

**No. 707,766.**

**Patented Aug. 26, 1902.**

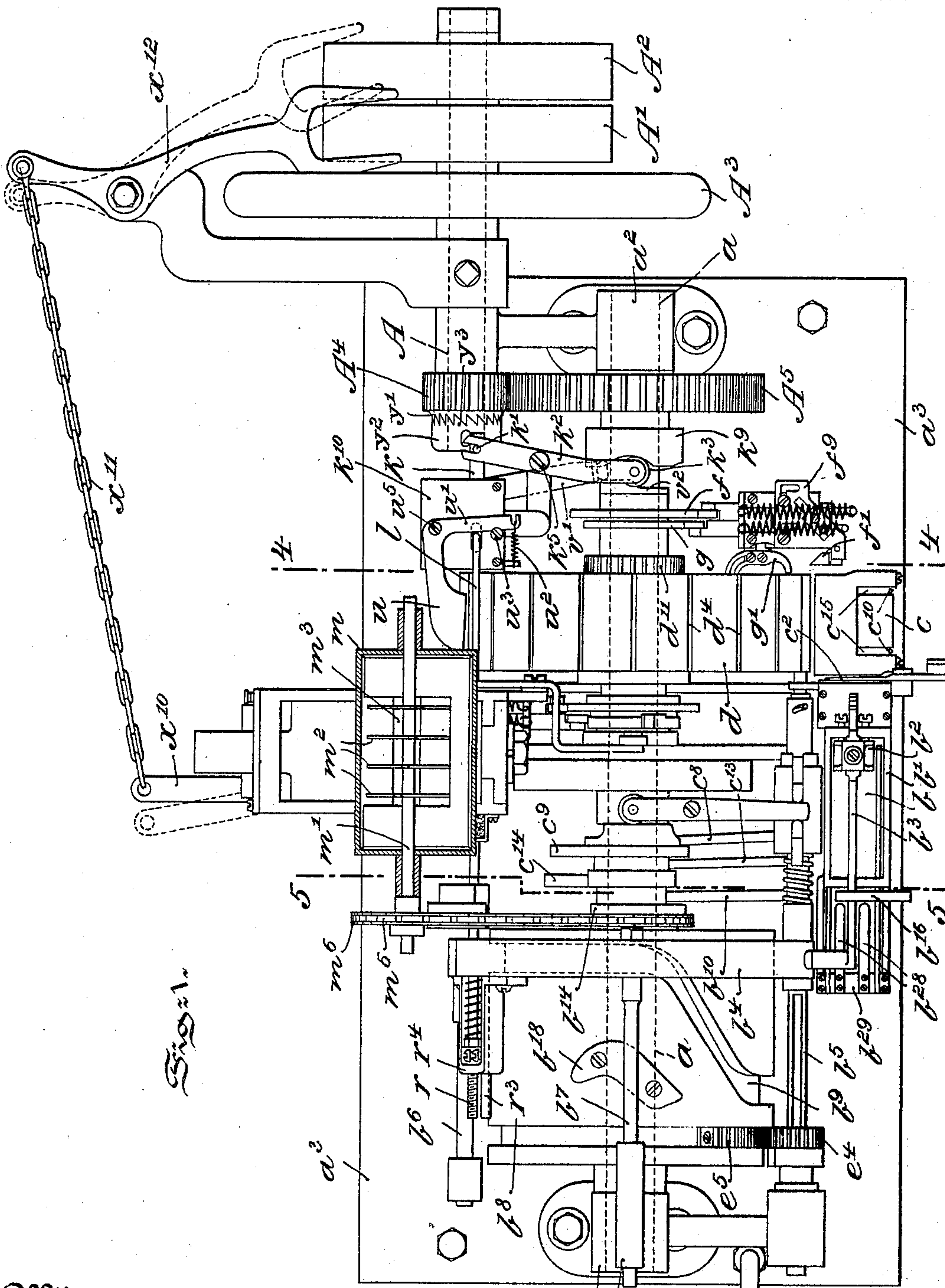
**G. FERRARI.**

**CIGARETTE MACHINE.**

(Application filed Mar. 21, 1902.)

(No Model.)

**9 Sheets—Sheet 1.**



Witnesses:  
 Wilhelm Vogt  
 Thomas M. Smith.

*a<sup>1</sup>*  
*a<sup>7</sup>*  
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*By* **J. Walter Douglas**  
Attorney.

No. 707,766.

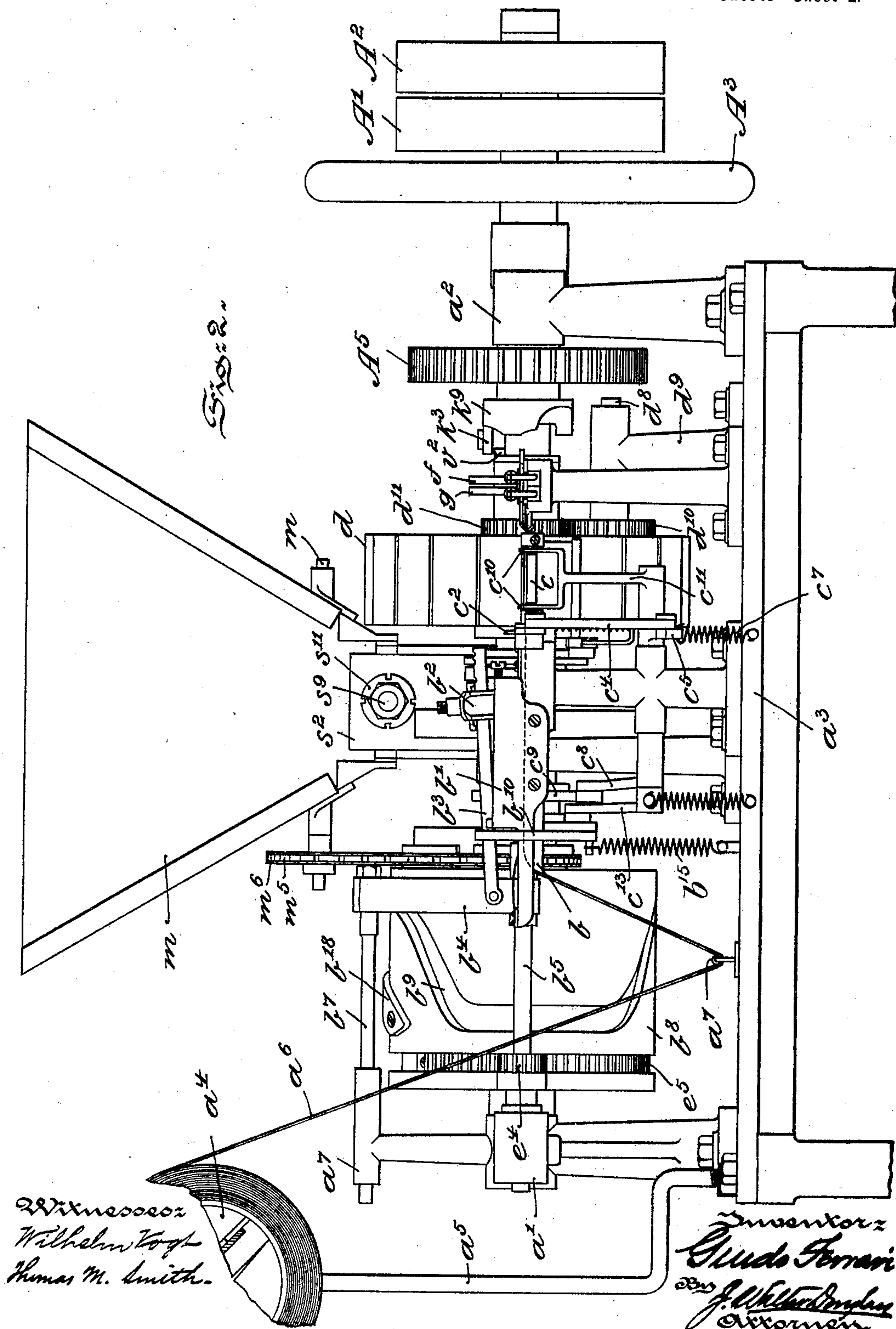
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9 Sheets—Sheet 2.





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9 Sheets—Sheet 3.

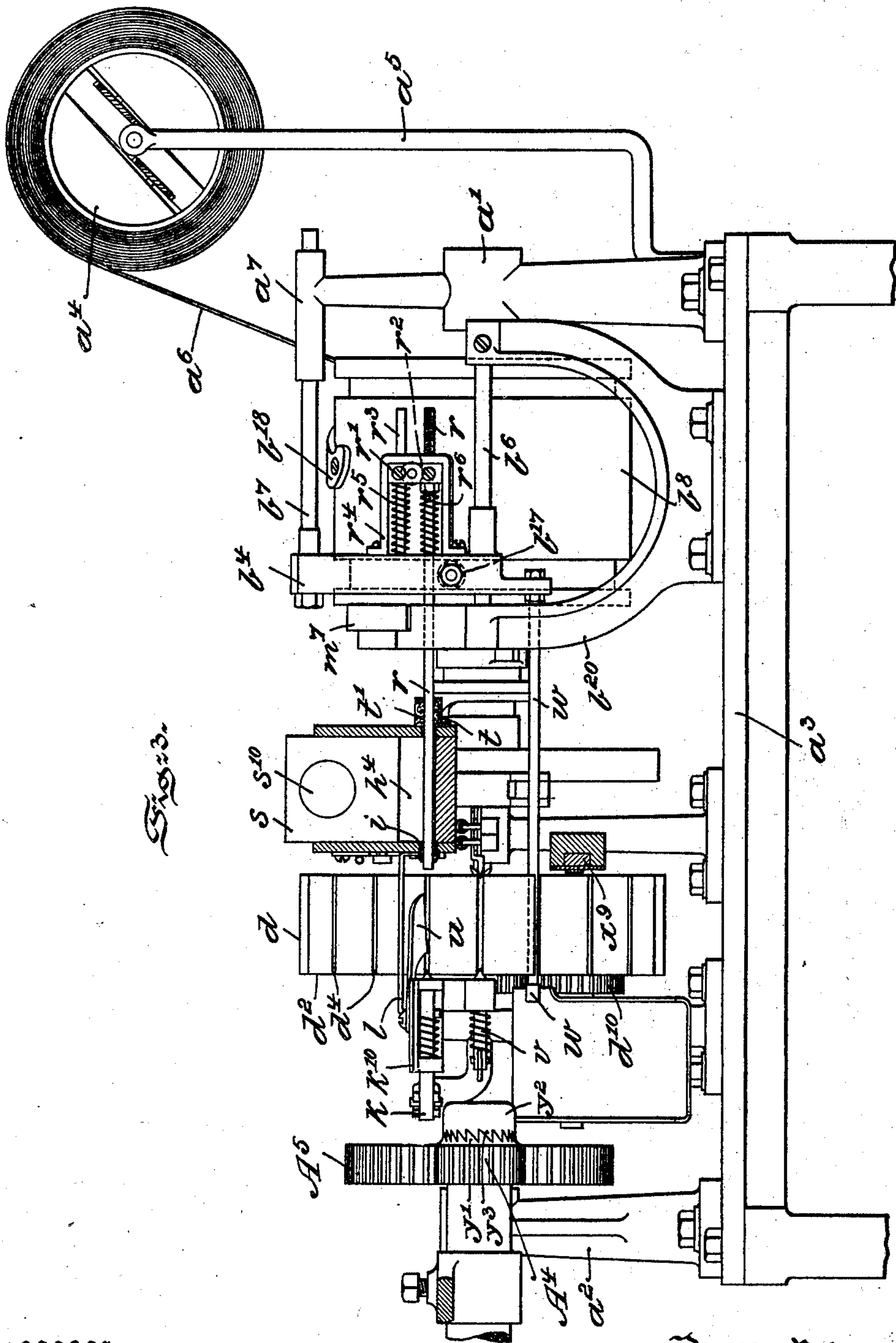


Fig. 3.

