

(No Model.)

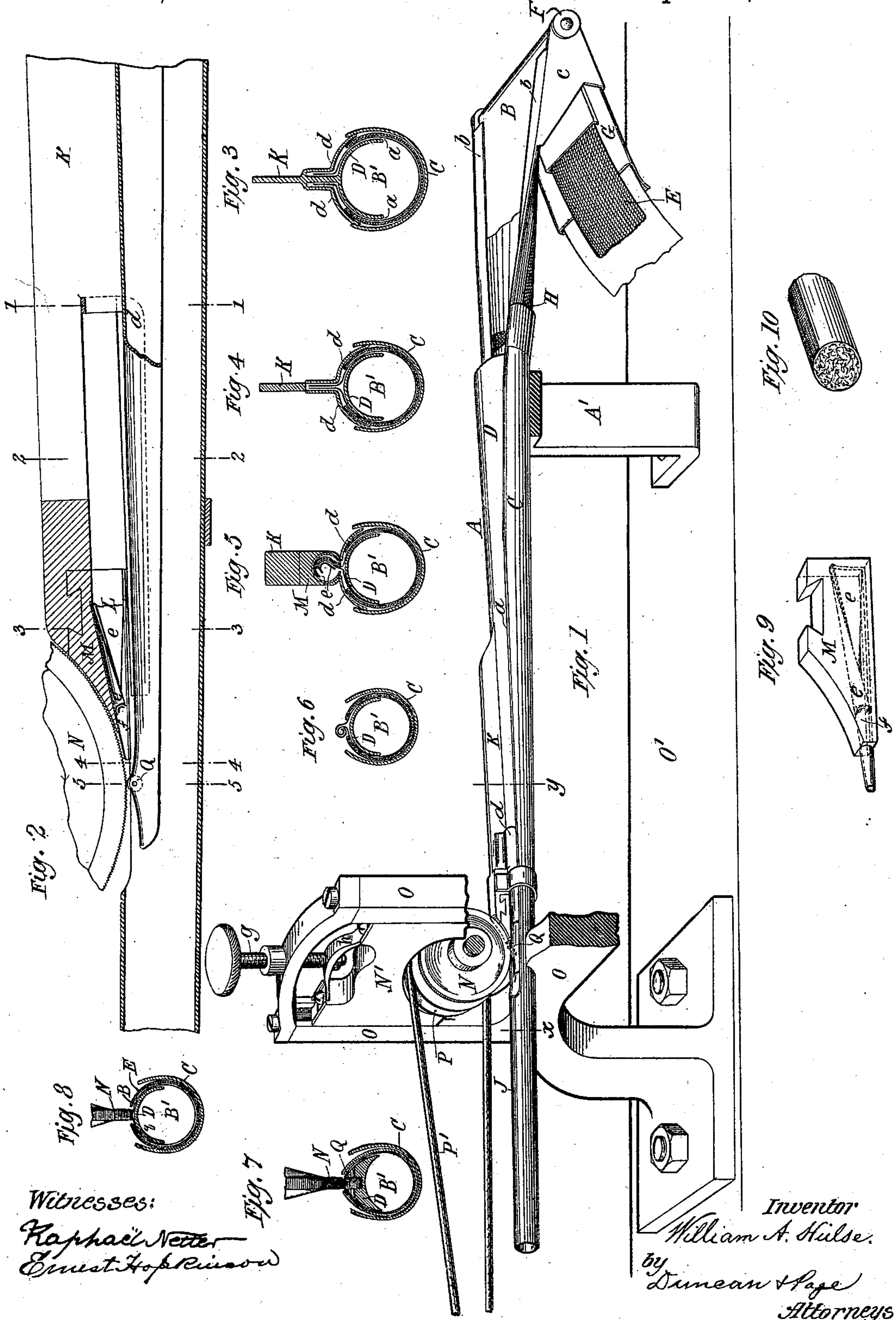
2 Sheets—Sheet 1.

W. A. HULSE.

METHOD OF AND MECHANISM FOR MAKING TOBACCO CIGARETTES.

No. 546,451.

Patented Sept. 17, 1895.



Witnesses:

Raphael Vetter
Ernest Hopkinson

Inventor

William A. Hulse.

by Duncan & Page

Attorneys

(No Model.)

2 Sheets—Sheet 2

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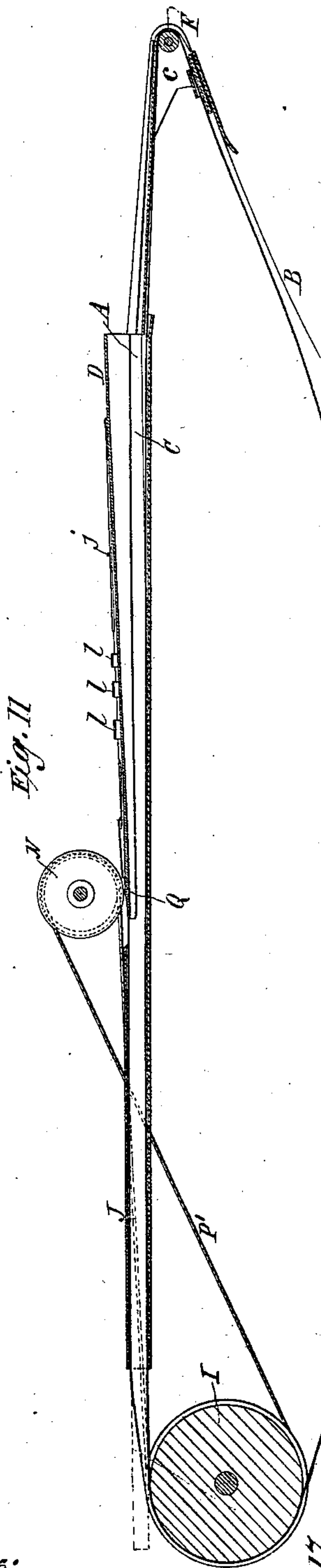


