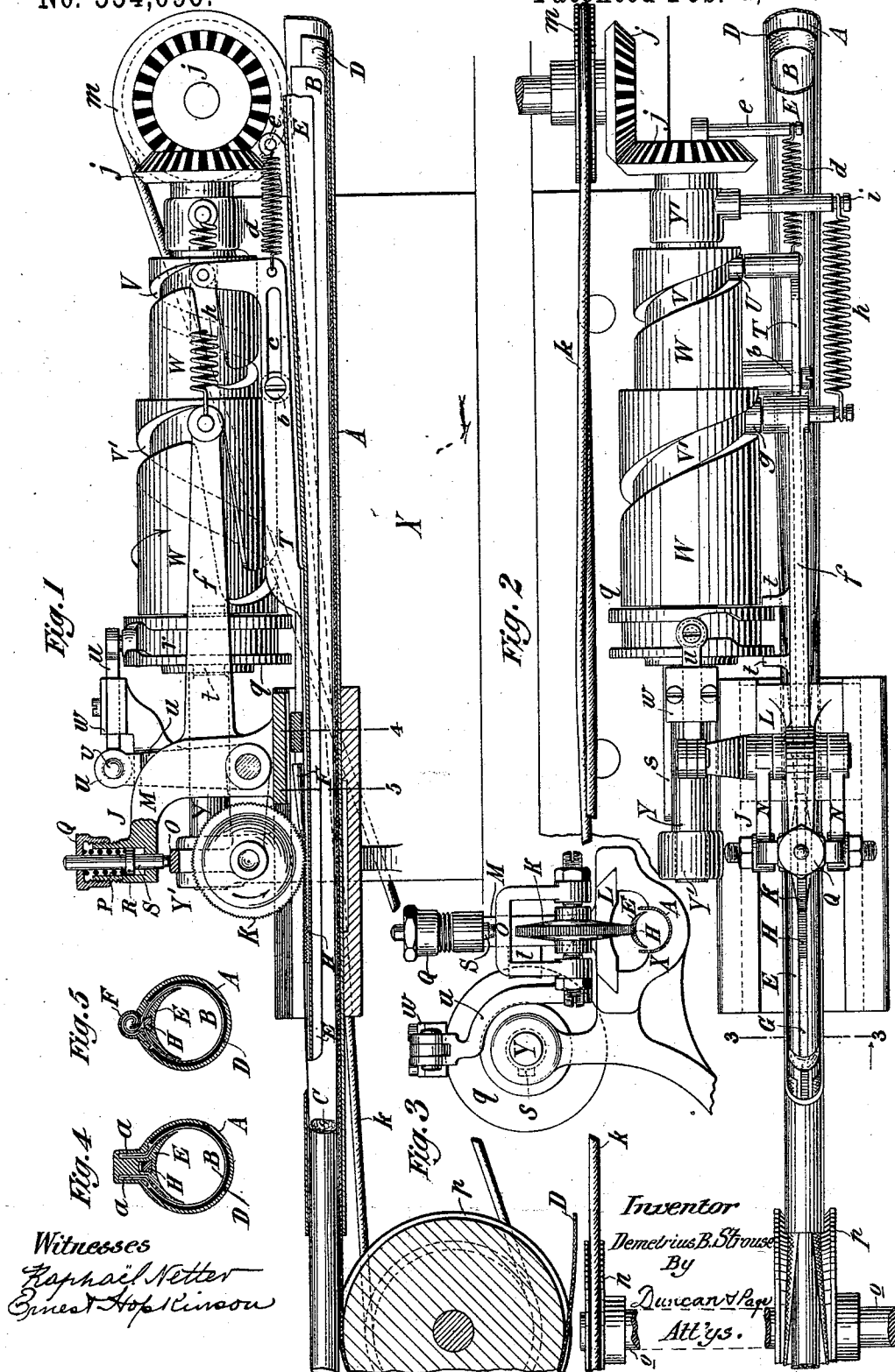


D. B. STROUSE.
CIGARETTE MACHINE.

Patented Feb. 4, 1896.