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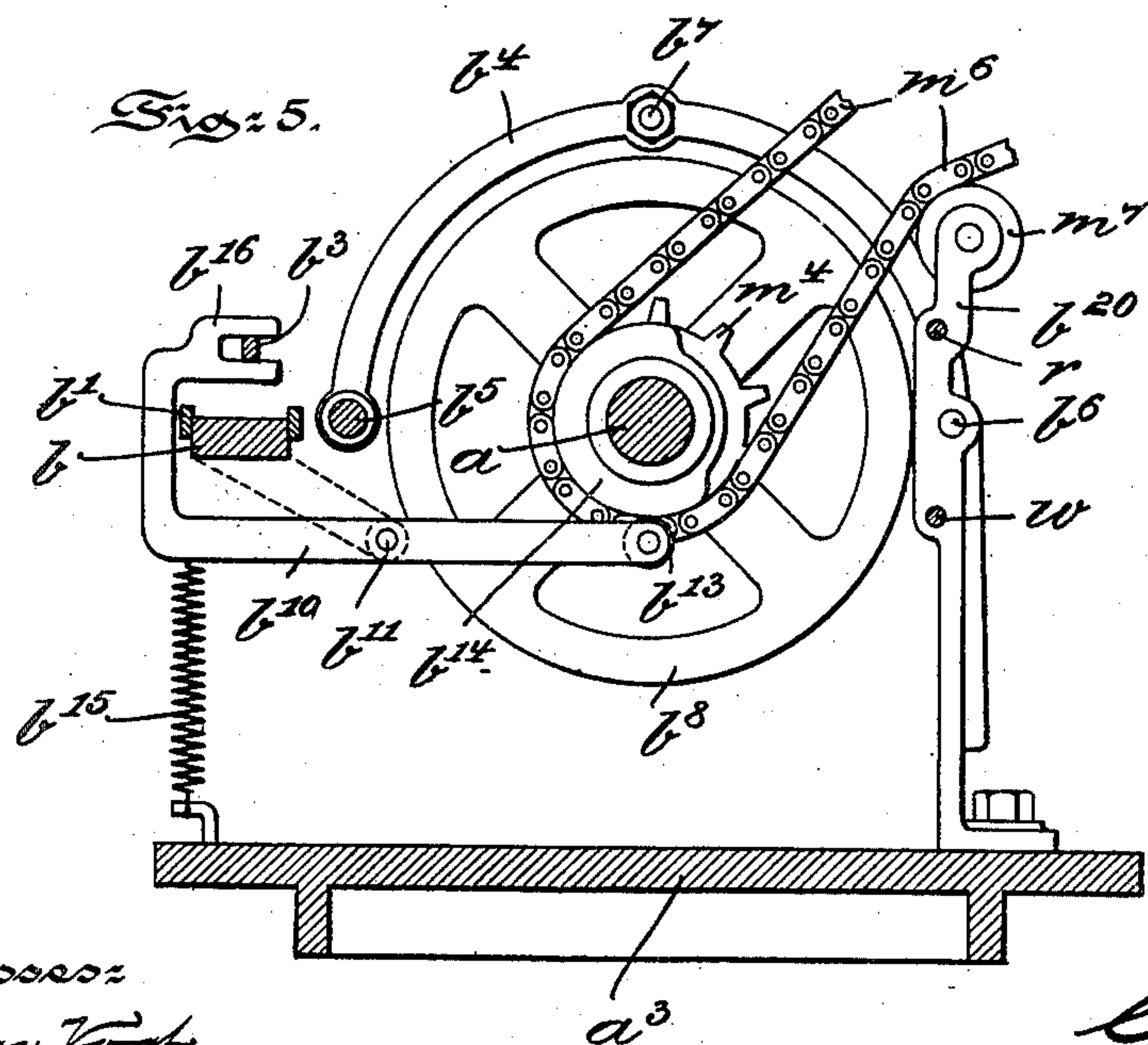
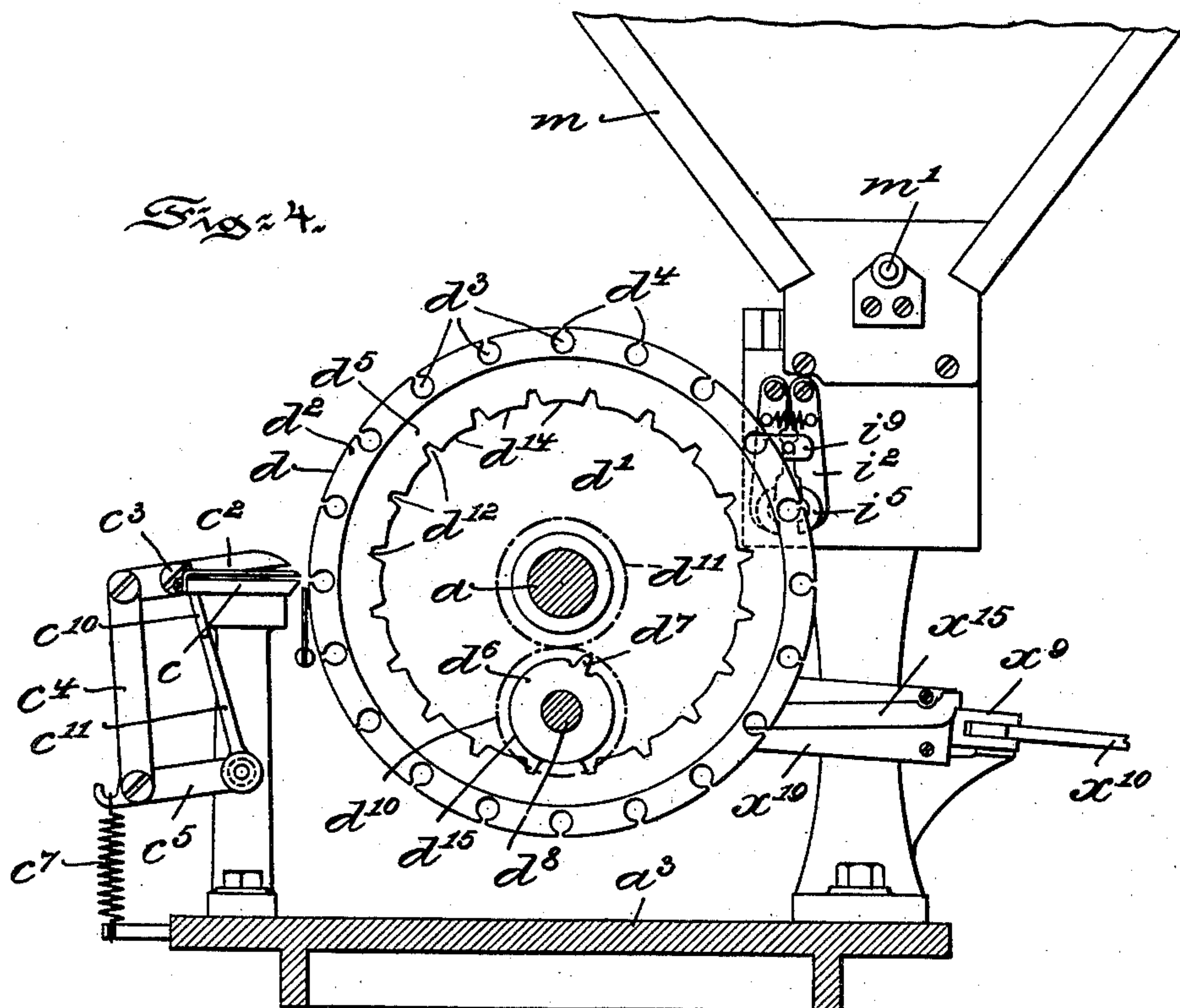
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**CIGARETTE MACHINE.**

(Application filed Mar. 21, 1902.)

(No Model.)

**9 Sheets—Sheet 4.**



Witnesses:  
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No. 707,766.

Patented Aug. 26, 1902.

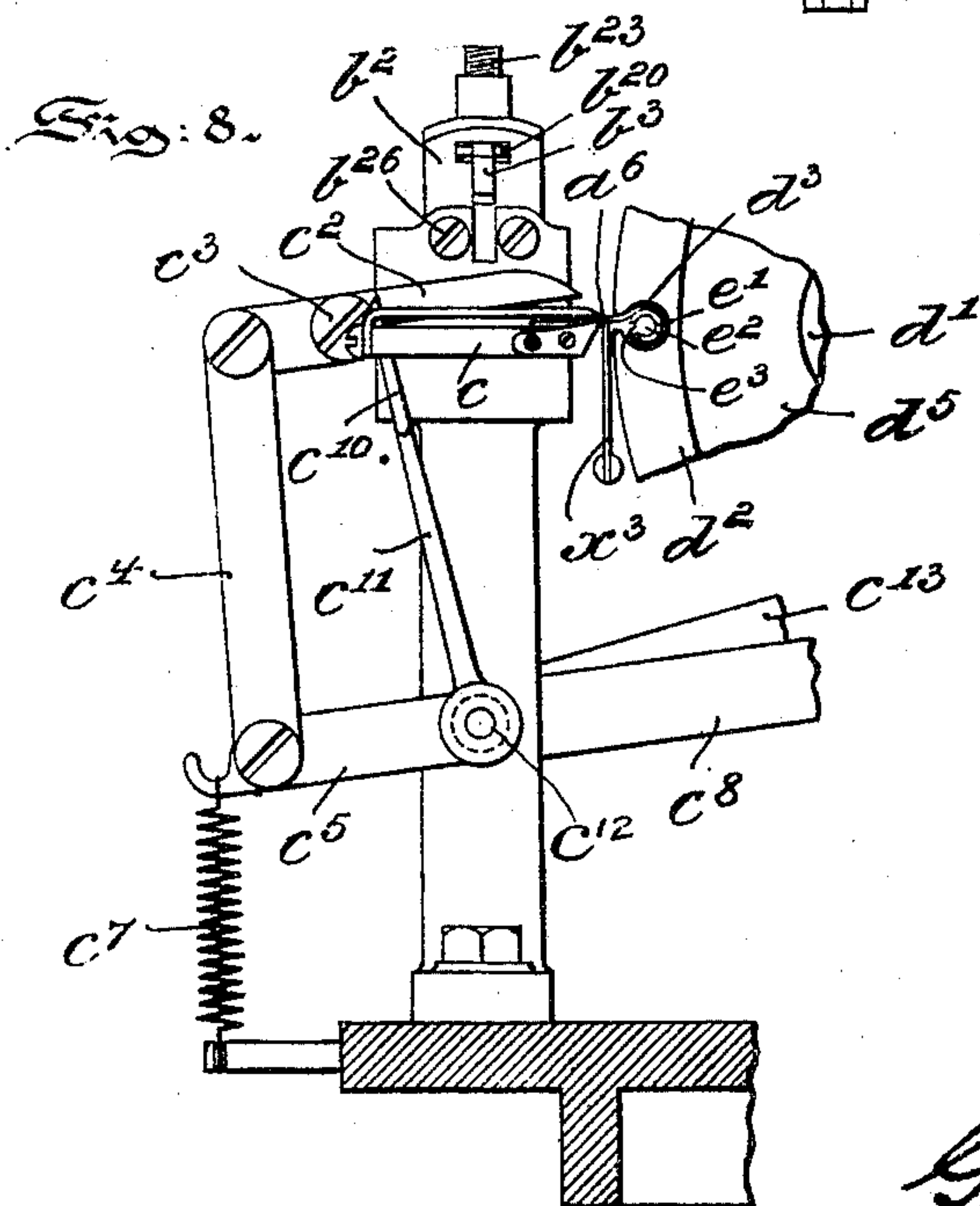
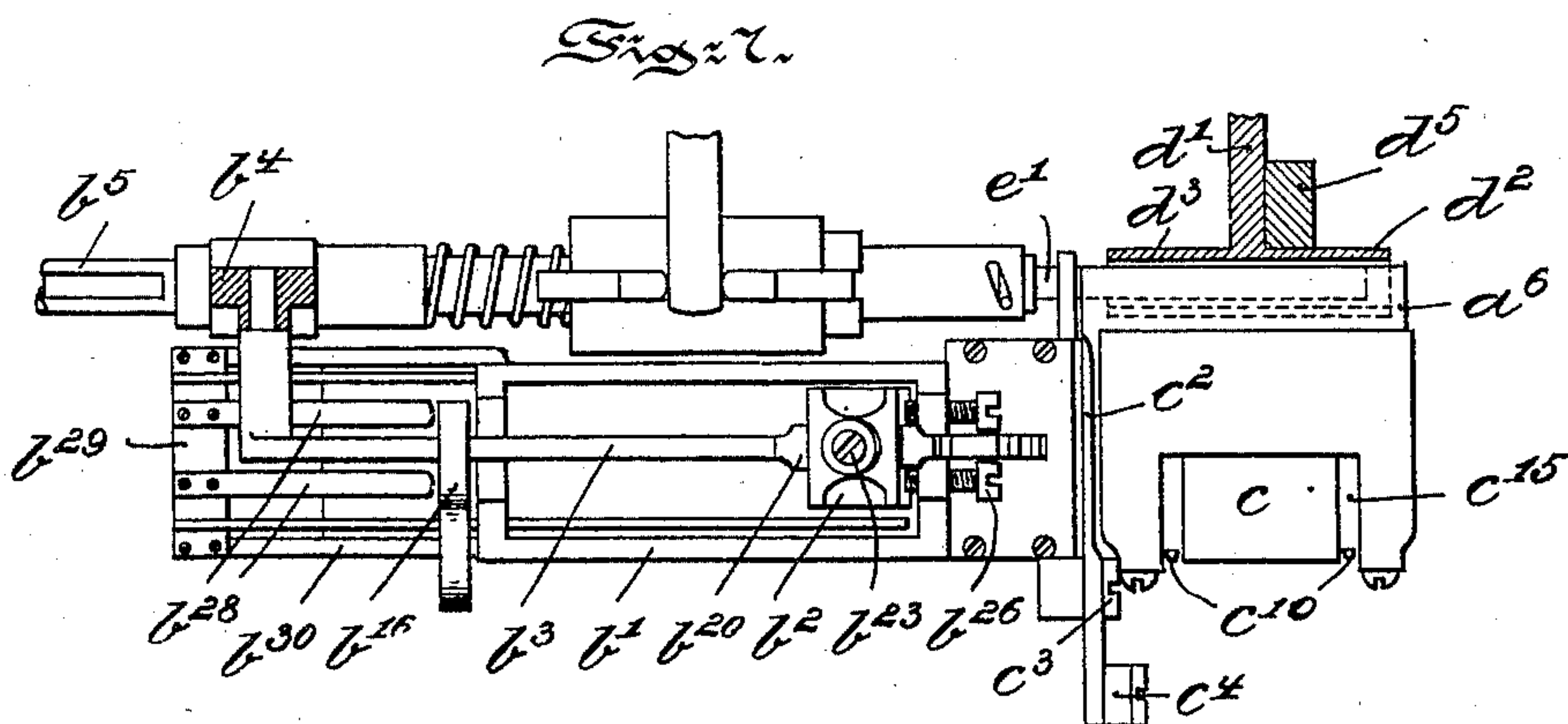
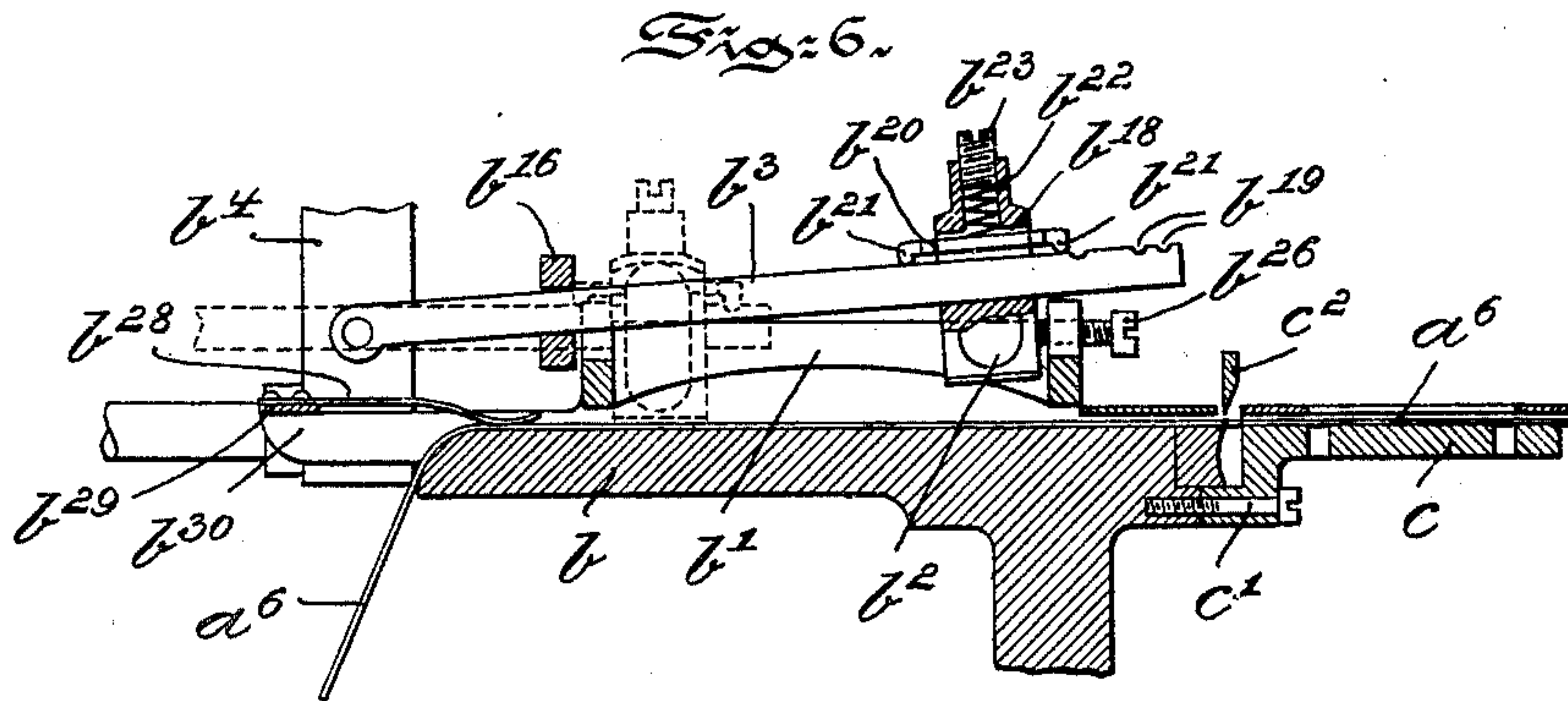
G. FERRARI.

CIGARETTE MACHINE.

(Application filed Mar. 21, 1902.)

(No Model.)

