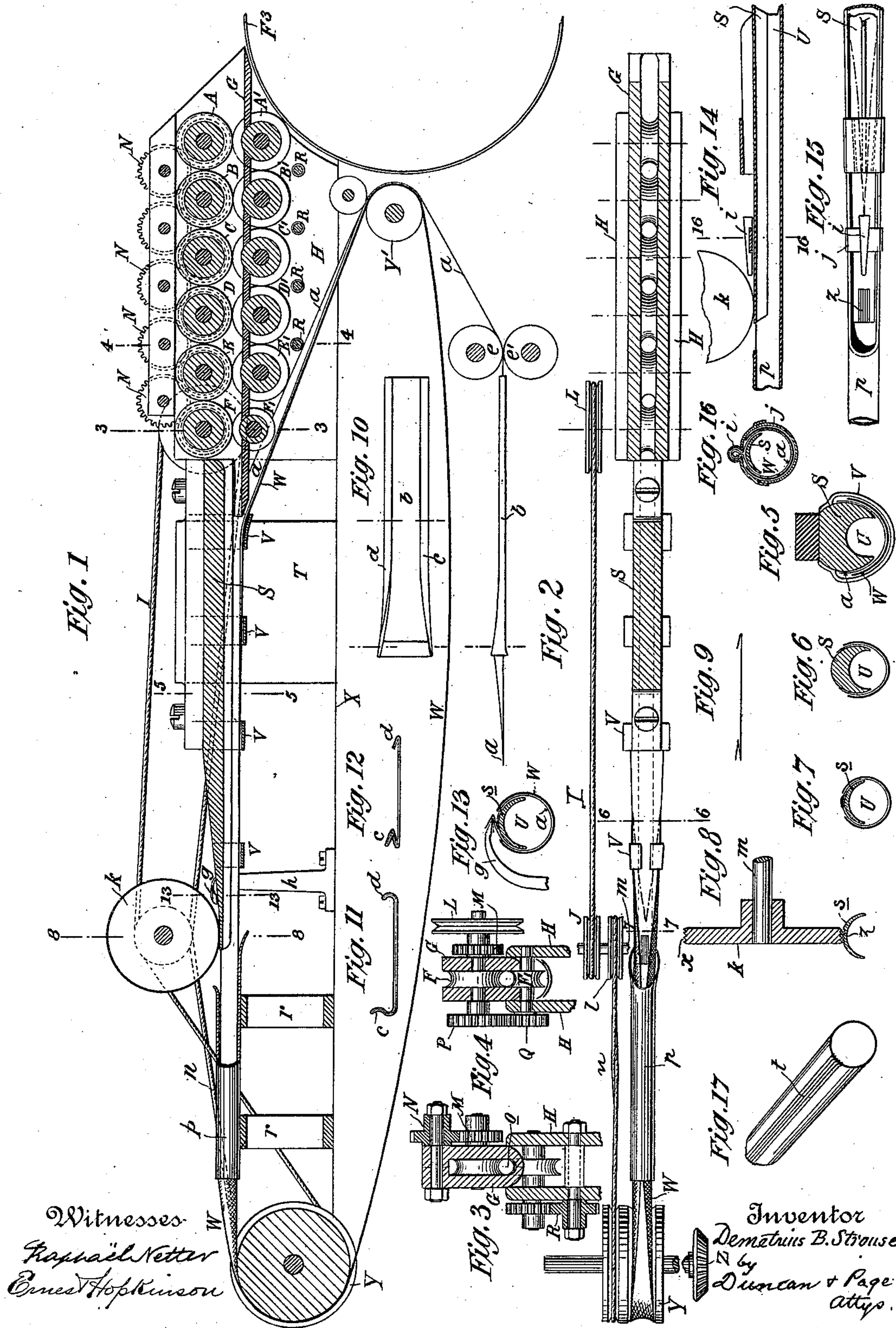


D. B. STROUSE.
CIGARETTE MACHINE.

No. 533,098.

Patented Jan. 29, 1895.



(No Model.)

2 Sheets—Sheet 2.

D. B. STROUSE.
CIGARETTE MACHINE.

No. 533,098.

