

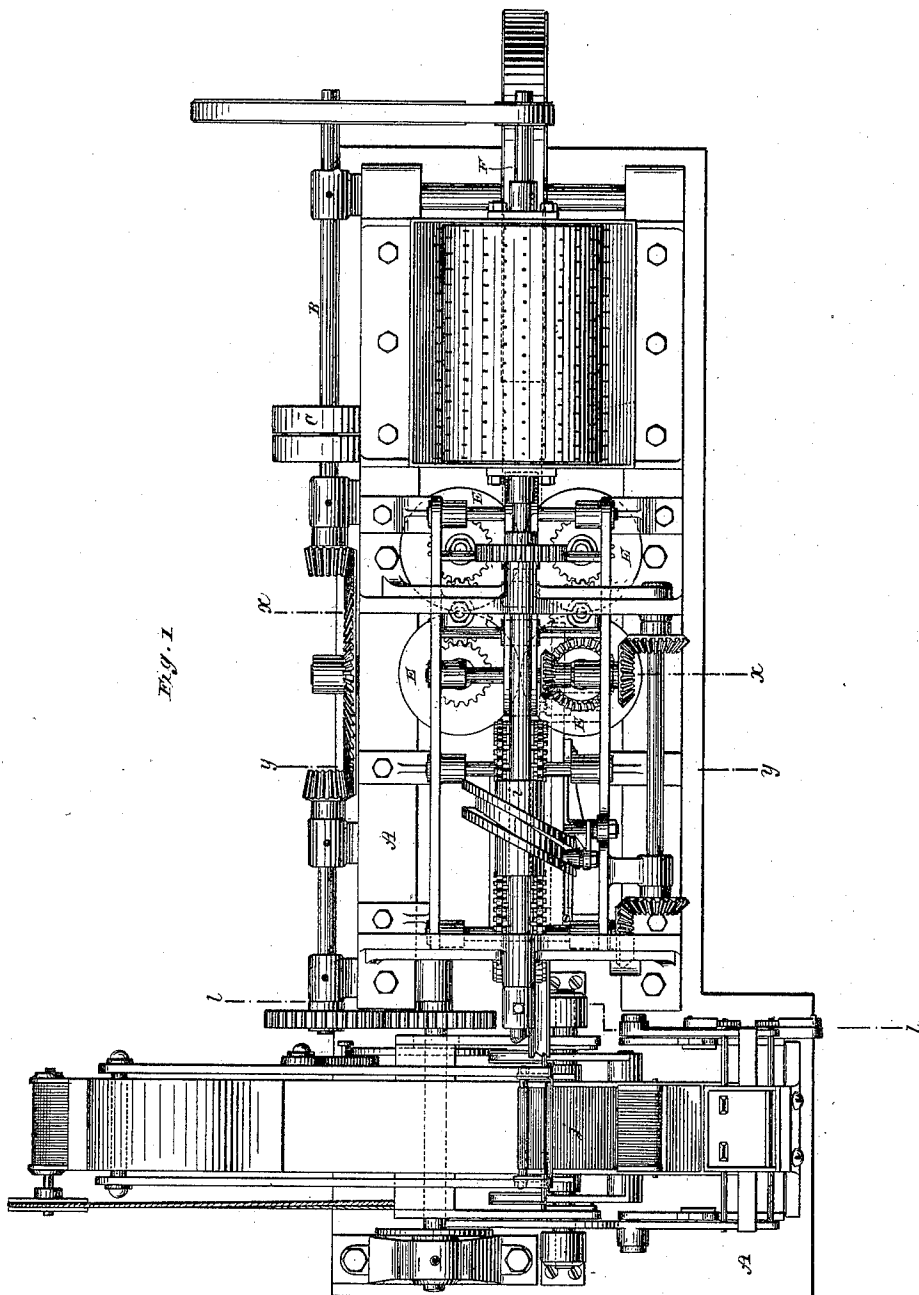
(No Model.)

7 Sheets—Sheet 1.

J. A. BONSAK.
CIGARETTE MACHINE.

No. 585,253.

Patented June 29, 1897.



Witnesses:

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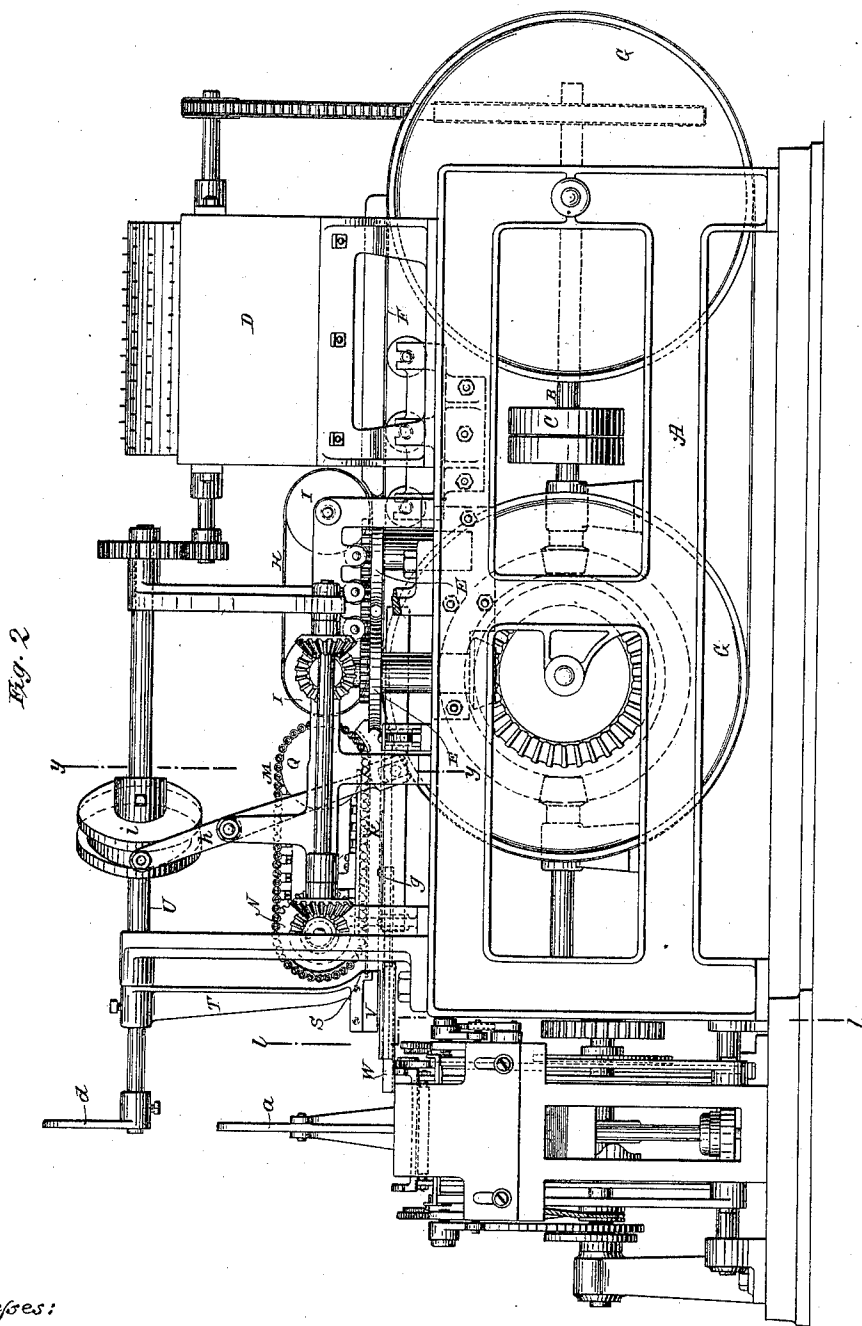
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(No Model.)