9 Sheets—Sheet 5.



Witnesses:  
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**No. 707,766.**

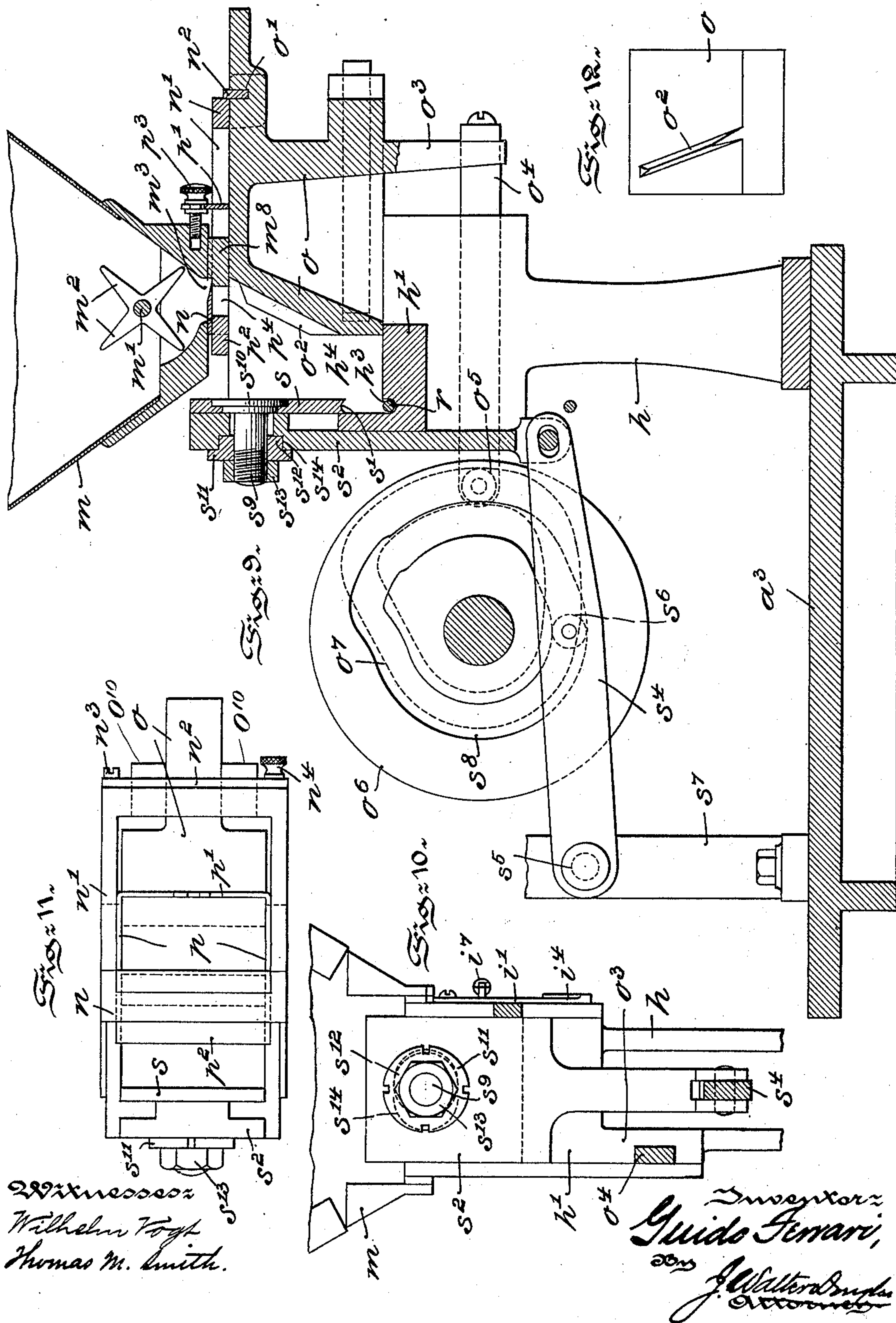
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**9 Sheets—Sheet 6.**





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(Application filed Mar. 21, 1902.)

(No Model.)

9 Sheets—Sheet 7.

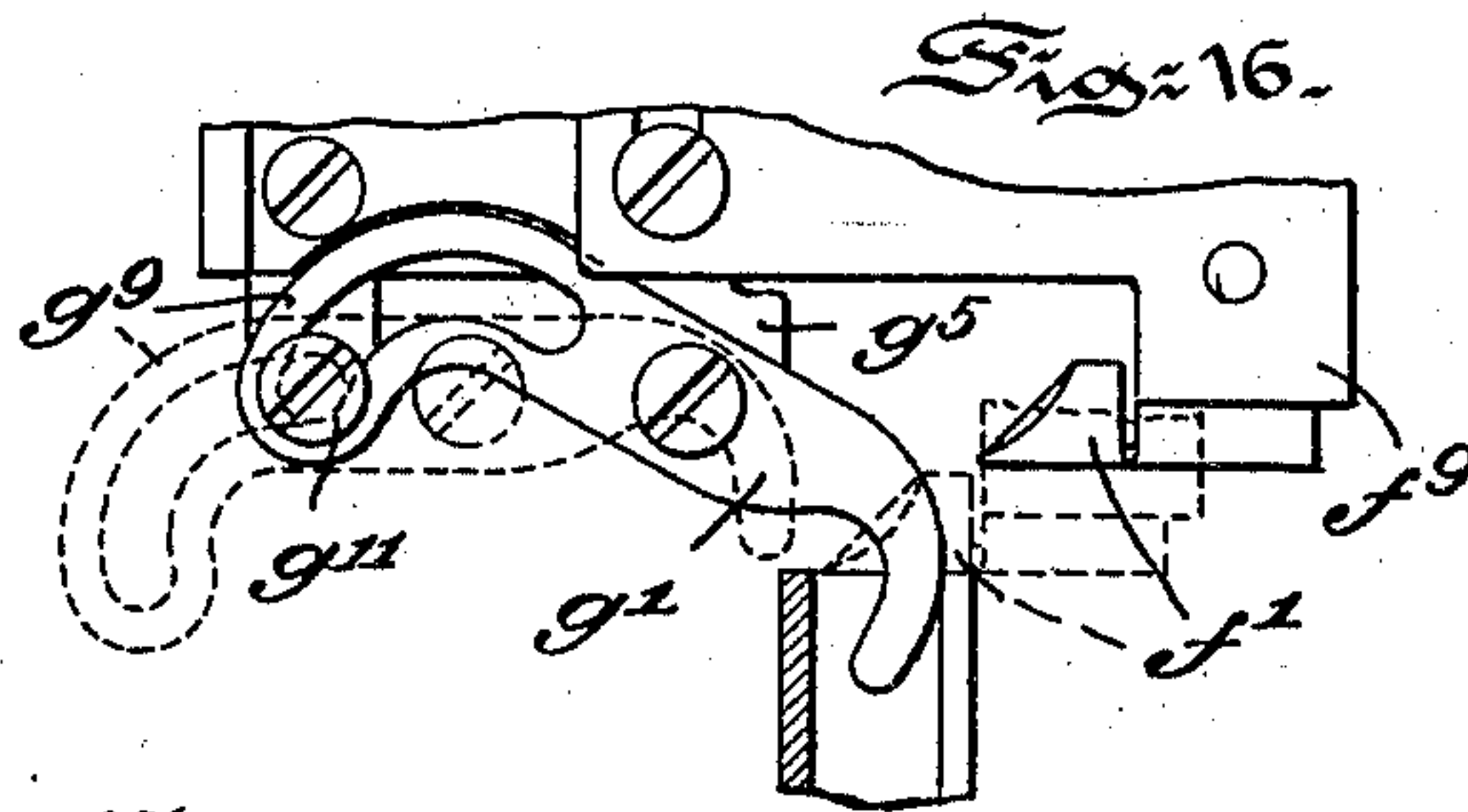
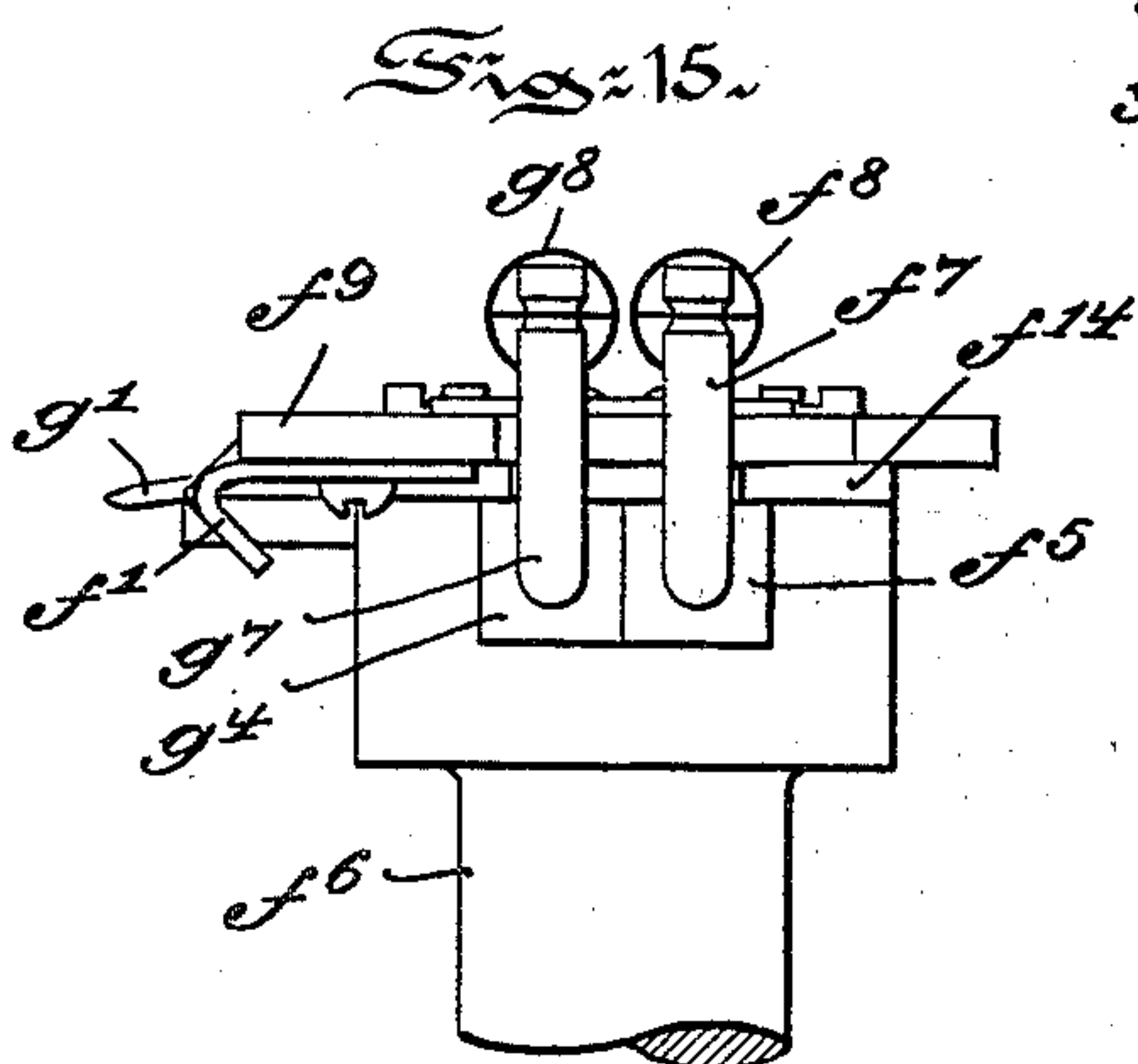
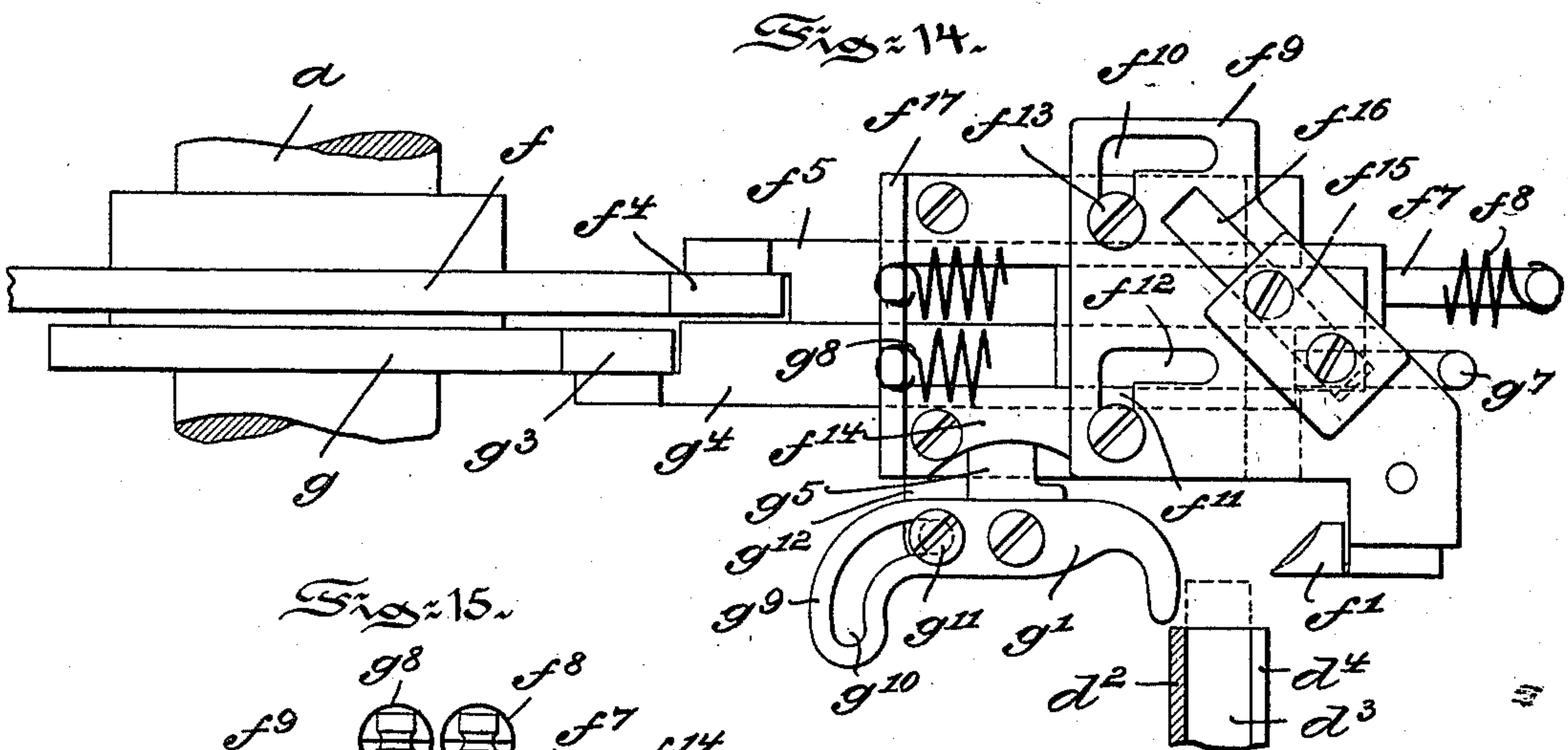
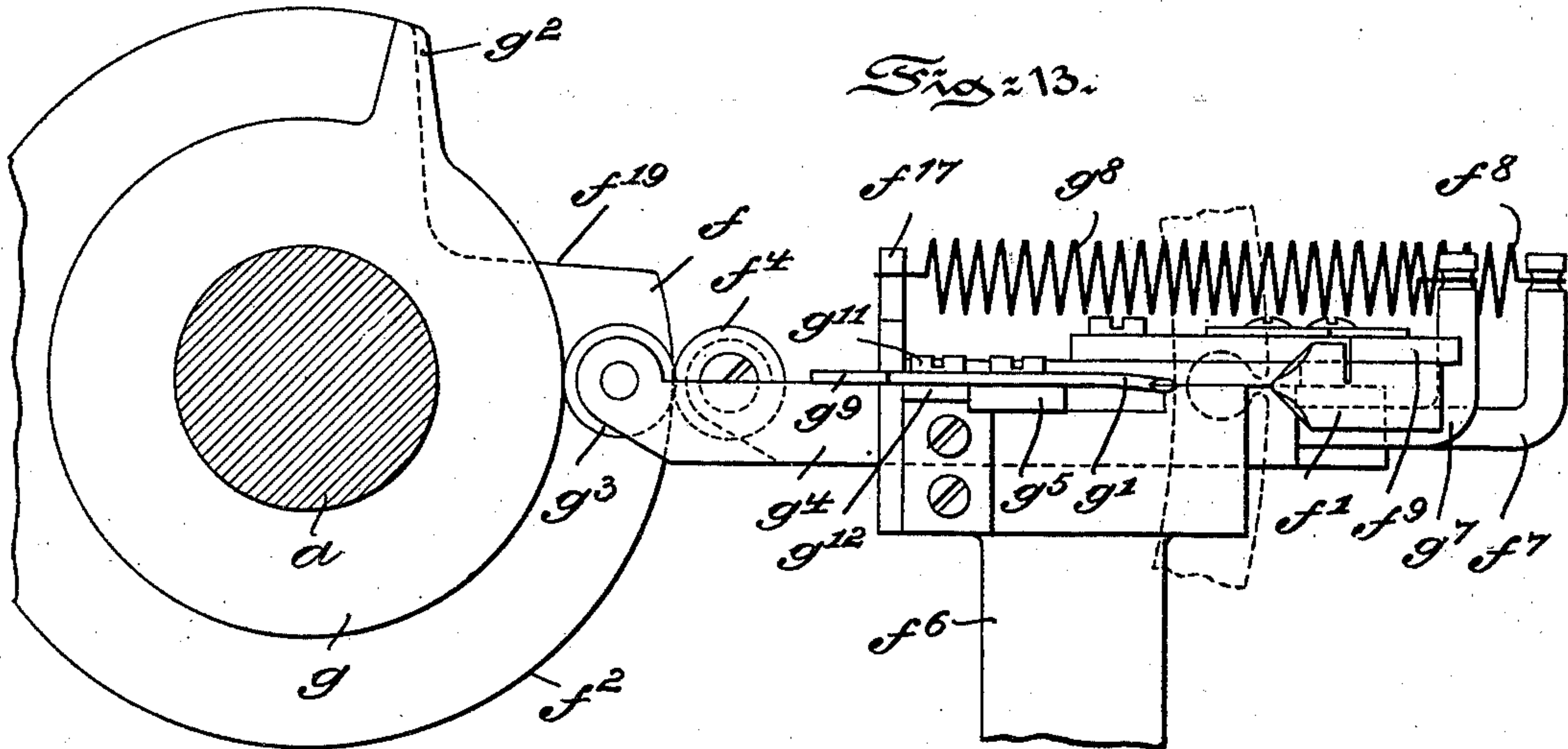