Patented Jan. 29, 1895.

Fig. 18

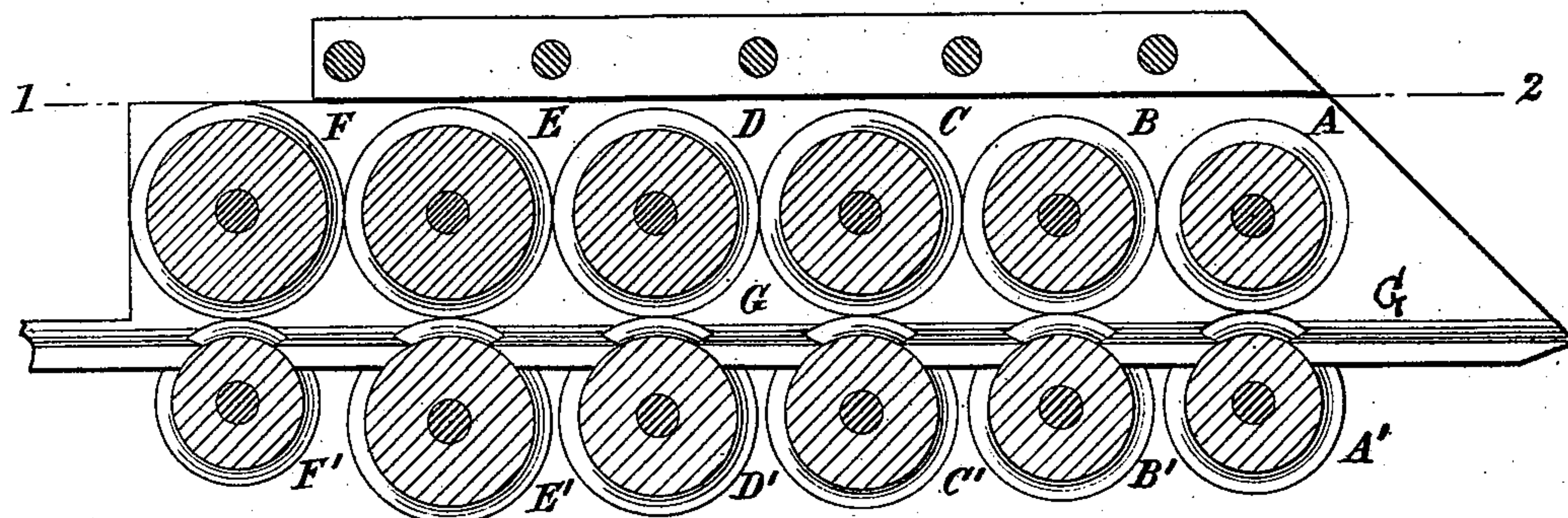


Fig. 19

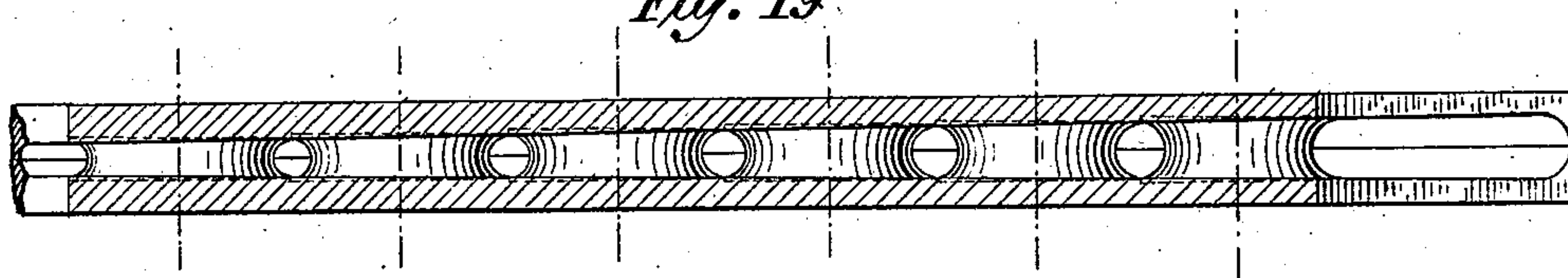


Fig. 20

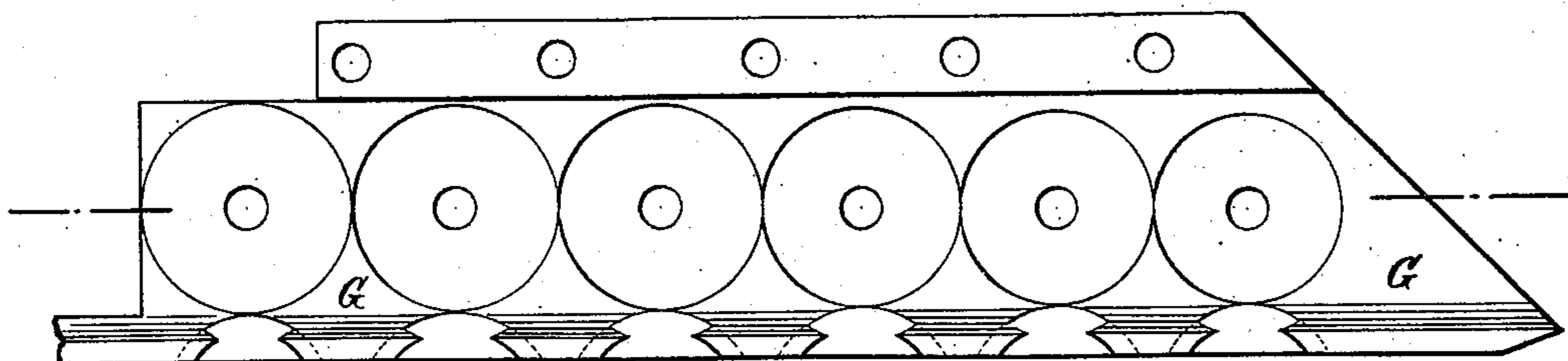
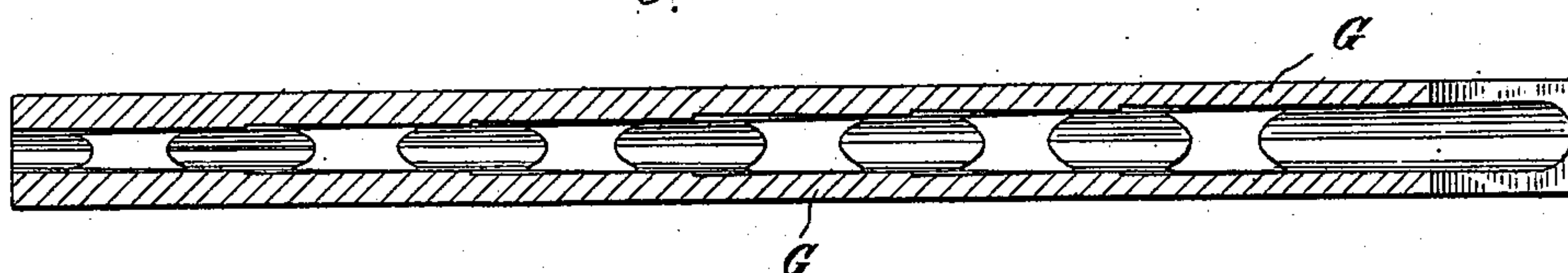


Fig. 21



Witnesses:
Raphael Netter
Ernest Hopkins

Inventor
Demetrius B. Strouse
by Duncan & Ray
Attorneys

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. 533,098, dated January 29, 1895.

Application filed June 1, 1893. Serial No. 476,247. (No model.)

To all whom it may concern:

Be it known that I, DEMETRIUS B. STROUSE, a citizen of the United States, residing at Salem, 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.

The present invention relates more especially to that class of cigarette machines in which a continuous tobacco filler or rod is wrapped in a continuous strip of paper whose opposite edges are brought together and secured into a longitudinal crimped seam, thereby forming a long or continuous cigarette which can be cut up into marketable lengths.

