivering end of the belt to prevent the escape of the tobacco from the edges of the belt.

The device (especially shown in Figs. 1, 2, 3, and 6 of the drawings) for compressing or

compacting the wedge-shaped mass of tobacco as it is fed along consists of an endless belt C, passing over rollers c and c', the shafts of which are arranged laterally on an angle to the surface of the feeding-belt B, so that a wedge-shaped space is left between them in which the tobacco is compressed and compacted by the movements of the belts B and C. The under portion of the belt C is preferably supported to resist the pressure of the tobacco by block c², filling the space between the rollers c and c' and the belt, the block c² being held in place by attachment to that portion of the machine which supports the rollers c c' and b² b³. Belt C is driven by means of gears c³ and c⁴, attached to the rollers c' and b³, respectively, and it receives an intermittent movement corresponding to that of belt B.

The devices shown in the drawings for separating the desired quantity of tobacco from the wedge-shaped compressed mass or web and delivering the same upon the wrapping-apron consist of two combs D and D', the former having simply an up-and-down movement to enter the tobacco after it has been compressed by passing between the belts B and C and then to be withdrawn therefrom after the comb D' has operated to separate the desired quantity of tobacco. The comb D' has a downward movement to enter the tobacco, then a forward movement to separate and deliver the tobacco to the wrapping-apron, then an upward movement, and then a backward movement to again enter the tobacco.

In Fig. 2 the combs are shown in dotted lines in position to enter the tobacco, and in Fig. 6 comb D is shown as being in the tobacco and comb D' as having completed its forward movement, while in Fig. 7 comb D' is shown in its upward forward position, ready to return for another charge of tobacco. The comb D' on its upward movement passes in contact with and above the lower edge of the scraper D², (shown in dotted lines in Figs. 6 and 7,) the office of this scraper being to remove any fibers of tobacco or any gum from the teeth of the comb. This scraper is attached to a stem d, arranged to move in a bearing in the arm D³, so as to move longitudinally relatively to the arm, and is provided at its opposite end with a head d', between which and the end of the arm D³ is arranged spiral spring d², so that the scraper D², when not otherwise controlled, is held at its uppermost position relatively to the arm D³ by the spring d².

The comb D is attached to one end of the bell-crank lever D⁴ (shown in Fig. 6 in dotted lines as broken away) and is pivoted to the frame of the machine at D⁵ and having upon its other end a roller D⁶, working in a cam-groove D⁷ on cam b¹⁰. The cam-groove D⁷ is of such shape as to cause the lever D⁴ to rock upon its pivot and move the comb D up and down intermittently to the desired extent and for the purpose before indicated. The

comb D' is attached to one end of the arm D³, which arm is pivoted at its other end to one end of a bell-crank lever D⁸, which lever is pivoted to the frame of the machine at D⁹ and bears upon its other end a stud and cam-roller D¹⁰, working in a cam-groove D¹¹ of the cam D¹², arranged on the same shaft with the cam b¹⁰. The arm D³ has pivoted between its ends one end of a connecting-rod D¹³, which rod bears a stud and cam-roller D¹⁴, working in a cam-groove D¹⁵ of the cam D¹², which, as before stated, is arranged upon the same shaft with the cam b¹⁰. The other end of the connecting-rod D¹³ is slotted so as to embrace the shaft A⁴ and support such end. The cam-groove D¹¹ is of such shape that it causes the lever D⁸ to move the arm D³ up and down intermittently to the desired extent and for the purpose before indicated, while the cam-groove D¹⁵ is of such shape as to cause the connecting-rod D¹³ to move the arm D³ back and forth intermittently to the desired extent to cause the comb D' to deliver the tobacco to the wrapping-apron, the lever D⁸ turning upon the pivot connecting it to the lever D⁸ for this purpose. The up-and-down and the backward-and-forward movements of the arm D³ take place successively, and when the former movements occur the connecting-rod D¹³ has substantially no longitudinal movement, and when the latter movements occur the lever D⁸ remains stationary, and thus when the comb D' has entered the tobacco the desired distance it is held there by the lever D⁸ during the forward movement of the comb. The scraper D², as before described, moves with the arm D³, except when otherwise controlled, and as the arm D³, with the comb D', moves forward to deliver the tobacco the head d' moves under a stationary stop d³, attached to the frame of the machine, so that as the arm D³ moves upward the scraper D² is prevented from moving with it by head d', abutting against the stop d³, and thus causing the comb D' to move in contact with and past the lower edge of the scraper D², as before described, in which latter position it is shown in Fig. 7 with the spring d² compressed. Upon the backward movement of the arm D³ the head d' passes out from under the stop d³, when the spring d² moves the scraper D² back to the former position, as shown in Fig. 6, which also shows the position of the parts just previous to the upward movement of the arm D³.