7 Sheets—Sheet 3.

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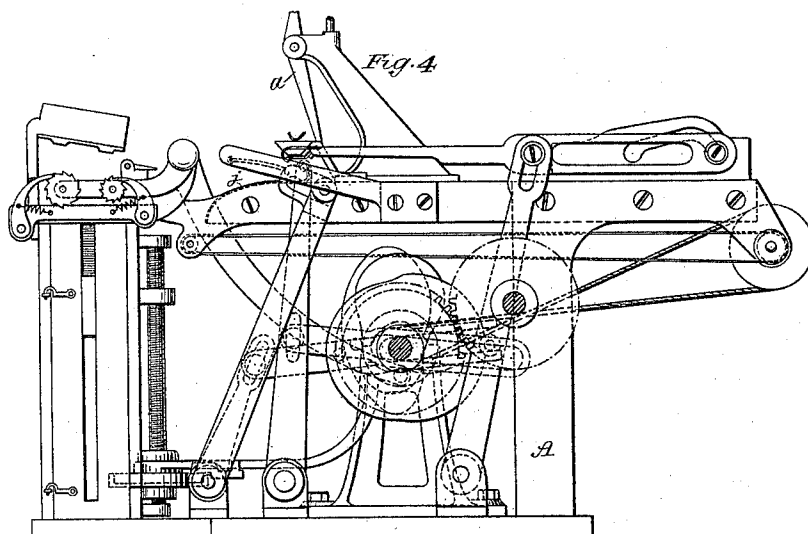
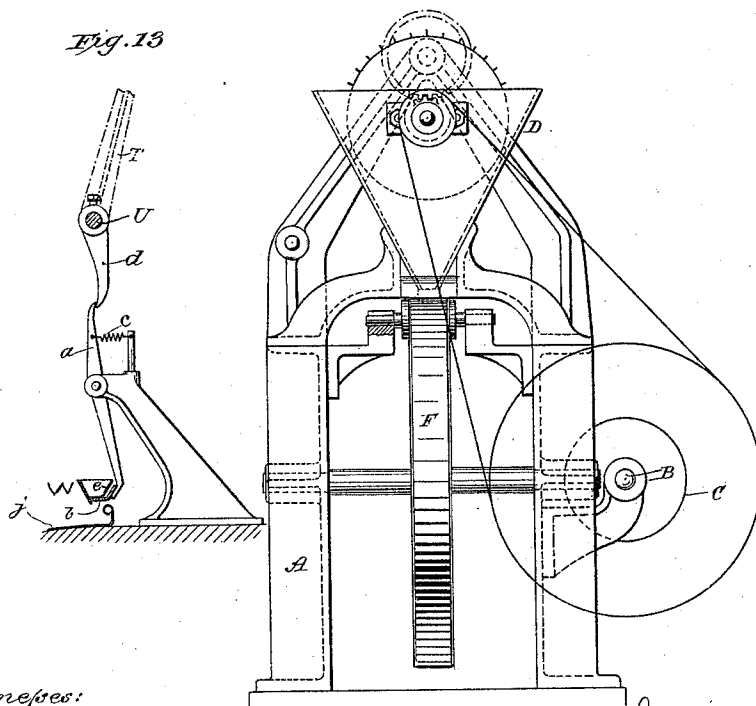


Fig. 3



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7 Sheets—Sheet 4.

