(No Model.)

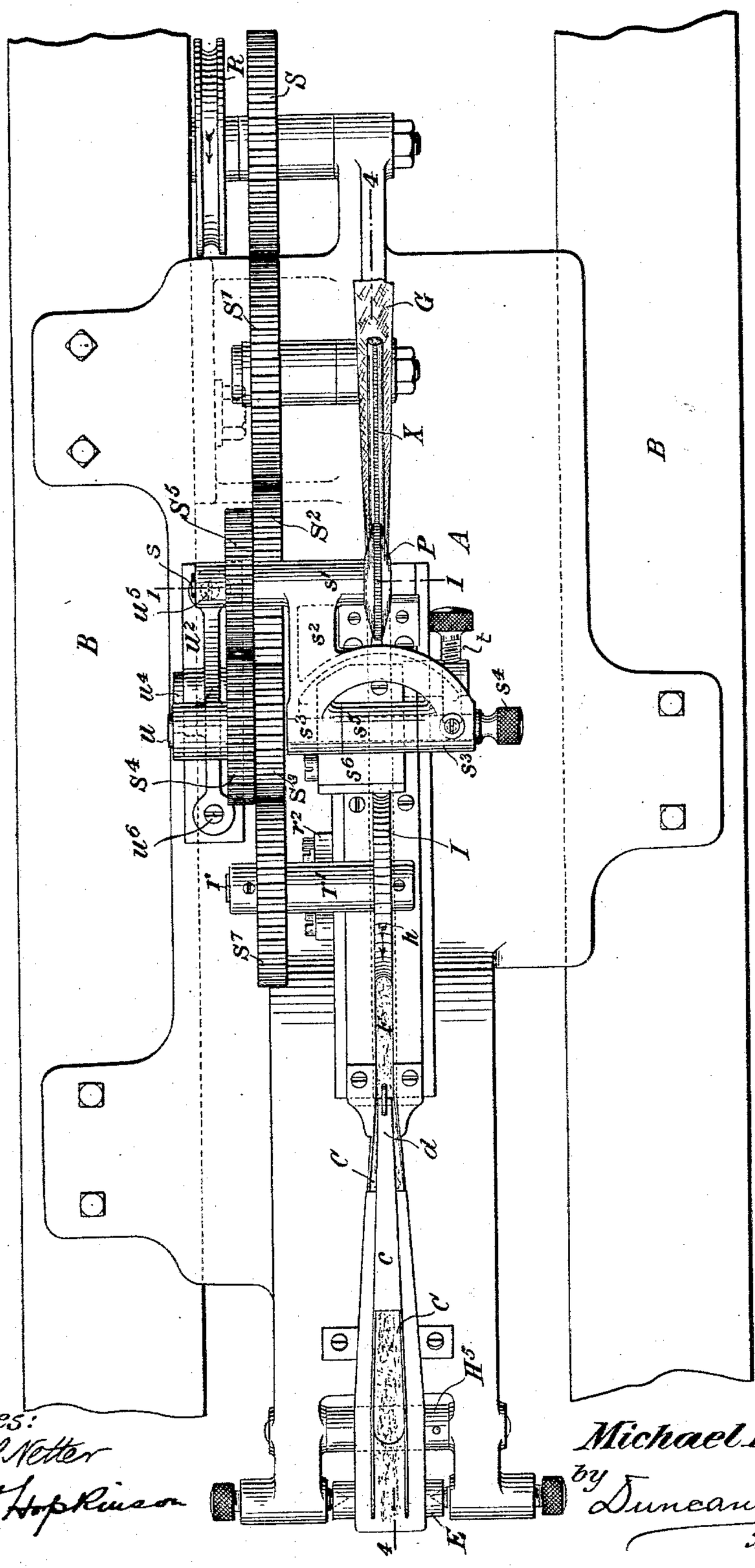
5 Sheets—Sheet 1.

M. KIRSHNER.

CIGARETTE MACHINE.

No. 551,332. Patented Dec. 10, 1895.

Fig. 1



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Ernest Hopkinson

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by Duncan & Page
Attorneys

(No Model.) 5 Sheets—Sheet 2.

M. KIRSHNER.

CIGARETTE MACHINE.

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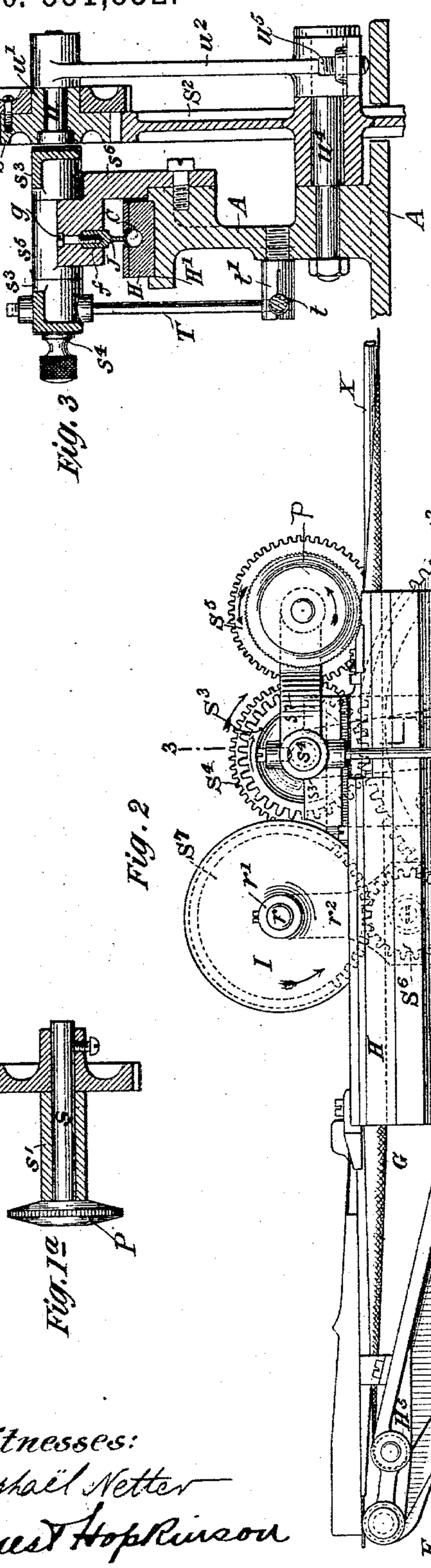

Fig. 3

Fig. 2

Fig. 1a

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(No Model.) 5 Sheets—Sheet 3.

