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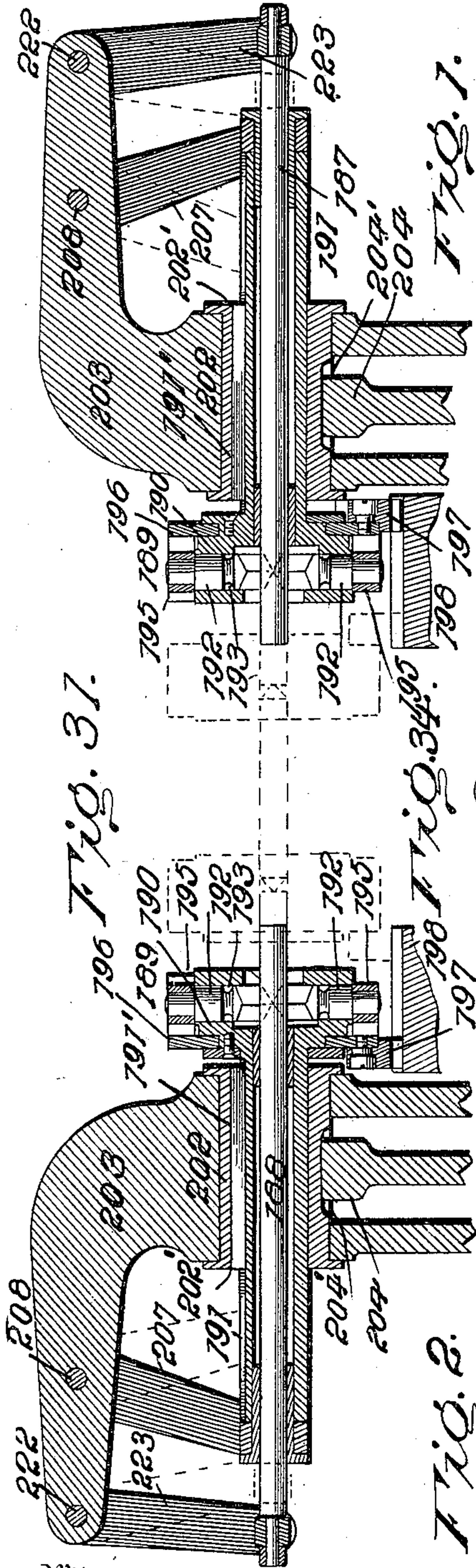
Patented Nov. 20, 1900.

H. ROBINSON.  
CIGARETTE MACHINE.

(Application filed Sept. 30, 1899.)

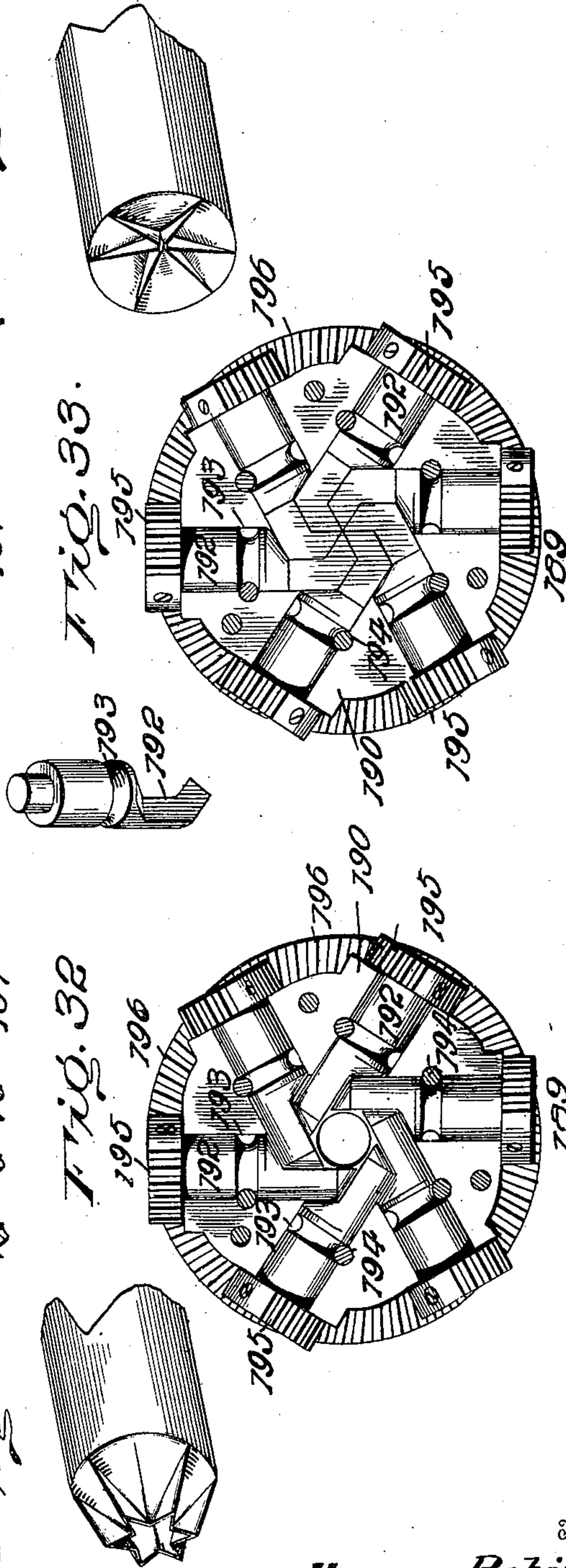
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15 Sheets—Sheet 1.



Witnesses

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*by Stewart & Stewart*

Attorney



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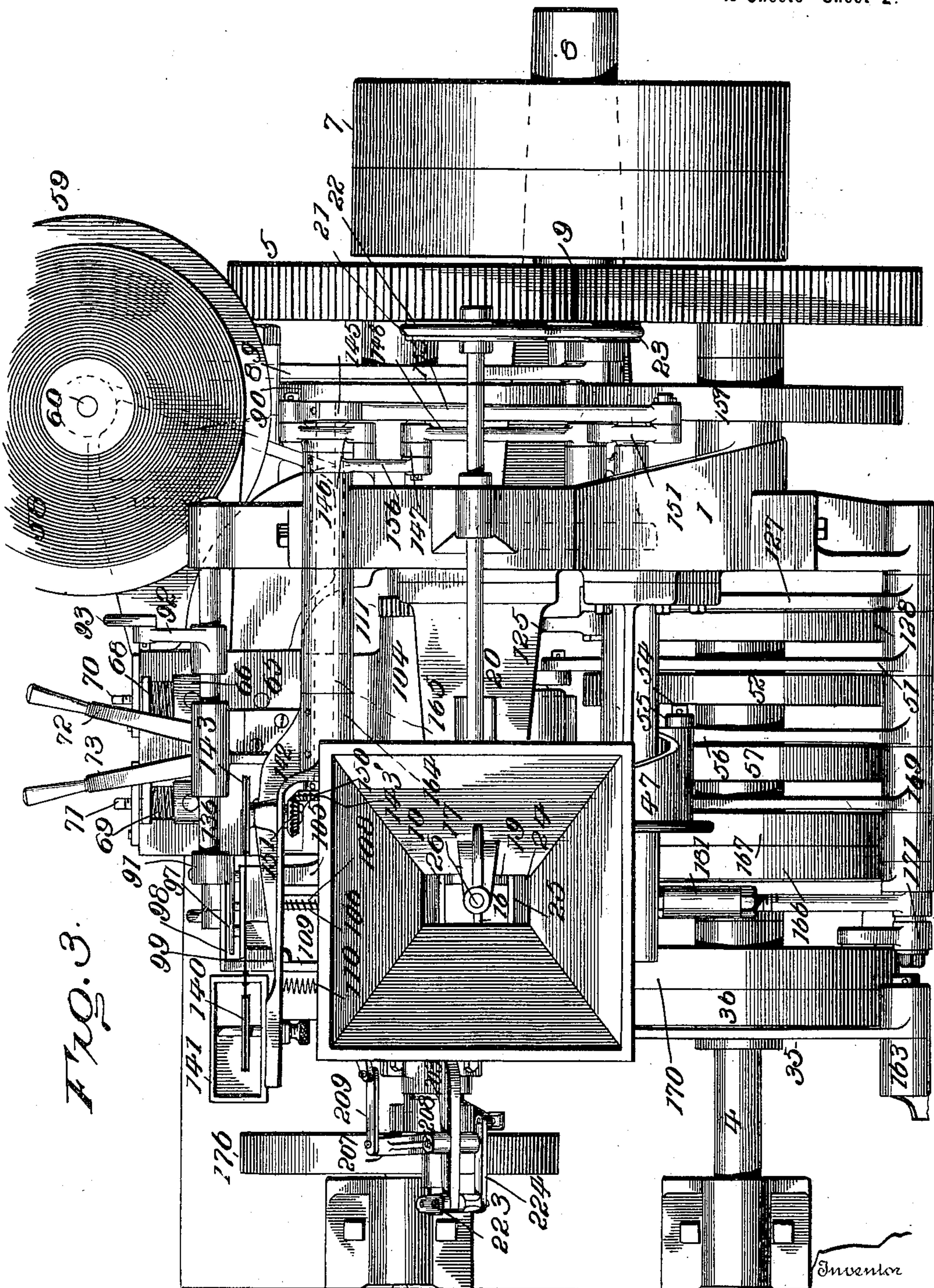
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15 Sheets—Sheet 2.