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Fig. 6

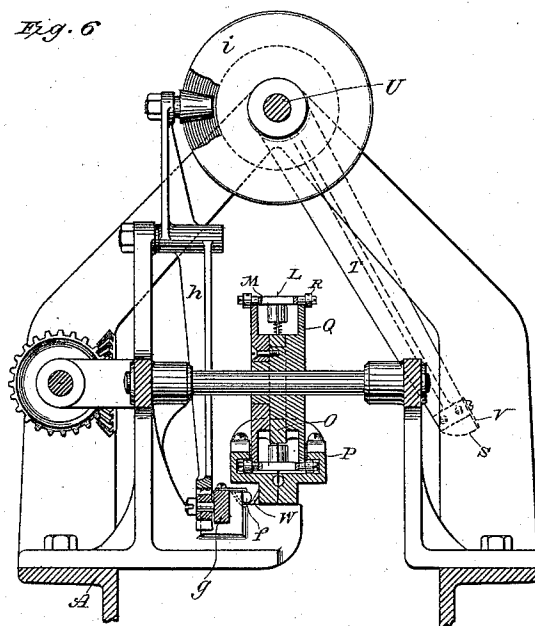


Fig. 12

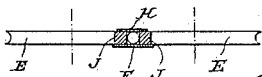


Fig. 5

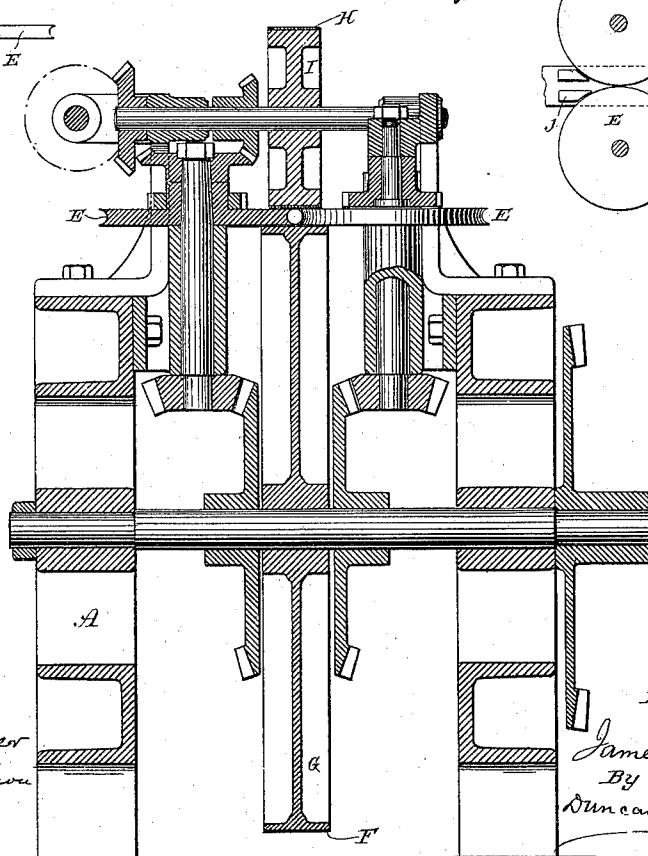
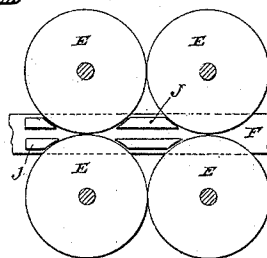