Fig. 11

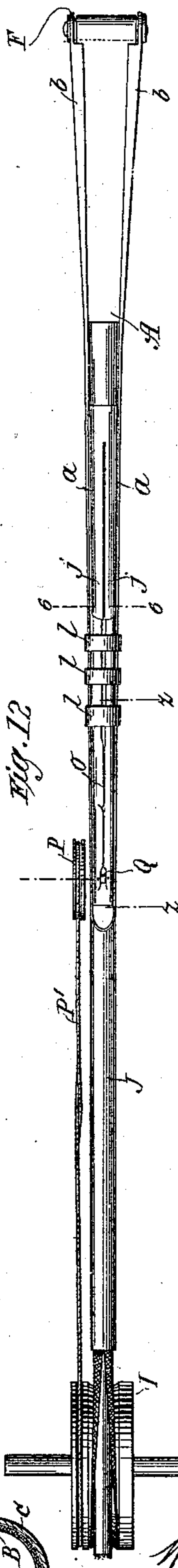


Fig. 12

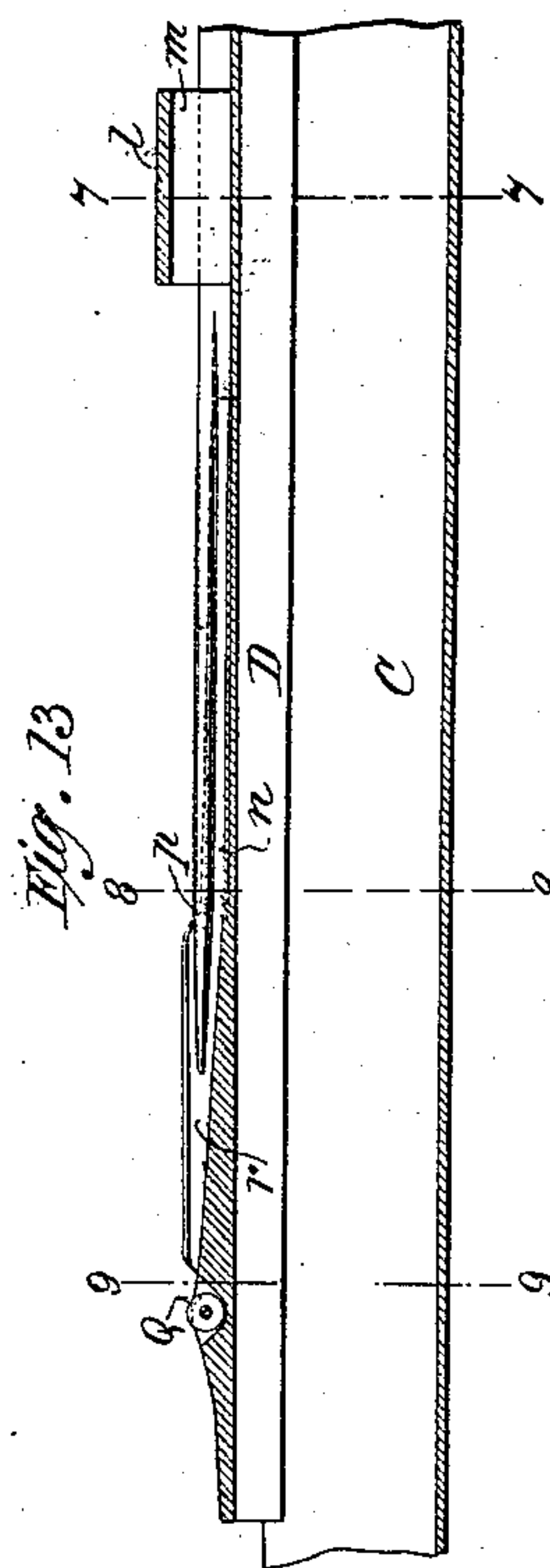


Fig. 13

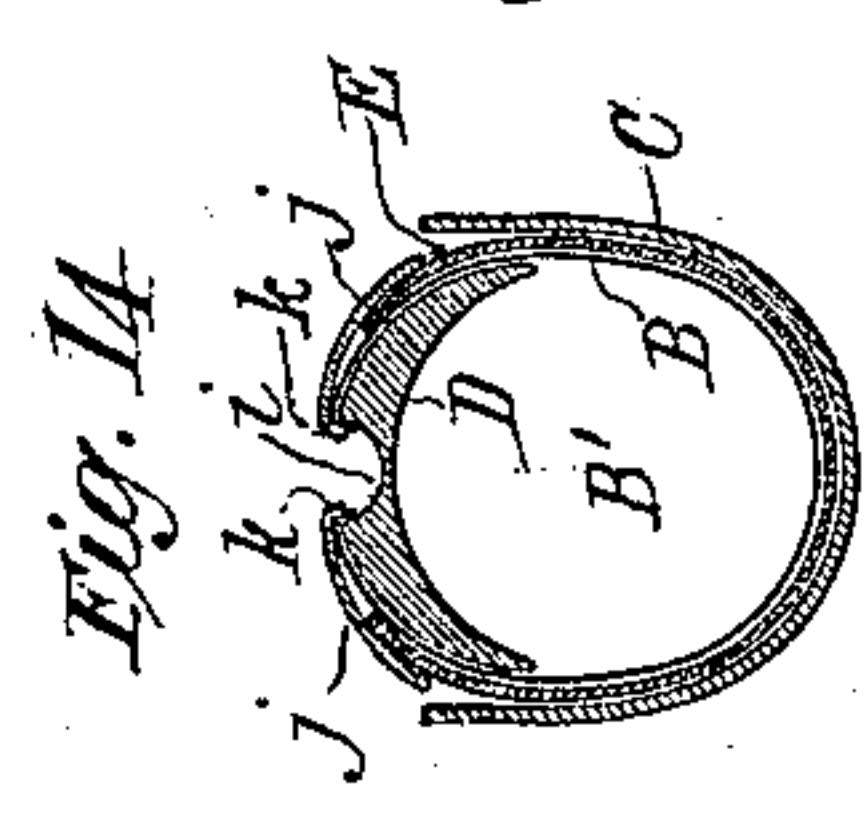