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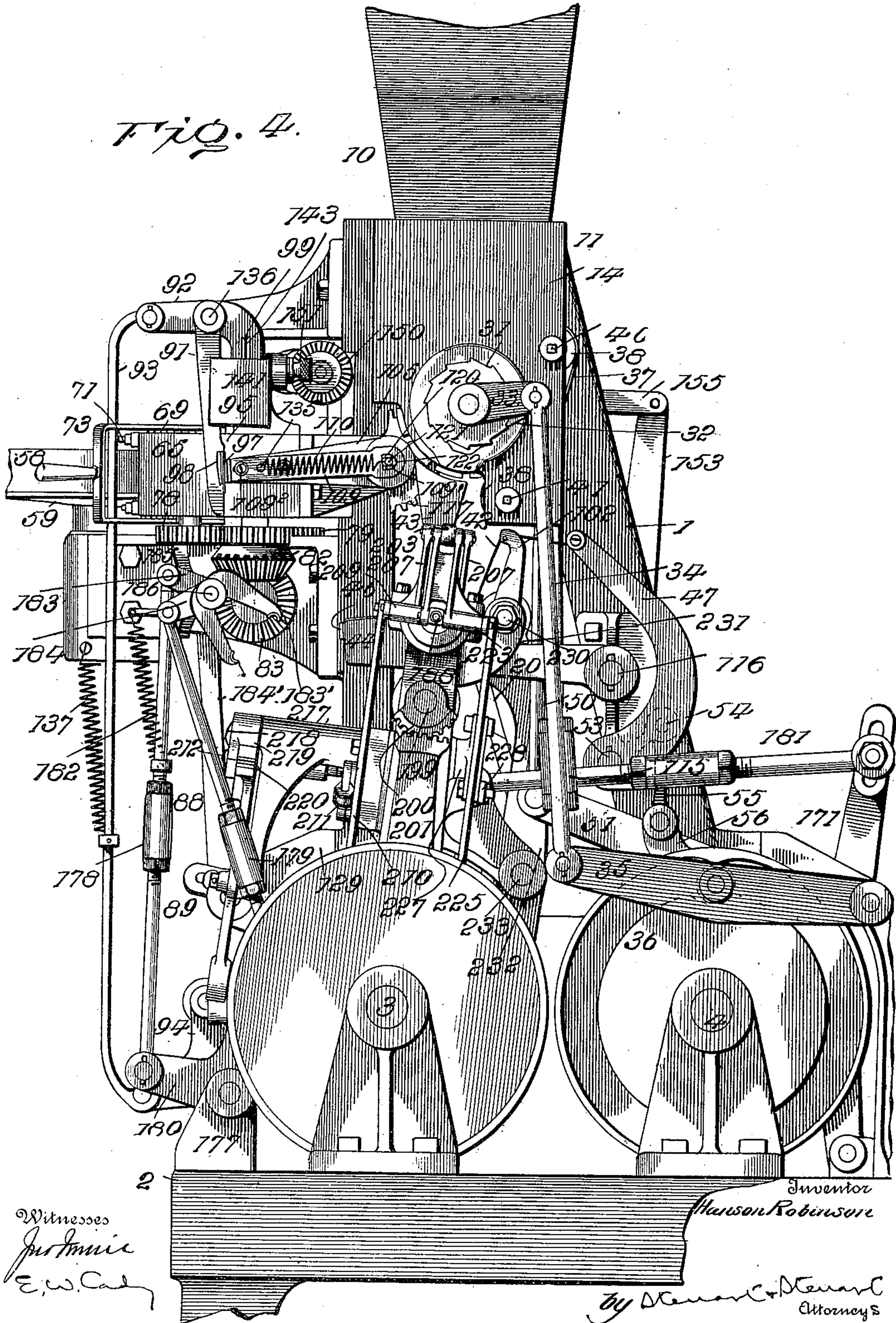
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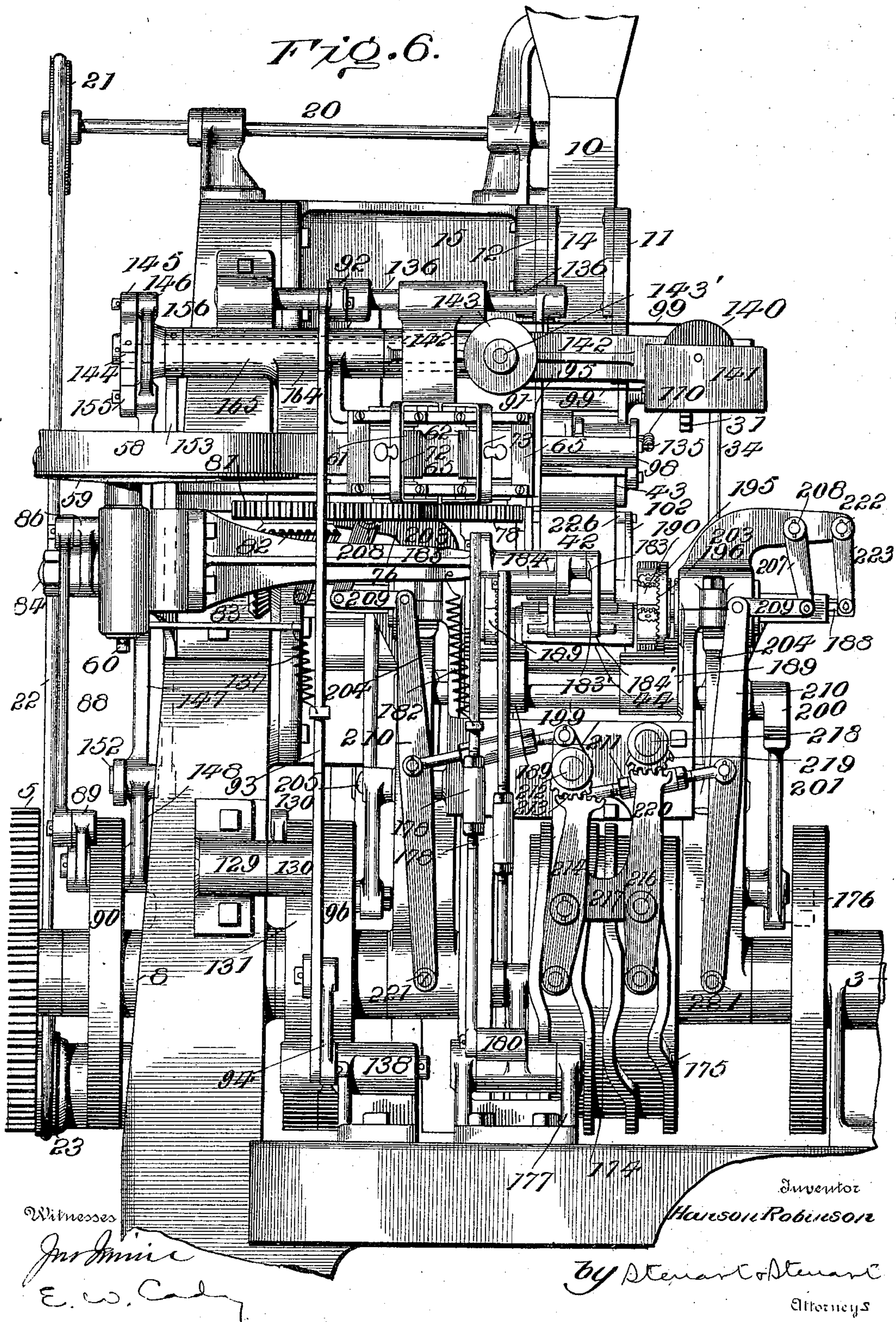
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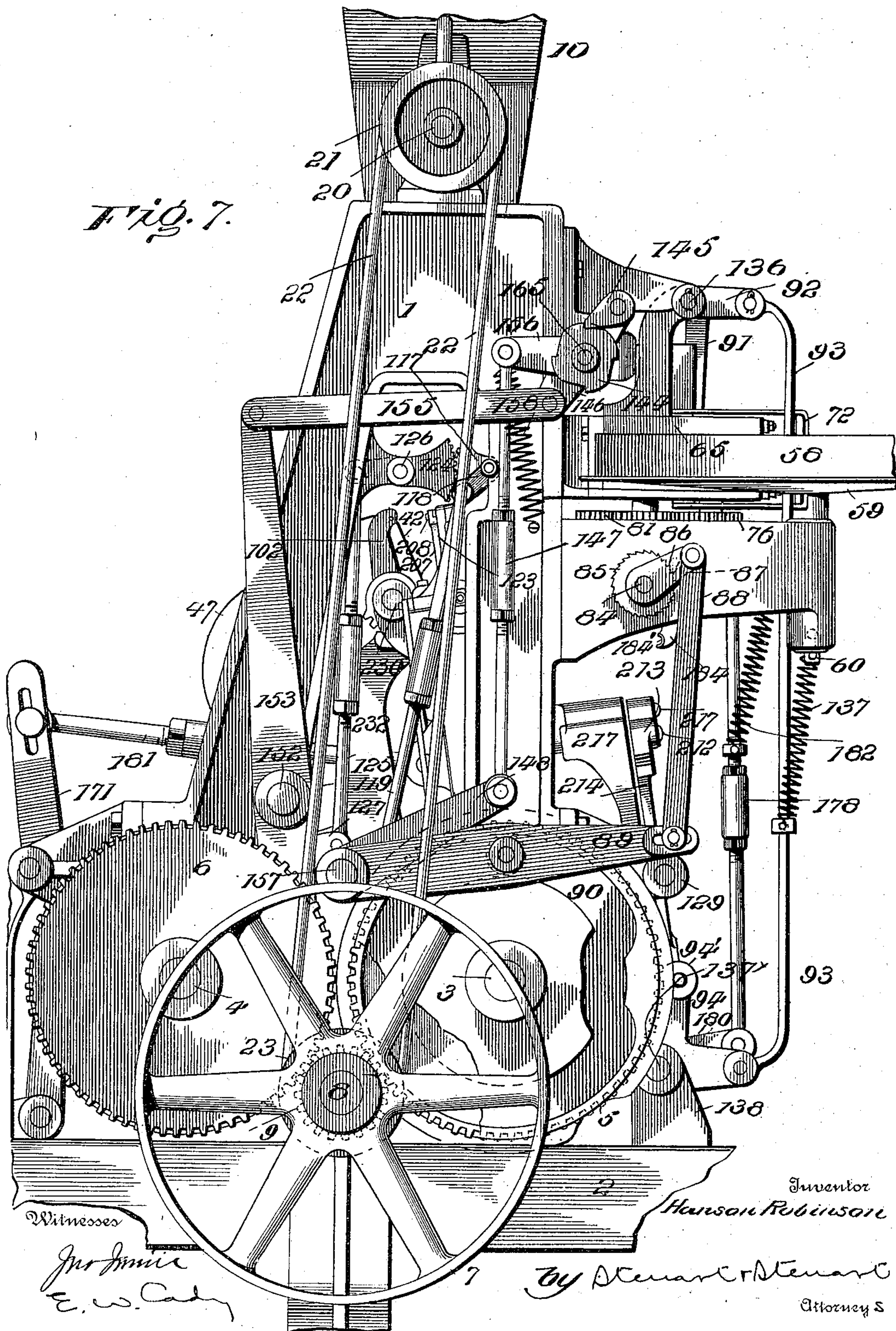
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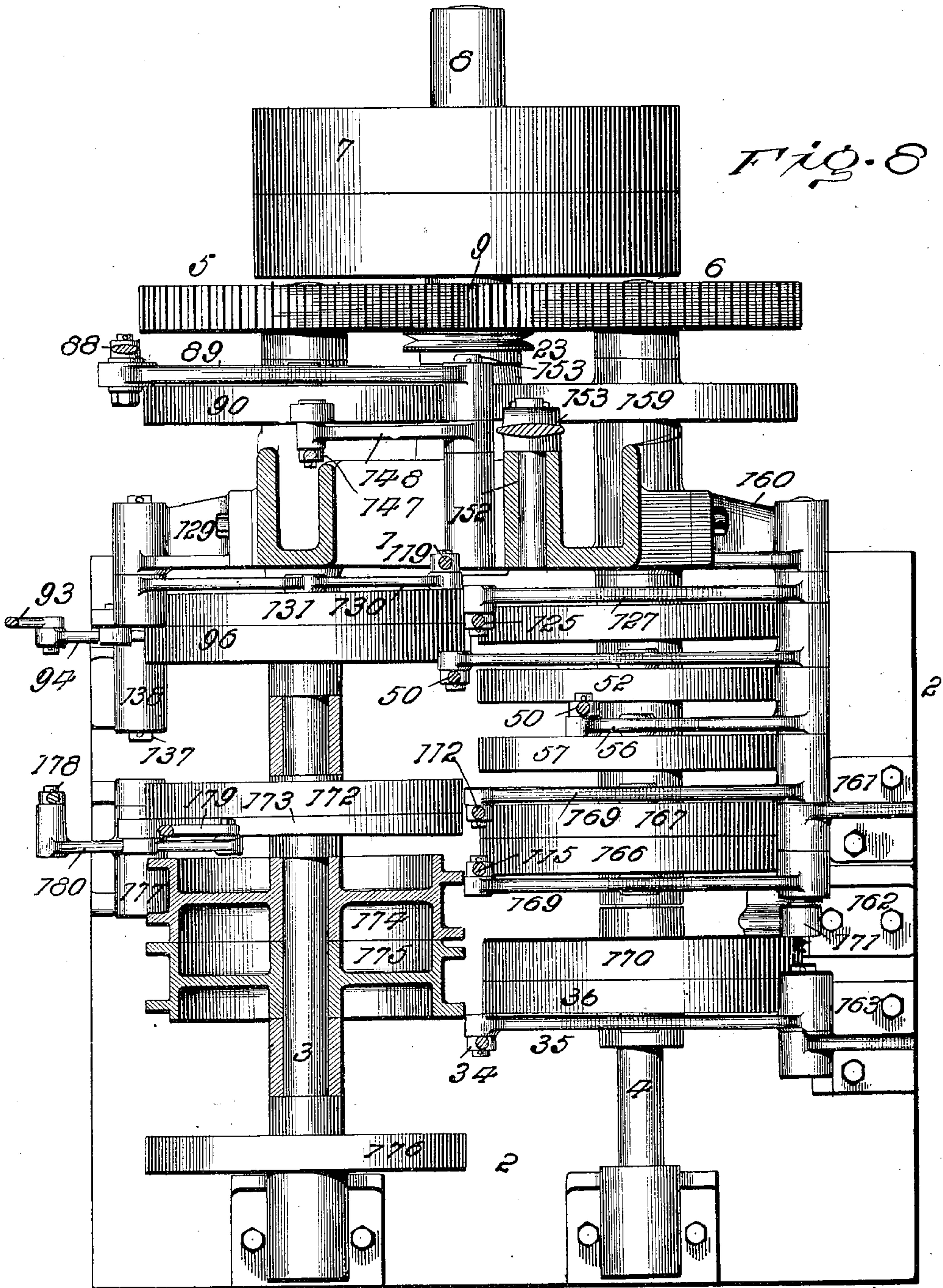
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15 Sheets—Sheet 7.