Fig. 11



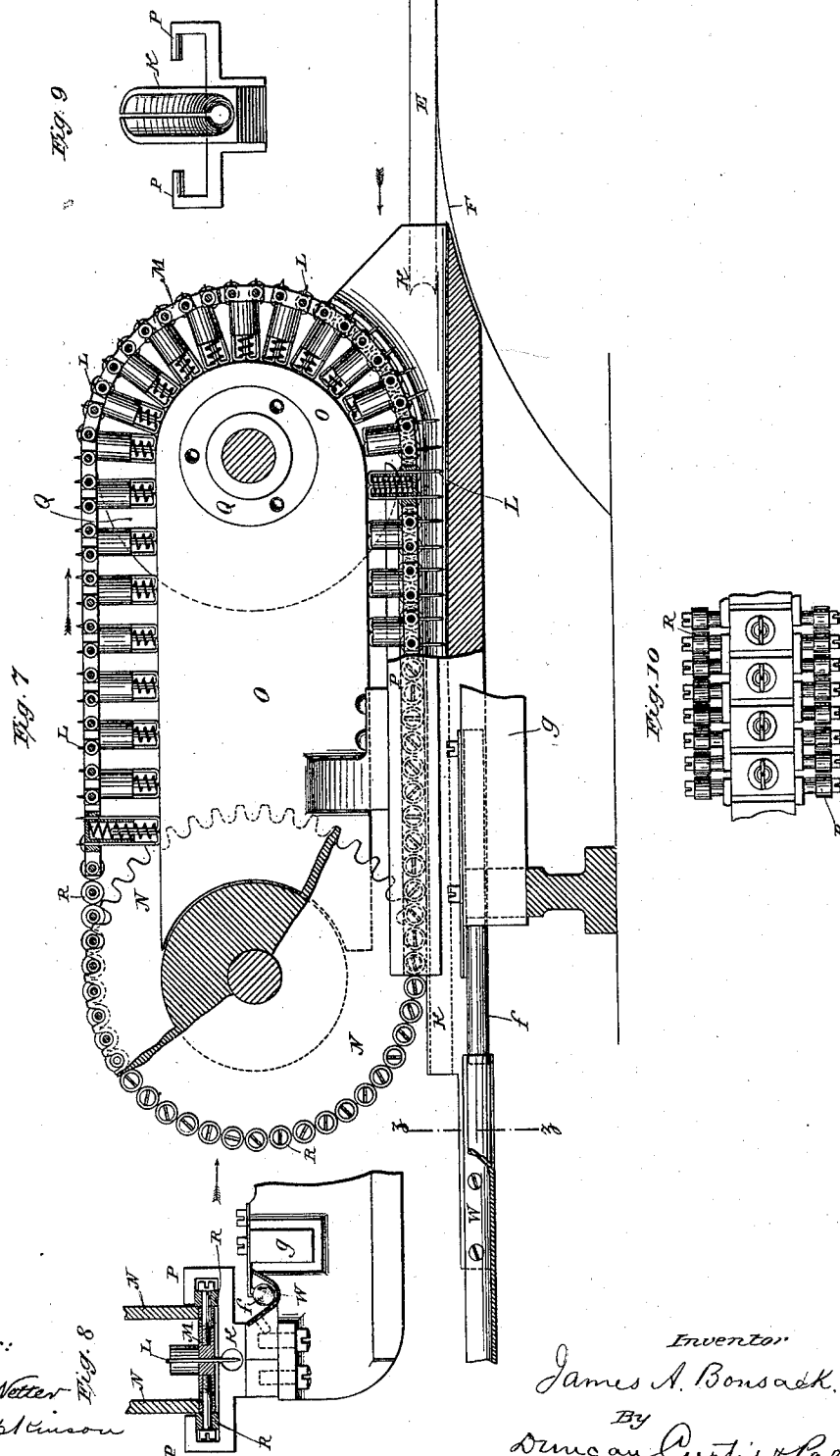
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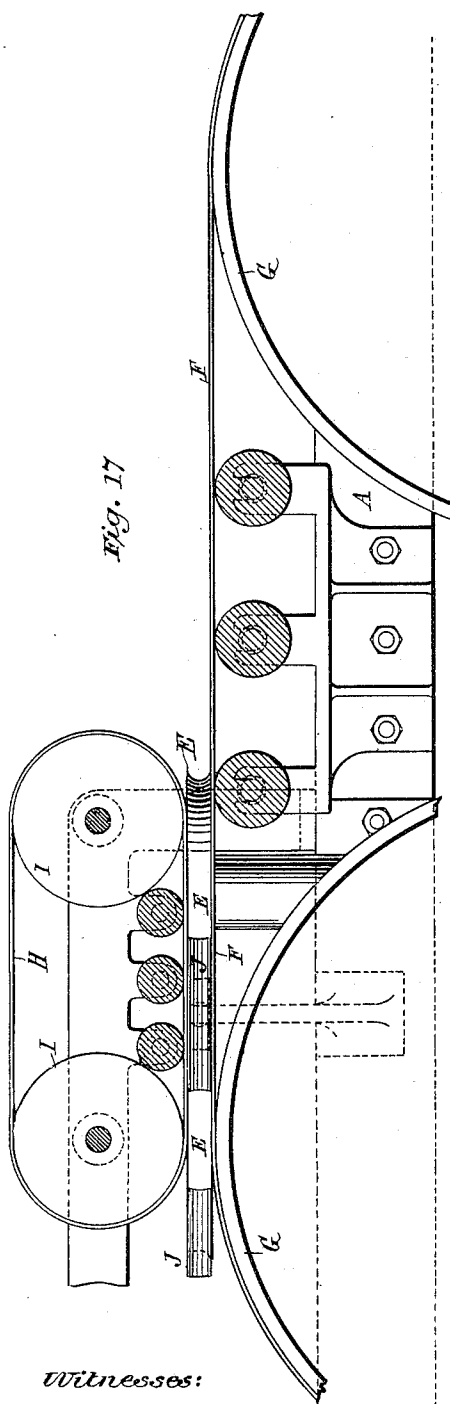
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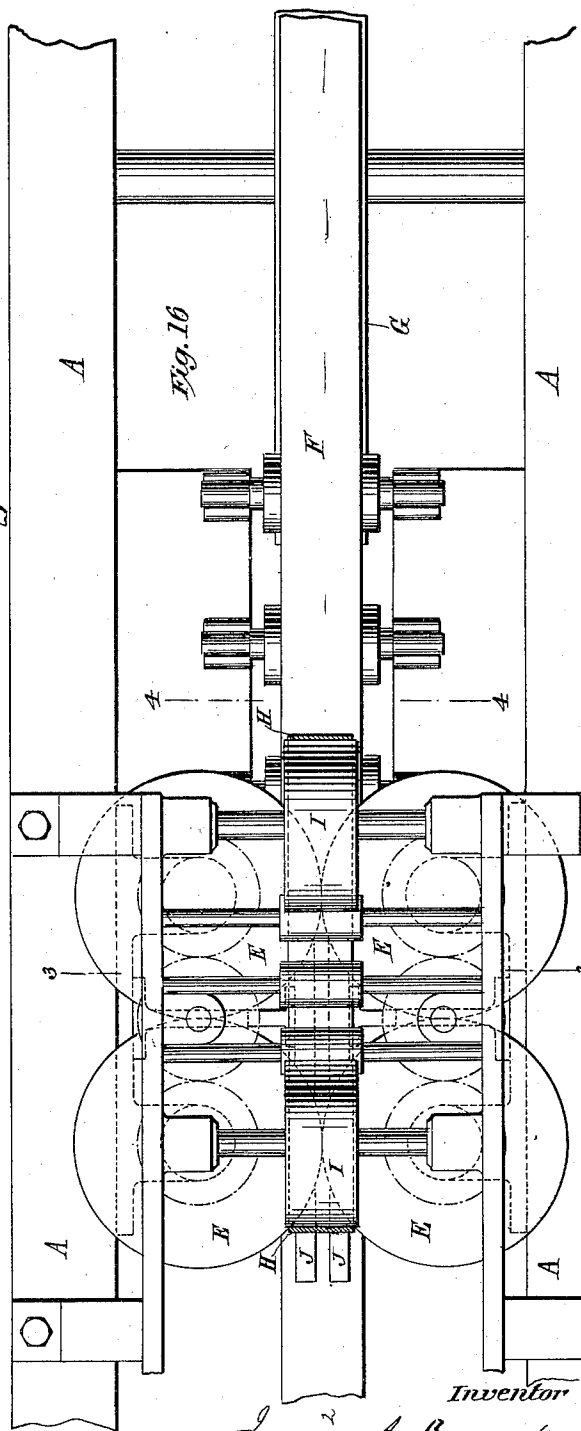
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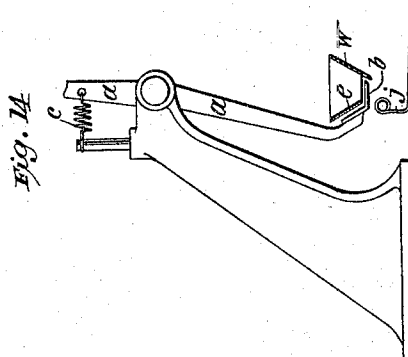
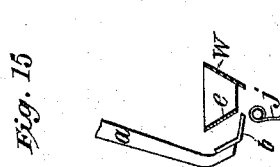
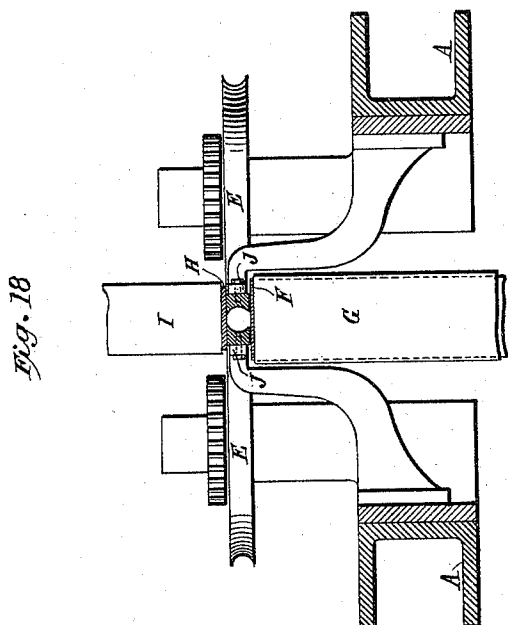
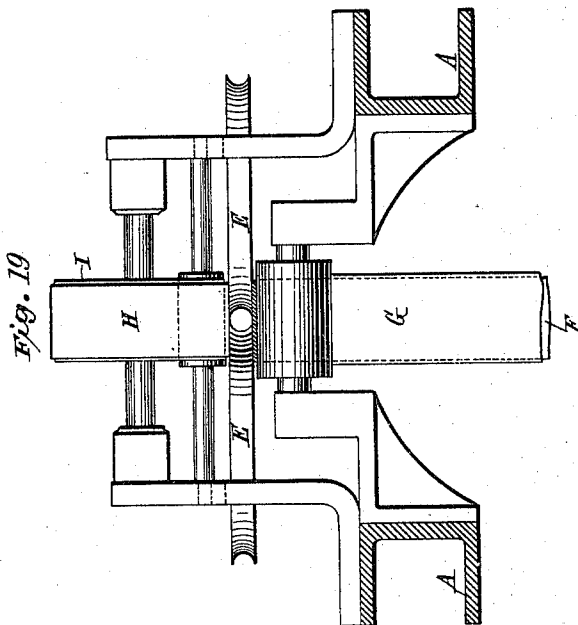
(No Model.)