M. KIRSHNER.

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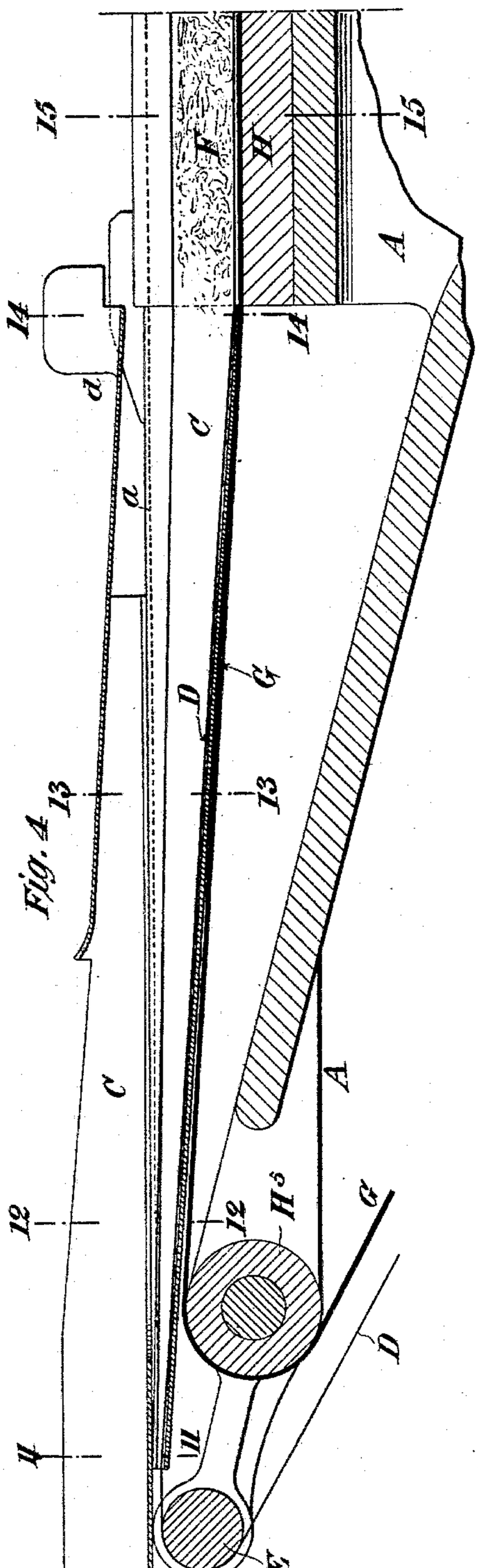