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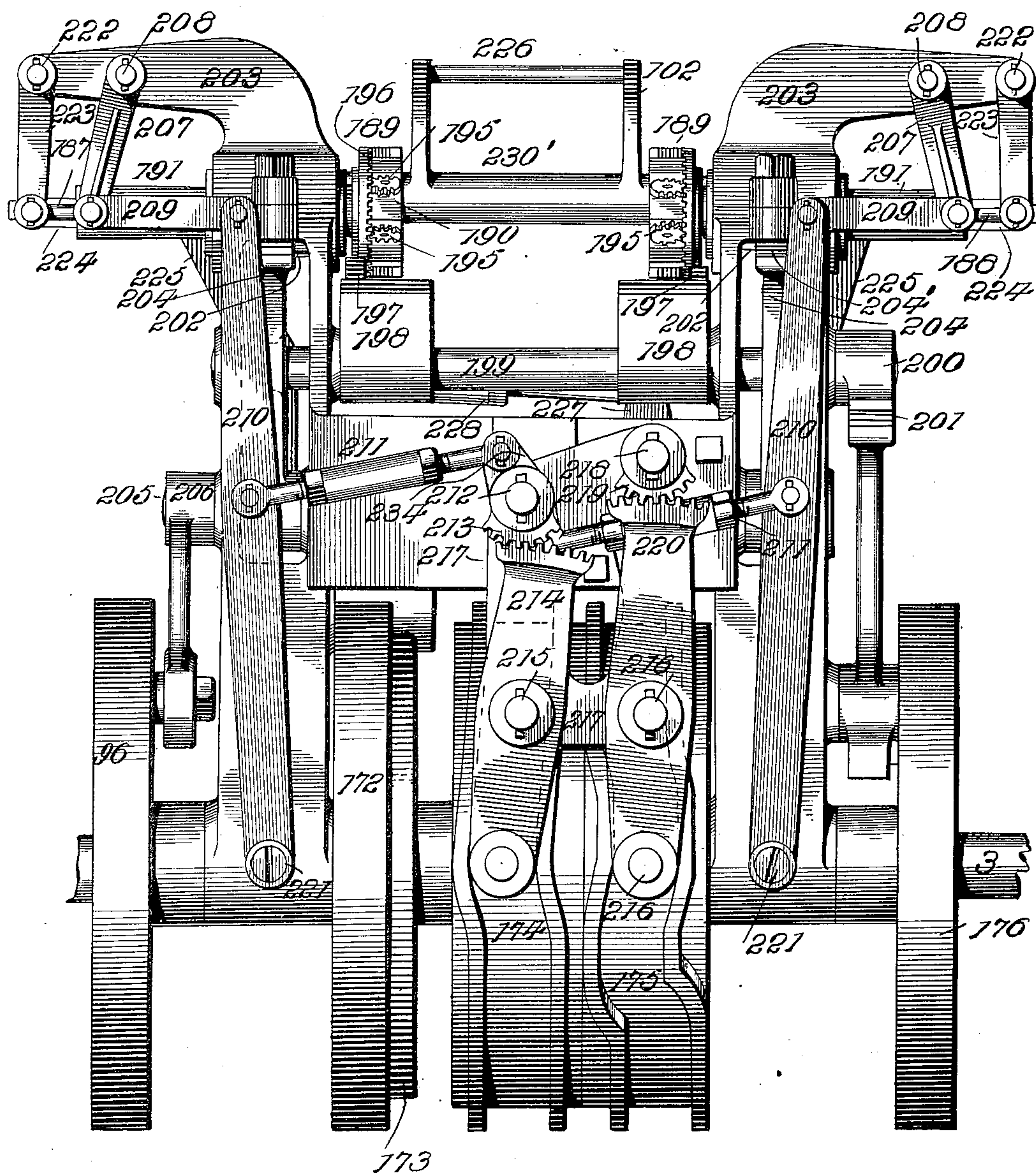
**H. ROBINSON.**  
**CIGARETTE MACHINE.**

(Application filed Sept. 30, 1899.)

(No Model.)

15 Sheets—Sheet 8.

Fig. 9.