The invention consists in certain new features of construction of devices and combinations thereof which appertain to, first, mechanism by which the filler rod is fed or advanced to the crimping device and the wrapper brought around the filler rod and its edges engaged with each other to form a partially-completed seam; and, second, mechanism by which the engaged wrapper edges are secured together by crimping or indenting them into each other to form a completed seam, all substantially as hereinafter more fully described and claimed.

The improvements herein described and claimed are especially intended for use upon what is known as the "Bonsack machine," described and shown in United States Letters Patent No. 247,795, dated October 4, 1881, or upon machines of similar construction and operation, without making any very essential or costly changes therein, it being, however, understood that my invention is not to be limited to use upon any special machines, since it is capable of application and use upon machines of quite different construction.

Referring to the said Bonsack patent, it will be observed that the wrapping tube G^3 and the pasting devices therein shown and described can be easily removed from the machine, and in their place the present improvements can be readily applied. This change, when made, will leave the following mechanisms or parts of the Bonsack machine substantially intact, namely: mechanism for preparing the tobacco and forming the same into

a partially-formed filler, the latter mechanism consisting of three endless belts, including a bottom belt F^3 and two converging side belts F^2 and F' , with a compressing wheel H^2 located between the side belts at or near their point of nearest convergence; also devices for severing the long cigarette into marketable lengths and means for advancing the filler and wrapping strip through the machine, substantially as shown in said patent, and consequently these parts will require no further special description.

It is here remarked that it is the main object of my invention to produce, upon a machine which operates to make continuous or long cigarettes, an improved cigarette having its wrapper edges secured into a crimped or indented seam. I am aware that such cigarettes have been made experimentally by the use of a crimping or indenting device consisting of a small serrated roller located inside of the wrapper and an outside serrated pressure wheel, the seam being crimped between the wheel and the roller. In such case the roller occupies so much of the wrapper space as to require a sudden and too great compression of the tobacco in order that it may pass the contracted space where the said roller is located and then expand sufficiently to fill the wrapper and produce a good cigarette. I am also informed that constructions have been described by which it is designed to provide a stationary support inside the wrapper, which is serrated transversely to the line of movement of the wrapper, to operate conjointly with a wheel or other revolving device located outside of the wrapper and correspondingly serrated across its periphery, by which the wrapper edges are to be secured into a crimped seam having the crimping lines or indentations across the length of the seam. This construction, in my judgment, is impracticable, inasmuch as the transverse serrations on both the outside wheel and the internal support would cause serious obstruction to the free and uniform advance of the wrapper and would result in tearing the same.

I desire to remedy the above described defects by gradually compressing the tobacco to form a filler rod of uniform diameter, preferably slightly less than in the finished cigar.

ette, so that it will easily pass a thin crimping part or support located within the wrapper and around which the wrapper is closely drawn, and I secure the engaged wrapper edges into a reliable seam by the use of an outside wheel whose periphery is provided with slight projections and grooves extending around as distinguished from across it, which operates in conjunction with the thin part or support located inside the wrapper and which may be smooth or provided with longitudinal projections and grooves corresponding with those of the periphery of the outside wheel, to crimp or indent the wrapper edges into a seam having longitudinal grooves and projections. As the serrations both of the wheel and the support (if used on the latter) run or point in the same direction in which the wrapper advances and the peripheral speed of the wheel is substantially the same as that of the advance of the wrapper, there will be little obstruction or drag on the wrapper during the crimping operation; also, as the internal support can be made quite thin, it will occupy but a small portion of the wrapper space at the point where the crimping is done, and will furnish but small obstruction to the passage of the filler, and consequently the natural expansion of the tobacco after the same has been crimped will cause the wrapper to be completely filled.