UNITED STATES PATENT OFFICE.

DEMETRIUS B. STROUSE, OF SALEM, VIRGINIA, ASSIGNOR TO THE BONSAK MACHINE COMPANY, OF SAME PLACE.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 554,096, dated February 4, 1896.

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To all whom it may concern:

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

This invention relates generally to cigarette-machines of the class which make a continuous cigarette from a continuous filler wrapped in a continuous strip of paper, the continuous cigarette being afterward cut up into smokable lengths; and the invention relates especially to devices for securing the seam formed by the engagement of the opposite edges of the wrapper-strip with each other; and it consists generally of a mandrel constructed and arranged to slide forward and backward or reciprocate within the wrapper and to permit the tobacco filler to pass beneath it, and a wheel constructed and arranged to operate on the outside of the wrapper-seam and coact with the mandrel to secure the several thicknesses of paper which form the seam together. More particularly the invention relates to a combination of a reciprocating mandrel and a reciprocating wheel, these being so arranged in relation to each other and to the seam that they act to secure the seam while both the wheel and mandrel are advancing, and then both the wheel and mandrel are suddenly retracted to their former positions and again advanced to do the work; also, in the means and devices for giving the necessary reciprocating movements to the wheel and mandrel, all as hereinafter more fully described and claimed.

In the manufacture of continuous cigarettes in which the wrapper-seam is secured by crimping the thicknesses of paper composing such seam down upon the body of the cigarette it is desirable to provide a support or mandrel inside of the wrapper to resist the pressure of a crimping wheel or device operating on the outside thereof. It is also desirable, in order to make a secure seam, that the mandrel should be serrated or notched to correspond with serrations or notches on the

periphery of the wheel, and that such mandrel be so constructed and operated that the paper will not be torn in its passage between the wheel and the mandrel. It is also desirable that the least possible space within the wrapper should be occupied by the mandrel, in order to permit the free and unobstructed passage of the filler past the mandrel.

I am aware that British Patent No. 12,736, of July 11, 1892, describes a machine for making continuous cigarettes, in which there is a crimping-wheel constructed and arranged to operate outside of the wrapper-seam to coact with a serrated mandrel or support located inside of the wrapper to secure the folded seam by crimping or indenting the same; but in this case the serrated mandrel is a roller constructed to revolve within the wrapper and occupies so much of the filler-space as to seriously obstruct the advance of the filler unless the filler is greatly compressed.

It is the object of the present invention to provide a seam-securing device consisting of a serrated or toothed mandrel constructed and arranged to reciprocate within the wrapper and occupying comparatively a small portion of the wrapper-space, and a crimping-wheel provided with indenting teeth or points constructed and arranged to reciprocate on the outside of the wrapper and over the seam thereof to indent and secure the seam by forcing the same downward upon the mandrel.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the wrapper, seam-forming, and securing devices of a cigarette-machine containing my invention, the tubular part through which the wrapper, the filler, and belt pass being shown in longitudinal section. Fig. 2 is a plan view of the same. Fig. 3 is a cross-section on the line 3 3 of Fig. 2, looking in the direction of the arrow, the cigarette and belt being omitted and the parts beyond being shown in elevation. Figs. 4 and 5 are cross-sections of the forming-tube and mandrel on the lines 4 and 5, respectively, of Fig. 1, showing the positions of the wrapper and belt, the tobacco filler being omitted.

In the drawings, A represents a tubular-shaped part through which a wrapping-strip of paper B and the wholly or partially formed

tobacco filler superimposed thereon are caused to pass by any means adapted for this purpose, preferably by the action of an endless belt D which underlies the wrapper and filler. The upper part of tube A is provided with a tongue or support E, which is secured to the main part at the rear of the point where the opposite edges of the wrapper come into contact with each other, as seen in Fig. 4.