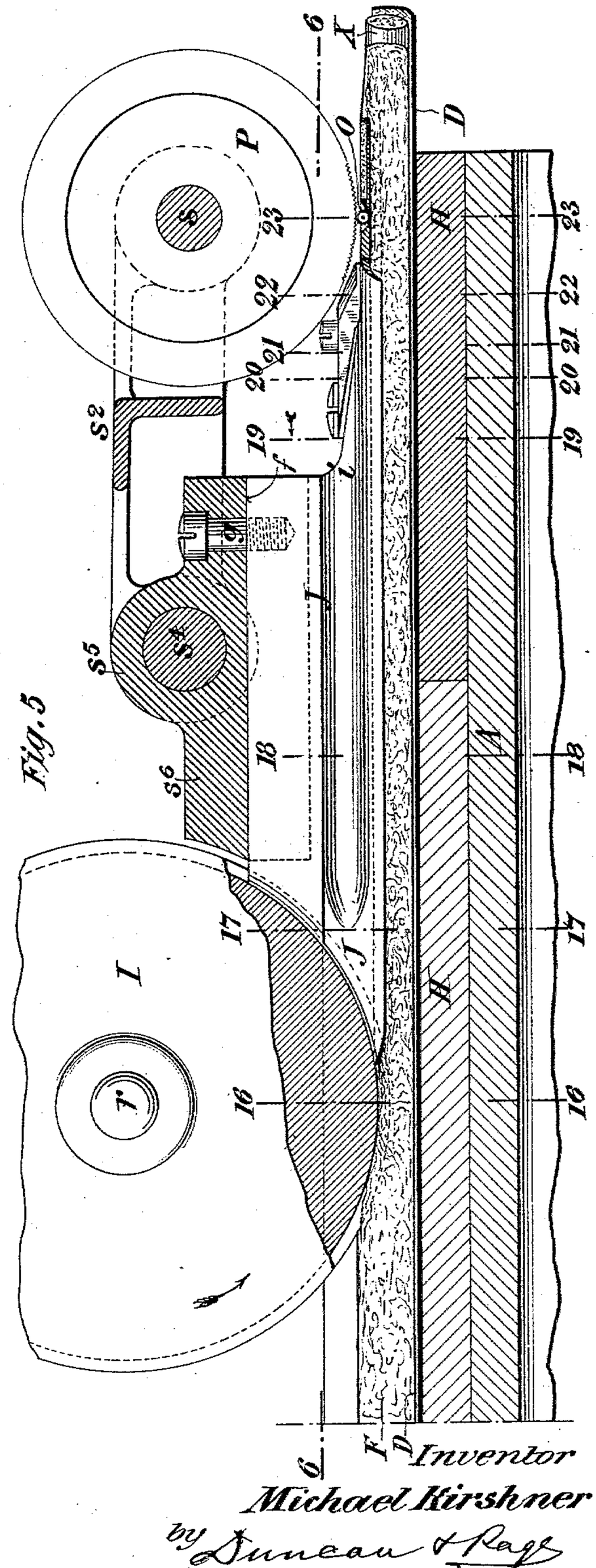

Witnesses
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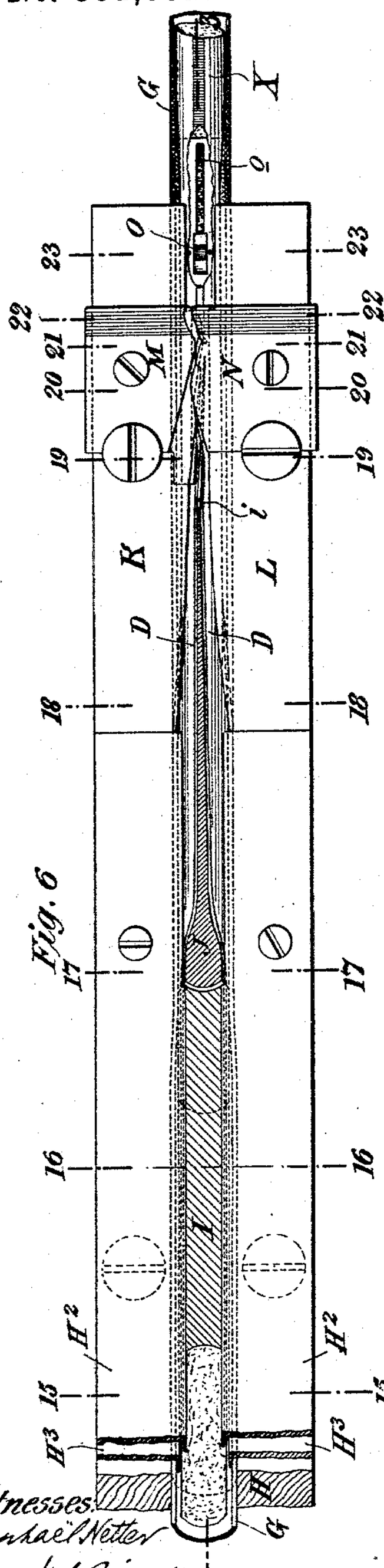
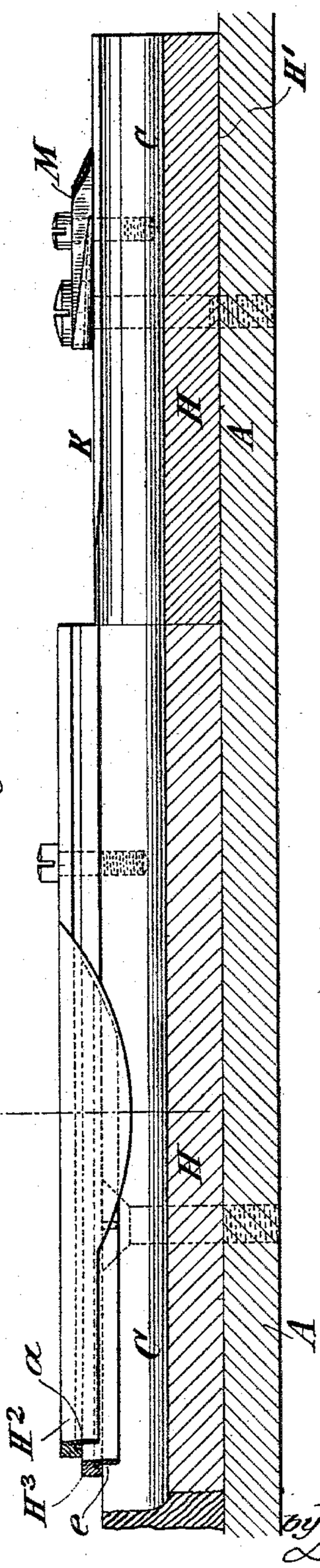
(No Model.) 5 Sheets—Sheet 4.

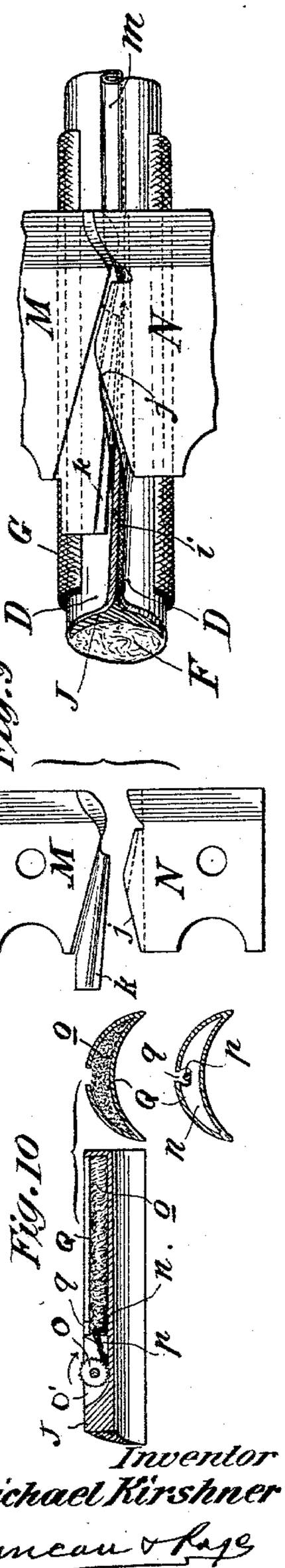
M. KIRSHNER.

CIGARETTE MACHINE.

No. 551,332. Patented Dec. 10, 1895.







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M. KIRSHNER.

CIGARETTE MACHINE.

No. 551,332. Patented Dec. 10, 1895.