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

Figure 1 is a longitudinal sectional view of a cigarette machine containing my invention. Fig. 2 is a plan view of the machine, certain parts being shown in section. Figs. 3 and 4 are cross-sections on the lines 3—3 and 4—4. Fig. 5 is an enlarged cross-section through the lines 5—5 of Fig. 1. Figs. 6 and 7 are enlarged cross-sections through lines 6—6 and 7—7 respectively of Fig. 2. Fig. 8 is an enlarged cross-section through the lines 8—8 of Fig. 1, showing the crimping devices, the wrapper and belt shown in Fig. 7 being removed. Fig. 9 represents a wrapper with its edges folded. Figs. 10, 11 and 12 are respectively plan and cross-sectional views of a folding device through which the wrapper strip is passed to fold its edges as shown in Fig. 9. Fig. 13 is a cross-section through line 13—13 of Fig. 1, showing an opening finger for one of the folded edges of the wrapper. Figs. 14 and 15 are respectively views in elevation and plan of a modified construction for folding the edges of the wrapper strip together. Fig. 16 is a cross-section of the same on line 16—16 of Fig. 14; and Fig. 17 is a view in perspective of a cigarette with a longitudinal serrated or crimped seam. Fig. 18 is a vertical longitudinal section through the center of the filler-forming trough, showing the series of wheels. Fig. 19 is a horizontal section of the same through the line 1—2 of Fig. 18. Figs. 20 and 21 are detail views of the trough with the wheels removed.

As heretofore stated, it is preferred to use,

for preparing the tobacco and bringing the same into the condition of a partially formed filler, the mechanism described and shown in the said Bonsack patent, No. 247,795, and the partially formed filler is then advanced between a series of compressing rolls whose construction and operation will now be described by reference to the accompanying drawings, as follows:

A A', B B', C C', D D', E E', and F F', represent pairs of grooved wheels (preferably six pairs) arranged to operate as hereinafter described and shown in the drawings. The upper wheels are journaled in the sides of a trough G, the sides of the wheels fitting close to the sides of the trough. The lower wheels are journaled in standards H secured to the frame of the machine and are so located in relation to the upper wheels and the trough G that their peripheries slightly project up through the bottom of the trough and form circularly-shaped openings with the peripheries of the upper wheels as seen in Figs. 2, 3 and 4. The bottom of the trough G is preferably semi-cylindrical and is provided with openings to permit of the entrance of the peripheries of the lower wheels, the openings being so shaped that the lower wheels as they revolve will fit closely in such openings. The relative arrangement of the successive pairs of wheels is such that the opening between the wheels of each pair gradually decreases in diameter in the successive pairs, being largest at the rear pair A A' and smallest at the forward pair F F'. These wheels also preferably decrease in thickness from the rear pair to the forward pair as shown in Fig. 2, and the sides of the trough are so constructed and arranged as to fit closely to the sides of the wheels throughout the whole extent of the trough. The diameter of each forward pair of wheels is preferably slightly increased over its preceding or next rear pair, that is, the radial distance from the axis to the head of the groove is slightly greater in each forward wheel over its next rear wheel, so that its peripheral speed will be slightly greater, in order to take up any elongation of the filler rod caused by its compression between each pair of wheels. The diameter of each upper wheel is also preferably slightly greater than that of its corresponding lower wheel, in order to cause a slight slip of the upper wheels on the filler rod to prevent it from clinging to the wheels. Instead, however, of making the diameters of the pairs of wheels to increase from the rear to the forward pair and making the diameter of the upper wheels slightly greater than that of the lower wheels, substantially the same result may be obtained by driving the upper wheels, if of the same diameter with the lower wheels, slightly faster than the lower wheels, and also driving each forward pair of wheels slightly faster than its next rear pair. The forward lower wheel F' is shown as somewhat smaller than the others of the series to enable the wrapper strip and

carrying belt to be brought into position as near this wheel as possible, as shown in Figs. 1 and 4.

The series of pairs of wheels above described may be driven in any convenient way, as by a belt I driven from pulley J on the crimping wheel shaft and passing over pulley L on the shaft of wheel F, to which shaft, as also to the shafts of the other upper wheels, is fixed a gear wheel M. Gear wheels N are arranged to revolve upon shafts fixed in the upper part of the trough G, and the revolution of the shaft of the wheel F causes the gear wheel M to mesh with gear wheel N next to it, which in turn meshes with gear wheel M on the shaft of wheel E, which in turn meshes with the next gear wheel N of the series, and so on, thus driving all the upper wheels. The lower wheel F' is driven from a gear wheel P upon the end of shaft of wheel F farthest from pulley L, which gear wheel P meshes with gear wheel Q upon shaft of wheel F', by which means the wheel F' can be driven at the desired speed to compensate for its smaller diameter. The lower wheel E' may be driven in the same way, that is, from a gear wheel attached to the shaft of wheel E and meshing with a gear wheel fixed to the shaft of the wheel E' and the remaining lower wheels may be driven by a series of gear wheels revolving on shafts R similar to the wheels N above described, by which the upper wheels are driven.