It is observed that the width of the feeding-belt B is preferably about the length of the cigarettes to be made, and that the tobacco which is to be separated and constitute the charges for the individual cigarettes is so disposed upon this belt as to be of greater quantity at one side or edge of the belt than at the other and to gradually decrease in quantity from the edge of the belt which has the more tobacco on it toward the other edge, so that when sections of tobacco are removed transversely of the belt and are compressed and

rolled they will form tapered or conical cigarette-fillers.

Paper-feeding and wrapper cutting and carrying mechanism.—The paper-feeding mechanism shown in the drawings is especially designed for feeding short strips of paper from which the wrappers are cut, but by a slight change of the devices hereinafter described a continuous web of paper can be used. In the drawings, E represents a guide or table on which the paper rests and is guided between and through the feeding-rolls E' and E², which are geared together, and are driven intermittently by a pinion E³ on the shaft of roll E', meshing with gear-wheel E⁴ on the shaft E⁵, which, it will be observed, is in line with the rolls E' and E², which are shown inclined at an angle with the main driving-shaft of the machine. It is here stated that the lower feeding-roll E² is preferably arranged to have an elastic contact with the roll E', so as to yield to any inequalities in the paper strips as they are fed along. On the other end of the shaft E⁵ is a ratchet-wheel E⁶, into which a pawl E⁷, attached to the arm E⁸, engages. The arm E⁸ is attached to a separate stud secured to the frame of the machine, the axis of which is parallel to the axis of the main driving-shaft, and consequently is at an angle to that of the shaft E⁵, to which the ratchet-wheel E⁶ is attached.

The arm E⁸ is attached to one end of a connecting-rod E⁹, which carries a stud and cam-roller E¹⁰, working on the outer surface or contour of the star-cam E¹¹, loosely attached to the main driving-shaft A', which cam, as will be observed, is provided with six points, one being longer than the others, for the purpose hereinafter described. The other end of the connecting-rod E⁹ is slotted to embrace the main shaft A', so as to be supported thereby, and is provided with a spring E¹², which in turn is to be secured to the frame of the machine. The length of each of the five points e of the cam E⁴ is such that it will cause the connecting-rod E⁹ to be moved longitudinally a sufficient distance for the arm E⁸ and the pawl E⁷ to engage with the desired number of teeth to revolve the ratchet-wheel E⁶, so as to feed the paper forward sufficiently to form a single wrapper after the strip of paper has had the first wrapper cut therefrom. The sixth point e' of the cam E⁴ is, as before described, longer than the five points e, so that as a strip of paper is first introduced between the feeding-rolls E' and E² such rolls will be caused to revolve a distance sufficient to feed the paper from the center of the rolls to the farther side of the cutting-die, which distance is greater than from one edge of the die to the other, the latter distance being all that is required after the first wrapper has been cut. Of course it is understood that the cam E¹¹ will be provided with a sufficient number of points e to utilize what is left of the strip of paper after it has been advanced to the cutting devices by the operation of the point e'