Fig. 17.



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(Application filed Mar. 21, 1902.)

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9 Sheets—Sheet 8.

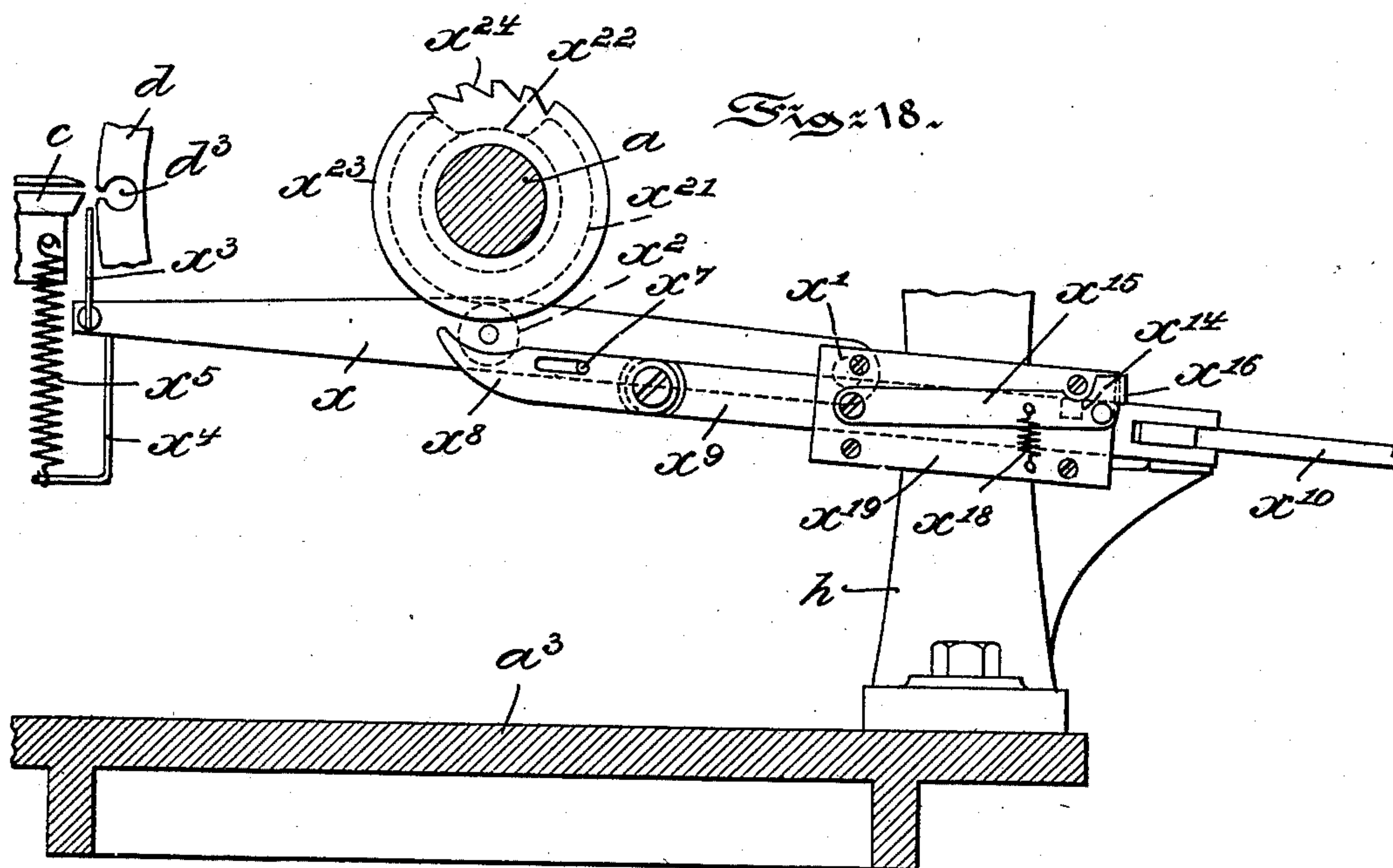
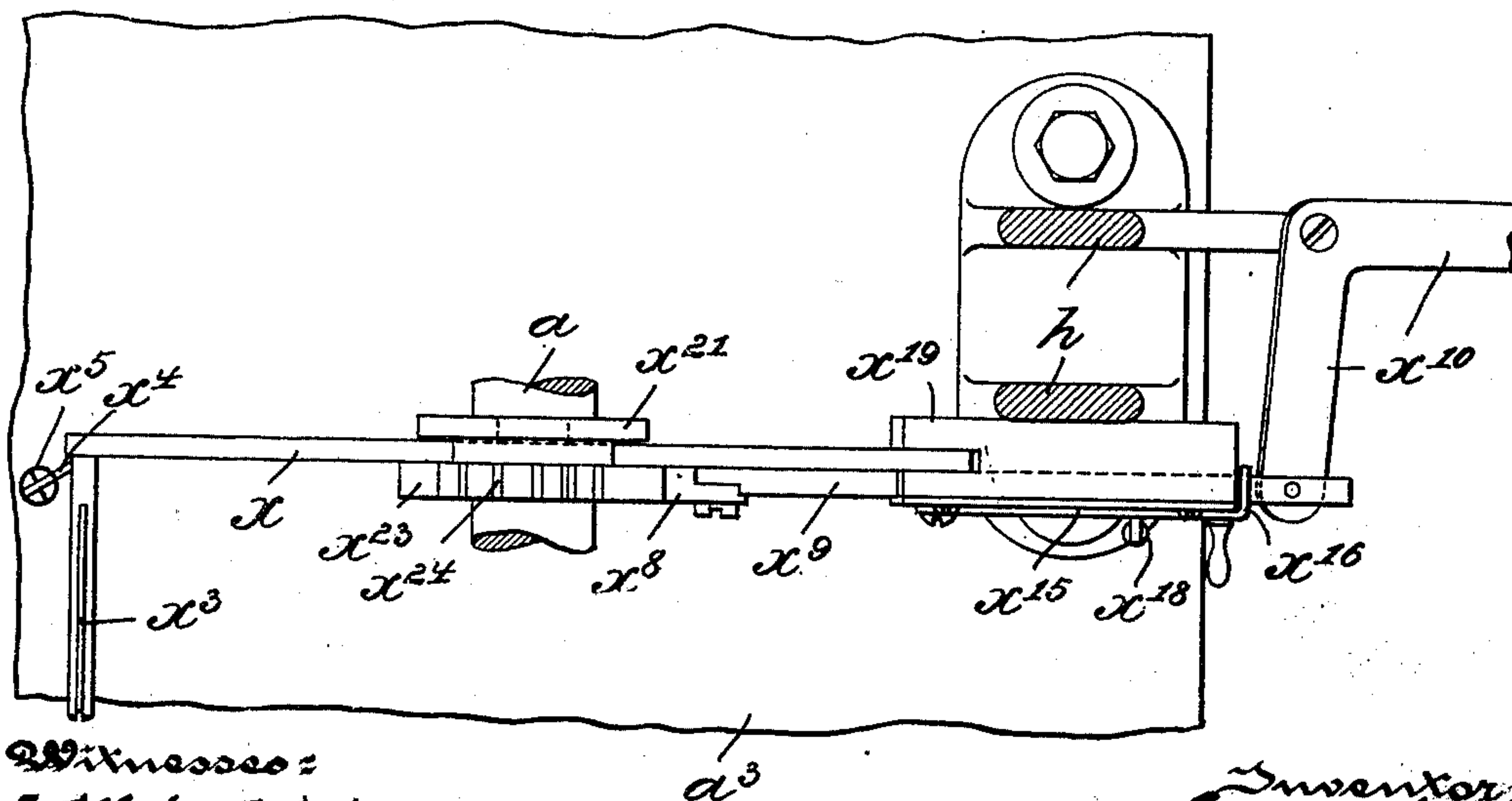


Fig. 19.