The tobacco in the condition of a partially-formed filler is delivered by the endless belt F³ (see said Bonsack patent) into the mouth of the trough G and is carried or advanced to the first pair of compressing wheels A A' by the said belt F³, the opening between said wheels being substantially in line with the feed direction of said belt. The peripheries of the lower wheels A', B', &c., project upward through the bottom of the trough G just enough so that the head of their grooves will operate to receive and assist to carry or feed the tobacco forward. As before stated, the diameter of the openings between each successive forward pair of wheels is slightly less than that of the opening between its next rear pair, so that the filler is slightly compressed by each pair of wheels, but it is sufficiently compressed so that when it is delivered or passes the forward or advance pair F F', it is brought to the desired size to be wrapped with the wrapping strip. The grasp or friction of the grooved peripheries of the wheels upon the filler in the act of compression is sufficient to cause a constant and regular advance of the filler rod, and the peripheral speed of the compressing wheels is substantially the same as the rate of advance of the wrapper. The bottom of the trough G furnishes a support to the filler as it passes from one pair of wheels to the other and as this bottom is semi-cylindrical in shape it conforms to the shape of the filler and per-

mits the filler to pass without disturbing or changing its shape.

The devices by which the completed filler is inclosed in its wrapper with the opposite edges of the wrapper brought into engagement with each other, and the wrapper and filler are advanced to the crimping device will now be described by reference to the drawings, as follows: S represents a mandrel located directly forward of the series of filler-forming wheels heretofore described, and secured in place by supports T attached to the frame of the machine. This mandrel is provided with a semi-cylindrical groove U, preferably upon its under side, and is adjusted so that this groove shall register with the exit of the filler from the compressing wheels. The groove U is preferably of nearly the same diameter as the filler, in order to prevent the filler from expanding as it passes from the filler-forming wheels to the crimping devices. The wall or upper portion of the mandrel is thinned down toward the forward end of the mandrel so that, at the point where the edges of the wrapper are brought into engagement with each other, it occupies only a small portion of the interior wrapper space as shown in Fig. 7. V are guides attached to the mandrel for the endless band and wrapper and serve to cause the wrapper to come into close contact with the filler and to keep the filler in the groove U while the wrapper is gradually wrapped or folded around the filler and mandrel. The wrapper and filler are advanced or fed along the mandrel by the operation of an endless band W which passes over pulleys Y Y' and is driven by pulley Y, which in turn is driven by a bevel gear Z attached to its shaft, which meshes with a corresponding gear, as shown in Fig. 1 of the drawings of the said Bonsack patent. The band W, before it comes in contact with the mandrel S, receives the superimposed wrapper strip, and the wrapper and filler are advanced along the mandrel by the draft of the band passing through the guides V and through a tube p located in front of the crimping device, and the wrapper as it advances is gradually wrapped around the mandrel and the advancing filler. The wrapper strip a is sufficiently wide to encircle the filler and form the necessary lap for the seam, and may be drawn from a reel (not shown) located in any convenient place on or off the machine. The edges of the wrapper strip may be folded, as shown in Fig. 9, before the strip is wrapped around the mandrel, by causing the strip to be drawn through a folding device b whose edges, c and d, are formed into the proper shapes to gradually give the edges of the strips the desired folds, as set forth in my pending application, Serial No. 488,128, filed October 14, 1893. As the wrapper strip emerges from the end of the folder b, it preferably passes between two rollers e and e' by which the folded edges are flattened down, and thence it passes over the band

pulley Y' where a roller *f* presses both the band and the superimposed wrapper strip down upon the pulley Y'. When the wrapper strip has advanced along and around the mandrel and filler to a point where its opposite edges are about to come in contact with each other, a finger *g*, secured to a standard *h* attached to the frame X, is inserted between the folds of the double-folded edge of the wrapper and holds them open while the single folded edge is drawn into and between the double folds as the strip advances, thus bringing the edges into engagement with each other and forming a seam of five thicknesses, as seen in Fig. 13.