Fig. 14

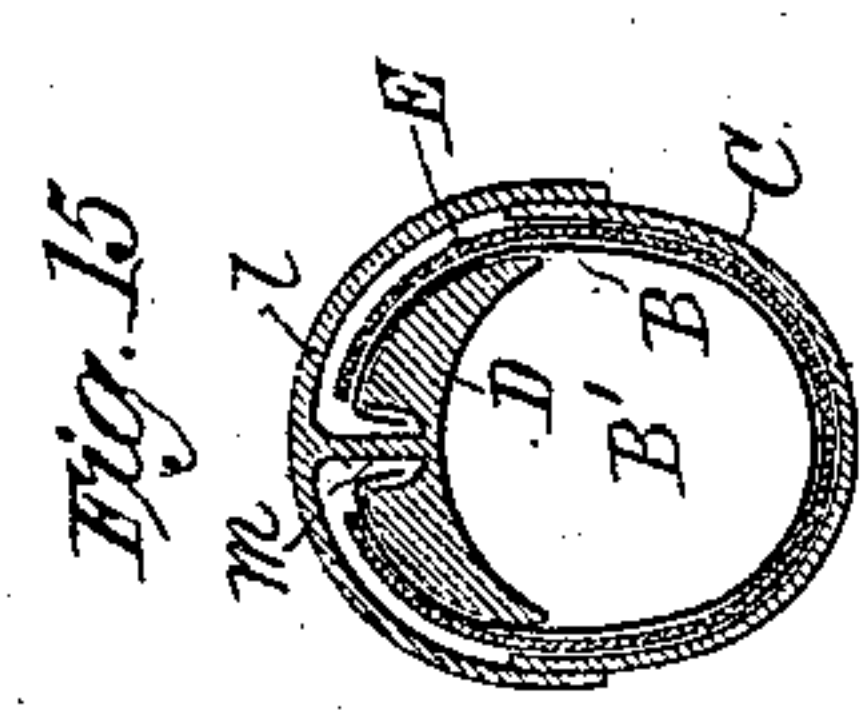


Fig. 15

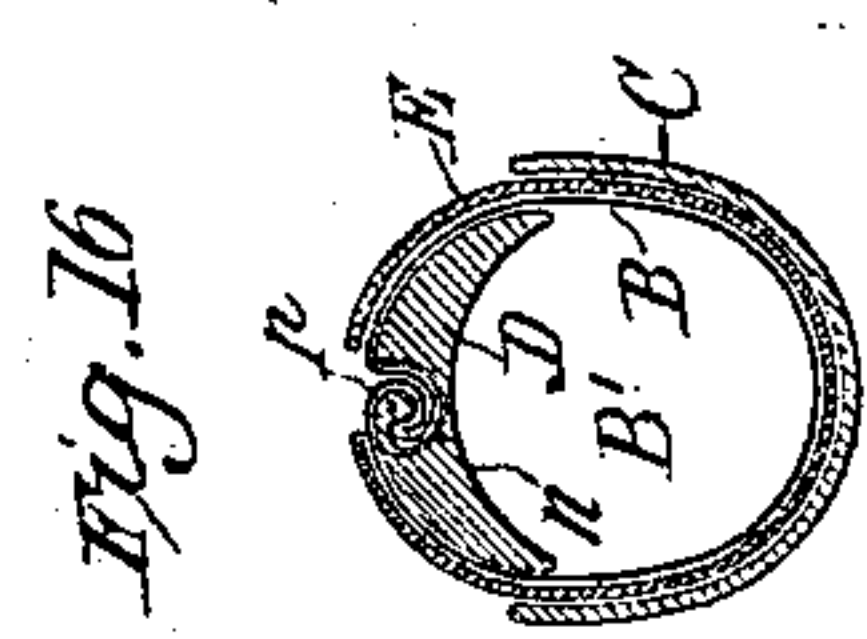
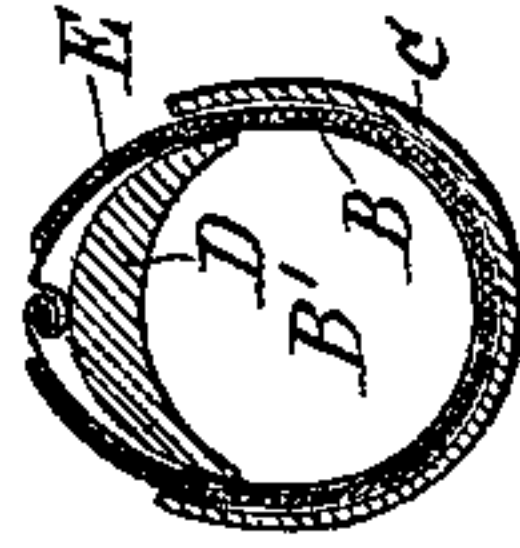