and the first wrapper has been cut therefrom. The cam E^{11} has secured to it a ratchet-wheel e^2 , preferably provided with the same number of teeth as the cam has operative points, into which a pawl e^3 engages, which pawl is pivoted to the arm e^4 , which in turn is pivoted to the main shaft A' . The arm e^4 is pivoted to one end of a connecting-rod e^5 , which at its other end carries a stud and roller e^6 , working upon cam e^7 , attached to the shaft A^4 , the connecting-rod e^5 being slotted to embrace the shaft A^4 and be supported thereby. A spring e^8 is attached to one end of the connecting-rod e^5 and its other end to the frame of the machine, so as to hold the cam-roller e^6 in contact with the cam e^7 . At each revolution of the cam e^7 the pawl e^3 engages with the ratchet-wheel, so as to move the cam E^{11} in contact with the cam-roller E^{10} from the bottom of one of its points to the bottom of the next one, thus operating the paper-feeding rolls to feed the paper strip the desired distance to cut a wrapper therefrom for each revolution of the cam e^7 . If it is desired to use a continuous strip of paper, all the points of the cam E^{11} will be made of an equal length.

When the paper strip has been fed between the punch F and die F' , the punch descends and cuts out the wrapper. This wrapper is to be of such shape as to wrap a conical-shaped cigarette-filler, and is preferably of the shape shown in plan view in Fig. 1^a. The cutting edges of the punch and die are of course to be correspondingly shaped. The punch is attached to a slide F^2 , working in suitable ways on the frame of the machine, so as to guide it into and out from the die the desired distance. The slide F^2 is provided with two pins or bearings F^3 , which work in a slot F^4 of the arm F^5 , attached to a rock-shaft F^6 , which shaft is provided with an arm F^7 , to which one end of a connecting-rod F^8 is attached, which carries a roller and stud F^9 , working in a cam-groove F^{10} in a cam F^{11} , attached to the main shaft A' , the lower end of the connecting-rod F^8 being slotted, so as to embrace the shaft A' and be supported thereby in manner similar to that of connecting-rod E^9 . The shape of the cam-groove F^{10} is such that the rock-shaft F^6 will be moved sufficiently to give the punch the desired movement to coact with the die F' and cut out a wrapper. The wrapper as it is cut from the paper strip is delivered to a wrapper-carrier f , and the punch is preferably provided with a follower f' , attached to a stem f^2 , which extends upward through a suitable opening in the punch and slide, which opening forms a bearing or guide for the same, the punch being suitably recessed to receive the follower, as is shown in Figs. 18 and 19. The upper end of the stem f^2 is attached to an arm f^3 of the rock-shaft f^4 , which is provided with another arm f^5 , which is pivoted to one end of a connecting-rod f^6 , which is provided with a cam-roller and stud working in a cam-groove in one side of gear-wheel A^5 , attached

to shaft A' , the other end of connecting-rod f^6 being slotted to embrace the shaft A' and be supported thereby in a manner similar to connecting-rod E^9 . The shape of the cam-groove in the gear-wheel A^5 is such as to cause the follower f' to move down out of its recess in the punch F and carry with it the wrapper after it is cut by the punch and die into the wrapper-carrier f . The two extreme positions of the follower are shown in Figs. 18 and 19. The carrier f is attached to the slide f^7 , arranged to move longitudinally in suitable bearings in the frame of the machine, as seen in Figs. 3, 4, and 29. The carrier f is composed of a skeleton frame, (shown in cross-section in Figs. 18 and 19,) in which the wrapper is received and supported at its edges, the frame being constructed to leave an opening or slot f^{11} beneath the wrapper and having one of its ends open, as shown in Fig. 17. The slide f^7 , to which the carrier is attached, is provided with a cam-roller f^8 , working in a cam-groove f^9 of the cam f^{10} , attached to a rock-shaft A^7 , which makes about one-quarter revolution, and in so doing moves the slide f^7 and the carrier from the position shown in full lines in Fig. 17, where it receives the wrapper, to the position there shown in dotted lines, where the wrapper is taken by the delivering device and removed from the carrier f , and upon the reverse movement of the cam the slide and carrier are returned to the position shown in full lines in Fig. 17.