Witnesses

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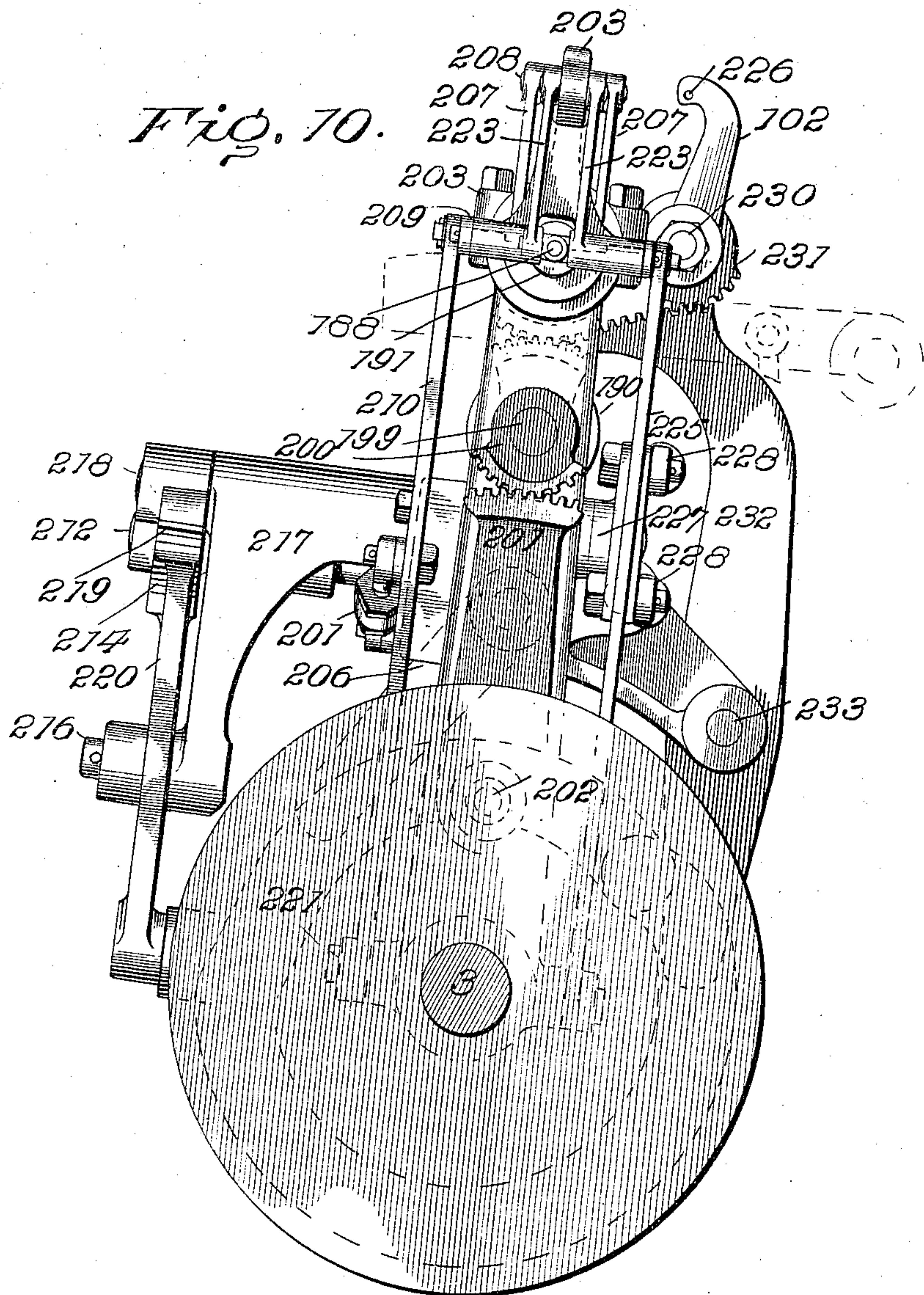
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15 Sheets—Sheet 9.



Witnesses

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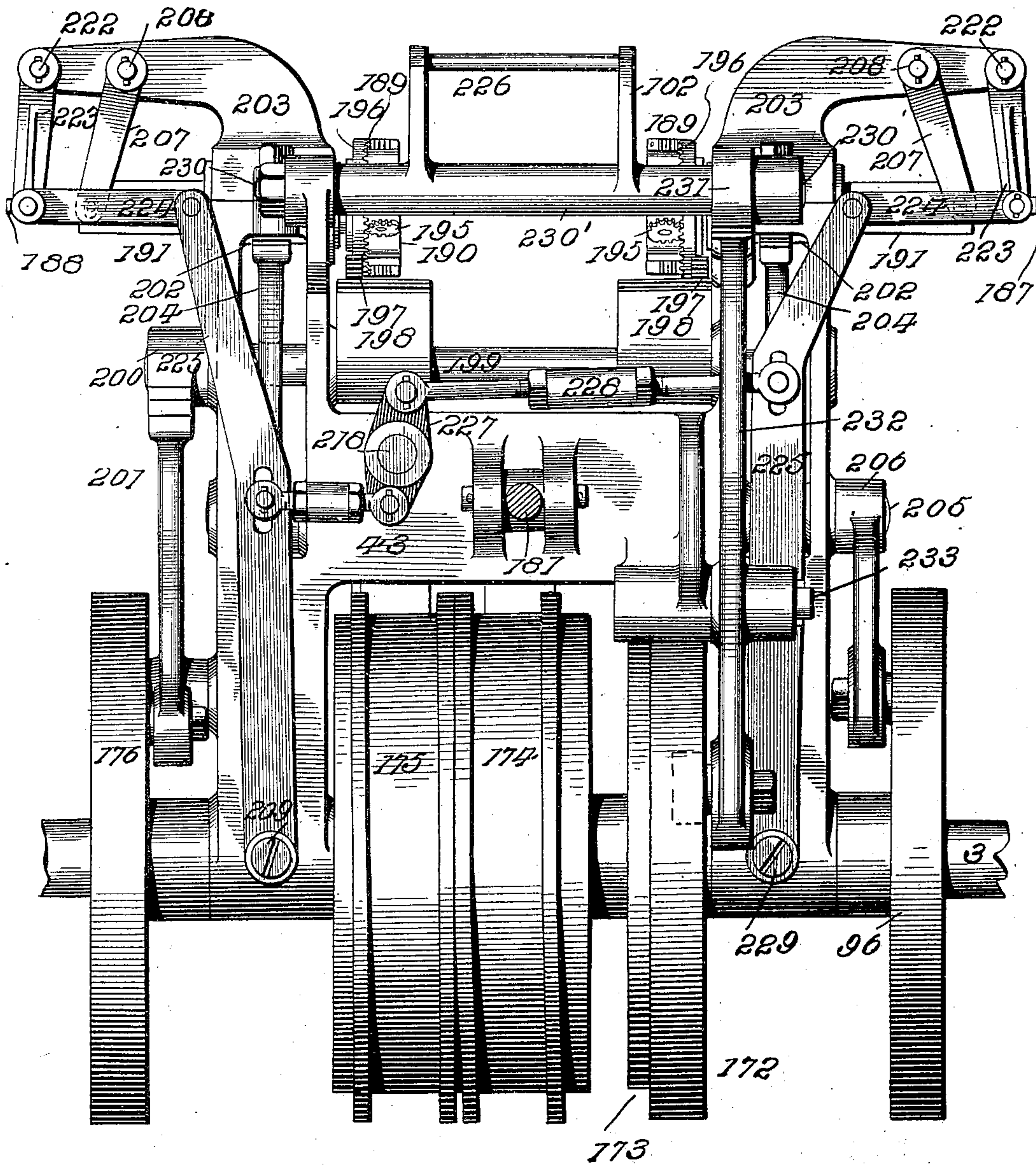
H. ROBINSON.  
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FIG. 11.