Fig. 14

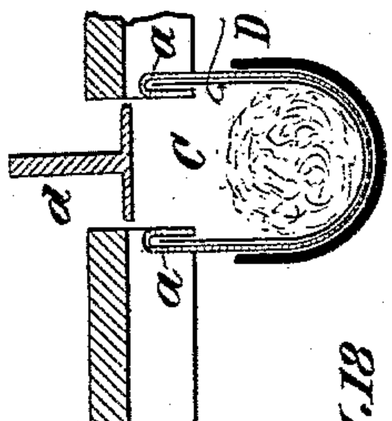


Fig. 13

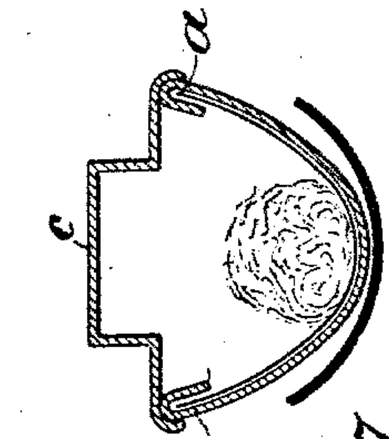


Fig. 12

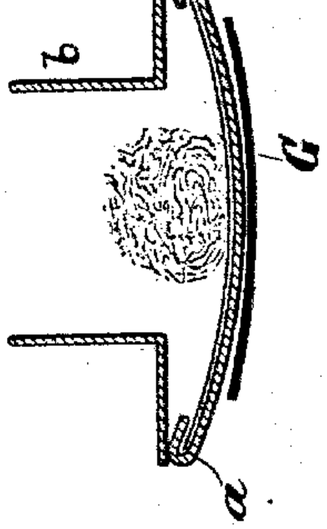


Fig. 11

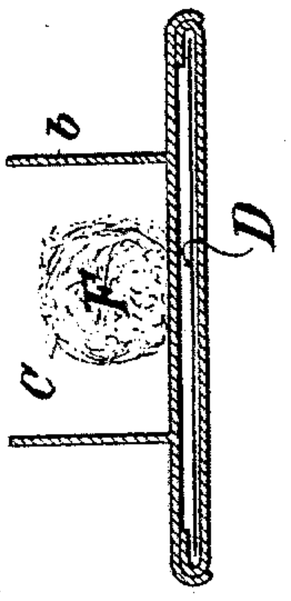


Fig. 18

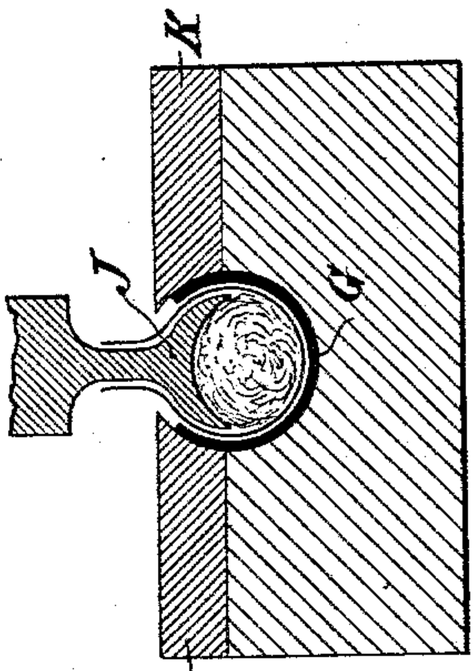


Fig. 17

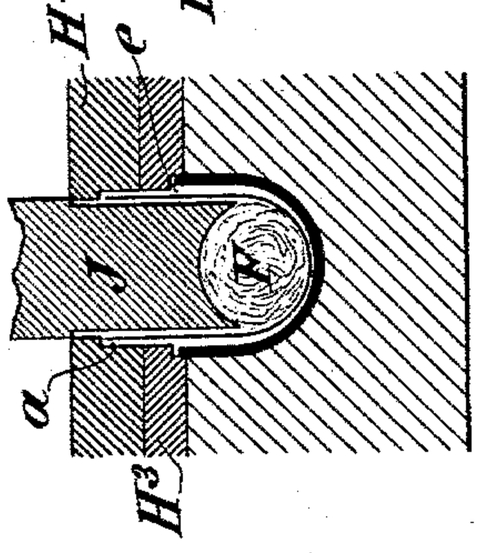


Fig. 16

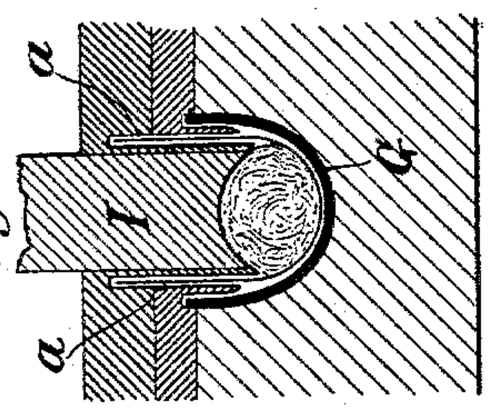


Fig. 15

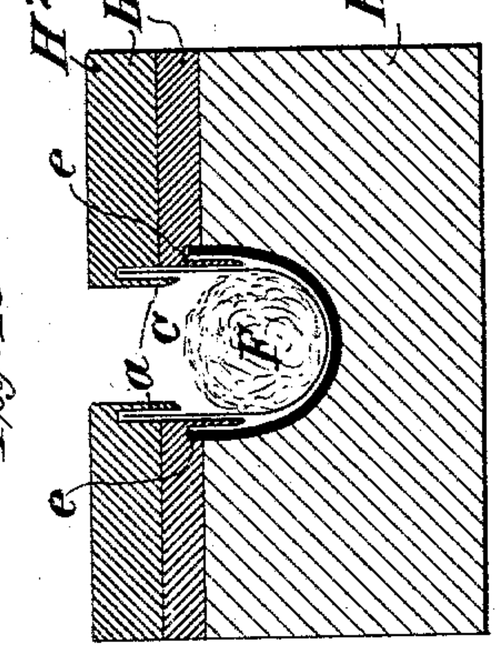


Fig. 23

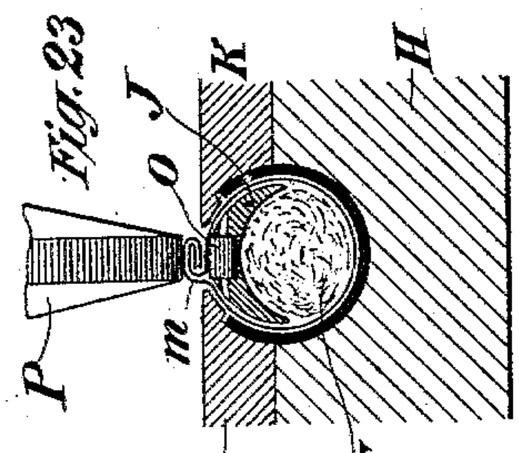


Fig. 22

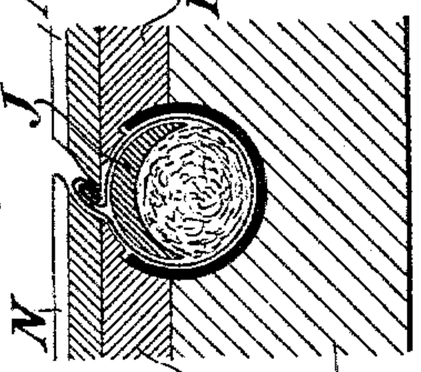


Fig. 21

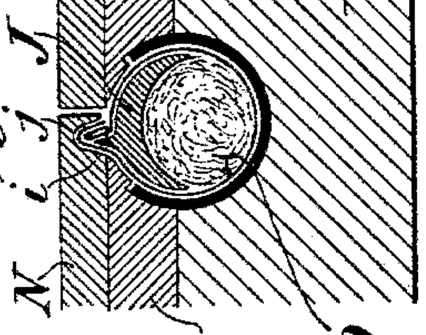


Fig. 20

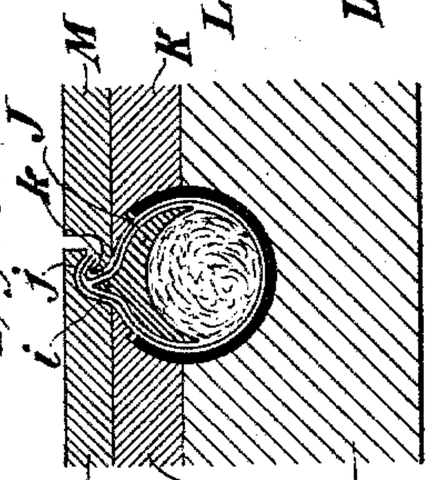
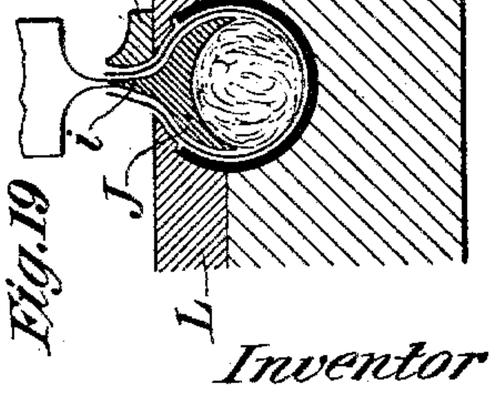


Fig. 19



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UNITED STATES PATENT OFFICE.

MICHAEL KIRSHNER, OF SALEM, VIRGINIA.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 551,332, dated December 10, 1895.

Application filed December 1, 1894. Serial No. 530,584. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL KIRSHNER, a citizen of the United States, residing in the city of Salem, in the county of Roanoke and State of Virginia, have invented certain new and useful Improvements in Cigarette-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of the same.

This invention relates to improvements in cigarette-machines of the class which are adapted to make continuous cigarettes by applying a long or continuous wrapper-strip to a proper quantity of tobacco compressed into rod-like form and hereinafter called the "filler," bringing the opposite edges of the wrapper into suitable engagement with each other and incorporating them together by indenting or crimping to form a completed seam.

In the manufacture of continuous cigarettes by progressively bringing a long wrapper-strip around a tobacco filler, and securing its opposite engaged edges together by crimping or indenting, it is necessary to subject such engaged edges to considerable pressure, and in order to make such pressure effective it is considered essential to provide a support located between the filler and the engaged wrapper edges which will resist the pressure exerted by a proper device operating outside of the wrapper. This support should be as stiff and unyielding as possible so as not unnecessarily to compress the tobacco and at the same time should be sufficiently thin so as not to occupy too much of the wrapper-space. It is also desirable that this support should carry a small serrated or notched roller to co-operate with a serrated wheel located outside of the wrapper to incorporate the engaged wrapper edges into a completed seam, and that means be provided