Fig. 16

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Fig. 17



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UNITED STATES PATENT OFFICE.

WILLIAM A. HULSE, OF ROCHESTER, NEW YORK, ASSIGNOR, BY DIRECT
AND MESNE ASSIGNMENTS, TO THE BONSAK MACHINE COMPANY, OF
VIRGINIA.

METHOD OF AND MECHANISM FOR MAKING TOBACCO CIGARETTES.

SPECIFICATION forming part of Letters Patent No. 546,451, dated September 17, 1895.

Application filed February 12, 1892. Serial No. 421,254. (No model.) Patented in New South Wales May 2, 1892, No. 3,771; in Victoria May 26, 1892, No. 9,675; in Canada June 24, 1892, No. 39,191; in England July 11, 1892, No. 12,736, and in Spain August 8, 1892, No. 13,505.

To all whom it may concern:

Be it known that I, WILLIAM A. HULSE, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Methods of and Mechanism for Making Tobacco Cigarettes, (for which the following Letters Patent have been granted, viz: Great Britain, No. 12,736, dated July 11, 1892; Dominion of Canada, No. 39,191, dated June 24, 1892; New South Wales, No. 3,771, dated May 2, 1892; Victoria, No. 9,675, dated May 26, 1892, and Spain, No. 13,505, dated August 8, 1892,) of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The present invention relates to improvements in the method and mechanism by which a continuous web or strip of paper is wrapped around a tobacco-filler and its opposite edges united to produce a continuous or long cigarette-cylinder composed of a tobacco filler inclosed in a paper wrapper, which is to be cut up into suitable lengths for marketable cigarettes.

Heretofore such cigarettes have been made, as by the Bonsack machine described and shown in United States Letters Patent No. 247,795, dated October 4, 1881, by feeding a rod or filler of tobacco and a continuous strip of paper simultaneously through a tubular construction in which the paper strip is wrapped around the tobacco, the edges of the strip being brought together and overlapped and secured by means of paste applied to the overlapping edges. There is also described in United States Letters Patent No. 437,207, dated September 30, 1890, devices for forming continuous cigarettes by which a continuous strip of paper is wrapped around a tobacco filler and its opposite edges are brought into contact with each other in an outstanding position, so that pressure devices can operate upon the opposite sides of such edges and outside of the wrapper to incorporate the edges together and form an outstanding seam, preferably without the application

of adhesive material. Such cigarettes are objectionable, as the outstanding seam is peculiarly exposed to abrasion and is liable to become crumpled and loosened, and the cigarettes fail to smoke properly or at all.

It is the object of my improvements to provide a method and mechanism by which long or continuous cigarette-cylinders, composed of a tobacco filler inclosed in a paper wrapper having a longitudinal seam formed without the application of paste or other adhesive material and laid down flat upon the body of the cigarette-cylinder, are produced by continuously wrapping the paper strip around the filler and progressively bringing and sealing the opposite edges together into a longitudinal seam, which is laid or flattened down to coincide with the body of the finished cigarette.

For a clear understanding of my invention a detailed description of mechanism of the preferred form for carrying out my improved method is illustrated in the accompanying drawings, the construction shown and hereinafter specifically described being such that it can be easily applied to cigarette-machines now in practical use—as, for instance, to the Bonsack machine above referred to—by taking off the Bonsack wrapping-tube designated by G³ in Figure 1 of the drawings of the said Bonsack patent and substituting therefor my mechanism without changing materially the other parts of the Bonsack machine. It follows, therefore, that the mechanism shown and described in the said Bonsack patent for preparing the tobacco, for forming the same into a rod or filler, and delivering it upon the wrapping-strip as the strip enters the wrapping-tube, as well as the mechanism for delivering the completed cigarette-cylinder to the cutting devices and cutting it into cigarette lengths, or any other well-known forms of mechanism or devices for performing these several operations may be employed in connection with my improvements.

In the drawings, Fig. 1 represents a view in perspective of such parts of a cigarette-machine as are necessary to illustrate the ap-

plication of my improvements thereto. Fig. 2 represents a longitudinal section of the same between the lines x and y of Fig. 1. Figs. 3, 4, 5, 6, and 7 represent cross-sectional views on the lines 1, 2, 3, 4, and 5, respectively, of Fig. 2, showing the position of the various parts at those points as the wrapping-strip and the tobacco filler deposited thereon are advancing. Fig. 8 is a section of a modified construction through the line 5 of Fig. 2. Fig. 9 is a view in perspective of the device for folding or coiling the edges of the wrapper-strip. Fig. 10 is a section of a finished cigarette shown in perspective. Figs. 11 to 17 of Sheet 2 of the drawings show modifications of the construction shown in Figs. 1 to 9, inclusive, Figs. 11 and 12 being longitudinal sectional and plan views of a filler-compressing and paper-wrapping tube provided with my improvements; Fig. 13, an enlarged longitudinal sectional view of the part included between lines $z z$ of Fig. 12; and Figs. 14, 15, 16, and 17 being cross-sections on the lines 6, 7, 8, and 9, respectively, of Figs. 12 and 13.