Witnesses

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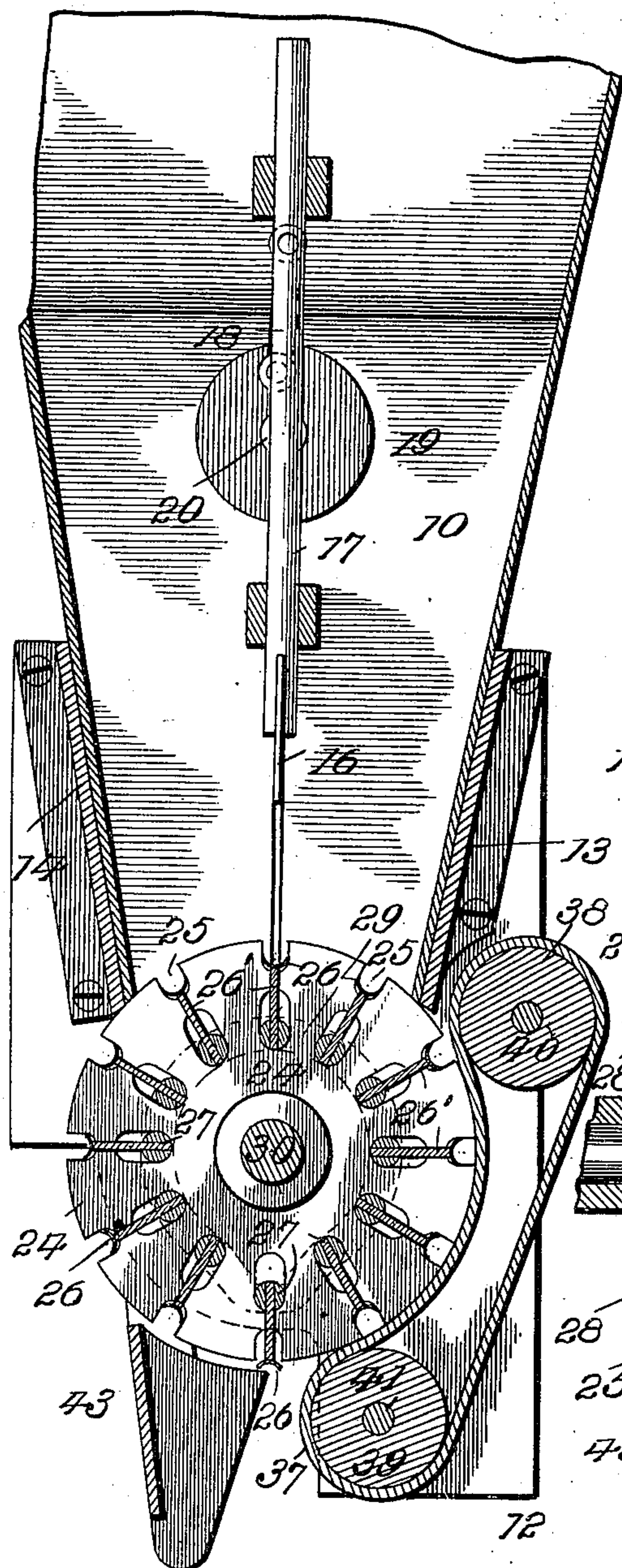
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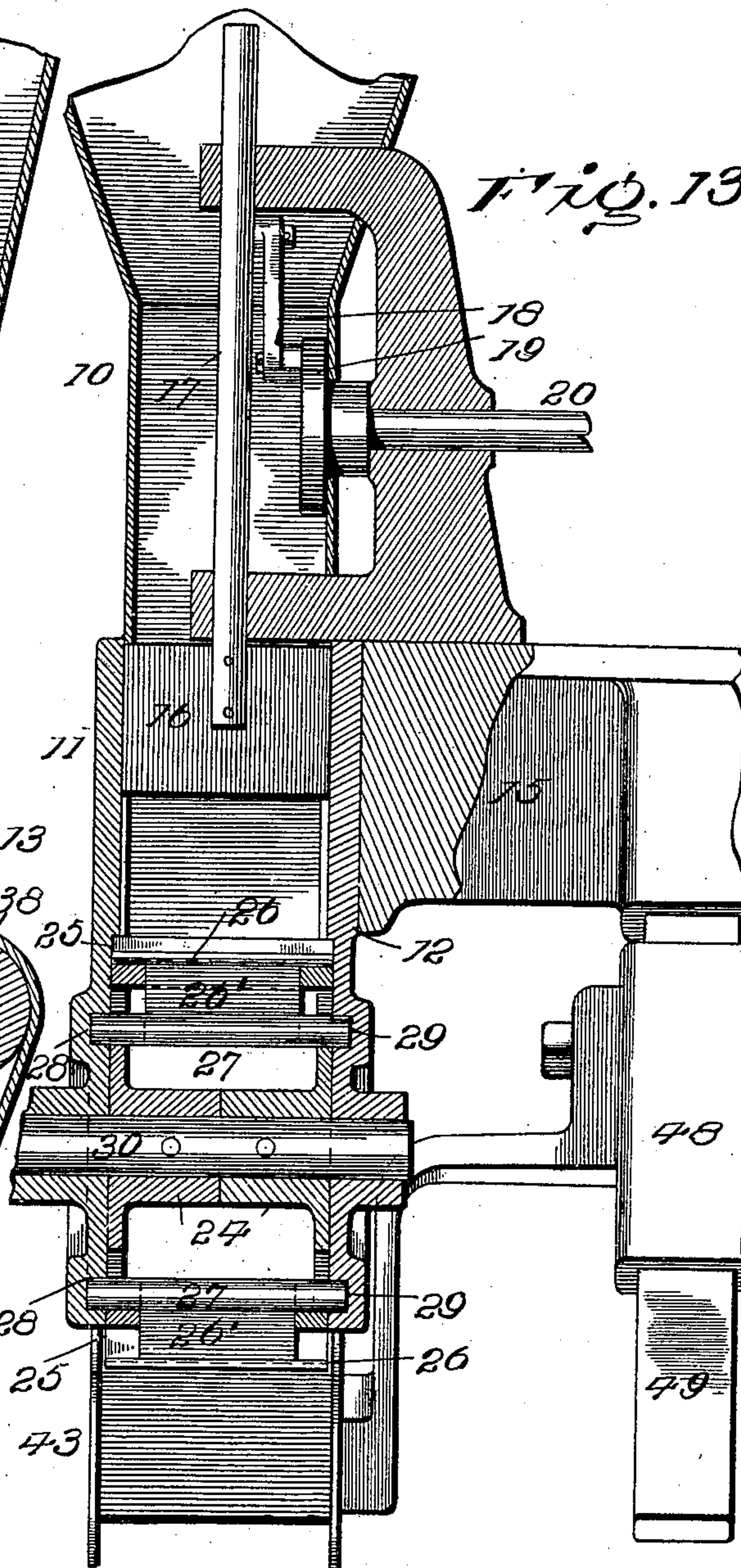
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*Fig. 12.*



*Fig. 13.*



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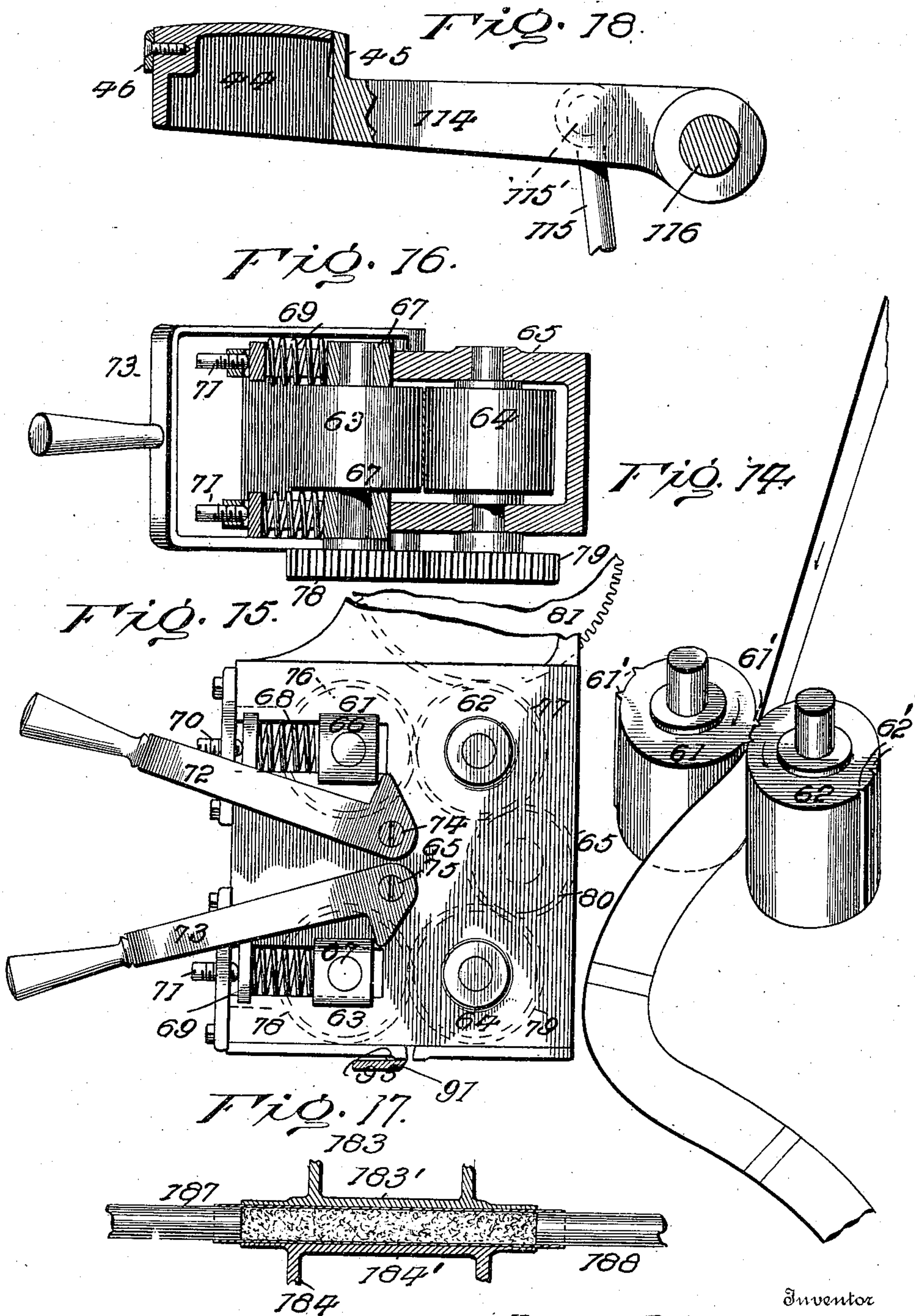
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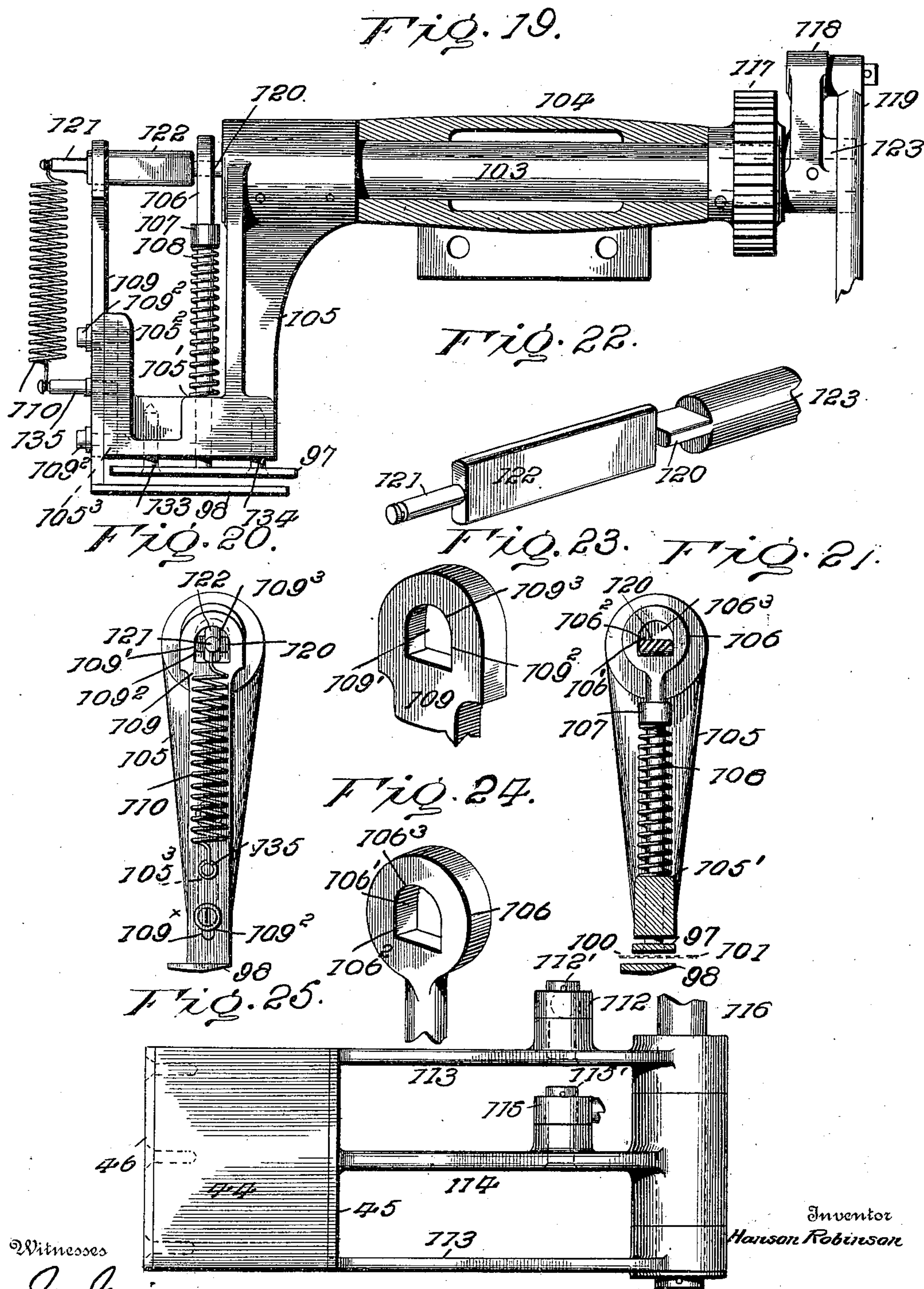
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(No Model.)