7 Sheets—Sheet 7.

J. A. BONSAACK.
CIGARETTE MACHINE.

No. 585,253.

Patented June 29, 1897.



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UNITED STATES PATENT OFFICE.

JAMES A. BONSAK, OF BONSAKS, VIRGINIA, ASSIGNOR TO THE BONSAK MACHINE COMPANY, OF SALEM, VIRGINIA.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 585,253, dated June 29, 1897.

Application filed November 12, 1889. Serial No. 330,041. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. BONSAK, a citizen of the United States, and a resident of Bonsaks, Roanoke county, Virginia, have invented new and useful Improvements in Cigarette-Machines, of which the following is a full, clear, and exact specification.

This invention relates to improvements in cigarette-machines by which the requisite quantity of tobacco is formed into a cigarette-filler which is subjected to uniform pressure for a sufficient length of time while being conveyed toward its wrapper mechanism to set it in substantially its shape and size in the finished cigarette for the purpose of facilitating the application of the wrappers and improving the quality and appearance of the completed cigarette; and the invention consists in the combination of various mechanical devices and parts, especially those for forming the tobacco into a continuous filler or rod and for setting the formed filler before it is delivered to the wrapping mechanism, as hereinafter described and claimed.

In cigarette-machines as hitherto constructed to apply individual wrappers to fillers the filler is shaped and its diameter largely determined by the wrapping device during the operation of wrapping, and this necessitates the use of a wrapping-belt long enough and of sufficient movement to shape and size the filler before it applies the wrapper thereto. In such constructions the length of the wrapping-belt and its movement render the machine slow in operation, or if its speed is increased the wear of its parts is so increased that it is expensive to keep in repair and adjustment. Another difficulty in such case is that the wrapping-belt becomes soiled by contact with the tobacco while compressing the same into a filler of substantially the shape and size desired and when so soiled has a tendency to soil the wrapper of the finished cigarette. It has also been found that when this compressing of the filler into the desired size and shape takes place in the wrapping-belt after a given quantity of tobacco to form a filler has been separated from the mass the portions which form the ends of the filler are

freer to spread or elongate than the central portions, and because of this the ends of the filler do not contain the same proportional quantity of tobacco as the central portions, and therefore the filler is not of uniform density throughout its length. It has also been found that in the operation of machines designed to form a continuous cigarette-cylinder which is afterward cut or severed into the desired lengths for individual cigarettes considerable difficulty has been experienced from the "choking" of the partially formed and shaped filler in its course through the device which applies the continuous wrapper to it which arises from the somewhat unequal size of the continuous filler, and therefore the unequal friction of the same upon the wrapping devices as the wrapper is being applied. This unequal friction causes the filler to drag and slip in its passage through the wrapping device, and thus choke therein, which would not be the case if the filler was of substantially the desired size and had given to it a sufficient amount of "set," so as to be of substantially a uniform size throughout its length.

The principal objects of the present invention are to improve the said machines in the respects above referred to, and thus largely remedy the difficulties and defects pointed out and produce cigarettes of a more uniform and pleasing appearance and at a less cost.