By reference to the figures of the drawings, A represents a tube through which the tobacco filler and the paper-wrapping strip B are advanced or fed, and by means of which, together with certain attachments hereinafter described, the paper strip is gradually brought from a flat into a tubular shape to encircle or surround the tobacco filler. This tube is shown as attached to a cigarette-machine by any convenient means, as by support A' and frame O secured to frame O' of the machine. The tube is conveniently made by forming two nearly semicircular parts, the lower part being designated by C and the upper part by D, from sheet metal and uniting them into a tube adapted to form a channel or passage-way B', through which a tobacco filler and a wrapping-strip are advanced simultaneously, the wrapping-strip being gradually brought from a flat into a tubular form to completely encircle or surround the tobacco filler.

The parts C and D are secured together by means of solder or brazing or connecting bands or pieces in such manner as to leave slits or openings $a a$ between the parts C and D, through which the edges of the wrapping-strip and endless band E can project. The lower part C projects rearwardly beyond the part D and gradually recedes from a semicylindrical into nearly a flat shape, and its edges are folded over to form guides $b b$ for the edges of the paper strip, these guides preferably extending somewhat beyond the junction of the part C and D to or near the beginning of the slits $a a$. The rear end of the part C is provided with a friction-roller F, over which the paper strip and the band E pass. This roller is journaled in side pieces c , secured to the edges of the part C, and on the upper face of which is a passage-way for the paper strip B and upon its under face a similar way for the band E. After passing over the roller F

the band E passes underneath the part C till it reaches an opening II, cut through the wall of part C, where it enters the tube A. The paper strip passes over the roller F above the band E and enters the rear end of the part C, its edges lying in the guides $b b$, and as it is advanced it is gradually brought into semicircular shape as it enters the mouth of the tube, and is there brought in contact with the upper surface of the band E. The band E passes through the tube and over a pulley I, located beyond the forward end of the tube and journaled in attachments to the frame of the machine conveniently, as shown in the drawings of the said Bonsack patent, and operates to advance or draw the paper strip and the tobacco filler deposited thereon through the tube and beyond its forward end, if desired.

The parts C and D are preferably tapered, so as to form a tapered or gradually contracted space or channel B' for the purpose of compressing the tobacco filler to such degree that as it passes out from the forward end of the part D and the pressure is released therefrom it will expand sufficiently to fill the sealed wrapper. The part C preferably extends beyond the forward end of the part D and is preferably formed into a tube J, through which the band E and the cigarette-cylinder are passed.

As the strip of paper carrying the tobacco is advanced through the tube A by means of the continuous movement of the band E, it is gradually wrapped or folded into tubular shape, and its opposite edges, having passed out through the slits $a a$ with the edges of the band, are gradually brought toward and into engagement with each other upon the outer surface of the part D and are secured together to form a seam laid down flat upon the body of the wrapper without the application of paste or other adhesive material.

In the drawings, K is a projection secured to the upper surface of the tube, and on either side thereof are secured at their upper edges thin metal strips $d d$ whose lower edges and forward ends are free or unsecured. The inner and under surfaces of these strips conform substantially to the upright surfaces of the projection K and the upper surface of the part D, but the strips are so arranged relatively to these surfaces that narrow guide-ways are formed for the edges of the paper strip and the band E. These strips are preferably slightly elastic at their lower edges and forward ends, and are arranged to hold the edges of the band and the paper strip in close contact with the surface of the part D. The portion of the projection K between the strips $d d$ is thinned away till it terminates in a knife-edge, which permits the edges of the paper strip to come in contact with each other, as shown in section in Fig. 4 of the drawings. The edges of the paper strip being now in contact with each other enter a device L, secured to the projection K, in which

they are gradually folded or rolled upon each other to give the necessary number of thicknesses of paper for the seam.

The device L is conveniently made by bending two strips *e e* of thin metal spirally and securing their rear ends to a supporting-block or piece M, in which they are contained so as to form a narrow channel between the strips for the passage of the paper edges. As the paper passes through this channel the edges are folded or coiled to such an extent that when they emerge into the small tapered chamber *f* the coiling will be continued according to the length and taper of the chamber. The exit from this chamber should be small enough to consolidate the several thicknesses or folds of paper into a compass to give a seam of the desired size.

The piece M is preferably made separate from the projection K and is removably secured thereto by inserting it into dovetailed or other notches cut through the projection, the upper edge of the piece M being correspondingly notched to prevent any longitudinal movement. The piece M is shown in perspective in Fig. 9 of the drawings.

The engaged edges of the wrapper as they emerge from the mouth of the tapered chamber *f* pass directly to a pressure device in which they are secured together to form a seam without the application of paste, and this seam is pressed down flat, so as to conform to the body contour of the finished cigarette, as seen in Fig. 10 of the drawings.