It is proper to remark at this point that I have previously applied for a United States patent, application serially numbered 414,402, filed December 8, 1891, in which I have described and shown substantially the same devices for feeding paper strips and cutting therefrom wrappers for conical cigarettes and carrying the same to a delivering device, as hereinbefore described, and shown in the accompanying drawings.

Wrapper pasting and delivering mechanisms.—When the carrier f is in position, (shown in dotted lines in Fig. 17,) the wrapper is removed therefrom and is supplied with the necessary adhesive material and delivered to the wrapping-apron by the following means: In the drawings, G represents a movable finger adapted to be brought in contact with the under side of the wrapper as it rests in the carrier f , (see Fig. 30,) and remove it therefrom and carry it against a stationary finger G' , attached to an arm G^2 , which in turn is attached to a rock-shaft A^7 . The finger G is attached to a slide G^3 , which moves in suitable ways located in the arm G^2 , and the slide has a longitudinal movement in this arm, so that the finger G can move relatively to the finger G' , as described. The end of the slide opposite that to which the finger G is attached is preferably slotted and provided with a pin and roller G^4 , working in cam-groove G^5 of the feather or slide G^6 , which moves longitudinally in the rock-shaft A^7 by means of the movable collar G^7

attached thereto, the cam-groove G^5 being of such shape to cause the finger G to make the desired movement. The collar G^7 is embraced upon one side by the cap G^8 of a casing G^9 , which contains a spring G^{10} , adapted to hold the collar G^7 in contact with the cap G^8 , so that the collar and feather or slide to which it is attached is moved positively in one direction by the cap G^8 and elastically in the other direction by the spring G^{10} . The casing G^9 is provided with a circular groove G^{11} , adapted to receive a roller and stud G^{12} , attached to one end of pivoted lever G^{13} , the other end of this lever being provided with a cam roller and stud G^{14} , working in a cam-groove G^{15} of the cam G^{16} , which is attached to the shaft A' , the cam-groove G^{15} being of such shape that it will give the desired longitudinal movement to the feather or slide G^6 to cause the finger G to move as before described. The rock-shaft A^7 is driven by a segment g of a gear-wheel attached to such shaft and meshing with a rack g' on a connecting-rod g^2 , which rack is properly held in mesh with the segment by the guide g^3 , attached to the frame of the machine. The connecting-rod g^2 is provided with a cam roller and stud g' , which works in the cam-groove g^5 of the cam g^6 , attached to the shaft A' , the other end of the connecting-rod being slotted to embrace the shaft A' and be supported thereon. The shape of cam-groove g^5 is such that the rock-shaft A^7 remains stationary while the fingers are closing and then moves the fingers, with the wrapper grasped between them, toward the paste-roll g^7 , bringing the under edge of the wrapper, as shown in Fig. 31, in contact with the paste-roll g^7 , where it receives the desired quantity of paste and then moves the fingers, with the wrapper still grasped between them, into position to deliver the unpasted edge of the wrapper to the wrapping-apron, the rock-shaft remaining stationary while the fingers open to release the wrapper therefrom, and then moves the fingers in a reverse direction in position to remove another wrapper from the carrier f , the latter position of the fingers being shown in Fig. 30, while the position of the fingers when the wrapper is receiving its paste and when it is being delivered to the wrapping-apron is shown in Fig. 31. It will be observed that the finger G , when in its open position, passes under the carrier f , as seen in Fig. 30, then passes through the open slot in the bottom of said carrier in the act of removing and grasping the wrapper, and then passes over said carrier in the act of applying the paste and delivering the wrapper to the wrapping-belt.