to supply this roller (which must revolve very rapidly to do its work) with a constant supply of oil or other lubricant. Inasmuch as this support must be wholly secured and held in position at a point forward of the meeting of the wrapper edges and at a considerable distance from the point where the crimping pressure is applied, it follows that the support must have considerable thickness or body in order to give it the desirable rigidity, and consequently will take up an undesirable portion of the wrapper-space which could otherwise be occupied by the filler. From this it follows that the filler must be sufficiently compressed to pass readily beneath this support, and when it has passed beyond it it must expand sufficiently to fill the then sealed wrapper. It is also desirable that means be provided for adjusting the pressure of the devices which act to incorporate the engaged wrapper edges into a seam.

It is the object of the present invention to provide improved devices which are especially adapted to accomplish the above-named results. These and accompanying devices consist mainly of a channel through which, and means by which, the wrapper-strip and tobacco filler superimposed thereon are advanced, and means by which the wrapper is progressively brought to encircle the filler, and devices by which the opposite edges of the wrapper are brought into proper engagement with each other; also, a support which forms the upper wall of the channel for a part of its length, and whose forward end co-operates with a filler-compressing wheel while its rear end carries a small crimping-roller arranged to operate inside of the wrapper and between the filler and the wrapper-seam and to co-operate with an outside crimping-wheel to incorporate the engaged opposite edges of the wrapper into a completed seam; also, means of supplying the necessary lubricant to the small crimping-roller; also, mechanism for communicating motion to the outside crimping-wheel and the filler-compressing wheel; also, devices for adjusting the outside crimping-wheel to vary its pressure, and devices for adjusting certain connecting gear-wheels. These devices are preferably so constructed that they can be combined upon a single frame and constitute an attachment of such form that it can be applied to the well-known Bonsack cigarette-machine of the general form and construction set forth in United States Letters Patent No. 247,795, dated October 4, 1881, by removing from the said machine the wrapping-tube marked G^3 and the pasting devices G^4 and G^5, as shown in the drawings, and substituting therefor the present construction.