The edges of the wrapper B pass on the outside of this tongue in suitable guides *a* (seen in Fig. 4) and are gradually brought together and folded or rolled upon each other by means of a spiral folding device F, as seen in Fig. 5, or other suitable means, to form a seam of the desired number of thicknesses of paper. The forward part of the tongue E is provided with a groove G, in which is arranged a bar or mandrel H constructed and arranged to slide forward and backward, or reciprocate, in the groove G by means hereinafter more fully described and having its upper surface provided with a series of fine teeth or notches and located relatively to the seam of the wrapper, so that as the latter is delivered from the folding device F in which it is formed it will be advanced directly over the mandrel H.

The interior surface of the support E underneath the mandrel H is preferably concave to conform to the cylindrical shape of the filler which passes beneath it.

Above the mandrel H and journaled in a frame J, which is constructed and arranged to slide forward and backward or reciprocate in suitable ways in the main frame of the machine, is located a crimping-wheel K, whose periphery is serrated, notched, or toothed, preferably so that it will correspond or mesh with the notches in the mandrel H, which is located directly underneath the periphery of the wheel and with which the latter coacts to crimp, indent, and bind the various thicknesses of paper which form the wrapper-seam and reliably secure the same together.

The sliding frame J, as shown in the drawings, consists of a base L, constructed and arranged to slide in ways in the frame X, a standard M, and arms N N, pivoted to the rear part of the frame and united to the lower part of the arms of a yoke O, which passes over the upper surface of the wheel K, the axis of this wheel being journaled in the ends of the arms of the yoke, as seen in Fig. 3.

In the upper end of the standard M is a recess in which is placed a spring P, whose upper end bears against a screw-cap Q, while its lower end bears against a shoulder R formed on a pin S, which passes loosely through the cap and the lower wall of the recess and bears upon the yoke O to force the wheel down into contact with the wrapper-seam according to the strength of the spring P, which can be regulated by screw-cap Q.

As shown in the drawings, both the mandrel H and the wheel K are constructed and arranged to reciprocate along the line of the

wrapper-seam, and the mandrel is moved forward at the same rate or speed as the wrapper, while the wheel K is moved forward at a greater speed, preferably at least twice as fast, and the crimping or securing together of the layers or thicknesses of paper which form the seam is done while the wheel and mandrel are advancing. When the limit of advance of the wheel and mandrel is reached and the portion of the seam over which the wheel has passed is secured, the wheel and mandrel are instantly brought back to their original positions and again operate to secure another portion of the seam, the wheel, of course, having in addition to its forward and backward movements a revolution upon its axis, which revolution will be in the direction shown by the arrow and can be given by its frictional contact.

The mechanism by which the above-described movements are produced, as shown in the drawings, is as follows: To the rear end of the mandrel H is attached an arm T, whose free end carrying a roller U enters and runs in the cam-groove V of the revolving cylinder W, fixed to its axis Y, which is journaled to revolve in bearings Y' Y', secured to the main frame X. The arm T is steadied in its movement by a pin *b*, attached to the main frame X and working in a slot *c* in the arm T. A spring *d* connects the rear end of the arm T to some stationary part, as arm *e*, and operates to retract the mandrel H whenever the shape of the cam-groove V permits.

The sliding frame which supports and carries the wheel K is connected to the cam-groove V' of the revolving cylinder W by an arm *f*, whose rear end is provided with a roller *g* which enters and runs in the groove V', and is also connected by spring *h* to some stationary part, as arm *i*, by which the sliding frame is retracted whenever the shape of the cam-groove V' permits.

The cam-cylinder W is revolved in the direction of the arrow by the beveled gear-wheels *j j*, which are driven by a belt *k* passing over pulleys *m* and *n*, the latter being attached to shaft *o*, which carries pulley *p*, over which belt D passes, which shaft is preferably positively driven by a belt-pulley (not shown) or any other desired means. The relation of the cam-grooves V' and V is such that the frame J and wheel K carried thereby will be advanced at greater speed than the mandrel H, preferably at about double the speed of the latter.