The pressure device is composed of two main operative parts, one part having a wheel N journaled in a plate N' arranged to slide in suitable ways in a frame O secured to the main frame O' of the machine and driven by a pulley P, as seen in Fig. 1, which pulley is in turn driven by a cross-belt P', which passes over a positively-driven pulley I, over which the band E passes and by which it is driven, as seen in Figs. 11 and 12, the size and arrangement of the parts being such that the periphery of wheel N is caused to travel at the same speed as the band E, and consequently the paper strip B is advanced through the pressure device at the same speed with the periphery of the wheel N, which bears upon its engaged edges. The pulley I is driven by a beveled gear R attached to its shaft which meshes with a corresponding gear, as shown in Fig. 1 of the drawings of the said Bonsack patent hereinbefore referred to.

The second part of the pressure device, as shown in Figs. 1 to 7 of the drawings, is a small roller Q, journaled in the walls of a recess formed in the upper surface of the part D. The shaft of this roller is arranged at right angles to the line of the advance of the wrapper and filler, and the face of the roller is directly in the path of the folded edges of the wrapper, so that such edges will pass over the face of the roller and the roller is revolved by the friction or pressure of the opposing parts. The periphery of the wheel N is

arranged to bear directly over the face of the roller Q, and this wheel is preferably adjustable by means of a screw *g*, passing through the top of the frame O and connected with a spring *h* in such manner that the piece N', carrying the wheel N and the pulley P, can be moved up and down to bring the desired pressure upon the seam, the spring *h* operating to compensate for any variations in the thickness of the seam. The periphery of the wheel N is serrated or roughened in any desired manner, so that as it is forced down upon the engaged edges of the wrapper and the pressure is resisted by the surface of the roller Q, located within the wrapper and operating as an anvil to resist the pressure of the wheel N, the engaged edges of the wrapper will be pressed into close contact and will be indented and incorporated or embodied into each other sufficiently to form a strong and reliable seam without the application of paste or other adhesive material to hold the tobacco filler in place and to resist any pressure which may result from the expansion of the filler when released from pressure.

To facilitate the incorporation of the engaged edges of the wrapping-strip into a seam, the roller Q may be provided with notches or serrations, which should be arranged to match those upon the periphery of the wheel N, as shown in Fig. 2, and the roller Q is preferably separated from the tobacco filler by a wall or partition *g*, so as to prevent the roller from interfering with the passage of the filler and to prevent the fibers of tobacco from interfering with the operation of the roller.

The position of the parts when the wrapper edges are pressed together to form the flat seam is shown in Fig. 7, in which it is seen that the advancing tobacco filler is encircled or surrounded by the advancing wrapper, and that one of the pressure devices, the wheel N, is located outside of the wrapper to give the necessary pressure, while the other part, the roller Q, is located within the wrapper to resist the pressure of the wheel N, and that the engaged wrapper edges pass between the pressure-producing and pressure-resisting parts and are incorporated into a finished seam, which is flattened down upon the body of the wrapper. It is also seen that at this point and when the engaged edges of the wrapper are being incorporated into a seam and forced down upon the body of the wrapper the tobacco filler occupies a chamber which is encircled by the wrapper, which chamber is shown in the drawings as the part of the channel B' not occupied by the wrapper and belt.

It is observed that instead of the roller Q the smooth plain surface of the part D may be used for the anvil or resisting part of the pressure device, as shown in Fig. 8 of the drawings, and that in such construction no enlargement of the part D would be required to seat the roller Q. The roller, however, as

it moves under pressure with equal speed with the wheel N, greatly reduces the liability of tearing the paper as it is advanced.

The tobacco filler, as it passes through the contracted part of the channel B' beneath the part D, in which the roller Q is located, will be sufficiently compressed, so that when it passes from under the forward end of the part D and is thus released from pressure it will immediately expand to fill the now sealed wrapper and produce a smooth cigarette. The diameter of the roller Q can be made very small as compared with the diameter of the channel B' at this point, and consequently but little expansion of the filler will be required to take up the slack of the wrapper.

It is here observed that the capacity of fibrous tobacco to expand after it has been compressed depends largely upon the length of time it is retained under pressure. If retained under pressure only momentarily, it will expand to nearly its original bulk. In a machine of the above-described type, which easily makes two hundred cigarettes per minute, the tobacco is retained under pressure during only the fraction of a second, and even if the cross-area of the filler-chamber at the point where the pressure devices operate to form the finished seam is considerably less than that of the whole interior of the wrapper the tobacco will quickly expand when the pressure is removed and will take up the slack and completely fill the wrapper.

When the completed cigarette-cylinder has passed beyond the end of tube A, it may be delivered to a cutter and severed into smokable lengths by the mechanism set forth in the said Bonsack patent or by any other well-known means.

In the mechanism heretofore specifically described and shown in Figs. 1 to 9, inclusive, of the drawings the edges of the wrapping-strip are turned outward and rolled over outside of the body of the wrapper and the seam is compressed down on the outside of the wrapper. By slight changes or modifications in the construction the wrapper edges are turned inwardly and the seam is formed within the wrapper and is pressed against its interior surface.