The invention is illustrated in the accompanying drawings, (five sheets,) in which—

Figure 1 is a plan view of a machine con-

taining the invention secured to the frame of a cigarette-machine. Fig. 1[a] is a cross-section through the line 1 1 of Fig. 1. Fig. 2 is a side elevation of the machine, part of the frame being shown in section. Fig. 3 is a cross-section through the broken line 3 3 of Fig. 2. Figs. 4 and 5 are enlarged longitudinal central sections through the line 4 4 of Fig. 1. Fig. 6 is an enlarged longitudinal horizontal section through the line 6 6 of Fig. 5. Fig. 7 is an enlarged vertical section through the line 7 7 of Fig. 6, certain parts being omitted. Fig. 8 is an enlarged plan view of the devices for directing the opposite edges of the wrapper and for folding the same into a seam when in position for operation. Fig. 9 is a detailed view of devices for folding the opposite edges of the wrapper when such devices are separated from each other. Fig. 10 contains detailed views of the oil-chamber and devices for lubricating the small crimping-roller. Figs. 11 to 23, inclusive, are cross-sections taken through cross-lines of Figs. 4, 5, and 6, such lines being numbered respectively to correspond to the numbers of the cross-sections.

It is remarked at this point that the tobacco is properly prepared and formed into a filler or rod before it is presented to the devices shown in the accompanying drawings, and any suitable mechanisms may be used for this purpose—as, for instance, those shown in the said Bonsack patent above referred to. It is further noted that where the words "forward" and "rear," or other words of similar meaning, are used in this specification, they generally refer respectively to the entrance or head and to the exit or tail of the machine.

Referring to the accompanying drawings, A represents the frame on which the various devices are mounted, and this frame may be attached in any desirable way to the main frame B B of a cigarette-machine, as shown in Figs. 1 and 2.

C is a channel extending longitudinally over the frame, through which the wrapper-strip D, taken from any convenient source and passed over the roller E, and the tobacco filler F, previously formed and delivered upon the wrapper, are advanced. The forward part of this channel is trough-like in shape, gradually growing deeper by the depression of its central portion as distinguished from the raising up of its sides, which construction permits the edges of the wrapper to remain in substantially the same horizontal plane and greatly facilitates bringing the strip progressively from a flat into a U shape without straining or tearing the delicate paper. This part of the channel is conveniently made of sheet metal secured in proper position by supports attached to the frame A and is provided with side guides *a* for the edges of the wrapper. Side walls *b*, Figs. 11 and 12, serve to keep the filler in a central position of the wrapper until the latter has been brought into approximately a U shape, as seen in Fig. 13. This trough may be provided with a cover *c* secured to its edges, as seen in Fig. 13, which afterward may terminate as a tongue *d*, as seen in Fig. 14.

The rear portion of the channel C is conveniently formed in a block or piece H fixed in a groove H′ of the frame A, as seen in Figs. 2 and 3, and in plates H[2] and H[3] arranged above and secured to piece H, in the edges of which guides *a* for the wrapper edges and guides *e* for the edges of an endless belt are conveniently formed. As the filler is advanced through the trough-like portion of the channel it encounters little obstruction or friction, and the advance of the wrapper easily carries the filler along at an equal speed, but as the filler is to be compressed and subjected to considerable friction in its passage through the rear part of the channel it is necessary to provide additional means to carry it and the wrapper along. For this purpose an endless belt G runs through the channel and encircles the wrapper and filler sufficiently to carry them along, at the same speed with the belt, through the channel and past the devices hereinafter described. This belt passes over rollers H[4] and H[5] near the entrance end of the trough-like portion of the channel and thence under the bottom of the channel until it enters the same and is brought in contact with the wrapper at the point shown in Fig. 4 of the drawings, and thence through the rear part of the channel, being properly guided in its course relatively to the wrapper by means of the side guides *e*, and thence over a return-wheel (not shown in the drawings) which may be secured to the main frame of the machine and be positively driven at any desired speed.

The top or upper portion of the channel C is nearly closed for a considerable portion of its length by a revolving wheel I, whose periphery, preferably grooved, dips into the upper portion of the channel and revolves therein, and by a support J, whose lower face is concaved to correspond substantially with the groove of the wheel I. This support forms a hood over the filler under which the filler is advanced while the sides of the wrapper and the edges of the belt pass along in narrow grooves or openings between the outer wall of the support and the upper inner wall of the channel C.

The forward end of the support J is brought into close proximity with the periphery of the wheel I, and is preferably rounded off so that it will fit closely into the groove of the wheel, and its concaved under surface is elevated slightly above the groove of the wheel at its lowest point, so that the revolution of the wheel will compress the filler slightly below the entrance of the support and thereby enable the filler to pass readily under the same. This support extends from the wheel I to or slightly beyond the crimping mechanism hereinafter described, and carries upon or near its rear end a small crimping-roller. The

sides of the support, throughout a considerable portion of its length, are cut away or grooved out to permit the edges of the wrapper to gradually approach each other, as seen in Figs. 18 and 19, and the support is thinned down to an edge *i* upon its top and gradually decreases in height till it disappears in the rounded surface of the support, as seen in Fig. 22, so that the edges of the wrapper are gradually brought in contact with each other in their passage between the points designated by Figs. 19 and 20, and the opposite edges of the wrapper are gradually turned over the edge *i* which is preferably at this point deflected laterally to a slight extent in order to provide a properly-located abutment over which the wrapper edges are turned. This support J is held in its position by being closely fitted into a slot or groove *f*, formed near the top of the frame, and is held in position by one or more screws *g*, as seen in Figs. 3 and 5.

The wheel I is revolved in the direction of the arrow and preferably at a peripheral speed slightly greater than the advance of the tobacco filler, so as to give to its upper portion, with which the wheel comes in contact, a smoothing effect.

It has been found advantageous, especially when the filler is in a dry condition, to provide the periphery of wheel I with cross serrations or corrugations *h* of slight depth and at a considerable distance apart, as shown in Fig. 1, which construction materially assists to feed the tobacco. At the point where the wheel I revolves the inner walls of the guides *a* are extended down to the periphery of the wheel to prevent the sides of the wheel from coming in contact with the wrapper to crumple it or prevent its uniform and steady advance.