It is important that the wheel K when it has reached its limit of advance and is to be retracted should be slightly raised from contact with the wrapper-seam, and for this purpose the following-described mechanism, as shown in the drawings, may be employed: A cam-cylinder *q*, provided with a cam-groove *r*, is secured to the shaft Y by means of a spline or feather *s* in such manner that while the cylinder *q* revolves with the shaft and with cylinder W it is free to slide forward

and backward upon the shaft to conform to these movements of the sliding frame and wheel K. The sliding frame J has a double connection with the cam-cylinder *q*, one of such connections being the arms *tt* of the bar or arm *f*, which are in contact with the sides of the cylinder and cause it to move as the bar *f* is moved, as seen in Fig. 2. The other connection is through the bell-crank lever *u*, pivoted at *v* and connected to the rear end of one of the arms N, which carry or support the wheel K, the rear end of this leader being provided with a roller which runs in the cam-groove *r*, the object of this connection being to raise the wheel K by rocking the arms N upon their pivots through the rocking action of the lever *u* produced by the cam *r* by which the lever-arm is suddenly drawn backward. A guide *w* attached to the sliding frame, as shown in Figs. 1 and 2, supports and steadies the rear end of the lever *u* and keeps it in proper relation to its cam-groove.

The operation of the above-described devices is stated as follows: The tobacco filler, being previously wholly or partially formed, is fed by any desired means upon a wrapper-strip B when the same is sufficiently open to receive it, as shown at the right hand of Fig. 1 or 2, the wrapper and filler being advanced through the tube A or other device adapted for wrapping the strip around the filler by an endless belt D or other suitable means, and the opposite edges of the wrapper-strip are brought together and folded into a seam by any suitable devices, as by folder F. A tongue or support E, supported in the rear of the point where the opposite edges of the wrapper are brought together, is provided with a mandrel H, which is located in the path of the advance of the wrapper-seam and inside of the wrapper, and is caused to slide forward at the same speed with which the paper advances by means of its connection with the cam-groove V of the revolving cylinder W, and at the same time the wheel K, forced down by spring P upon the seam, is caused to move forward by means of its connection with the cam-groove V' at a greater speed than that of the mandrel, and the wrapper-seam which is interposed between the mandrel and the periphery of the wheel is crimped and secured. As the wheel mounted upon its sliding frame is advanced, the cam-cylinder *q* slides along the shaft Y, and when the wheel has reached its advance limit it is suddenly raised, by means of its connection with the cam-groove *r*, through the arms N N and bell-crank lever *u*. The cam-grooves V and V' are so arranged that after the wheel and mandrel have reached the limit of their advance they can be rapidly retracted by the contraction of the springs *d* and *h*, this movement being readily permitted by the shape of the respective grooves, and the wheel and mandrel be thereby again brought into the position shown in Figs. 1 and 2 ready for another advance. The cam-

cylinder *q* is so arranged upon the shaft Y that its cam will operate to suddenly draw back the rear end of the lever *u* and thereby operate to raise the wheel at the instant the wheel has reached its limit of advance.

I do not wish to limit my invention to any special means or mechanism for advancing the wrapper-strip and filler or for wrapping the strip around the filler and bringing its opposite edges into a seam, as my invention relates especially to the devices by which the seam after it has been formed is secured together by means of crimping or indenting its various thicknesses into each other, and more especially to a reciprocating mandrel operating inside of the wrapper and advancing with the wrapper, in connection with a crimping-wheel arranged to coact with such mandrel and the mechanism by which these parts are operated.

In order to lessen the liability of tearing the paper I prefer to construct and arrange the parts so that the crimping-wheel and mandrel shall advance simultaneously to do the crimping work, but do not wish to limit my invention to this construction, as the mandrel may be stationary while the wheel reciprocates above it or the wheel may be stationary while the mandrel reciprocates below it.