The pasting-rollers g^7 and g^8 are represented in the drawings as frusto-conical in shape, so as to present a parallel surface to the inclined edge of the wrapper, the punch and die by which the wrapper is cut being preferably arranged so that the edge of the wrapper which is presented to the wrapping-apron is parallel with the main driving-shaft A' , thus leaving

the inclined edge of the wrapper to be presented to the pasting-roll. The pasting-rolls are geared together, as shown in Fig. 2, by gears g^9 and g^{10} , the gear g^3 also meshing with gear-wheel g^{11} on shaft g^{12} , which shaft is provided with a ratchet-wheel g^{13} , operated by a pawl g^{14} , attached to an arm g^{15} , pivoted on shaft g^{12} , the lower end of such arm being slotted to embrace a pin in one end of the connecting-rod g^2 , as seen in Figs. 2, 3, and 30, so that upon the movement of the connecting-rod g^2 , as before described, the paste-rollers will be revolved to the desired extent to properly distribute the paste upon them and present a fresh surface of paste to each wrapper. The pasting-rollers are located in a suitable receptacle to receive the paste.

The wrapping mechanism consists of the following devices: a wrapping-apron H , in shape preferably like the segment of an annular disk, as shown in Fig. 2^a of the drawings. The ends of this apron are secured in any desirable manner to frusto-conical-shaped (hereinafter for brevity called "conical") wrapping-drums H' and H^2 , which are mounted in arms H^3 and H^4 in such manner that their axes are arranged radially to the rock-shaft H^5 , and these arms are supported upon the frame of the machine at the point H^6 , as seen in Figs. 1 and 4. The apron H passes over frusto-conical-shaped (hereinafter called "conical") rollers h and h' , or rather between these last-named rollers and the drum H' , so as to form a pocket in such apron into which the tobacco is deposited and the rolling of the filler and the wrapping of the wrapper takes place, the conical rollers h and h' being arranged to move away from the drum H' to open the pocket to permit of the removal of the cigarette and the introduction of a new charge of tobacco and to move toward the drum H' to close the pocket, so that the wrapping-apron can operate to roll and wrap the tobacco. The axes of the drums H' and H^2 and of the rollers h and h' all point substantially to a common center or point, which is a continuation of the axis of the cigarette as it is being wrapped. It is also true that the operative surfaces of the parts above named, when such surfaces are in contact with the wrapping-apron during the operation of rolling and wrapping the tobacco, converge substantially toward the common center or point with the axes. The drum H^2 is shown with its axis inclined to the plane of the axis of drum H' , but nevertheless the axis of drum H^2 points and its operative surface converges substantially toward the same point as the axes and operative surfaces of the drum H' and the rollers h and h' . The wrapping-apron H is secured at one end to the conical drum H' and at its other end to drum H^2 , so that as it unwinds from one drum it is wound upon the other drum, unless otherwise controlled, so long as both drums revolve simultaneously. In order to provide the necessary increase of slack to form a pocket of the desired size and opening to re-

ceive the loose tobacco, as shown in Fig. 6, the drum H' ceases to revolve before the stoppage of drum H², so that a greater length of apron is paid off from the latter than is taken up by the former. The conical drum H² commences its revolution and the taking up of the apron H before the drum H' commences to pay off the apron. Consequently the slack of the belt is decreased and the pocket is lessened in size to the desired extent to compress the loose tobacco and roll it into a filler ready to be wrapped, as seen in Figs. 11 and 31. The pocket formed in the apron H is first lessened in size by the movement of the conical rollers *h h'* from the position shown in Fig. 6 to that shown in Fig. 8, which movement takes place just prior to the beginning of the forward movement of the drum H², and upon the beginning of this movement the pocket formed in the apron H is further lessened in size by decreasing the slack of the belt until it reaches the dimensions shown in Figs. 11 and 31, whereupon the drum H' commences to pay off the apron H, keeping the pocket of substantially the same size until the cigarette is wrapped, when the rollers *h h'* move back again into the position shown in Fig. 9 and the cigarette is released from the control of the wrapping-apron ready to be ejected therefrom, this position of the rollers *h h'* being the same as that shown in Fig. 6, where the pocket of the apron is shown at its full opening and size. As shown in the drawings, the construction and arrangement are such that the drums H' H² begin their backward or reverse movement simultaneously, the drum H' taking up the apron H as fast as it is paid off from the drum H² until drum H' ceases its movement in this direction, but, as heretofore explained, the drum H² continues to pay off the apron H to give the necessary increase of slack to form the pocket to receive the loose tobacco for a cigarette. Any suitable means may be employed to remove or eject the cigarette from the wrapping-apron and, if desired, to convey it to trimming devices.