The devices for folding the opposite edges of the wrapper, when they have been brought into contact with each other by passing beyond the interposed top of the thinned-down edge *i* of the support J, consist of a gradually spiral-shaped grooved edge and face *j*, formed on the edge of plate N, which turns the two edges of the paper over the edge *i* and over an edge or part *k* formed on the edge of plate M, which is then interposed between one of the turned-over edges of the paper and its body part, and as this edge *k* gradually thins out and disappears the edge of the wrapper which was in contact with it is brought in contact with the body of the wrapper, as seen in Figs. 20 and 21, where the lower portion of the part *i* still remains to separate, for the time being, two of the thicknesses of paper from each other until the edges are still farther turned over and brought in contact with each other by the disappearance of the edge *i*. Still farther along, as shown in Fig. 22, by a change in the shape of the operative folding parts, the thicknesses of paper are gradually brought in closer contact with each other and are still farther folded over to form a seam or joint of four thicknesses, and farther on these thicknesses are laid over by the shape of the folders to form a seam in substantially a horizontal position of five thicknesses, as shown in Fig. 23. The plates N and M are conveniently mounted upon plates L and K, the four plates being secured in place by screws passing into the piece H, as seen in Figs. 6 and 7. The plates L and K preferably extend forward and rearward of the folding-plates M and N and their edges operate to direct and keep in proper position the wrapper and belt.

Devices for securing the seam.—Upon the support J and near the rear end thereof is mounted a small roller O, which is arranged in a chamber O′ formed in the upper part of the support to revolve upon an axle secured in the side walls of the chamber. This chamber does not extend through the support, and thus the roller O is kept entirely out of contact with the tobacco of the filler. This roller is provided upon its surface or periphery with fine serrations running in the direction of its axle, as seen in Figs. 5, 6, 10, and 23. The wheel P, whose periphery is preferably serrated to correspond with the serrations of the roller O, is mounted to revolve above the said roller, as shown in the figures last referred to, and the wrapper-seam *m*, formed as above described, passes directly between the periphery of the said wheel P and the roller O. By an adjusting arrangement, hereinafter described, the wheel P can be brought to exert any desired pressure upon the wrapper-seam, which will be resisted by the roller O, to incorporate the several thicknesses of which the seam is composed together to form a completed seam. The roller O is frictionally driven by the pressure exerted upon it by the wheel P through the seam *m*, the latter wheel being preferably driven at the same peripheral speed at which the belt G and the wrapper and filler are advanced.

It is essential to lubricate the operative face of the roller O so that the paper composing the wrapper-seam will not adhere to such face but will readily be freed therefrom even when forced by the pressure of the wheel P between the fine serrations formed on the face of the roller. As this roller is inclosed within the wrapper and cannot be lubricated in the ordinary way, it is necessary to provide special means for accomplishing this, which should be such as in practice to apply the lubricant in such minute quantity as not to stain through the delicate paper and injure the appearance of the cigarette. To effect this result, I provide a chamber or recess Q in the support, and place therein waste or strands or threads of textile material which will absorb oil or other fluid lubricant; and I establish a passage or communication between the chamber or recess Q and the face of the roller O by leading one or more of these threads or strands under and in contact with the face of the roller O. By supplying this

textile material with a few drops of oil from time to time it is found that the face of the roller will be sufficiently lubricated to prevent the adhesion of the paper thereto which has been forced into the fine serrations in its face and without staining the paper sufficiently to injure the appearance of the cigarette.

If it is desired, in order to obviate the frequent applications of lubricant to the chamber Q, to introduce a larger supply of the lubricant than the textile material will at once absorb, I provide the chamber Q with a partition *n* to prevent the flow of unabsorbed lubricant to the chamber O′, and lead a thread or strand of the textile material over this partition (which is preferably provided with a notch *p*) and thence under and in contact with the face of the roller O.

As the roller O revolves in the direction of the arrow, as seen in Fig. 10, the strand of waste interposed between its face and the bottom of its receptacle will be retained in the desired position, and will not interfere with the crimping action of the roller which takes place at a point opposite the contact of the oiling-strand.

Driving and adjusting mechanism.—The crimping-wheel P and the filler-compressing wheel I may be mounted and driven by any desirable means or mechanism to produce the required results of their operation. In the drawings the following-described constructions are shown for this purpose: The wheel P is attached to its shaft *s*, which revolves in a sleeve *s′*, which is hung by an arm s^2 to a sleeve s^3, which is secured to a pin s^4, which rotates in a bearing s^5, formed in the top of a bracket s^6, secured to the frame A of the machine, as seen in Figs. 1, 2, and 3. The wheel I is attached to its shaft *r*, which revolves within a sleeve *r′*, which forms the upper part of a bracket r^2, secured to the frame A of the machine. The crimping-wheel P is driven from a belted pulley R, through the meshing gear-wheels S, S′, S^2, S^3, S^4, and S^5, the latter being fixed to the shaft *s* of the wheel P, and the filler-compressing wheel I is driven by the intermeshing of the wheel S^2 with the wheel S^6, which in turn meshes with wheel S^7, the latter being fixed to the shaft *r* of the wheel I. The wheel P is adjustable to produce a greater or less pressure upon the wrapper-seam to crimp the same by the following means: A spring-rod T is secured to the sleeve s^3, from which the sleeve *s′* carrying the wheel P is hung through arm s^2, and a thumb-screw *t*, threaded through a projection *t′*, takes against the lower end of the rod T, so that, when it is screwed outward against the end of the rod, it will cause the pin s^4 and the sleeve s^3 fixed thereto to rock, and through the arm s^2 force the sleeve *s′* and the crimping-wheel rotating therein downward upon the wrapper-seam to be operated upon. The construction is in fact a bell-crank lever pivoted to rock in the bearing s^5, its upper arm s^2 being rigidly connected to the suspended wheel P while its lower spring-arm T is controlled by the abutting screw *t*. As the rod T is preferably of spring-steel, the pressure exerted by this mechanism will be a spring-pressure, so that the wheel P will be at liberty to rise up slightly should it meet with any unusual obstruction or variation in the thickness of the wrapper-seam operated upon. By this means, also, the crimping pressure can be very finely regulated—that is, the wrapper-seam can be at any moment subjected to a very slight increase or decrease of pressure. The gear-wheel S^3 revolves on axle *u*, and the gear-wheel S^4 is secured to a hub *u′* of the wheel S^3 to revolve with it, the axle *u* being fixed in the top of the standard u^2, which is pivoted on the stud u^4 fixed in the frame of the machine, which also serves as the axle on which wheel S^2 revolves. The gear-wheels S^3 and S^4 are adjustable concentrically with the axle u^4 and to and from the wheel S^5 by means of the screws u^5 and u^6 which pass through the foot of the standard u^2 and take against or into the bottom plate of the frame. This adjustment provides for the substitution for the wheels S^4 and S^5, the latter of which directly drives the crimping-wheel P, of slightly smaller or larger wheels whereby the speed of the crimping-wheel can be regulated.