I am aware that it has been proposed to employ the following combinations of devices in the construction of cigarette-machines, and I therefore disclaim the same, when broadly considered, from my invention as described and claimed herein, viz: The combination, with feeding devices for advancing a continuous-cigarette wrapper and filler therein with the edges of the wrapper engaged, of an interior support located within the wrapper and devices coacting therewith to press down and secure the edges of the wrapper; also, the combination of the devices last named with devices for folding the wrapper with its edges rolled or folded together over the filler and a support located within the wrapper; also, the combination, with feeding devices for advancing a continuous-cigarette wrapper and filler therein with the edges of the wrapper engaged, of a support located within the wrapper and forming one member of crimping, indenting or perforating devices, and a member outside the wrapper coacting therewith to secure the wrapper edges; also, the combination of the devices last named with devices for folding the wrapper with its edges rolled or folded together over the filler and a support located inside the wrapper.

What is claimed as new is—

1. In a cigarette-machine, a mandrel and a support therefor, the mandrel being constructed and arranged to operate within a cigarette-wrapper, and mechanism for reciprocating the mandrel, in combination with a crimping-wheel constructed and arranged to operate outside the wrapper and in such relation to the mandrel that they will coact

to secure an interposed wrapper-seam, and means for advancing a tobacco filler inclosed in the wrapper beneath the mandrel when the opposite edges of the wrapper are engaged into a seam, substantially as set forth.

2. In a cigarette-machine, a crimping-wheel arranged upon a sliding frame and mechanism for sliding the said frame forward and backward along the line of a wrapper-seam, in combination with a mandrel and its support located opposite the periphery of the said wheel and within the wrapper to coact therewith to secure the seam, and means for advancing the wrapper inclosing a filler beneath the mandrel and having its opposite edges folded into a seam, substantially as set forth.

3. In a cigarette-machine, the combination substantially as set forth, of a mandrel constructed and arranged to reciprocate within the wrapper and along the line of the seam thereof, a mandrel-support, a crimping-wheel constructed and arranged to reciprocate outside the wrapper and along the seam thereof, mechanisms to reciprocate the said mandrel and wheel and means for advancing the wrapper inclosing a filler beneath the mandrel and having its opposite edges folded into a seam, whereby the several thicknesses of paper forming the wrapper-seam are secured together.

4. In a cigarette-machine, the combination substantially as set forth, of a serrated or notched mandrel constructed and arranged to reciprocate within a wrapper and along the seam thereof, a mandrel-support, a crimping-wheel having its periphery serrated or notched, constructed and arranged to reciprocate outside the wrapper and along the seam thereof, mechanism for reciprocating the said mandrel and wheel, and means for

advancing the wrapper inclosing a filler and having its opposite edges folded into a seam.

5. In a cigarette-machine, a mandrel and a support therefor, the mandrel being constructed and arranged to slide in the support and located within a wrapper and along the seam thereof, in combination with a revolving cam by which the mandrel is advanced, a spring by which it is suddenly retracted when it has reached its advance limit, means for advancing the wrapper inclosing a filler and having its opposite edges folded into a seam, and a crimping-wheel constructed and arranged to co-operate with the mandrel.

6. In a cigarette-machine, a crimping-wheel and a mandrel, the former being supported upon a reciprocating frame and constructed and arranged to coact with the mandrel located below the wheel and within the wrapper to secure the wrapper-seam, in combination with mechanism for reciprocating the wheel, consisting of a revolving cam connected to the frame by which the frame is advanced, and a spring by which the frame is retracted when it has reached its advance limit, substantially as set forth.

7. In a cigarette-machine, a mandrel H, connecting-arm T, revolving cylinder W having cam-groove V therein, and spring d, in combination with a crimping-wheel K, frame J, connecting-arm f, revolving cylinder W having cam-groove V', spring h, mechanism for raising the wheel K when it has reached the limit of its forward movement and means for revolving the cylinder W, substantially as described.

DEMETRIUS B. STROUSE.

Witnesses:

EVERETT STROUSE,
E. S. STRAYER.