The wrapper, with the necessary amount of paste applied to one of the edges, is delivered to the wrapping-apron, as before explained, and as soon as it reaches the position shown in Fig. 31 the unpasted edge of the same extends down through a suitable space left between the two portions of the apron H which form the mouth of the pocket and is grasped between the wrapping-apron and the tobacco filler as soon as the fingers G G' release their hold upon the wrapper, and the continued rolling of the filler wraps the wrapper around it and brings the pasted edge in contact with the underlapping edge of the wrapper, thus causing the two edges to adhere. A brush or other suitable means may be employed to remove the particles of tobacco from the apron H and prevent the cigarette from being soiled. The drums H' and H² are provided with gear-wheels H⁷ H⁸, which mesh

with racks H⁹ H¹⁰, formed on the segment H¹¹, attached to the perpendicular rock-shaft H⁵, journaled in the frame of the machine at right angles to shaft A'. The rock-shaft H⁵ is provided with a segment H¹² of a gear-wheel which meshes with a rack H¹³ in the slide H¹⁴, which slide is slotted to embrace the shaft A' at one end and is supported thereon, and at its other end rests between guide-rollers H¹⁵ H¹⁶, so as to have a free endwise movement, the slide being also provided with a cam roller and stud working in a cam-groove of the cam *g*⁶. The shape of this cam-groove is such as to cause the slide H¹⁴ to reciprocate longitudinally and cause the rock-shaft H⁵ to take on the necessary movements to operate the drums H' and H², as before explained. It will be observed that the rack H⁹ is shorter than the rack H¹⁰, so that the gear-wheel H⁷, attached to the drum H', moves out of mesh with such rack and remains stationary, while the rack H¹⁰ is always in mesh with the gear-wheel H⁸ on the drum H², and thus the drum H² is always under the control of the rack H¹⁰. This construction permits the drum H' to remain stationary while the drum H² is increasing or decreasing the slack of the apron H to the size of the pocket, as heretofore explained.

The conical rollers *h* and *h'* are journaled in brackets attached to the support *h*², which is pivoted upon the rock-shaft H⁵, which support is provided with an arm *h*³, bearing upon it a cam roller and stud *h*⁴, working in a cam-groove *h*⁵ of the cam *h*⁶, attached to a vertical shaft *h*⁷, which is driven by beveled gears *h*⁸ *h*⁹, the latter gear being attached to shaft A'. The cam-groove *h*⁵ is of such shape that it causes the rollers *h* and *h'* to swing intermittently to and from the drum H' at the proper times, as before explained. The function of the roller *h* is to hold the apron H in proper relation to the drum H' during the rolling of the tobacco and the wrapping of the wrapper around it. The function of the roller *h'* is to assist in compressing the tobacco in the apron and in giving the proper shape, size, and finish to the cigarette.

It is observed that it is desirable that the diameter of the drums H' and H² should be such that the cigarette can be wrapped during one revolution or less of the drums, so that the apron will not overlap itself on the drums and thus increase and diminish their operative sizes in taking up and paying off the apron.