The function and operation of the various parts above referred to are sufficiently set forth in connection with their description.

It is specially stated that the present invention is not limited to any particular construction of the parts or devices which co-operate to produce the desired results, except as recited in the specification and claims.

It will be understood that the finished continuous cigarette X as it emerges from the devices, by which the engaged wrapper edges are incorporated together by crimping or indenting, may be cut into marketable lengths by any of the well-known devices employed for this purpose.

What is claimed as new is—

1. In a cigarette machine, the combination substantially as set forth, of a filler channel, a pressure-resisting support constituting the upper wall of said channel and provided with a projecting edge gradually thinned down or decreasing in height toward the rear end of the support, devices arranged on either side of such thinned-down edge and co-operating therewith for the purpose of folding the opposite edges of the wrapper into a seam when brought into contact with each other, devices for folding the wrapper around the filler, devices for incorporating the opposite edges of the wrapper into a completed seam one of which is located on the rear end of the support and within the wrapper and the other outside of the wrapper, and means for advancing the wrapper and filler through the channel, for the purposes set forth.

2. In a cigarette machine, the combination

substantially as set forth, of a filler channel, a support J provided with a projecting edge, *i*, gradually thinned down or decreasing in height toward the rear end of the support, plates K and L whose edge faces are shaped to direct and hold the wrapper to the outer wall of the support, plates M and N whose edge faces are properly shaped to co-operate with each other and with the thinned-down edge of the support to fold the opposite wrapper edges together, devices for folding the wrapper around the filler, devices to incorporate the folded wrapper edges into a completed seam and means for advancing the filler and wrapper through the channel, for the purposes set forth.

3. In a cigarette machine, the combination substantially as set forth, of a filler channel, a support J provided with a projecting edge *i* gradually thinned down or decreasing in height toward the rear end of the support, plates K and L whose edge faces are shaped to direct and hold the wrapper to the outer wall of the support, plates M and N whose edge faces are properly shaped to co-operate with each other and with the thinned down edge *i* of the support to fold the opposite wrapper edges together, the edge of plate M being provided with a part *k*, devices for folding the wrapper around the filler, devices to incorporate the folded wrapper edges into a complete seam and means for advancing the filler and wrapper through the channel, for the purposes set forth.

4. In a cigarette machine which operates to secure the opposite engaged wrapper edges into a seam by crimping or indenting, the combination, substantially as set forth, of a support, a revolving pressure-resisting roller mounted thereon whose operative face is provided with fine serrations, a crimping or indenting wheel arranged to co-operate with the pressure-resisting roller, means for advancing the wrapper past said wheel and roller with the wrapper seam between the peripheries thereof, a chamber or recess for containing lubricant-absorbing material and a thread or strand connecting such material with the face of the roller, for the purpose described.

5. In a cigarette machine which operates to secure the opposite engaged wrapper edges into a seam by crimping or indenting, the combination substantially as set forth, of a support, a pressure-resisting roller, mounted thereon and arranged to revolve within the wrapper, a crimping wheel located outside of the wrapper and arranged to co-operate with the said roller, means for advancing the wrapper past the said wheel and roller with its seam between the peripheries thereof, and a lubricant chamber carried on said support and adapted to contain textile waste or other fluid lubricant-absorbing material and separated from the roller by a partition, and means to convey the lubricant from the chamber to the roller, for the purpose set forth.

6. In a cigarette machine which operates to secure the opposite engaged wrapper edges into a seam by crimping or indenting, the combination substantially as set forth, of a support, a pressure-resisting roller mounted thereon and arranged to revolve within the wrapper, a crimping wheel located outside the wrapper and arranged to co-operate with the said roller, means for advancing the wrapper past the said wheel and roller with its seam between the peripheries thereof, and a lubricant chamber carried on said support and adapted to hold oil or other fluid lubricant and separated from the roller by a partition, and a strand or threads of textile material passing from the lubricant chamber over the partition to the face of the roller, for the purpose described.

7. In a cigarette machine which operates to secure the engaged wrapper edges into a seam by pressure, the combination substantially as set forth, of a support arranged to act inside of the wrapper, a revolving wheel arranged to operate outside the wrapper and to co-operate with the said support, a bell-crank lever to one of whose arms the wheel is suspended and whose other arm is an adjustable spring arm, and means to adjust the spring-arm and cause the lever to rock for the purpose of increasing or diminishing the pressure of the wheel upon the wrapper seam.

8. In a cigarette machine in which the wrapper edges folded together are operated upon by a pressure-resisting device to complete the seam, the combination with means for advancing the wrapper and devices for folding the opposite edges of the wrapper together of a pressure-resisting support located within the wrapper, a revolving pressure wheel P located outside of the wrapper, gear wheels S^2, S^3, S^4 and S^5 for driving the wheel P, a standard u^2 on which the wheels S^3 and S^4 are mounted, and means for adjusting such standard concentrically with the axis of wheel S^2, whereby the wheels S^3 and S^4 are moved to or from wheel S^5 and wheels of greater or less diameter can be substituted for wheels S^4 or S^5, for the purpose set forth.

MICHAEL KIRSHNER.

Witnesses:
S. D. McCOMMON,
EVERETTE STRAUSE.