15. Sheets—Sheet 13.



Witnesses

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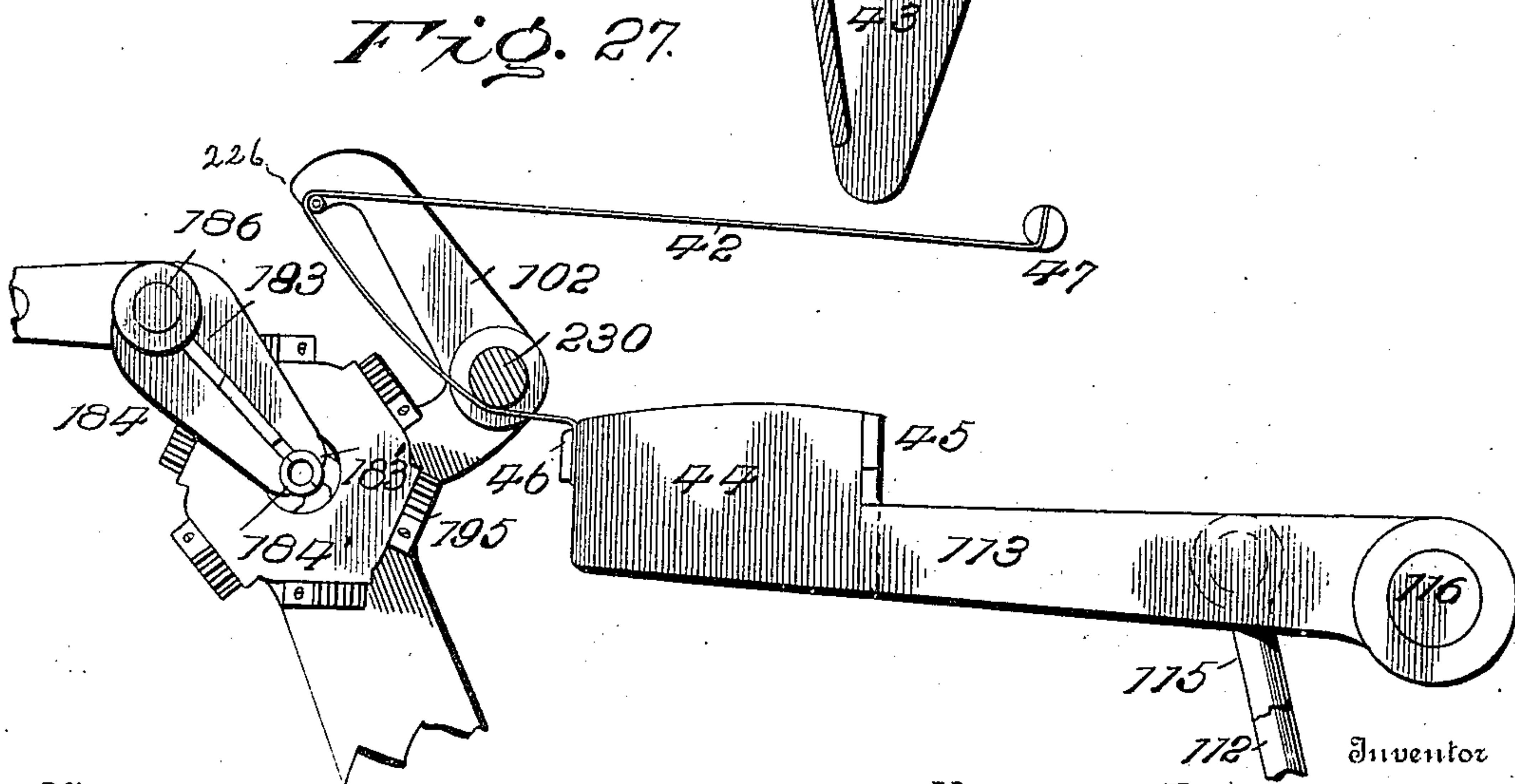
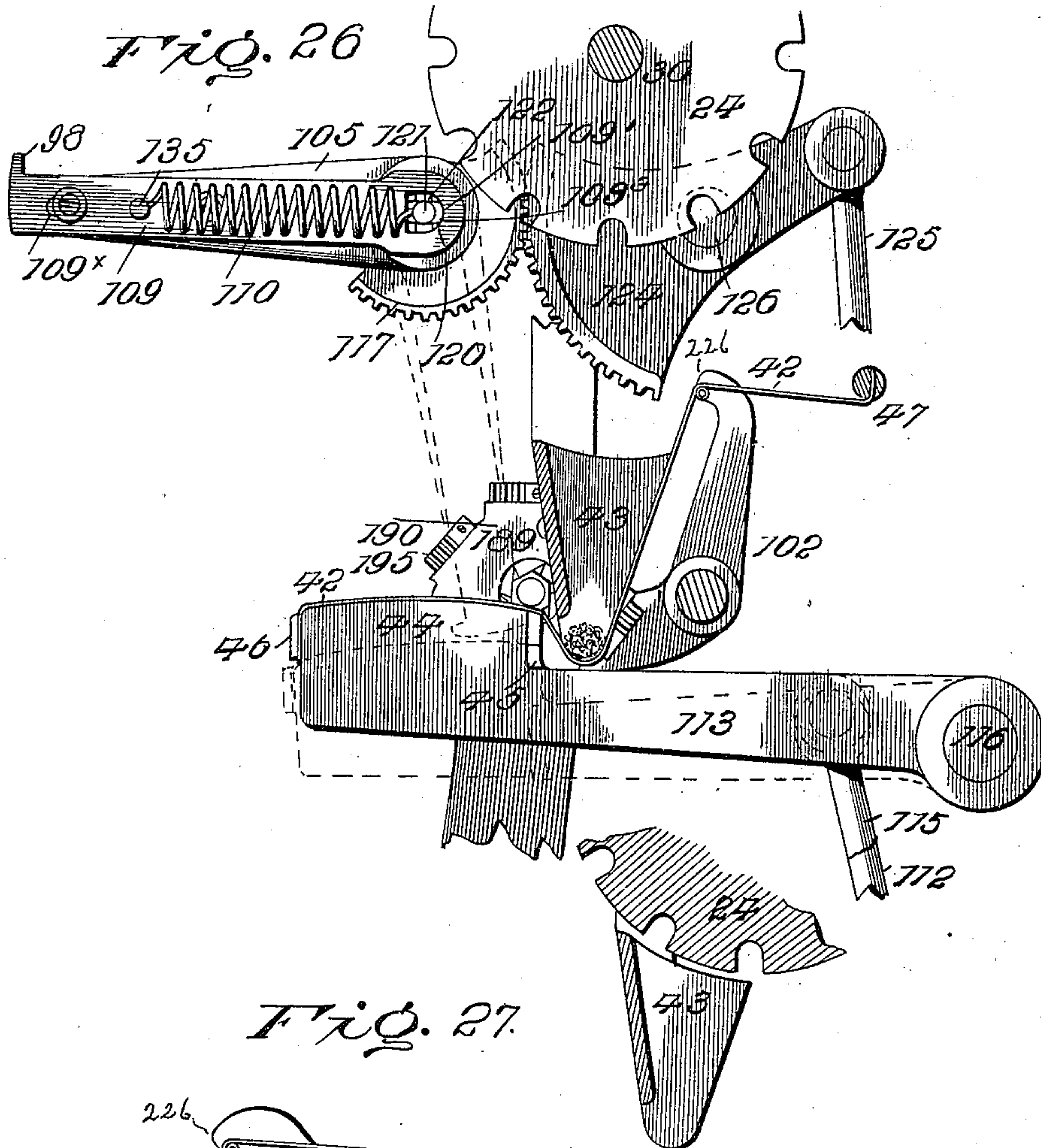
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(Application filed Sept. 30, 1899.)

(No Model.)