Figs. 11 to 17, inclusive, of Sheet 2 of the drawings represent substantially the same construction as heretofore particularly described, with the exception of devices for turning the edges of the wrapping-strip B inwardly relative to the body of the wrapper and forming the seam on the interior thereof, and consequently it is considered necessary to describe only these devices. In these figures of the drawings, *i* is a longitudinal groove or depression formed on the upper surface of the part D of the tube A. *jj* are strips of thin metal conforming to the upper surface of the tube and secured thereto at their rear ends, their forward ends being left free or unattached. The upper edges *k* of these strips at their forward ends are turned down-

ward into the groove *i*, and the strips are preferably so constructed that their forward ends will press downward upon the surface of the tube, but will easily spring upward and outward to permit the passage of the edges of the paper strip and the band E between them and the surface of the tube, as seen in Fig. 14. The function of these strips is to guide the edges of the paper and turn them downward into the groove *i* as the strip is advanced through and along the tube and as the edges are turned downward to prevent the body of the strip from crumpling or wrinkling. After the edges of the paper strip have passed the forward ends of the strips *jj* they are advanced to the downward projections *m*, secured to the part C, as shown in Fig. 15, and are still further turned downward toward the center of the tube, and as they pass the last of these projections they are brought in contact and pass into a slit *o*, opening into a guideway formed on the top of the tube, in which is located a strip of metal *n*, curved around a small core *p*, secured to the wall of the guideway, by which the downwardly-projecting edges of the strip are gradually rolled or coiled upon each other and partly around the core *p*, as shown in Figs. 13 and 16. The free end of this core is tapered and projects into a tapered chamber *r*, whose exit is near the pressure-wheel Q, and as the partly-coiled edges are advanced along the tapered end of the core and to the exit of the chamber they are still further rolled or coiled together to produce the desired number of thicknesses of paper for the seam, as shown in Fig. 17, and are delivered to the pressure device.

The construction of devices by which the wrapper edges are turned downwardly or inwardly and folded or rolled together and the seam formed and secured upon the inside of the wrapper is more specifically described and is claimed in an application filed by me March 21, 1893, and serially numbered 467,032.

As I am, so far as I am aware, the first to devise a method to produce a continuous or long cigarette having a longitudinal wrapper-seam formed by folding, rolling, or interlocking the opposite edges of the wrapper-strip together and laid down upon the body of the cigarette and a form of mechanism by which such method can be practiced I do not wish to limit my invention to any special means or mechanism for forming the loose tobacco into a filler or rod, or for advancing or feeding the tobacco filler and wrapper-strip to a seam-forming mechanism, or to any special devices for wrapping the strip of paper around the filler, or for bringing the opposite edges of the wrapper-strip into engagement with each other to form the necessary thicknesses of paper for the seam, as all these operations are old and can be carried out by a great variety of well-known devices or mechanisms.

The novelty of my invention relates more particularly to the step or operation by which the opposite wrapper-edges, after they have

been folded, rolled, or otherwise interlocked together, are secured into a completed seam at a point where the wrapper surrounds or encircles the filler and while the filler and wrapper are being simultaneously advanced, and especially to the application of pressing, crimping, or indenting devices arranged to operate upon the opposite sides of the rolled or folded-together wrapper edges to incorporate them into a completed seam.

What is claimed as new is—

1. The method of making continuous cigarettes which consists in simultaneously advancing a long or continuous wrapper and a filler superposed thereon, progressively wrapping or folding the wrapper around the filler, folding or rolling the opposite edges of the wrapper together and securing such folded or rolled edges into a seam by pressing, crimping or indenting them together.

2. In a machine for making continuous cigarettes, the combination, substantially as set forth, of mechanism for simultaneously advancing a wrapper and a filler superposed thereon, mechanism for progressively folding the wrapper around the filler, and a seam-forming mechanism, which consists of devices by which the opposite edges of the wrapper are folded, rolled or interlocked together, and pressing, crimping or indenting devices arranged to operate upon the opposite sides of such folded or rolled together edges to incorporate them into a completed seam.

3. In a machine for making continuous cigarettes, the combination, substantially as set forth, of mechanism for simultaneously advancing a wrapper and a filler superposed thereon, mechanism for progressively folding the wrapper around the filler and a seam-forming mechanism, which consists of devices by which the opposite edges of the wrapper are folded, rolled or interlocked together, and pressing, crimping or indenting devices arranged to operate upon the opposite sides of such folded or rolled together edges to incorporate them into a completed seam, the part or parts of such devices upon one side of the seam being located inside of the wrapper.

4. In a machine for making continuous cigarettes, the combination, substantially as set forth, of mechanism for simultaneously advancing a continuous wrapper and a tobacco filler encircled thereby, a seam-forming mechanism consisting of devices by which the opposite edges of the wrapper are brought into engagement with each other and a two-part pressure device, one part being arranged to operate outside of the wrapper, and the other inside thereof and of such form as to permit the tobacco filler to pass it, the two parts co-acting to incorporate the engaged edges of the wrapper while it encircles the filler into a longitudinal seam flattened down upon the body of the wrapper.

5. In a machine for making cigarettes, composed of a tobacco filler inclosed in a paper wrapper having a longitudinal seam formed

without paste or other adhesive material and flattened down upon the body of the cigarette, the combination substantially as set forth, of a chamber adapted to receive the tobacco filler and to be encircled by the wrapper, and a two-part device, one part arranged to operate outside of the wrapper, and the other inside thereof and of such form as to permit the filler to pass it, the two parts cooperating to secure the engaged edges of the wrapper, while it encircles the filler, into a flattened longitudinal seam.