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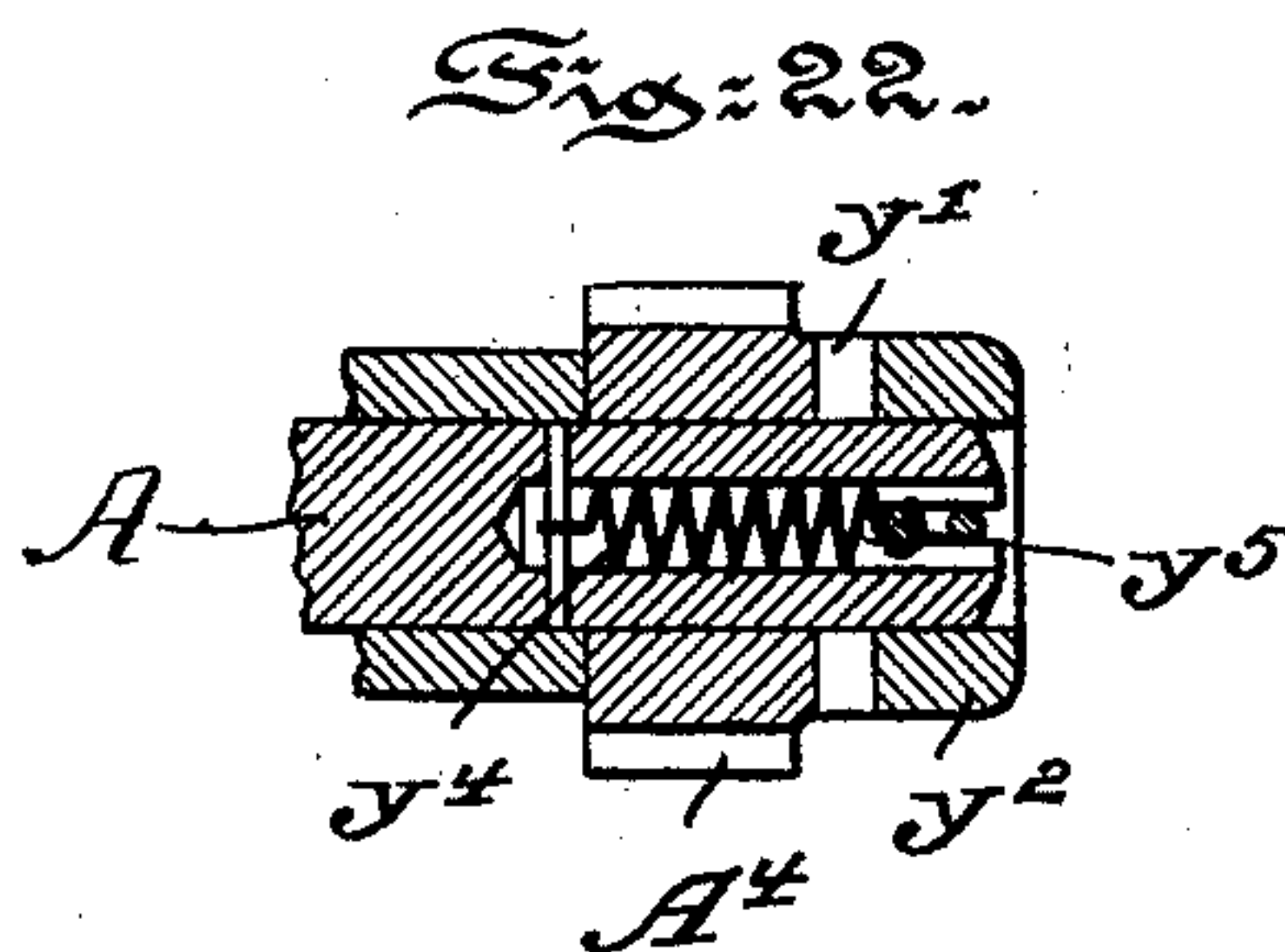
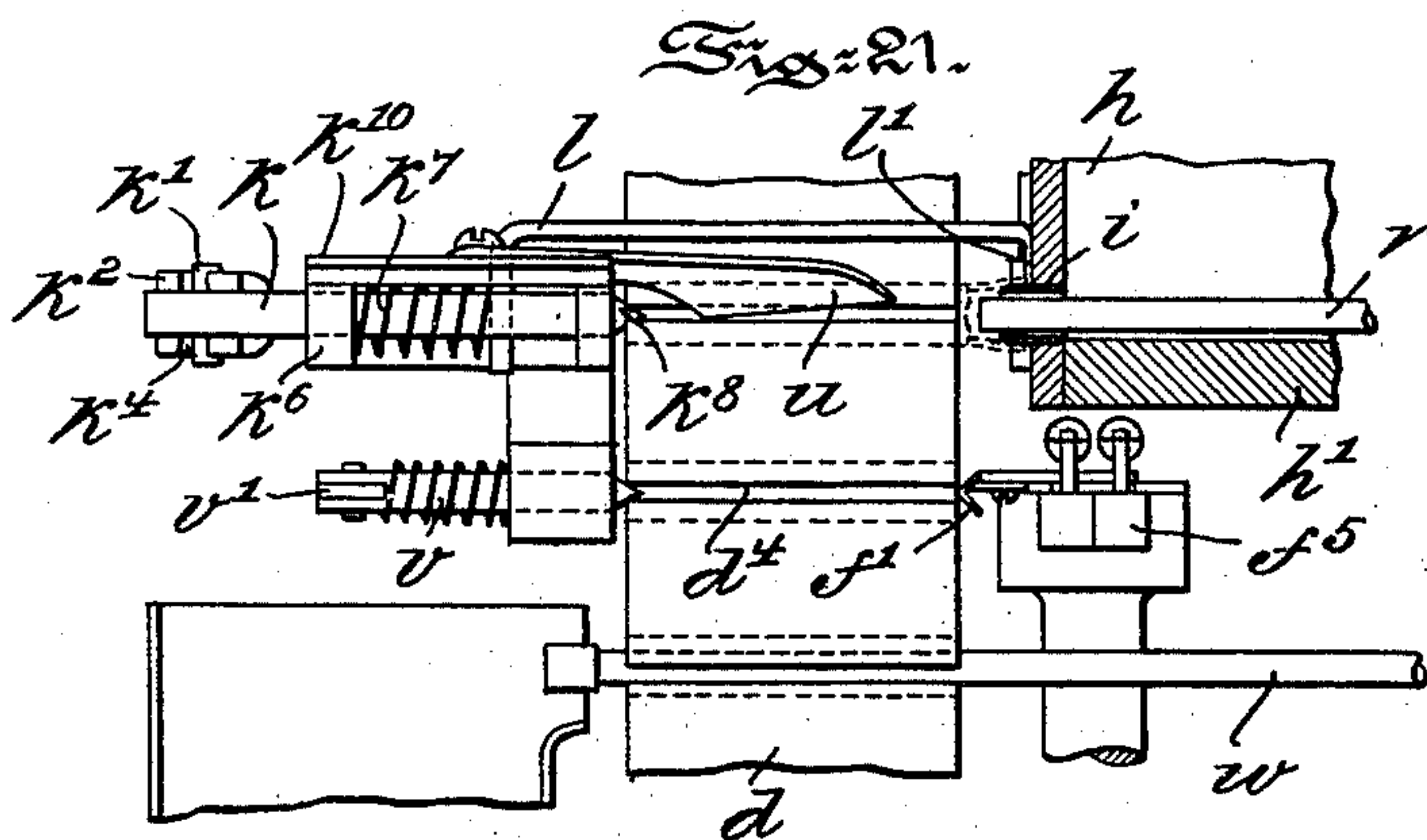
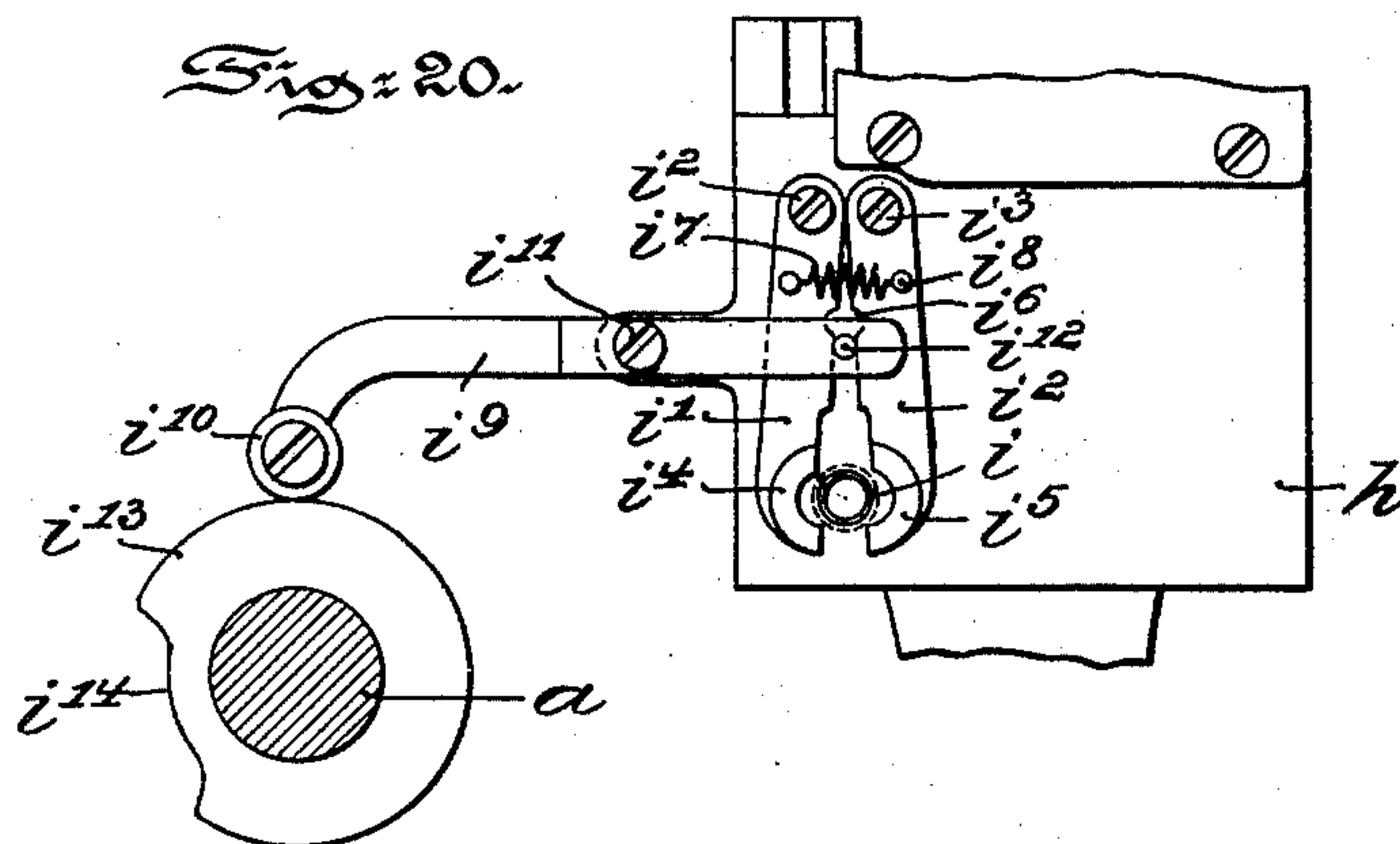
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(No Model.)

9 Sheets—Sheet 9.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

GUIDO FERRARI, OF PHILADELPHIA, PENNSYLVANIA.

## CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 707,766, dated August 26, 1902.

Application filed March 21, 1902. Serial No. 99,341. (No model.)

*To all whom it may concern:*

Be it known that I, GUIDO FERRARI, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Cigarette-Machines, of which the following is a specification.

My invention has relation to that class of cigarette-machine such as is shown and described in the United States Letters Patent No. 636,625, granted November 7, 1899, wherein paper is first cut in predetermined lengths, then a tube is formed from such paper by the machine, and the tube thereafter filled with tobacco and the ends of the tube closed or tucked in; and in such connection it relates to the general construction and arrangement of such a machine.

The principal objects of my invention are, first, to provide in a cigarette-machine mechanism simple in construction and efficient in operation for feeding a strip of paper forward for a predetermined distance, the strip being cut and the cut portion fed to a tube-forming mechanism; second, to provide in such a machine a simple and efficient tucking mechanism for tucking in the ends of the paper tube; third, to provide in such a machine a simple and efficient mechanism for rotating the wheel or paper-tube holder and to stop the same, so as to present and hold the tube in proper position opposite the tobacco-filling mechanism; fourth, to provide in such a machine simple and efficient mechanism for agitating, measuring, feeding, and compressing the tobacco prior to presenting the same to the paper tube; fifth, to provide in such a machine simple and efficient mechanism for stopping or cutting off the tobacco-feed; sixth, to provide in such a machine simple and efficient mechanism for regulating the degree of compression of the tobacco to be fed to the tube; seventh, to provide in such a machine simple and efficient mechanism for clamping or holding the paper tube in position during the filling of the tube with tobacco; eighth, to provide in such a machine simple and efficient mechanism for filling the paper tube with the compressed tobacco; ninth, to provide in such a machine simple and efficient mechanism for clamping

or holding the filled tube to prevent displacement of the same in the tube-holder at the return or withdrawing movement of the tube-filling mechanism; tenth, to provide in such a machine simple and efficient mechanism for moving the filled paper tube a certain distance and then holding the same in position during the tucking in of the other end of said tube; eleventh, to provide in such a machine simple and efficient mechanism for withdrawing an empty tube when the tobacco-feed has been accidentally or otherwise cut off; twelfth, to provide in such a machine simple and efficient mechanism for automatically stopping the machine in case the paper is accidentally not fed to the tube-holder and tube-forming mechanism, and, thirteenth, to provide in such a machine simple and efficient mechanism for preventing backward or retrograde movement of the operating parts of the machine.

My invention, stated in general terms, consists of a cigarette-machine constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a top or plan view of a machine embodying main features of my invention, the tobacco-feeding mechanism being illustrated in section, so as to more clearly illustrate other portions of the machine. Fig. 2 is a front elevational view of the machine, illustrating also a portion of the paper-reel. Fig. 3 is a rear elevational view of the machine with the tobacco-feeding device shown in section and illustrating the mechanism for filling the paper tube with tobacco, tucking in the open end, and ejecting the formed cigarette. Figs. 4 and 5 are cross-sectional views, respectively, on the lines 4-4 and 5-5 of Fig. 1 looking toward the left of the machine. Figs. 6, 7, and 8 are enlarged detail views illustrating, respectively, in longitudinal section, top plan view, and side elevation the mechanisms for feeding a strip of paper forward for a predetermined distance, for cutting the same, and for feeding the cut portion to a tube-forming mechanism and a tube-holder. Fig. 9 is



an enlarged cross-sectional view illustrating in detail the tobacco agitating, measuring, feeding, and compressing mechanisms. Fig. 10 is an enlarged detail view illustrating in front elevation the mechanism for compressing the tobacco and regulating the degree of compression of the same. Fig. 11 is an enlarged detail view illustrating in top plan view the mechanism for regulating and cutting off the tobacco-feed, the tobacco receptacle and agitating mechanism being removed. Fig. 12 is an enlarged detail view illustrating in side elevation a projecting rib or fin for conducting the greater portion of the tobacco to the forward end of the compressing mechanism. Figs. 13, 14, and 15 are enlarged detail views illustrating, respectively, in side elevation, top plan view, and front elevation the mechanism for tucking in the ends of the paper tube. Fig. 16 is a detail view of Fig. 14, illustrating one of the tucking mechanisms in operative position. Fig. 17 illustrates in enlarged detail view one end of a paper tube after the same has been tucked in. Figs. 18 and 19 are enlarged detail views illustrating, respectively, in side elevation and top plan view the mechanism for automatically bringing the machine to a standstill should the paper fail to be fed to the tube-forming mechanism. Fig. 20 is an enlarged detail view illustrating in side elevation the mechanism for clamping and holding the paper tube in position during the filling of the same with tobacco. Fig. 21 is an enlarged detail view illustrating in front elevation the mechanism for holding the filled paper tube in position to prevent displacement of the same at the return movement of the tobacco-feed and for holding the filled tube in position during the tucking in of the other end of said tube and for ejecting the complete cigarette, and Fig. 22 is an enlarged detail view illustrating in section the mechanism for preventing the backward or retrograde movement of the machine.

Referring to the drawings, A represents a counter-shaft on which are located the fast and loose pulleys A' and A<sup>2</sup> and the fly-wheel A<sup>3</sup>. Power is communicated from the power-shaft A by gear-wheels A<sup>4</sup> and A<sup>5</sup> to the power-shaft a of the machine, which is supported at either end by bearings a' and a<sup>2</sup> upon the bed-plate a<sup>3</sup> of the machine. On this shaft a are located all of the means for operating the various mechanisms of the machine.

The paper to be used in the formation of the cigarette is preferably wound on a reel a<sup>4</sup>, carried by a standard a<sup>5</sup>, secured upon the bed-plate a<sup>3</sup>. From this reel the strip of paper a<sup>6</sup> is guided over a roller a<sup>7</sup> to the feeding mechanism, as fully illustrated in Figs. 2, 3, and 6 of the drawings. This feeding mechanism, which serves to feed the strip of paper forward for varying lengths or distances, consists, essentially, as illustrated in Figs. 1, 2, 6, and 7, of a table b, supported by the bed-plate a<sup>3</sup>, and to which is secured

a frame b'. A block b<sup>2</sup>, carried by an arm b<sup>3</sup>, reciprocates within said frame, and the under face of this block is adapted to engage the strip of paper a<sup>6</sup>, traveling over the table b. The arm b<sup>3</sup> is pivotally secured to a bail b<sup>4</sup>, held in position by the shafts b<sup>5</sup> and b<sup>6</sup>, and guided by a rod b<sup>7</sup>, sliding in an extension a<sup>7</sup> of the bearing a' of the shaft a. This bail b<sup>4</sup> partially surrounds a drum b<sup>8</sup>, secured to the power-shaft a, in the periphery of which is arranged a cam-groove b<sup>9</sup>. The bail b<sup>4</sup> by means of a roller b<sup>17</sup>, Fig. 3, engages said cam-groove b<sup>9</sup> and is given a reciprocating movement by the cam-groove b<sup>9</sup> by the rotation of said drum. This movement is transferred to the arm b<sup>3</sup> and block b<sup>2</sup>. It is, however, necessary to raise the block from the paper a<sup>6</sup> at each completion of the forward movement and to bring the same into engagement with said paper at the beginning of the forward movement, so as to feed the same forward only. The required raising and lowering of the block b<sup>2</sup> is accomplished by a lever-arm b<sup>10</sup>, pivoted at b<sup>11</sup> (see Fig. 5) to an extension of the table b. The free end of said arm b<sup>10</sup> carries a roller b<sup>13</sup>, which by means of a spring b<sup>15</sup> is held in engagement with a cam b<sup>14</sup>, secured to the power-shaft a, while the other end is bent and engages with its forked end b<sup>16</sup> the arm b<sup>3</sup> of the block b<sup>2</sup>. By the rotation of the cam b<sup>14</sup> an up-and-down movement is imparted to the end b<sup>16</sup> of the lever-arm b<sup>10</sup>, by means of which the arm b<sup>3</sup> and block b<sup>2</sup> are raised and lowered and the block is brought into and out of engagement with the paper a<sup>6</sup>, so that the same will be fed forward only as hereinbefore described. In order to decrease or increase the forward travel of the block b<sup>2</sup>, so as to feed the paper forward for varying distances, the block b<sup>2</sup> is movable on the arm b<sup>3</sup> and is shifted thereon by the preferred mechanism illustrated in Figs. 6, 7, and 8. The block b<sup>2</sup> is provided with a slot b<sup>18</sup>, through which passes the arm b<sup>3</sup>, actuating the block. On this arm b<sup>3</sup> within the slot b<sup>18</sup> bears a bar b<sup>20</sup>, and this bar b<sup>20</sup> is held in engagement therewith by a spring b<sup>22</sup>, engaged by a screw b<sup>23</sup>, adjustable in the block b<sup>2</sup>. The pressure of the spring b<sup>22</sup> against the bar b<sup>20</sup> and the arm b<sup>3</sup> can in this manner be regulated by said screw b<sup>23</sup>. The bar b<sup>20</sup> is provided with a projection b<sup>21</sup> at either end, and the actuating-arm b<sup>3</sup> has arranged therein notches b<sup>19</sup>. When the block b<sup>2</sup> is moved backward, it abuts against the front end of the frame b' and is thus limited in its backward movement. The actuating-arm b<sup>3</sup>, however, moves farther backward and forces the block b<sup>2</sup> forward, bringing one of the projections b<sup>21</sup> of the bar b<sup>20</sup> into engagement with one of the notches b<sup>19</sup>, as indicated in dotted lines in Fig. 6, thereby locking the block to the arm b<sup>3</sup>. The block b<sup>2</sup>, which is held in engagement with the paper a<sup>6</sup> by means of the spring b<sup>15</sup>, is now moved forward and takes the paper a<sup>6</sup>, resting on the table b, along with it. This