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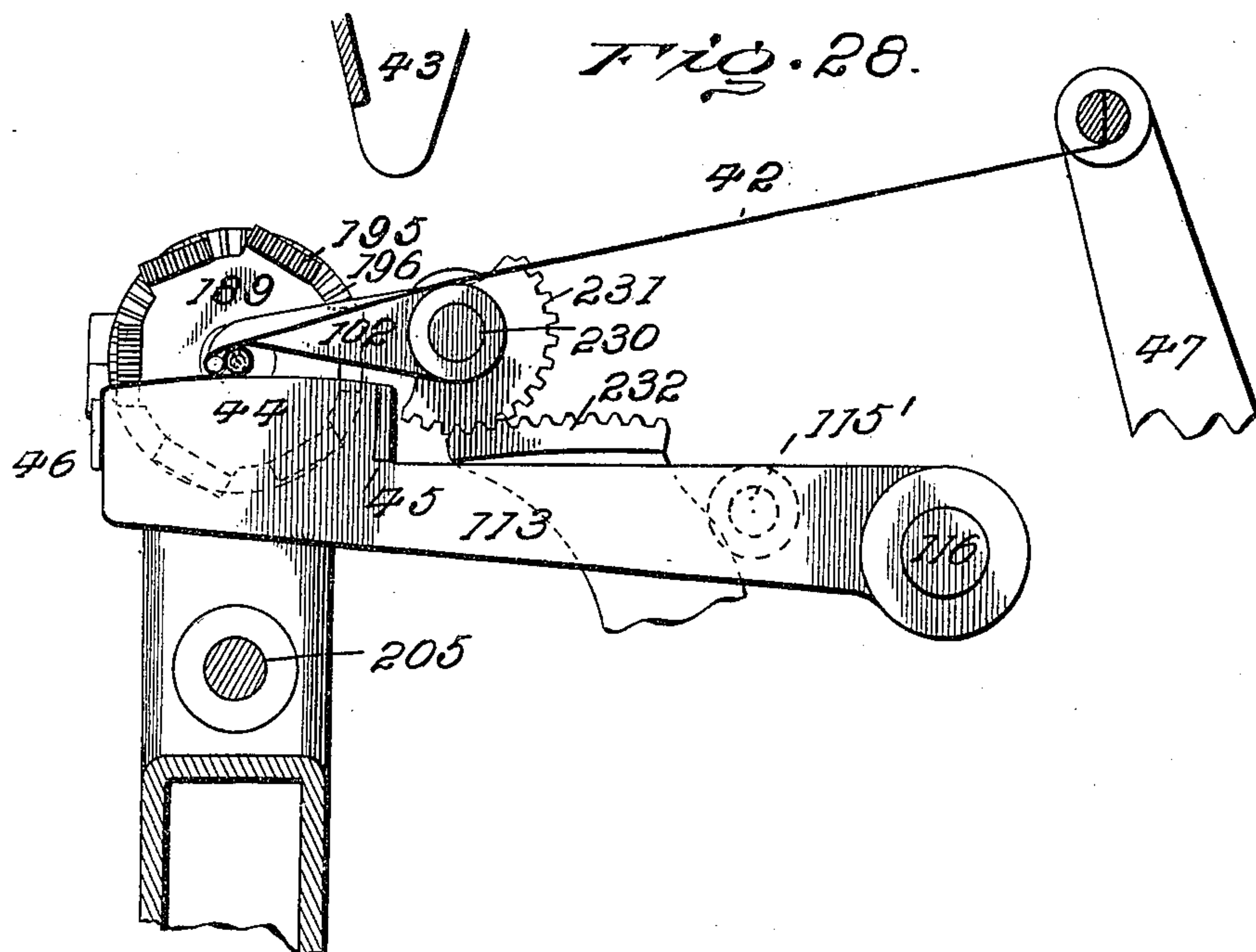
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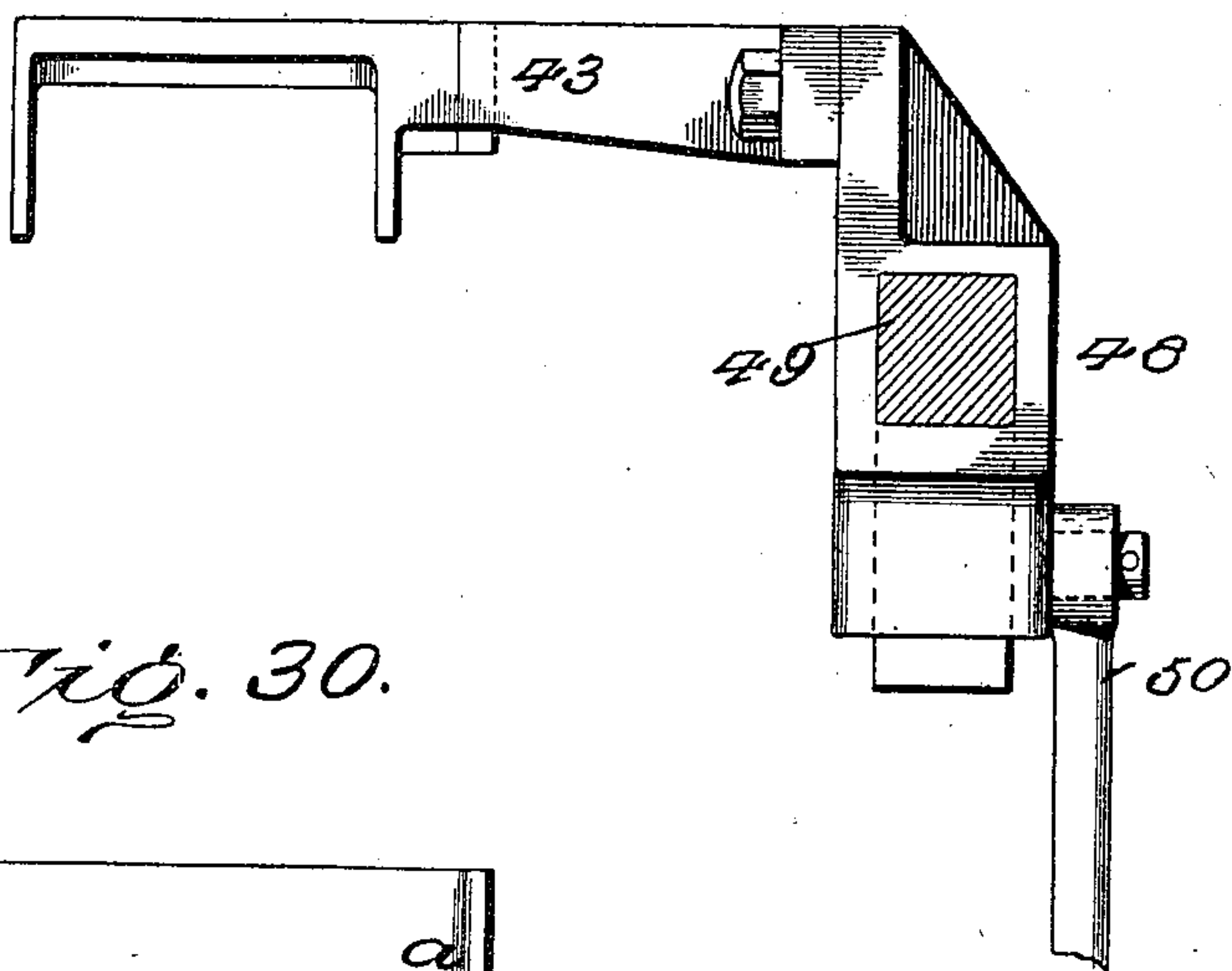
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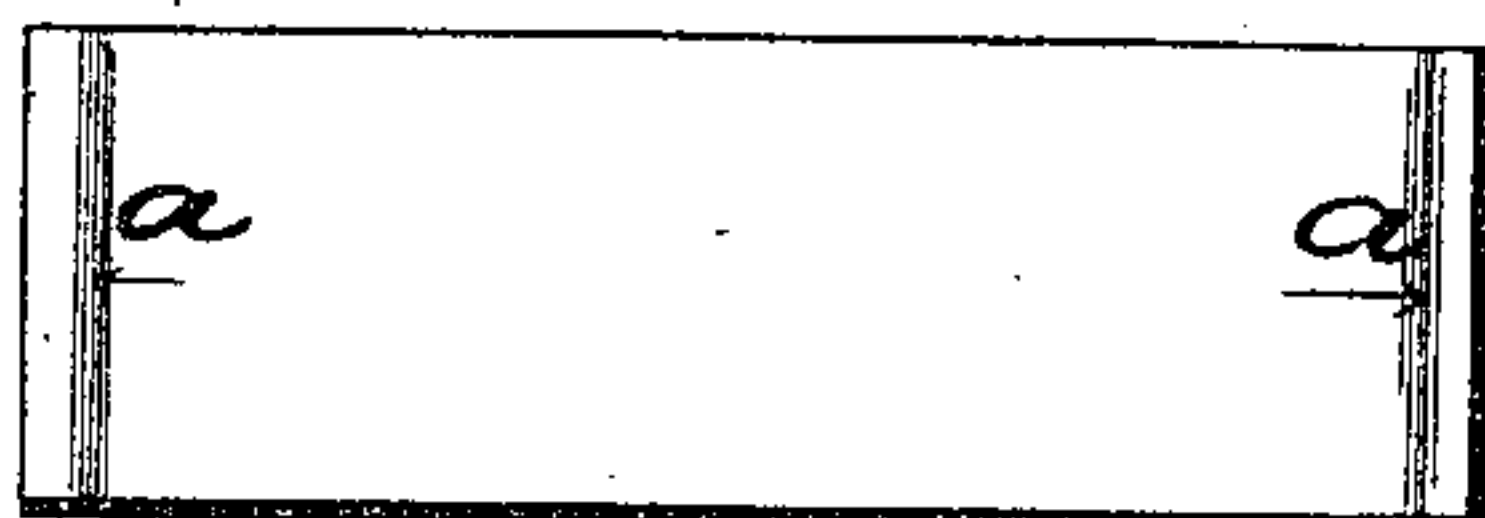
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*Fig. 29.*



*Fig. 30.*



Witnesses

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# UNITED STATES PATENT OFFICE.

HANSON ROBINSON, OF BALTIMORE, MARYLAND.

## CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 662,027, dated November 20, 1900.

Application filed September 30, 1899. Serial No. 732,178. (No model.)

*To all whom it may concern:*

Be it known that I, HANSON ROBINSON, a citizen of the United States of America, and a resident of the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Cigarette-Machines, of which the following is a specification.