The present invention is illustrated in the accompanying drawings, (seven sheets,) forming a part of this specification, in which—

Figure 1 is a plan view of a cigarette-machine. Fig. 2 is a front side elevation of Fig. 1. Fig. 3 is a right-hand end elevation of Figs. 1 and 2. Fig. 4 is a cross-section on line 1 1 of Figs. 1 and 2. Fig. 5 is a cross-section through the line *xx* of Fig. 1. Fig. 6 is a cross-section through line *yy* of Figs. 1 and 2. Fig. 7 is a vertical view of the filler-conveying, filler-setting, and filler-delivering mechanisms. Fig. 8 is an end view of the filler conveying, setting, and delivering mechanisms on the line *zz* of Fig. 7. Fig. 9 is an end view of the filler-conveying and filler-setting tube and the belt or chain guide as seen from the right of Fig. 7, and Fig. 10 is a plan

view of a section of the conveyer belt or chain. Fig. 11 is a plan view of the compressing-wheels, lower or filler-conveying belt, and the doctors or scrapers. Fig. 12 is a cross-sectional view of the same devices or parts with the upper or compressing belt added, which parts are shown in other figures on an enlarged scale. Figs. 13, 14, and 15 are cross-sectional views of the filler-delivering trough and wrapping-belt on a line almost over the right-hand edge of such belt, as seen in Fig. 1, the last two figures being on a somewhat enlarged scale from that of the first one. Fig. 16 is an enlarged plan view of the lower or filler-carrying belt and the upper or tobacco-compressing belt, the rolls or means for holding such belts in position, the compressing-wheels, the doctors or scrapers, and means for holding the latter in place, the upper belt being broken away the better to show the rolls which hold its lower part against the compressing-wheels. Fig. 17 is a longitudinal section on line 2 2 of Fig. 16, showing the manner of supporting belt-rollers and doctors or scrapers as well as the position of compressing-wheels and belts. Fig. 18 is a cross-sectional view of Fig. 16 on line 3 3 with front pair of compressing-wheels removed and showing adjacent parts omitted from Fig. 12. Fig. 19 is a cross-sectional view of Fig. 16 on line 4 4. The parts shown in Figs. 5 to 10, inclusive, and 15 to 19, inclusive, are on a somewhat enlarged scale from what the corresponding parts are in the other figures.

The machine illustrated in the drawings contains the following principal parts—viz., tobacco-feeding devices, filler-forming and filler conveying and setting devices, cutting-off devices, devices for delivering cut-off fillers to wrapping mechanism, and filler-wrapping mechanism.

The present invention relates more particularly to the filler-forming, filler conveying and setting, and filler-delivering devices.

In the drawings, A represents the frame of the machine; B, the main or driving shaft, provided with driving-pulleys C.

A part of the tobacco-feeding devices (not fully shown in the drawings) may consist of any suitable mechanism by which fibrous tobacco can be fed in regulated quantity to a hopper or receptacle D. The style and construction of such devices are immaterial, provided they operate to deliver the desired quantity of tobacco to the hopper at the proper times and in the proper condition. Substantially the construction described and shown in Letters Patent No. 247,795, dated October 4, 1881, and issued to me, has been found to answer the requirements, and reference is here made to said patent for a fuller description of such devices.

After the tobacco has been delivered to the hopper D it is fed to forming-wheels E, arranged in pairs, preferably in two pairs, and these wheels are caused to revolve at a

uniform rate of speed, so as to pass the tobacco between their peripheries, which are grooved to compress the tobacco into cylindrical form. The tobacco as it falls into the hopper D is received upon an endless belt F, which forms the bottom of the hopper and is caused to travel by passing over the wheels G G, which are revolved by gearing connected to the main shaft B. This belt F passes directly under and in contact with the meeting peripheries of the forming-wheels and delivers the tobacco to the cylindrical opening between the first pair of wheels and supports the partially-formed filler in its course between and through the second pair of wheels. H is a second feeding-belt, passing over wheels I I, which are revolved by gearing connected to the shaft which drives one of the wheels G. This belt is arranged to run above and in contact with the forming-wheels E, as the belt F runs below them, and operates to compress the tobacco and feed it between the first pair of wheels E and to guide the partially-formed filler.

It will be observed that the shaft which carries the wheel G nearest the tobacco-feeding mechanism and over which the belt H runs is some distance in front of the center of the first pair of forming or compressing wheels E, and because of this the tobacco being carried along on the lower or filler-carrying belt F is first acted upon by the belt H and compressed down to the thickness of the forming or compressing wheels before it enters between them, and thus causes the tobacco so compressed to enter and be fed between such first pair of wheels E. Each of the forming-wheels is preferably provided with a doctor or scraper J, attached to the frame or other rigid part of the machine and extending to and in contact with the periphery of its wheel in such manner as to remove any tobacco which would tend to stick or cling to the wheel and also to assist to guide the filler to the next pair of wheels and to the setting-channel beyond the second pair of wheels. This construction is shown in Figs. 11, 12, 16, 17, and 18 of the drawings; but the connection of the doctors or scrapers to the frame is only shown for one pair, the other pair being attached in a similar way.

It is not intended to limit the construction of the machine to two pairs of forming-wheels E, as shown in the drawings, as one pair of such wheels will compress the tobacco into a partially-formed filler in condition to be received in the setting-channel, hereinafter described.

After the filler has passed through the last pair of wheels E it is conveyed through a tubular channel K, in which it is set, so as to retain its form and size, and is delivered to the cutting-off mechanism at the end of this channel.

The description of the channel and the means employed for conveying the filler

through it are as follows: The tubular channel K is located in line with the course of the filler and receives the filler as it is fed onward by the forming-wheels and belts. Its receiving end is preferably somewhat enlarged, as seen in Fig. 9, to aid in the delivery of the filler thereto, and its general diameter is substantially that required for the finished filler. This tube or channel is provided with a narrow longitudinal slot for the reception and passage of pins L. The filler is conveyed through the channel K by means of the pins L, projecting from an endless traveling belt or chain M, which pins are carried into the channel through its slot and are inserted into the filler, and as the pins are moved onward by the movement of the belt M they convey the filler through the channel.

The construction and operation of the conveyer belt or chain M and its projecting pins L are somewhat peculiar and will now be described.

The conveyer belt or chain M is made up of a series of links or sections, each of which is provided with a double-pointed spring-actuated pin L, means for connecting it to the adjoining link or section, and means for engaging with a suitably-constructed sprocket-wheel N for giving the belt or chain motion, and also means for use in connection with guides O and P for causing the spring-actuated pins to move in and out of the cigarette-filler as well as in a line parallel with the setting-channel K. The conveyer belt or chain is mounted upon two double-rimmed wheels, one being the sprocket-wheel N and the other the supporting-wheel Q, which, in addition to supporting such belt or chain, supports the forward end of the guide O. This guide is provided with an opening at its forward end of a size to fit over the central portion of the hub of the supporting-wheel Q, which is made in two parts, one rim on each part, so as to permit of its being taken apart for the insertion of its hub through the guide O, the space between the two parts being just sufficient to permit the wheel to revolve freely within the hole of the guide and yet support the guide in the desired position.