forward movement of the block  $b^2$  is limited by the frame  $b'$ , and the block is forced backward on the actuating-arm  $b^3$ , which continues its forward movement after the block has struck the forward end of the frame  $b'$ . It will therefore be readily seen that the strip of paper  $a^6$  is fed forward a predetermined distance, which distance can be limited or increased by two adjusting-screws  $b^{26}$ , arranged in the forward end of the frame  $b'$ , against which frame the block  $b^2$  abuts. In order to hold the strip of paper  $a^6$  in position on the table  $b$ , it is passed under leaf-springs  $b^{28}$ , which are secured to a bar  $b^{29}$ , carried by the extensions  $b^{30}$  of the frame  $b'$ . As the paper is advanced on the table  $b$  by the mechanism hereinbefore described it is fed to a second table  $c$ , arranged alongside or in advance of the table  $b$ , and secured thereto by screws  $c'$ , as shown in Fig. 6. The paper is then cut by a knife  $c^2$ , operated by the mechanism illustrated in Figs. 1, 2, and 8. As shown, the knife  $c^2$  is pivoted, as at  $c^3$ , to an extension of the table  $c$ , and by means of a link  $c^4$  is pivotally connected to a rocking arm  $c^5$ , carried by a tubular rocking shaft. (Not shown, but which is of well-known construction and arrangement.) The arm or lever  $c^5$  is normally depressed by a spring  $c^7$ , and the tubular shaft is connected with a rocking arm  $c^8$ , the free end of which engages a single-throw cam  $c^9$ , arranged on the main shaft  $a$  of the machine. For each revolution of the shaft  $a$  the rocking shaft is operated by the arm  $c^8$  and elevates the rocking arm  $c^5$ , which in turn, through the link  $c^4$ , depresses the knife  $c^2$  against the tension of the spring  $c^7$ . The depression of the knife  $c^2$ , acting between the adjacent edges of the tables  $b$  and  $c$ , serves to sever the paper. The table  $c$  is provided with slots  $c^{15}$ , in which reciprocates a feeder  $c^{10}$ , carried by an arm  $c^{11}$ , secured at one end to a rocking shaft, the end of which is shown at  $c^{12}$  and which is located within the tubular rocking shaft. (Not shown.) This solid rocking shaft is operated by an arm  $c^{13}$ , which is actuated by a cam  $c^{14}$ , arranged on the main shaft  $a$ . This cam has its throw-surface so arranged with respect to the cam  $c^9$  that it will operate the feeder  $c^{10}$  after the paper has been cut. Further description and illustration of this mechanism are deemed unnecessary, as the same is well known. The feeder  $c^{10}$  shifts the cut portion of the paper  $a^6$  transversely over the table  $c$  and into engagement with a tube-forming mechanism co-operating with a tube-holder or wheel  $d$ , loosely mounted on the shaft  $a$  of the machine. This tube-holder  $d$ , as illustrated in Figs. 1, 2, 4, and 7, consists of a disk  $d'$ , provided with a flange or annulus  $d^2$ , in which openings or molds  $d^3$  are formed. The molds are slotted, as at  $d^4$ , the slot extending through the periphery of the annulus  $d^2$ . The openings  $d^3$  and slots  $d^4$  are so arranged that as the wheel rotates the slot of each opening or mold will be presented successively to the table  $c$ . For this purpose a step-by-step

movement is imparted to the tube-holder  $d$  by the following preferred mechanism: To the disk  $d'$  is secured a ring  $d^5$ , provided with notches or indentations  $d^{12}$  at its inner periphery. These notches are engaged once during a complete revolution of the main shaft  $a$  by the tooth  $d^7$  of a one-toothed wheel  $d^6$ , carried by a shaft  $d^8$ , located in a standard  $d^9$ , secured to the bed-plate  $a^3$  of the machine. The one-toothed wheel  $d^6$  is connected to a gear-wheel  $d^{10}$ , located on the shaft  $d^8$ , which meshes with a gear-wheel  $d^{11}$ , secured to the main shaft  $a$ . Motion from this shaft  $a$  is therefore transmitted to the one-toothed wheel  $d^6$ , which by means of its tooth  $d^7$  engages one of the notches  $d^{12}$ , imparting to the tube-holder  $d$  a movement which brings one of the molds  $d^3$  opposite the table  $c$ . In order to securely lock or hold the tube-holder in each given position, the space  $d^{14}$  between the two notches  $d^{12}$  in the ring  $d^5$  is curved in a radius corresponding to the radius of the periphery  $d^{15}$  of the one-toothed wheel  $d^6$ . After the tooth  $d^7$  is brought out of engagement with one of the notches the periphery  $d^{15}$  engages the space  $d^{14}$  of the ring  $d^5$ , and thus prevents the further movement of the tube-holder  $d$ , so that the same will stop with a slot  $d^4$  opposite the table  $c$  to receive the paper which is to be used in the formation of the tube. At the moment when a slot  $d^4$  is thus brought into alinement with the table  $c$  its tubular opening  $d^3$  is also brought into alinement with the tube-forming mechanism and the formation of the tube begins. This tube-forming mechanism is the same as described and shown in the Letters Patent No. 636,625, dated November 7, 1899, and consists, essentially, of a shaft  $b^5$ , to which reciprocating motion is given toward and away from the tubular openings  $d^3$  of the tube-holder  $d$  by the bail  $b^4$ . A rotary motion within successive tubular openings is given by means of a gear-wheel  $e^4$  and toothed sector  $e^5$ , secured to the drum  $b^8$ . To this shaft  $b^5$  is secured a split sleeve  $e'$ , surrounding a rod  $e^2$ , provided with a rib  $e^3$ , which, in conjunction with the sleeve  $e'$ , clamps the end of the paper fed thereto from the table  $c$ . This paper is rolled into a tube by the rotation of the sleeve  $e'$  and rod  $e^2$ , which tube after completion is released by this rod and sleeve. For this purpose the sleeve is first opened to release the paper and then both sleeve and rod are withdrawn from the tubular opening  $d^3$ , leaving the tube therein. During the operation of the tube-forming mechanism the paper is engaged by a knife  $x^3$ , as illustrated in Figs. 8, 20, and 21, the purpose of which will be hereinafter more fully explained. After the tube has thus been formed and before it is carried away by the tube-holder  $d$  it rests in the tubular opening  $d^3$ , with both ends of the tube projecting some distance beyond the faces of the annulus  $d^2$ . The next operation is to tuck in one of the projecting ends of the tube prior to its



presentation to the tobacco-filling mechanism. The tucking mechanism for both ends is the same and consists, essentially, of two parts, one to tuck in the tube from one side and the other to tuck in the same from the opposite side and to force the tucked ends inward into the tube, and so complete the tucking.

Referring now to Figs. 1, 2, 3, and 13 to 17, inclusive, upon the main shaft *a* of the machine are placed side by side two cams *f* and *g*. The cam *f* operates a wedge-shaped tucker *f'*, which tucks in or makes the first fold into the end of the paper tube from one side, while the cam *g* operates a latch-shaped tucker *g'*, which tucks or folds in the tube from the other side, which second fold overlaps the first fold, and both folds are then pressed inward by the tucker *g'*. The tucker *f'* is normally held away from the face of the annulus *d*<sup>2</sup> of the tube-holder *d* by means of the cam *f* as long as a roller *f*<sup>4</sup> is in engagement therewith. This roller is secured to a slide *f*<sup>5</sup>, having a range of longitudinal movement within a standard *f*<sup>6</sup>, secured to the bed-plate *a*<sup>3</sup> of the machine. To the slide *f*<sup>5</sup> is fastened a plate carrying at its end an obliquely-arranged block *f*<sup>15</sup>, engaging a correspondingly-arranged slot *f*<sup>16</sup> within a cover-plate *f*<sup>9</sup>, to which the tucker or wedge *f'* is secured. A spring *f*<sup>8</sup>, secured at one end to an arm *f*<sup>7</sup> of the slide *f*<sup>5</sup> and the other end to a bracket *f*<sup>17</sup>, which is removably secured to the standard *f*<sup>6</sup>, tends to hold the roller *f*<sup>4</sup> always in engagement with the cam *f*. The cover-plate outside the oblique slot *f*<sup>16</sup> is also provided with two right-angular-shaped slots *f*<sup>10</sup>, engaged by bolts *f*<sup>13</sup>, secured to bars *f*<sup>14</sup>, fixed to the upper portion of the standard *f*<sup>6</sup> and guiding the block-plate *f*<sup>15</sup>. When the bolts *f*<sup>13</sup> occupy the portion *f*<sup>11</sup> of the slot *f*<sup>10</sup>, the wedge *f'* will be withdrawn from the face of the annulus of the tube-holder *d* as long as the roller *f*<sup>4</sup> engages the periphery *f*<sup>2</sup> of the cam *f*. The portion *f*<sup>11</sup> of the slot *f*<sup>10</sup> serves to guide the cover-plate *f*<sup>9</sup>, and thereby the wedge or tucker *f'*, in a line at a right angle to the standard *f*<sup>6</sup>, while the other portion *f*<sup>12</sup> of the slots *f*<sup>10</sup> serves to guide said plate and tucker *f'* in a line parallel to said standard. The oblique slot *f*<sup>16</sup>, however, serves, by means of the block-plate *f*<sup>15</sup> and slide *f*<sup>5</sup>, to actuate the plate *f*<sup>9</sup> and tucker *f'* first from right to left and then from left to right. When the roller *f*<sup>4</sup> in the rotation of the cam *f* reaches the throw *f*<sup>19</sup> of the same, the slide *f*<sup>5</sup> is moved toward the cam *f* and the plate *f*<sup>9</sup>, and tucker *f'* is moved toward the face of the annulus by means of the oblique slot *f*<sup>16</sup> until the bolts or pins *f*<sup>13</sup> reach the end of the portion *f*<sup>11</sup> of the slots *f*<sup>10</sup>, by which time the tucker *f'* has reached a position in front of the projecting end of the paper tube and in close proximity to the face of said annulus of the tube-holder *d*. The further movement of the plate *f*<sup>9</sup> and tucker *f'* toward the cam *f* forces the pins or bolts *f*<sup>13</sup> into the portions *f*<sup>12</sup> of the slots *f*<sup>10</sup>, and the tucker now moves

forwardly in a direction parallel to the face of the annulus and is brought into engagement with the projecting end of the paper tube and folds or tucks the same inward. As soon as the tucker *f'* has completed the tucking of one side of the paper tube it then begins its return movement. The slide *f*<sup>5</sup>, plate *f*<sup>9</sup>, and tucker *f'* are now moved backward away from the cam *f*, while the latch-like tucker *g'*, having been idle, is now moved forward, following the tucker *f'*. The forward movement of the tucker *g'* is accomplished by the throw *g*<sup>2</sup> of the cam *g* being brought in its rotation into engagement with a roller *g*<sup>3</sup>, secured to a slide *g*<sup>4</sup>. This slide *g*<sup>4</sup> is carried by the standard *f*<sup>6</sup> and arranged alongside of the slide *f*<sup>5</sup> and below the cover-plate *f*<sup>9</sup>. The slide *g*<sup>4</sup> is provided with a lateral projecting arm *g*<sup>5</sup>, to which is pivotally secured the latch-like tucker *g'*. A spring *g*<sup>8</sup> normally tends to hold the roller *g*<sup>3</sup> in engagement with the cam *g*, which spring at one end is secured to an arm *g*<sup>7</sup> of the slide *g*<sup>4</sup> and at its other end to the bracket *f*<sup>17</sup>. The tucker *g'* is provided with a curved extension *g*<sup>9</sup>, in which a similar-shaped slot *g*<sup>10</sup> is formed. This slot is engaged by a pin or bolt *g*<sup>11</sup> of an arm *g*<sup>12</sup>, secured to the standard *f*<sup>6</sup> in such manner that when the tucker *g'* is moved forward it will first operate in a straight line and then swing sidewise. During the forward movement of the tucker the same is brought into engagement with the projecting end of the paper tube and folds in the same from the opposite side thereof, so that this second fold overlaps the first fold. After this second fold is completed both tucked portions of the paper tube are forced inward by the tucker *g'*, and in this manner the tube at one end is securely closed, said closed end assuming the shape as illustrated in Fig. 17 of the drawings, and is now ready for the reception of a charge of tobacco. The tucker *g'* is now brought back to its normal position when the throw portion *g*<sup>2</sup> of the cam *g* has passed under the roller *g*<sup>3</sup>. The tube so tucked is next transferred by the tube-holder to the opposite side of the machine, where the tobacco is fed, measured, compressed, and forced into the tube. Preferably loose granulated tobacco is used for a filler, containing a certain percentage of moisture.

As shown in Fig. 1 of the drawings, the wedge-shaped tucker *f'* is located adjacent to the table *c*, over which the paper *a*<sup>6</sup>, previously cut from a strip of paper, is fed into the tube-holder *d*, as hereinbefore fully described. As the paper has to project some distance beyond the face of the annulus *d*<sup>2</sup> of the tube-holder *d*, said paper is wider than the table *c*. By withdrawing the wedge-shaped tucker *f'* from the face of the annulus *d*<sup>2</sup> by a lateral movement the same is held out of the path of travel of the paper *a*<sup>6</sup>, fed to the tube-holder *d*, and is thus prevented from interfering with the proper feeding of the same.



After the paper has been formed into a tube, as described, and has been removed from the path of lateral movement of the tucker  $f'$  the projecting end of the paper tube is tucked or folded by the same—that is to say, by first moving the tucker toward the annulus  $d^2$  and bringing the same into alinement with the face thereof in front of the projecting end of the tube, as shown in dotted lines in Fig. 16, and then moving the tucker in a forward direction.