It will be seen from the above description and explanation that the mechanism for forming the tobacco rolling and wrapping pocket in the apron H consists of the drum H', the roller *h*, and the means by which these parts are operated.

It is also remarked that the main functions of the drum H' are to hold the apron in the proper relation to the rollers *h* and *h'* and to secure and deliver a portion of the apron used

in the wrapping of the cigarette, but it is evident that other means than the drum H' may be employed for this purpose.

It will be readily understood that the various shafts, cams, rock-shafts, arms, and levers are to be so formed and timed as to give to the various operative parts of the machine the necessary extent of movement at the proper times to perform the several operations heretofore described, each revolution of the main shaft A' completing one cigarette.

It will also be manifest to those skilled in the art to which this invention relates that the construction and arrangement of the various parts may be somewhat changed and yet perform the functions herein set forth without departing from the principles of my invention, and therefore I do not wish to limit myself to the specific construction and arrangement of the parts herein described and shown.

What is herein claimed as new is—

1. In a machine for making conical cigarettes, the combination with a tobacco-feeding belt of guides of unequal height arranged on the opposite sides of the belt, whereby the distribution of loose tobacco into a wedge-shaped mass on the belt is facilitated, and the tobacco prevented from being displaced.

2. In a machine for making conical cigarettes, the combination substantially as set forth, of a tobacco-feeding belt, means for operating said belt, a compressing device arranged laterally at an angle with such belt and means for operating said compressing device, whereby a wedge-shaped mass of tobacco is compressed and compacted on the belt.

3. In a machine for making conical cigarettes, the combination substantially as set forth, of a tobacco-feeding belt, means for operating said belt, a compressing-belt arranged laterally at an angle thereto and means for operating said compressing-belt, whereby a wedge-shaped mass of tobacco is compressed and compacted on the belt.

4. In a machine for making conical cigarettes, the combination substantially as set forth, of a wrapping-apron and a conical drum H² by which the apron is operated, mechanism for forming a rolling and wrapping pocket in the apron and mechanism to operate the drum, whereby tobacco in the pocket is rolled into a conical filler and wrapped with a wrapper to form a conical cigarette.

5. In a machine for forming conical ciga-

rettes, the combination substantially as set forth, of a wrapping-apron, a conical wrapping-drum H² to which one end of the apron is secured, mechanism for operating the same, a support to which the other end of the apron is secured, a conical roller *h* and mechanism for moving the same into one position to form a rolling and wrapping pocket in the apron, and into another position to release the finished cigarette and to receive a fresh charge of tobacco.

6. In a machine for making conical cigarettes, the combination substantially as set forth, of a wrapping-apron, a conical wrapping-drum H² to which one end of the apron is secured, mechanism for operating the same, a support to which the other end of the apron is secured, conical rollers *h* and *h'* and mechanism for moving the same into position, one to form a pocket and the other to assist in compressing the tobacco and to give shape, size and finish to the cigarettes.

7. In a machine for making conical cigarettes, the combination substantially as set forth, of a wrapping-apron and conical drums H' and H² to which said apron is secured and a conical roller *h*, the operative surfaces of said drums and roller, when in contact with the apron to roll and wrap the tobacco, being arranged to converge substantially toward a common center or point.

8. In a cigarette-machine, the combination substantially as set forth, of a wrapping-apron, two winding-drums to which the apron is secured and mechanism for operating said drums, and a roller to form a rolling and wrapping pocket in said apron, and mechanism for operating said roller, whereby tobacco in said pocket is compressed and rolled into a cigarette-filler and wrapped with a wrapper.

9. In a cigarette-machine, the combination substantially as set forth, of a wrapping-apron, two conical winding-drums to which the apron is secured and mechanism for operating said drums, and a conical roller to form a rolling and wrapping pocket in the apron, and mechanism for operating said roller, whereby tobacco in said pocket is compressed and rolled into a conical cigarette-filler and wrapped with a wrapper.

JAS. A. BONSACK.

Witnesses:

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