The above construction is shown in cross-section in Fig. 6. Two of the sections or links of the belt M are shown in section in Fig. 7 and illustrate the construction of the pins L and their operation in connection with the guide O for causing them to enter the filler and then to permit them to be withdrawn therefrom by the action of their springs. The guide O is of such shape that it causes the pins L to enter the filler against the force of their springs and then permits the springs to exert their force to withdraw the pins when the squared end of the guide O near the center of the sprocket-wheel N is reached by each pin as the chain or belt is moved around. These links or sections are connected together by means of links or pivoted bars in a well-known manner, so that they can readily pass

around the sprocket-wheel N and supporting-wheel Q. The supporting-wheel Q is located at a suitable distance from the wheel N, and its central portion revolves within and supports one end of the guide O, as hereinbefore explained. The opposite end of the guide O is conveniently supported by brackets attached to each of its sides and to the upper part of the belt-guide P, which in turn is conveniently attached to the channel K, as shown in Fig. 6.

The pivots which secure the links, or sections of the belt or chain together are made long enough to form bearings for engaging with the sprocket-wheel N and also to form projections or bearings on which rollers R may be placed to work in connection with the guide P, as shown in Fig. 8. The guide P and rollers serve to keep the chain or belt in a line parallel with the setting-channel K, irrespective of the guide O, which only acts to operate the pins L.

If it is considered desirable, the delivery end of the channel K may be slightly enlarged from the point where the pins L are withdrawn from the filler to relieve the friction upon the filler, so that it will move more freely toward the cutting-blade.

The object of passing the partially-formed filler through the filler-setting channel K is to compress and set the filler or to bring it into substantially the shape and size and set it in such shape and size as it is to have in the finished cigarette, so as to render the application of the wrappers easier and give to the completed cigarette a smoother, more uniform, and tasteful appearance than would be the case were the fillers shaped wholly or largely during the application of the wrappers thereto. This setting of the filler can be accomplished by other means than the special setting-channel K, through which the filler is continuously passing; but whatever means are employed for this purpose the element of time is necessary—that is, the filler should be kept under pressure long enough to deprive the tobacco of its power to return to its former condition.

To effect the desired uniform compression and set of the filler by the means shown in the drawings, the channel K may be made of any desired length to keep the filler under continuous and substantially uniform pressure long enough to set the tobacco, so that when the filler leaves the channel its tendency to enlarge will be mostly taken away. It is desirable, inasmuch as the forming-wheels E act upon the tobacco for only a short time, that these wheels should be set close enough together to compress the tobacco into a filler or rod of slightly less diameter than that of the tube K, as the filler when relieved from the pressure of the wheels will at once enlarge. This increased compression by the wheels will facilitate the introduction of the filler into the channel K.

It is here observed that the filler-setting

channel K, with means for positively conveying the filler through such channel, instead of operating in connection with the filler-forming and tobacco-feeding devices herein described and shown, or either of them, may be employed to advantage when the filler is partially formed and delivered to such channel by any other mechanical means or even by hand.

As the continuous formed filler is delivered from the channel K it is cut into cigarette lengths. The cutting mechanism consists of the following devices: In front of the delivery end of the channel K is a blade S, attached by arm T to shaft U and revolving with it and shearing just past the end of channel K, which acts as a stationary shearing-blade. At every revolution of the blade S the portion of the continuous formed filler projecting from channel K is severed, and by properly timing the speed of the feeding devices, the filler-forming wheels, and the conveyer-belt relatively to each other and to the revolving blade S the portion of the filler projected beyond the end of channel K and severed by the blade at each revolution will be of the desired length for a single cigarette.

It is here observed that a longitudinal movement on the shaft U may be given to the arm T in a well-known manner at the instant the cutting-blade S operates to sever the filler, and this longitudinal movement should be equal to the forward movement of the formed filler in order to give a smooth cut and prevent the end of the filler from banking up against the cutting-blade, and in such case the cutting end of the channel should be slanted off or a forward movement given it in a manner also well known to correspond to the forward movement of the cutting-blade. If the latter construction is adopted, the cutting end of the channel should be separated from the main channel K.

Attached to the arm T is a plate V, having its plane at right angles to the plane of the cutting-blade S and extending forward from this blade in line with the filler as it is advanced beyond the end of the tube or channel K, as shown in Figs. 2 and 6 of the drawings. This plate operates to carry or sweep the severed filler to the top or mouth of the trough W, which, as hereinafter described and shown in Figs. 6 and 8, is located below and at one side of the end of the tube K. The plate V is preferably so arranged that when it passes over the trough W its plane will coincide with a vertical plane passing through the longitudinal axis of the trough, and the severed filler when it is carried to this point by the plate V will readily drop into the trough by gravity, provided the speed of the revolution of the arm T is not too great.

The individual fillers are now to be properly delivered from the trough W upon a wrapping belt or apron upon which paper

wrappers are placed in proper relation to be wrapped around the fillers. For this purpose the forward end of the trough W extends over the part of the wrapping-belt which receives the wrappers and is constructed with a movable bottom, as shown in Figs. 4, 13, 14, and 15, in which the pivoted lever *a* carries the movable bottom *b*. A spring *c* serves to return and hold the movable bottom *b* to its normal or closed position. An arm *d*, attached to the shaft U, is arranged to come in contact with the upper end of the lever *a* and cause it to be moved sufficiently to move the bottom *b* from under the trough and allow the filler to drop upon or near to the wrapper placed upon the belt beneath it. The side *e* of the trough prevents the filler from moving with the bottom *b* when the latter is removed. The trough W is open upon its upper part, where it receives the filler, but from this point to its end this part may be open or closed, as desired. The individual fillers are delivered upon the movable bottom of the trough W by means of a plunger *f*, attached to a slide *g*, working in suitable ways attached to the frame of the machine, as seen in Figs. 7 and 8, and this plunger is operated by a pivoted lever *h*, connected at one end to the slide and having the opposite end provided with a roll working in cam *i* on shaft U, as seen in Fig. 2. The construction and arrangement of this cam and its connection with the slide *g* are such that the plunger *f* moves the filler from where it is received in the trough W over and upon the movable bottom *b* and is so timed as to properly perform this work.