As illustrated in Figs. 1 to 5 and 9 to 12 and 20 and 21, inclusive, the tobacco-feeding device is carried by a standard  $h$ , supported upon the bed-plate  $a^3$  of the machine, at the top of which standard a hopper  $m$ , containing a tobacco-agitating device, is located, as will be presently more fully described. In order to fill the paper tube with tobacco, the same must first be clamped with its open end to a ferrule  $i$ , carried by the standard  $h$  and communicating with the tobacco-feeding device. For this purpose the paper tube must be shifted forward toward the ferrule  $i$  until its open end engages the end of the ferrule projecting from the standard  $h$ . The mechanism for shifting the paper tube forward consists, as shown in Figs. 1, 3, and 21, of a rod  $k$ , sliding within a bracket  $k^6$ , supported by the bed-plate  $a^3$  and within which is mounted a spring  $k^7$ , surrounding the rod  $k$ . This spring bears at one end against the bracket  $k^6$  and at its opposite end against an arm  $l$ , fixed to the rod  $k$ , and normally tends to shift the rod  $k$  and paper tube toward the tobacco-feeding device. The rod  $k$  is normally retracted by a lever  $k^2$ , engaging a pin  $k'$  of the same with its forked end  $k^4$ , the lever being pivoted at the point  $k^5$  and being provided at its free end with a roller  $k^3$ , engaging a cam  $k^9$ , located on the main shaft  $a$  of the machine. During the rotation of the cam the rod  $k$  with its end  $k^8$  is allowed to shift the paper tube forward and is held opposite thereto in the tube-holder until the open end of the tube surrounds the ferrule  $i$ , as fully illustrated in Fig. 21. As soon as the tube engages the ferrule  $i$  the same is clamped thereto by means of the arms  $i'$  and  $i^2$ , pivotally secured by the screws  $i^2$  and  $i^3$  to the standard  $h$ , as shown in Fig. 20. The arms  $i'$  and  $i^2$  are provided with jaws  $i^4$  and  $i^5$ , which are normally brought into engagement with the ferrule  $i$  by a spring  $i^7$ , secured to pins or bolts  $i^8$  of the arms  $i'$  and  $i^2$ , but are held separated from said ferrule  $i$  by a bolt  $i^{12}$  of a lever  $i^9$  when the same is brought out of engagement with the indentations  $i^6$ , arranged in the arms  $i'$  and  $i^2$ . The lever  $i^9$ , pivotally secured, as at  $i^{11}$ , to the standard  $h$ , carries a roller  $i^{10}$ , engaging a cam  $i^{13}$ , secured to the main shaft  $a$ . This cam is provided with a single throw  $i^{14}$ , which allows the bolt  $i^{12}$  to engage the indentations  $i^6$  of the arms  $i'$  and  $i^2$  to permit the jaws  $i^4$  and  $i^5$  to close and clamp the paper tube to the ferrule  $i$ . This tube is now held in proper position to receive the tobacco filling and is

after completion of the filling released from the ferrule by the cam  $i^{13}$ . In case the tube is not filled with tobacco the arm  $l$ , secured to the rod  $k$  and engaging the paper tube with its bent end  $l'$  in the manner illustrated in Fig. 21, will by the return movement of the rod  $k$  withdraw the empty tube and disengage the same from the ferrule  $i$ . The tube is thus shifted backward and prevented from projecting too far beyond the tube-holder, which would result in the tearing of the same by the second tucker. It will, however, be tucked by the second tucker to permit the ejector-rod  $w$  to force the empty tube from the carrier  $d$ , and thus prevent clogging of said carrier.

With special reference to Figs. 1, 2, 4, 5, and 9 the hopper  $m$ , in which the tobacco is placed, is provided at its lower end with a shaft  $m'$ , having arms  $m^2$ , adapted to loosen or agitate the tobacco, so that the same will be uniformly fed through an opening  $m^3$  into a tobacco-measuring mechanism. Motion is imparted to the shaft  $m'$  and arms  $m^2$  from the main shaft  $a$  by means of the sprocket-wheels  $m^4$  and  $m^5$  and sprocket-chain  $m^6$ . The chain, as shown in Fig. 5, is preferably guided over a roller  $m^7$ , carried by a bracket  $b^{20}$ , in order to clear certain mechanisms of the machine.

Referring to Figs. 9 to 12, inclusive, the opening  $m^3$  of the hopper  $m$  is normally closed by a knife  $n$ , which is secured to a frame  $n'$ , clamped to a reciprocating block  $o$  by means of a bar  $n^2$ , which engages a groove  $o'$  in the block  $o$  and similar grooves in the lips  $o^{10}$ , projecting from said block  $o$ . The bar  $n^2$  is pivotally connected with the frame  $n'$  at one end by a screw or bolt  $n^3$ , while the other end of the bar carries a button  $n^4$ , by means of which the bar  $n^2$  can be lifted at one end and brought out of engagement with the groove  $o'$  of the block when the knife is to be thrown out of action. The tobacco feed is then cut off, as the opening  $m^3$  of the hopper is closed by said knife  $n$ . This instantaneous cutting off of the tobacco feed by simply disengaging the frame  $n'$  from the block  $o$  is important in instances when the filling of the paper tubes is to be stopped or the feeding of the tobacco to the same is irregular. Below the knife  $n$  and within the frame  $n'$  is located a second frame  $b$ , which, however, is not connected with the reciprocating block  $o$ , but is fixed and adjustably secured to the hopper  $m$  by means of an adjusting-screw  $p^3$ , engaging the part  $p'$  of the frame  $p$ . The bar-like portion  $p^2$  of the said frame rests directly below the knife  $n$  and forms, in conjunction with the extension  $m^8$  of the hopper, a chamber  $p^4$ , adapted to receive the tobacco coming from the hopper  $m$  through its opening  $m^3$ . This chamber  $p^4$  can be readily increased or decreased in size by simply turning the adjusting-screw  $p^3$  which shifts the frame  $p$  and the bar  $p^2$  away from or toward the extension  $m^8$  of the hop-



per  $m$ , so forming a tobacco-measuring device, by means of which the amount of tobacco to be fed to the paper tube can be accurately determined. The tobacco, however, can only be fed to the chamber  $p^4$  when the reciprocating block  $o$  and knife  $n$  are moved toward the left in Fig. 9, in which instance the chamber  $p^4$  is opened at its upper end by the knife  $n$  and closed at its lower end by the block  $o$ . The tobacco will fall into the measuring-chamber and fill the same and be fed into a compressing-chamber  $h^4$  as soon as the block  $o$  occupies the position shown in Fig. 9, in which position the opening  $m^3$  from the hopper  $m$  into the measuring-chamber  $p^4$  will be closed. As soon as the tobacco leaves the measuring-chamber  $p^4$  a certain portion thereof strikes in its fall a rib  $o^2$ , projecting from the reciprocating block  $o$ , and on account of the oblique position of said rib a greater amount of tobacco is conducted to the forward portion of the chamber  $h^4$  for a purpose to be presently described. The block  $o$  is guided between a table  $h'$ , integral with the standard  $h$ , and the projection  $m^8$  of the hopper  $m$  and receives its reciprocating movement from a cam-groove  $o^7$ , provided in a disk  $o^6$ , secured to the main shaft  $a$  of the machine. In this cam-groove  $o^7$  travels a roller  $o^5$ , carried by a link  $o^4$ , connected to a projecting arm  $o^3$  of the block  $o$ . The table  $h'$  is provided with an indentation  $h^3$ , within which an ejector-rod  $r$  is adapted to slide, which, however, during the feed of tobacco to the table  $h'$  is withdrawn therefrom. Directly above the indentation  $h^3$  and within the chamber  $h^4$  is arranged a tobacco-compressing slide  $s$ , provided at its lower face with a semicircular groove  $s'$ , which, in conjunction with the semicircular groove  $h^3$ , forms a more or less circular opening when the slide  $s$  is lowered. The mechanism reciprocating said compressing-slide  $s$  in a vertical plane consists, preferably, of a slide  $s^2$ , having a range of movement within the standard  $h$  and is pivotally connected at its lower end to a link  $s^4$ , which in turn is movably connected to a standard  $s^7$ , as at  $s^5$ , which standard is secured to the bed-plate  $a^3$  of the machine. A roller  $s^6$ , carried by said link  $s^4$ , intermediate of its ends engages a cam-groove  $s^3$ , arranged in the disk  $o^6$ , which groove in the rotation of said disk imparts to both slides  $s$  and  $s^2$  a reciprocatory movement. The slides are connected with each other by a bolt  $s^9$ , the head  $s^{10}$  of which freely turns in the compressing-slide  $s$ , while the threaded portion of said bolt passes through a bushing  $s^{12}$ , integral with a disk  $s^{11}$ . This bushing is located within an elongated opening  $s^{14}$ , arranged in the actuating-slide  $s^2$ , and both slides are clamped together by the bolt  $s^9$  and a nut  $s^{13}$ , bearing against the disk  $s^{11}$  of the bushing  $s^{12}$ , as will be readily understood in connection with Fig. 9 of the drawings. The bolt  $s^9$  is eccentrically located in the bushing  $s^{12}$ , which bushing engages the elongated slot  $s^{14}$  in the slide

$s^2$ , as illustrated in dotted lines in Fig. 10. It follows, therefore, that when said bushing is turned within said slot the tobacco-compressing slide  $a$  is correspondingly raised or lowered within the compressing-chamber  $h^4$  and will in its downward movement more or less deeply engage the groove  $h^3$ . The tobacco which has been fed into the compression-chamber  $h^4$  and is resting on the table  $h'$  is moved into the groove  $h^3$  and in the space below the compressing-slide  $s$  by the forward movement of the block  $o$ , whereby a greater portion of the same, owing to the rib  $o^2$ , has been conducted to the forward end of the groove  $h^3$ . After the block  $o$  has reached a position in close proximity to the slide  $s$ , in which position the tobacco fills the groove  $h^3$  and a space below the slide  $s$ , the slide  $s$  is now operated and compresses the tobacco in its downward movement toward the groove  $h^3$ . By this compression the tobacco is brought into a shape in which the same can be readily received by the paper tube, which has been clamped to the ferrule  $i$ , communicating with the groove  $h^3$ , as shown in Fig. 21 of the drawings. With reference to the foregoing description it will be understood that by raising or lowering the compression-slide  $s$  with respect to the operating-slide  $s^2$  by means of the bushing  $s^{12}$  the degree of compression of the tobacco can be readily regulated. This feature is important, since, due to an incomplete or too great a compression, the tobacco will either be too loose or too hard and will therefore not be in proper condition for the ejection of the same, which would naturally tend to further compress the tobacco. By having a greater amount of tobacco fed toward the ferrule  $i$  the tobacco at this point will be in a greater state of compression than that occupying the opposite end of the groove  $h^3$ . This irregular compression will, however, be compensated for and equalized when the compressed tobacco is ejected from the compression-chamber by the plunger-rod  $r$  entering the chamber opposite the ferrule  $i$ . This rod  $r$  by abutting against the tobacco in its forward movement toward the tube-holder will compress this end of the tobacco, and so make the compression of the same uniform throughout its length. The compressed tobacco is now fed into the paper tube by said plunger-rod  $r$  in the usual or well-known manner.

With special reference to Figs. 1 and 3 of the drawings the plunger-rod  $r$  is secured to a slide  $r'$  of a bracket  $r^4$ , bolted to the bail  $b^4$ . As previously described, to the bail  $b^4$  is imparted a reciprocatory movement by means of the roller  $b^{17}$  and cam-groove  $b^9$ , arranged in the drum  $b^8$ . The forward movement imparted to the plunger-rod  $r$  is, however, not sufficient to shift the tobacco the proper distance forward. In order to complete the forward movement of the plunger-rod  $r$  after the same has been shifted by the cam-groove  $b^9$ , the drum  $b^8$  is provided with an auxiliary cam  $b^{18}$ , which



when the roller  $b^{17}$  has reached the straight portion of the cam-groove  $b^8$  engages a roller  $r^3$ , secured to a slide  $r'$ , to which the plunger-rod  $r$  is fastened, and imparts to the same the necessary end movement, and so completes the forward movement of the plunger-rod  $r$ . This forward movement at intervals has the beneficial result that the tobacco which might cling to the plunger-rod  $r$  during the ejection thereof is loosened therefrom and is so prevented from being drawn back into the compression-chamber  $h^4$ . To guide the slide  $r'$  properly within the bracket  $r^4$ , a second rod  $r^3$  is secured to the same. The springs  $r^5$  and  $r^6$ , arranged on the rod  $r^3$ , and plunger-rod  $r$  retract this plunger-rod to its normal position as soon as the auxiliary cam  $b^{18}$  has passed the roller  $r^2$  of the slide  $r'$ , as will be readily understood in connection with Fig. 3 of the drawings. The standard  $h$  carries a receptacle  $t$ , in which preferably cotton-waste  $t'$  is placed and through which the plunger-rod  $r$  passes. The object of this cotton-waste is to keep the plunger-rod clean and to remove therefrom any particles of tobacco which might adhere thereto.

In order to prevent displacement of the filled paper tube within the tube-holder through the plunger-rod  $r$  when the same withdraws from the paper tube, a clamp  $u$  is provided which engages the filled paper tube and holds the same in position. The clamp  $u$ , as shown in Figs. 1 and 21, is pivotally secured, as at  $u^5$ , to a plate  $k^{10}$  of the bracket  $k^6$  and is normally held out of engagement with the paper tube by means of a spring  $u^2$  pressing the arm  $u'$  thereof against a screw or bolt  $u^3$ , secured to the plate  $k^{10}$ . As soon as the arm  $l$ , carried by the rod  $k$ , is withdrawn from the ferrule  $i$ , as hereinbefore fully described, the same engages the arm  $u'$  and brings the clamp  $u$  into engagement with the filled paper tube. After this tube has been filled with tobacco, the tube-holder  $d$  is advanced a step to bring the open end opposite the tucking-wedge and tucking-latch, which are operated in the same manner as the wedge and latch which tucked the other end of the tube prior to its being filled. A further description of the tucking operation and the tucking mechanism is therefore deemed unnecessary. In order to tuck in the open end of the paper tube, it is necessary, however, to shift the tube slightly forward in the tube-holder  $d$ , so as to bring this end of the tube into proper location with respect to the tucking mechanism. This shifting is accomplished by a spring-controlled rod  $v$ , operated by a lever  $v'$ , and a cam  $v^2$ , located on the main shaft  $a$ . After the cigarette has thus been completed it is ejected from the tube-holder by means of a rod  $w$ , secured to the bail  $b^4$  and carried by the bracket  $b^{20}$  and caused by the reciprocation of said bail  $h$  to traverse the tube-holder, as shown in Figs. 3 and 21 of the drawings.

The preferred mechanism to automatically

stop the machine in case of the paper not being fed to the tube-holder  $d$ , owing to the improper working of the feeding device or the paper being torn, is illustrated in Figs. 18 and 19 and consists of the following mechanism: As hereinbefore described, during the feeding of the paper from the table  $c$  into the tube-holder  $d$  the same is engaged by a knife  $x^3$ , carried by a lever  $x$ , pivotally secured, as at  $x'$ , to a bracket  $x^{19}$  of the standard  $h$ . The lever  $x$  intermediate of its ends is provided with a roller  $x^2$ , normally engaging by the intervention of a spring  $x^5$  a single-throw cam  $x^{21}$  on the main shaft  $a$ . This spring  $x^5$  is secured at one end to an arm  $x^4$  of the lever  $x$  and at the other end to the table  $c$ . As soon as the roller  $x^2$  comes into engagement with the cam portion  $x^{22}$  of the cam  $x^{21}$  during rotation of the same the spring  $x^5$  tends to lift the end of the lever  $x$  carrying the knife  $x^3$ , which, however, is limited in its upward movement by the paper crossing the space between the table  $c$  and the tube-holder  $d$ . If, however, the paper does not obstruct the path of the knife  $x^3$ , the lever  $x$  will further ascend and bring a pawl  $x^8$ , supported by a pin  $x^7$ , engaging a slot of the pawl, into engagement with the teeth  $x^{24}$ , arranged in the periphery of a disk  $x^{23}$ , located on the main shaft  $a$ . These teeth in the rotation of the disk  $x^{23}$  will shift the pawl  $x^8$  and a slide  $x^9$ , joined thereto, backward and operate a bell-crank lever  $x^{10}$ , connected by a chain  $x^{11}$  (see Fig. 1) to a belt-shifter  $x^{12}$ , engaging a belt. (Not shown.) The belt by the movement of the belt-shifter is shifted from the fixed pulley  $A'$  to the loose pulley  $A^2$ , and the machine is brought to a standstill. In order to lock the slide  $x^9$ , which is carried by the bracket  $x^{19}$ , into an operative position, the slide is provided with a groove  $x^{14}$ , into which by means of a spring  $x^{18}$  the end  $x^{16}$  of a latch  $x^{15}$  is forced as soon as the slide is shifted.