6. In a machine for making cigarettes, composed of a tobacco filler inclosed in a paper wrapper, the combination substantially as set forth, of a chamber adapted to receive the tobacco filler and to be encircled by the wrapper, and a two-part pressure device, one part being arranged to operate outside of the wrapper, and the other inside thereof, the latter being of such form as to permit the filler to pass it and separated by a wall or partition from the filler chamber.

7. In a machine for making cigarettes, composed of a tobacco filler inclosed in a paper wrapper, the combination substantially as set forth, of a chamber adapted to receive the tobacco filler and to be encircled by the wrapper, and a two-part pressure device, one part consisting of a wheel arranged to operate outside of the wrapper and having its periphery serrated or roughened, and the other part arranged to operate inside of the wrapper and of such form as to permit the filler to pass it.

8. In a machine for making cigarettes, composed of a tobacco filler inclosed in a paper wrapper, the combination substantially as set forth, of a chamber adapted to receive the tobacco filler and to be encircled by the wrapper, and a two-part pressure device, one part consisting of a wheel arranged to operate outside of the wrapper and adjustably arranged thereto, and the other part consisting of a frictionally driven roller arranged to operate within the wrapper and of such form as to permit the filler to pass it.

9. In the seam-forming mechanism of a cigarette machine, the combination substantially as set forth, of a chamber adapted to receive the tobacco filler and to be encircled by the wrapper, and a two-part pressure device for incorporating the engaged edges of the wrapper into a seam, one part thereof consisting of a wheel arranged to operate outside of the wrapper and provided with a notched or serrated periphery, and the other part consisting of a roller of such form as to permit the filler to pass it, arranged to operate inside the wrapper and having its face provided with notches or serrations.

10. In a machine for making continuous cigarettes, the combination substantially as set forth, of a tube, mechanism for advancing a tobacco filler and a paper strip through the tube and for wrapping the paper strip around the filler, and seam-forming mechanism, consisting of devices for bringing the opposite

edges of the paper strip into engagement with each other, and of a two-part pressure device, one part being located on the tube to operate on the inside of the wrapper and of such form as to permit the filler to pass it, while the other part is located to operate on the outside of the wrapper, the two parts co-acting to press the engaged edges of the wrapper together when the tobacco filler is inclosed therein, and to incorporate such edges into a longitudinal seam.

11. In a machine for making continuous cigarettes, the combination substantially as set forth, of a tube, an endless band adapted to carry or advance a continuous strip of paper and a tobacco filler deposited thereon through the tube, devices for wrapping the paper strip around the filler, and seam-forming mechanism comprising devices for bringing the opposite edges of the wrapper into engagement with each other, and a two-part pressure device, one part being a roller Q, located near the forward end of the tube and arranged to operate inside the wrapper when it encircles the filler and of such form as to permit the filler to pass it, and the other part being a roughened or serrated wheel N arranged to operate on the outside of the wrapper.

12. In a machine for making continuous cigarettes by wrapping a tobacco filler with a continuous strip of paper, the combination substantially as set forth, of a two-part pressure device for incorporating the engaged edges of the wrapper strip into a seam when it encircles the filler, one part being arranged to press upon the engaged edges from the outside of the wrapper, and the other part being located inside of the wrapper to resist the outside pressure and being of such form as to permit the filler to pass it, and mechanism for compressing the tobacco filler, whereby the filler when released from pressure will expand to take up the slack of the wrapper caused by the presence within the wrapper of the pressure-resisting part or anvil.

13. In a machine for making continuous cigarettes, the combination, substantially as set forth, of mechanism for advancing a wrapper and a filler superposed thereon, mechanism for folding the wrapper to encircle the filler with its edges turned outwardly, and

seam-forming mechanism consisting of devices by which the wrapper edges are folded or rolled together, and pressing, crimping or indenting devices arranged to operate upon the opposite sides of such folded or rolled together edges to incorporate them into completed seam.

14. In the seam-forming mechanism of a cigarette machine, a device L, consisting of two spirally curved pieces *e e*, arranged to form a narrow way for the edges of a wrapping strip of paper, in combination with a tapered chamber *f*, whereby the edges of a paper strip as they are advanced through the device L are rolled or coiled spirally upon each other, substantially as set forth.

15. In the seam-forming mechanism of a cigarette machine, a piece M carrying devices for spirally rolling or coiling the edges of a wrapping strip of paper upon each other, and adapted to be removably secured in place, substantially as set forth.

16. In a cigarette tube, comprising devices for wrapping a continuous strip of paper around a tobacco filler and uniting its opposite edges into a seam on the outside of the wrapper, metal strips *d d*, in combination with a projection K and the surface of the tube, the metal strips being secured to the projection and forming in connection therewith and the surface of the tube ways or guides for the edges of the wrapping strip, substantially as set forth.

17. A tube provided with a channel B' through which an endless band, a continuous strip of paper and a tobacco filler deposited on said strip can be passed, devices for wrapping the paper strip around the filler and bringing its edges into engagement with each other, in combination with a device for incorporating the engaged edges of the wrapper into a seam while it encircles the filler, one part of such device consisting of a roller Q arranged to operate inside of the wrapper and the other part of a wheel N arranged to operate outside of the wrapper, substantially as set forth.

WILLIAM A. HULSE.

Witnesses:

DANA C. NEEL,
EDWARD KERN.