After the individual fillers have been formed and delivered to the wrapping-belt, as above described, they are wrapped with paper wrappers of suitable size for this purpose, one of whose edges is provided with paste or other adhesive material, so that the overlapped edges are securely united together.

Any of the well-known forms of wrapping-belts may be employed, as well as any suitable devices for cutting the paper wrappers from a continuous roll or strip of paper, gumming their edges and transferring them to the proper position upon the belt, and mechanism for operating the belt to cause the wrappers to be properly wrapped around the fillers and to seal their overlapped edges together.

Instead of performing all of the above-named operations by mechanical devices they may be done wholly or partly by hand—as, for instance, the wrappers may be cut to suitable sizes, gummed, and delivered to the wrapping-belt—and the belt may be operated either by hand or by disconnected mechanism.

In the accompanying drawings the mechanism shown for gumming the wrappers, delivering them to the wrapping-belt, and operat-

ing the belt is substantially that described and illustrated in Letters Patent No. 242,605, dated June 7, 1881, the only changes being that the cam which operated the pasting-rolls in the said patented construction is transferred to the main shaft and the pivoted lever which carries the pasting-rolls is changed in shape, so as to work properly in connection with the cam in its transferred position.

For a full and detailed description of the construction and operation of the mechanism above referred to reference is here made to the specification and drawings of said Patent No. 242,605.

I am aware that cigarette-machines have been constructed in which a wheel or an endless belt was used provided with pins which moved diametrically therewith to withdraw loose tobacco from the receptacle and carry it into a device which forms the loose tobacco thus withdrawn into a partially-formed filler; but in none of these machines is the partially-formed filler positively conveyed through such filler-forming device at a given rate of speed irrespective of the varying quantities of tobacco forming the filler, as is the case in the setting device of the present invention. In fact, the partially-formed filler in the machines referred to is caused to pass through the greater portion of the compressing-chamber of the filler-forming devices by the pressure of the following particles of tobacco as they are carried into the opening of such device by the pins, and therefore the speed of the different portions of the partially-formed filler in its passage through the filler-forming device necessarily varies.

In all of the above-named machines the filler-forming device is tapering throughout its length, and therefore the filler is not held under a uniform and continuous pressure so as to give it the required set.

What I claim is—

1. In a cigarette-machine, the combination substantially as set forth, of a filler-setting channel, an endless traveling chain or belt provided with spring-actuated pins adapted to be inserted into and withdrawn from the filler-setting channel and constructed to be actuated in one direction by their springs, and a guide constructed to move the spring-actuated pins in the other direction, whereby the pins are caused to enter the filler and be withdrawn therefrom at the proper time.

2. In a cigarette-machine, the combination substantially as set forth, of a filler-setting channel, a guide, as P, an endless traveling chain or belt provided with spring-actuated pins to engage with the filler and with projections as R, and means for withdrawing the pins and operating the belt, whereby the belt is caused to move in the desired path of travel relatively to the filler-setting channel by the engagement of its projections with the guide P, and to advance the filler through the chan-

nel by the engagement of the pins therewith.

3. In a cigarette-machine, the combination substantially as set forth, of a filler-setting channel, spring-actuated pins adapted to engage with the filler, means for advancing the pins through the setting-channel and withdrawing them therefrom, a cutting-off device located beyond the setting-channel for severing the continuous filler into individual fillers, a wrapping device located beyond the cutting-off device and means for delivering the individual fillers from the cutting-off device to the wrapping device.

4. In a cigarette-machine, the combination substantially as set forth, of a filler-forming device, a filler-setting channel, means adapted to engage with and positively convey the filler through the setting-channel, a cutting-off device located beyond the forward end of the filler-setting channel, and a wrapping device located beyond the cutting-off device, whereby tobacco is formed into a continuous filler which is conveyed through the setting-channel to the cutting-off device and is set in its course thereto and is severed into cigarette lengths which are subsequently wrapped with wrappers.

5. In a cigarette-machine, the combination substantially as set forth, of a tobacco-feeding device, a filler-forming device, a filler-setting channel, means adapted to engage with and positively convey the filler through the setting-channel, a cutting-off device located beyond the forward end of the filler-setting channel and a wrapping device located beyond the cutting-off device, whereby tobacco is fed and formed into a continuous cigarette-filler which is conveyed to the cutting-off device and is set in its course thereto and is severed into cigarette lengths which are subsequently wrapped with wrappers.

6. In a cigarette-machine, the combination substantially as set forth, of a cutting-off device, a delivering device provided with a moving part arranged to move in the direction of the length of the cigarette-filler, and a wrapping device, whereby a continuous filler is severed into cigarette lengths which are then delivered to a wrapping device to be wrapped.

7. In a cigarette-machine, the combination substantially as set forth, of two grooved forming-surfaces arranged to travel in substantially the same plane, means for moving such surfaces toward each other, and two flat surfaces arranged on opposite sides of the grooved forming-surfaces and means for moving each of the flat surfaces toward and into close proximity to both of the forming-surfaces, whereby tobacco is fed forward and compressed to form a cigarette-filler.

8. In a cigarette-machine, the combination substantially as set forth, of shaping-wheels arranged to rotate in substantially the same plane and toward each other, and two end-

less belts arranged upon opposite sides of the shaping-wheels, whereby tobacco is fed forward and compressed to form a cigarette-filler.

- 5 9. In a cigarette-machine, an endless carrier-belt and top or presser endless belt above the carrier-belt, combined with shaping-

wheels mounted to revolve between the said belts, whereby the tobacco is formed into a filler-rod, substantially as set forth.

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