While I prefer, in order to form a more uniform seam, to fold the edges of the wrapper strip as above described and shown in Fig. 9, before the strip is wrapped around the filler, I do not wish to limit my invention to this form of strip, as I may cause the strip with unfolded edges to be drawn around the filler and mandrel and its opposite edges to be rolled or folded into engagement with each other by any device adapted for this purpose. Figs. 14, 15 and 16 show a folder *i*, consisting of a small tapering tube with a slit in its under side through which the opposite edges of the wrapper may pass, mounted upon a band *j* surrounding the thin part *s* of the mandrel S and secured in position to the frame of the machine in any proper way, into and through which the opposite edges of the strip are drawn and by which they are rolled into a seam of several thicknesses, which seam may be secured by crimping or indenting by passing the seam between the crimping parts in the same manner as the seam heretofore described formed of the folded edges as shown in Fig. 9.

The devices for securing the wrapper edges by crimping or indenting them, after they have been brought into engagement with each other, to form a complete seam, consist of a wheel *k* having its periphery provided with narrow projections and grooves *x* extending around the same, and of the thin part *s* of the mandrel, which is preferably provided with longitudinal projections and depressions *z* corresponding to those of the wheel *k*, as shown in Figs. 2 and 8 of the drawings. The wheel *k* and its driving pulley *e* are fixed to a shaft *m*, which is journaled in a frame of any suitable construction secured to the frame X of the machine, and the wheel *k* may be provided with any means for adjusting it and regulating its pressure upon the wrapper seam. The wheel *k* is arranged directly over the thin part of the mandrel so that its serrated periphery will bear directly upon the seam and indent or crimp the seam down upon the thin part *s* of the mandrel. This wheel is conveniently driven by a cross-belt *n* which passes over the pulley Y which drives the endless band W and over the pulley *l*, and the diameters of the pulley Y and wheel *k* are so related that the peripheral speed of the wheel *k* will be substantially the same as the

movement of the band W, and, consequently, of the wrapper strip which is advanced by this band.

In advance of the crimping or indenting device is a tube *p*, preferably slightly flaring at its rear end, fixed to standards attached to the frame of the machine. The band W, with the completed cigarette nearly surrounded thereby, passes through this tube, and by the close contact or grasp of the band upon the cigarette the latter is drawn or carried through the tube, and the wrapper is drawn from the reel and along its entire course. The complete filler rod is also assisted in its passage through the groove of the mandrel by the draft of the band upon the cigarette in the tube *p*, although it is true that the frictional hold of the band upon the wrapper and of the wrapper upon the filler while they are passing along the mandrel assist to carry both the wrapper and filler onward.

The complete continuous cigarette, a section of which is shown in Fig. 17, as it issues from the forward end of the tube *p*, may be conducted by any suitable means to cutting-off devices by which it is severed into desirable lengths.

The operation of the above described improvements is briefly as follows: Preferably the tobacco is formed into a partially-completed filler by the mechanism of the said Bonsack patent and is delivered to the mouth of trough G by the endless belt F³. Thence it passes through the series of pairs of compressing wheels by which it is gradually reduced in size and brought to cylindrical shape and uniform consistency and to a size preferably slightly less than in the completed cigarette. When thus formed, the filler is advanced along the groove U of the mandrel S, where the wrapper strip carried forward by the endless band W is brought in contact with a portion of the filler and is gradually wrapped around the filler and the mandrel and its edges are brought into engagement with each other to form a seam of several thicknesses. The wall of the groove of the mandrel, together with the contact of the paper strip with the filler, prevents the filler from swelling or expanding while it is passing from the compressing wheels to the point where it is completely encircled by the wrapper. At the point where the wrapper edges are engaged to form the seam, the part *s* of the mandrel which is located within the wrapper is quite thin, and consequently permits the filler to occupy nearly the entire wrapper space so that the slight natural expansion of the tobacco will take up the slight slack of the wrapper. The wrapper with the filler inclosed therein is then advanced to the crimping devices and the seam passes directly under the wheel *k*, whose serrations extending around its periphery, crimp or indent the seam down upon the part *s* of the mandrel, which is within the wrapper, and form serrations or crimps extending lengthwise of the seam. The part *s* is