The preferred mechanism to prevent retrograde movement of the machine is illustrated in Figs. 1 and 22 of the drawings. For this purpose the gear-wheel  $A^4$  is loosely mounted on the shaft  $A$  and is provided with lateral projecting teeth  $y'$ , engaging the teeth  $y^3$  of a sleeve  $y^2$ , which is fixed to the shaft  $A$ , yet slidable thereon. As shown in Fig. 22, within the shaft  $A$  is arranged a spring  $y^4$ , connected to a bolt  $y^5$  of the sleeve  $y^2$ , normally tending to hold the sleeve with its teeth in engagement with the teeth  $y'$  of the gear-wheel  $A^4$ . As long as a movement in the proper direction is imparted to the shaft  $A$  this movement by the gear-wheel  $A^4$  will be transmitted to the gear-wheel  $A^5$  and main driving-shaft  $a$ . If, however, the shaft  $A$  is turned backward, the wheel  $A^4$  will be disengaged from the sleeve  $y^2$  and the machine brought to a standstill.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is —

1. In a cigarette-machine, a paper-feeding



mechanism, comprising a table over which the paper is adapted to travel, a block, an arm, means for holding said block in frictional contact with said arm, means for reciprocating said arm and block in a horizontal plane on and above said table, and means for limiting the reciprocatory movement of said block, substantially as and for the purposes described.

2. In a cigarette-machine, a paper-feeding mechanism, comprising a block, an arm controlling said block, means for raising and lowering said arm, means for reciprocating the arm and block in a horizontal plane, and means for holding the block in frictional engagement with said arm, substantially as and for the purposes described.

3. In a cigarette-machine, a paper-feeding mechanism, comprising a table over which the paper is adapted to travel, a frame secured to said table, a block arranged within the frame, an arm adapted to raise and lower and to reciprocate said block in a horizontal plane within said frame, said frame being adapted to limit the reciprocatory movement of said block and to shift the same on said arm, substantially as and for the purposes described.

4. In a cigarette-machine, a paper-feeding mechanism, comprising a table over which the paper is adapted to be fed, a frame secured to said table, a block, an arm adapted to raise and lower and to reciprocate said block in a horizontal plane within said frame, and adjustable means carried by said frame and adapted to limit and regulate the forward movement of said block in said frame, substantially as and for the purposes described.

5. In a cigarette-machine, a paper-feeding mechanism, comprising a block, an arm adapted to raise and lower and to reciprocate said block, a bar carried by said block adjacent to said arm, a spring resting on said bar, and a screw adjustable in said block, said screw being adapted to regulate the frictional contact of said bar with said arm and to allow the shifting of said block on said arm, substantially as and for the purposes described.

6. In a cigarette-machine, a paper-feeding mechanism, comprising a block, an arm having notches and adapted to raise and lower and to reciprocate said block, a bar carried by said block having projections at either end and resting on said arm, a spring adapted to depress said bar into engagement with said arm, an adjusting-screw adapted to engage said spring, a table, and a frame secured to said table and within which said block is adapted to reciprocate, said frame constituting a means for shifting said block on said arm so as to bring one of the projections of said bar into engagement with one of the notches of said arm at the backward movement of said block and to disengage the same at the completion of the forward movement of said block, substantially as and for the purposes described.

7. In a cigarette-machine, a paper-feeding

mechanism, comprising a table over which the paper is adapted to travel, a block, an arm adapted to raise and lower said block and to reciprocate the same in a horizontal plane to thereby bring at intervals said block into and out of engagement with the paper and to shift the paper in one direction only, a frame within which said block travels and beneath which the paper is fed, and adjusting-screws located in the frame and adapted to limit the reciprocatory movement of said block and to vary the travel of said block to feed the paper forward for varying lengths, substantially as and for the purposes described.

8. In a cigarette-machine in combination with a tube-holder and tube-forming mechanism, a paper-feeding mechanism, comprising a table, a second table arranged adjacent thereto and over both of which tables the paper is adapted to travel, a block adapted to feed the paper forward from one table to the other, a knife adapted to oscillate between said tables and to sever the paper thereon, and means adapted to shift the severed portion of said paper transversely over the second table into said tube-holder and into engagement with said tube-forming mechanism, substantially as and for the purposes described.

9. In a cigarette-machine, a tube-holder, comprising a disk carrying a projecting rim or annulus, openings or molds arranged in said annulus, said molds being slotted through the periphery of the annulus, a ring secured to said disk, a continuously-rotating power-shaft upon which the disk is loosely supported, means controlled by said power-shaft to engage said ring and to transmit to the same and the disk an intermittent motion and to lock the ring and disk after each intermittent movement, substantially as and for the purposes described.

10. In a cigarette-machine, a tube-holder, comprising a disk having a laterally-projecting rim or annulus, molds arranged in said rim and provided with slots traversing the annulus, a ring secured to said disk and having alternate notches and curved portions, a continuously-rotating power-shaft loosely supporting said tube-holder, and means controlled by said shaft adapted alternately to engage said notches and curved portions to impart to the ring and tube-holder an intermittent motion and to lock the same after each successive movement, substantially as and for the purposes described.

11. In a cigarette-machine, a tube holder or carrier, comprising a disk and a projecting rim or annulus integral therewith, slotted molds formed in said rim or annulus, a ring carried by said disk and having alternate notched and curved portions at its inner edge, said curved portions being of a radius less than the radius of said disk, a wheel having a tooth adapted to engage the notches and having its periphery intermittently in engagement with the curved portions of said



ring, substantially as and for the purposes described.

12. In a cigarette-machine, a tube holder or carrier, comprising a disk carrying an annulus in which the slotted molds are formed, a continuously - rotating power - shaft upon which said disk and annulus are loosely supported, a ring carried by said disk and having notches in its interior periphery and curved portions between said notches, a single-toothed wheel of a radius corresponding to the radius of the curved portions of said ring, a gear-wheel adapted to travel with said single-toothed wheel, a shaft carrying both of said wheels and a gear-wheel secured to said power-shaft and meshing with the gear-wheel secured to said single-toothed wheel so as to transmit the motion of the power-shaft to said single-toothed wheel and to cause the same to engage with its tooth the notches of said ring and to change the rotary movement of said power-shaft into an intermittent movement of the tube-holder, substantially as and for the purposes described.

13. In a cigarette-machine, a tube holder or carrier comprising a disk and a projecting rim or annulus in which the slotted molds are formed, a ring having alternate notched and curved portions and secured to said disk, a continuously-rotating power-shaft upon which the tube-holder is loosely supported, a shaft arranged below said power-shaft, a single-toothed wheel carried by said shaft and alternately engaging with its tooth the notches and with its periphery the curved portions of said ring, gear-wheels connecting the power-shaft and toothed-wheel shaft so as to transmit the rotary movement of said power-shaft to said single-toothed wheel and to impart through the same to the ring and tube-holder a step-by-step movement and to lock the same and the tube-holder against movement, substantially as and for the purposes described.

14. In a cigarette-machine, a mechanism for tucking in the end of a paper tube, comprising a wedge and a latch, means for imparting to said wedge a lateral and forward movement independent of the latch and means adapted to reciprocate said latch and oscillate the same independently of the wedge, substantially as and for the purposes described.

15. In a cigarette-machine, a tucking mechanism, comprising a wedge, a plate supporting said wedge and means adapted to move said plate and wedge both laterally and forwardly, substantially as and for the purposes described.

16. In a cigarette-machine, a tucking mechanism, comprising a wedge, a plate supporting said wedge and having an oblique slot, a horizontally-reciprocating slide adapted to engage the oblique slot of said plate and to impart to said plate and wedge reciprocatory and lateral movements in succession, substantially as and for the purposes described.

17. In a cigarette-machine, a tucking mechanism, comprising a wedge, a plate support-

ing said wedge having an oblique slot and angular-shaped slots arranged therein, a horizontally-reciprocating slide adapted to engage said oblique slot, a standard, bolts carried by said standard adapted to engage said angular slots, said angular slots being arranged so that when a reciprocatory movement is imparted to said plate by said slide the plate and wedge are first moved laterally and then forward, substantially as and for the purposes described.

18. In a cigarette-machine, a tube shifting and clamping mechanism, comprising a rod adapted to engage the tube at one end, an arm carried by said rod adapted to engage the paper tube at the opposite end, and means adapted to reciprocate said rod, arm and tube, substantially as and for the purposes described.

19. In a cigarette-machine, a tube shifting and clamping mechanism comprising a rod adapted to engage the tube at one end, an arm adapted to engage the tube at the other end, a ferrule, a spring normally tending to shift said rod, arm and tube until the tube and arm are in engagement with said ferrule, and means adapted to retract said rod and arm and to bring said paper tube out of engagement with said ferrule, substantially as and for the purposes described.

20. In a cigarette-machine, a tube shifting and clamping mechanism, comprising a rod having an arm, said rod and arm adapted to engage a tube at opposite ends, a housing within which said rod and arm are adapted to reciprocate, and a clamp carried by said housing and adapted to be controlled by said arm so as to engage said tube, substantially as and for the purposes described.

21. In a cigarette-machine, a combined tube shifting and clamping mechanism, comprising a rod carrying an arm, said rod and arm adapted to engage a tube at opposite ends, a housing within which said rod and arm are adapted to slide, a clamp carried by said housing, means adapted to normally hold said clamp out of engagement with said tube, and means adapted to bring said clamp into engagement with said tube, substantially as and for the purposes described.

22. In a cigarette-machine, a combined tube shifting and clamping mechanism, comprising a rod and an arm adapted to engage a tube at opposite ends, a tube-holder, a housing within which said rod and arm are adapted to slide, a clamp carried by said housing and having an engagement with said arm, a spring normally tending to hold said clamp out of engagement with the paper tube in said tube-holder, a ferrule, a spring adapted to shift the arm and tube into engagement with the ferrule, and means adapted to retract said rod and arm to thereby disengage said tube from said ferrule and bring said arm into engagement with said clamp and to move the clamp into engagement with said tube, whereby the tube is held against dis-



placement in said tube-holder, substantially as and for the purposes described.

23. In a cigarette-machine, a clamping mechanism, comprising two pivoted arms each having a jaw, a ferrule, means normally tending to close said jaws to bring the same into engagement with said ferrule, and means adapted to open said jaws and to disengage the same from said ferrule, substantially as and for the purposes described.

24. In a cigarette-machine, a clamping mechanism, comprising two arms each provided with a jaw and an indentation or groove, a ferrule adapted to receive the end of a paper tube, a spring normally tending to move the arms toward each other to bring the jaws into engagement with the paper tube so as to clamp said tube to said ferrule, a bolt normally tending in conjunction with the indentations or grooves to open said arms and to disengage the same from the ferrule and tube, and means adapted to alternately bring said bolt into and out of engagement with said indentations or grooves, substantially as and for the purposes described.

25. In a cigarette-machine, a combined tobacco feeding and compressing mechanism, comprising a chamber, a block forming one side of the chamber and having an obliquely-projecting rib, a slide arranged in said chamber opposite said block, a hopper adapted to contain tobacco located above said block and slide, an outlet-opening arranged in said hopper adapted to feed the tobacco partially to said projecting rib and in part directly to the chamber, and means controlled by the power-shaft of the machine adapted to reciprocate said block and slide within said chamber, substantially as and for the purposes described.

26. In a cigarette-machine, a combined tobacco feeding and compressing mechanism, comprising a chamber, a block at one side of the chamber having an obliquely-projecting rib, a slide arranged opposite said block in said chamber, a groove arranged in the bottom of said chamber, a hopper adapted to contain tobacco and located above said block and slide, an outlet-opening arranged in said hopper adapted to feed tobacco in part directly to said chamber and partially on the projecting rib, said rib being adapted to guide the greater quantity of tobacco toward the front of said chamber, substantially as and for the purposes described.

27. In a cigarette-machine, a combined tobacco feeding and compressing mechanism, comprising a block having a projecting rib located in a chamber, a slide arranged opposite said block in said chamber and having a groove, a groove arranged in the bottom of said chamber below said slide, a hopper adapted to contain tobacco and to feed the same to said chamber and to said rib, said block being adapted to shift said tobacco in said chamber toward and into said groove, and said slide adapted to compress the to-

bacco shifted into said groove, substantially as and for the purposes described.

28. In a cigarette-machine, a combined tobacco feeding and compressing mechanism, comprising a block having a projecting rib located in a chamber, a slide arranged in said chamber having a groove, a groove arranged in the bottom of said chamber opposite said slide, a hopper located above the chamber and adapted to feed tobacco to the same, means adapted to reciprocate said block and slide within said chamber to shift the tobacco into said groove and to compress the same therein, and means adapted to regulate the degree of compression imparted to the tobacco in said groove, substantially as and for the purposes described.

29. In a cigarette-machine, a combined tobacco-compressing mechanism, comprising a tobacco feeding and compressing chamber, a slide arranged within said chamber, a second slide arranged outside of said chamber and adapted to actuate said first slide, and means adapted to clamp the same together and to adjust their position with respect to each other, substantially as and for the purposes described.

30. In a cigarette-machine, a combined tobacco-compressing mechanism, comprising a slide located in a chamber and adapted to compress tobacco fed thereto, an opening arranged in said compressing-slide, a bolt engaging the opening in said compressing-slide, a slide adapted to actuate said compression-slide having an elongated opening, a bushing engaging said elongated opening in said actuating-slide and having an eccentrically-arranged opening through which said bolt passes, said bushing adapted when turned in the elongated opening to adjust said bolt and said compression-slide in a vertical plane with respect to the actuating-slide to regulate the degree of compression imparted to the tobacco by said compression-slide, substantially as and for the purposes described.

31. In a cigarette-machine, a combined tobacco-ejecting mechanism, comprising a plunger-rod, a chamber, a compression-slide adapted to hold tobacco under compression therein, in combination with a ferrule registering with the compressed tobacco in said chamber, a holder adapted to present a tube to said ferrule, arms adapted to clamp the end of said tube to said ferrule, and means adapted to impart to said plunger-rod, a reciprocatory and step-by-step movement to eject said tobacco from said chamber into said paper tube, substantially as and for the purposes described.

32. In a cigarette-machine, a combined tobacco-ejecting mechanism, comprising a plunger-rod, a chamber, a compression-slide adapted to hold the tobacco under compression therein in a position in alignment with the plunger-rod, in combination with a ferrule carried by the housing of said chamber and arranged in alignment with said tobacco, a



5 tube-holder adapted to present a paper tube  
to said ferrule, arms adapted to clamp the  
end of the paper tube to said ferrule, a bail,  
loosely supporting said plunger-rod, a bracket  
carried by said bail, having a slide to which  
said plunger-rod is fastened, a drum adapted  
to impart to said bail and plunger-rod a for-  
ward movement and an auxiliary cam se-  
cured to said drum adapted to impart to said  
10 slide and plunger-rod a movement at the com-

pletion of the forward movement of the plun-  
ger-rod by said drum, substantially as and for  
the purposes described.

In testimony whereof I have hereunto set  
my signature in the presence of two subscrib- 15  
ing witnesses.

GUIDO FERRARI.

Witnesses:

J. WALTER DOUGLASS,  
THOMAS M. SMITH.