preferably provided with serrations corresponding to those of the wheel *k*, and as the serrations both of the wheel and the parts are in the same direction as the advance of the wrapper, and the peripheral speed of the wheel is substantially the same as the advance movement of the wrapper, there will be little or no obstruction or drag of the wrapper while the same is undergoing the crimping or indenting operation. After the seam has been crimped, the cigarette passes off the end of the mandrel and is drawn through the tube *p* by the band *W*, as hereinbefore fully described.

The cigarette produced by the above described mechanism and shown in Fig. 17 is characterized by a longitudinal wrapper seam *t* crimped down upon the body of the cigarette and provided with alternate projections and grooves or serrations running in the direction of the length of the seam. By crimping, indenting and incorporating into each other the several thicknesses of the wrapper edges which form the seam by means of crimps or indentations which run lengthwise of the seam, or in the direction of the length of the cigarette, the seam is made stronger to resist the expansion of the tobacco transversely to the seam, than would be the case if the securing crimps or indentations were across the seam, or substantially at right angles of the cigarette.

Although I have described and shown in the drawings a series of grooved rolls to form and compress the tobacco into a filler rod, and have also described and shown in the drawings a mandrel provided with a groove upon its under side, along which the filler and the wrapper strip are advanced by means of an endless band and around which the strip is gradually wrapped, yet I do not wish to limit my invention, so far as it relates to devices and mechanism for crimping the engaged wrapper edges into a completed seam, to the above described, or to any special, means or devices for forming the filler, or for advancing the filler and wrapper, or for wrapping the wrapper around the filler, inasmuch as it is immaterial to the successful operation of my crimping devices by what means or devices these operations are performed, and other means or mechanism may be substituted for those described and shown in the drawings.

What is claimed as new is—

1. In a cigarette machine, the combination substantially as described and shown, of a

wheel provided with projections and grooves passing circumferentially around its periphery and arranged to operate outside of a cigarette wrapper and upon the seam thereof, an interior support located within the wrapper and means for advancing a tobacco filler inclosed in the wrapper beneath the support and for advancing the wrapper with its opposite edges engaged with each other between the periphery of the wheel and the interior support, for the purpose of forming a completed longitudinal serrated wrapper seam.

2. In a cigarette machine, the combination substantially as described and shown, of a device for securing the engaged opposite edges of a cigarette wrapper into a completed seam by crimping or indenting, consisting of a wheel arranged to operate outside the wrapper and provided with alternate projections and grooves extending circumferentially around its periphery, and a serrated stationary support located within the wrapper, and an endless band by which the filler inclosed in the wrapper is carried or advanced beneath the support and the engaged edges of the wrapper are advanced past the crimping or indenting device, and means for driving the wheel at a peripheral speed substantially equal to the advance of the wrapper, for the purpose set forth.

3. In a cigarette machine, the combination substantially as described and shown, of a mandrel provided with a longitudinal filler groove, means for advancing a wrapper whose opposite edges have been folded, one edge into a double and the other into a single fold, means for wrapping such wrapper around the filler and mandrel, a device for opening the double-folded edge to permit the single edge to come into engagement therewith, and a device which includes a part of the mandrel for securing the engaged edges into a completed seam.

4. A cigarette composed of a tobacco filler inclosed in a wrapper whose opposite edges are united into a seam secured to the body of the cigarette by alternate projections or ribs and grooves or depressions, said projections and grooves each running lengthwise of the seam.

DEMETRIUS B. STROUSE.

Witnesses:

D. G. ARMSTRONG,
EVERETT STROUSE.