This invention relates to cigarette-machines by means of which cigarettes are manufactured on a large scale and in which mechanism is employed by means of which the several steps of making cigarettes from the formation of the wrapper to the completion of the rolling of the cigarette in complete pasted form are carried out.

The invention also relates to the specific construction of a completed cigarette.

The object of this invention is to provide a cigarette-machine by means of which granulated tobacco may be used as a filler as well as long-cut tobacco and by means of which a cigarette may be made with closed or tucked-in ends to retain the granulated-tobacco filler in place.

The cigarette-machine herein set forth, which is capable of making cigarettes on a large scale and which illustrates the embodiment of my invention, embraces in its general features the construction and the several steps of operation as follows: a coil of paper for the wrappers, which is automatically unwound and fed between rolls which crease the wrapper-paper transversely of the length of the strip or tape of wrapper-paper at distances equal to the length of each cigarette when completed; a mechanism which grips each creased length and a mechanism for cutting off each creased length so gripped; a pasting mechanism which pastes the edge of each cut-off length brought to said pasting mechanism by the movement of the gripping mechanism; a mechanism which conveys to each cut-off pasted wrapper the proper amount of tobacco for the filler, said wrapper having been placed upon the bed of a mechanism for rolling the tobacco before the tobacco is placed upon the pasted wrapper, and a mechanism for crimping, folding, and tucking in the ends of the wrapper of the rolled and pasted cigarette.

In the cigarette-machine herein set forth the several mechanisms coöperating in the several steps in the manufacture of the cigarette

are timed in their movements and operated, preferably, by a number of cam-levers and cams.

Referring to the accompanying drawings, in which similar figures of reference refer to like parts, Figure 1 is a perspective view of the end of a cigarette made in accordance with this invention. Fig. 2 is a perspective view of the end of a cigarette, showing the end of a wrapper after the first operation of the heads and tuckers and before it is tucked into place. Fig. 3 is a plan view of the cigarette-machine. Fig. 4 is a side view looking from the right. Fig. 5 is a rear view of the machine. Fig. 6 is a front view. Fig. 7 is a side view looking from the left. Fig. 8 is a plan view, partly in horizontal section, showing the driving-pulley gears and camshafts and cams, &c. Fig. 9 is a front view of the machine, showing the vibrating frame and mechanism by means of which the cigarette is rolled. This frame carries the tucking-heads shown in Figs. 31, 32, 33, and 34. Fig. 10 is an end elevation of the vibrating frame, and Fig. 11 a rear elevation thereof. Fig. 12 is an elevation in vertical section of the device for feeding the tobacco. Fig. 13 is an elevation of the feeding device in vertical section transverse to that shown in Fig. 12. Fig. 14 is a detailed view in perspective, showing the rolls for creasing or scoring the paper or wrapper across its length. Fig. 15 is a plan view showing in detail the mechanism for feeding the paper or wrapper. Fig. 16 is an end view, partly in section, of said paper or wrapper feeding mechanism. Fig. 17 is a view in longitudinal section of the holders for receiving the cigarette after it has been rolled and holding it while the tucking-heads are in operation crimping, folding, and tucking or closing in the ends of the wrapper over the ends of the filler. Fig. 18 is a side view of the table, partly in section, on which the cigarette is rolled. Fig. 19 is a side view of the wrapper-carrier. Figs. 20, 21, 22, 23, and 24 are detailed views thereof. Fig. 25 is a plan view of the table upon which the cigarette is rolled. Fig. 26 is a combined view showing a portion of the tobacco-feeding device, the wrapper-carrier, the vibrating frame, and the pocket-former and table at one stage of the operation of the rolling of



the cigarette. Fig. 27 shows another position of the cigarette-rolling mechanism during the operation of the vibrating frame, the cigarette-receiving holders, and the table.

5 Fig. 28 shows another position during the operation of the vibrating frame. Fig. 29 is a plan view in detail of the device and pendant guide with its connections for forming the pocket in the apron by means of which the  
10 cigarette is rolled. Fig. 30 is a detailed view of the wrapper after it has been cut and creased or scored transversely at each end. This wrapper is in the shape in which it is  
15 carried to the table to be rolled or wrapped around the filler.

A cigarette-machine constructed in accordance with this invention is constructed and arranged as follows:

1 is the frame of the machine, and 2 the  
20 base-plate.

Referring to Fig. 7, 3 and 4 are main shafts, which have on one end spur-gears 5 and 6, meshing with the driving-pinion 9 on the pulley-shaft 8. The pulley 7 on the pulley-  
25 shaft 8 is driven by a belt, by means of which power is transmitted to the several cams and their connections and operating mechanisms, as hereinafter set forth.

Referring to Figs. 12 and 13 especially, 10  
30 is a hopper in which the tobacco is placed and fed to a mechanism for distributing the proper amount of tobacco as a filler for each cigarette. To keep the tobacco in the hopper from becoming clogged or packed, a device is lo-  
35 cated in the hopper for agitating or keeping stirred up the tobacco. This agitating device consists of a vertical flat piece of metal 16, extending across the inside of the hopper and is fastened to the lower end of a rod 17,  
40 to which a reciprocating motion is imparted by means of a connecting-link 18, eccentrically connected to the crank-disk 19, mounted on one end of the rotary shaft 20, having on its other end the pulley 21, (see Fig. 7,) op-  
45 erated by means of a belt 22 and pulley 23 on the main shaft 8. (See Figs. 3, 5, 6, 7, 12, and 13.)

The device for feeding the proper amount of tobacco to the wrapper is as follows: In  
50 the lower end of the hopper 10 is located a feed-wheel 24, (see Figs. 12 and 13,) which has a number of grooves or recesses 25, extending across the periphery, there being twelve in this particular case, although the number  
55 may be increased or diminished, as may be considered best. These recesses 25 are of such a size and capacity as to contain just the proper amount of tobacco necessary for the cigarette. In each of these recesses is a mov-  
60 able bottom 26, adapted to move from top to bottom of the recess and consisting of a thin trough-shaped piece of metal extending the whole length of the recess. This piece of metal 26 is mounted on a reciprocating plate  
65 26', which in turn is mounted on a bar 27, the ends of which bar engage in stationary cam-tracks 28 and 29 in the side plates 11 and 12,

respectively. The feed-wheel 24 is mounted on the shaft 30, which has a ratchet-wheel 31, (see Fig. 4,) by means of which, through the  
70 arm 33, ratchet-pawl 32, connecting-rod 34, cam-lever 35, and cam 36, an intermittent motion is imparted to the feed-wheel 24. It is preferable to have the same number of teeth in the ratchet-wheel 31 as there are recesses in  
75 the feed-wheel 24, so that when the ratchet-wheel 31 moves through one of its spaces one of the recesses in the feed-wheel is uncovered, thus allowing the tobacco to be discharged from the uncovered recess at the lower side  
80 of the wheel by the movement of a movable bottom 26, actuated by the stationary cam-tracks 28 and 29.

To keep the tobacco in the several recesses in the wheel 24 as it revolves intermittently  
85 from the hopper to the discharging position, I employ the endless flexible band or belt 37, which bears against a part of the feed-wheel 24. This band 37 extends around the idler-wheels 38 and 39, which wheels are free to  
90 turn on their respective shafts 40 and 41, so that when the feed-wheel 24 is moved the band 37, which partly encircles it, also moves with it, thus keeping the charges of tobacco in the different recesses 25 until at the proper  
95 time they are successively discharged from the lower side. The width of the band 37 is preferably the same width as the periphery of the feed-wheel 24.

In the next step of the manufacture of the  
100 cigarette the tobacco is to be delivered from the feed-wheel to the apron, by means of which the cigarette is rolled, and in order to properly deliver the charge of tobacco in the shape in which it is delivered from the feed-  
105 wheel and also to form a pocket in the cigarette-rolling apron the following pocket-forming device is used. (See Figs. 12, 13, 26, and 29.)

42 is the rolling-apron for rolling the ciga-  
110 rette, and 43 the device for forming the pocket in the rolling-apron 42. This device is of the shape shown in Fig. 13 and the other figures, and especially in plan view in Fig. 29. It has preferably three sides and of  
115 such a shape (shown in Figs. 13 and 26) as to suitably form the pocket in the apron 42. In forming the pocket in the rolling-apron the latter is slack, so that when the pocket-forming device 43 has descended from its highest  
120 position, or that shown in Figs. 12 and 13, to its lowest position, as shown in Fig. 26, the apron is drawn tight across the rolling-table 44 and 45 and is depressed to conform to the shape of the lower end of the device 43. One  
125 end of the apron 42 is fastened to the end of the table 44 by means of the clamping-plate 46, which is held in place, preferably, by screws, as shown. The other end of the apron is fastened to the take-up arm 47, whose con-  
130 nection and action will be presently described.

The pocket-forming device 43, as mentioned above, has preferably three sides to it,



so as to prevent the tobacco while being discharged from the feed-wheel 24 from falling in any but the desired position on the apron.

This device 43 has an extension from one side, (see Figs. 13 and 5,) by which it is fastened to the slide 48. The slide is guided in its motion by the pendent guide 49. The slide 48 is actuated by the connecting-rod 50, cam-lever 51, and cam 52. (See Fig. 5.) The arm 47 is fulcrumed on the stud 53 and has a timed vibratory movement. On the side of the arm 47 is located a pin 54, which is connected by the lever 55 with the cam-lever 56, operated by the cam 57, by means of which the timed vibratory movement aforesaid is imparted to the take-up arm 47.

The next steps in the manufacture of the cigarette will be the construction of the wrapper, pasting it, and conveying it to the tobacco to be rolled. The paper for the wrapper is mounted in the form of a roll of ribbon-paper on a reel 58, the paper being of the proper width to wrap or envelop the cigarette. The reel 58 is located in a horizontal position on the disk 59 and is located centrally on the pin 60. (See Figs. 3, 6, and 7.) The disk is free to revolve as the paper is unwound from the reel. The paper is drawn from the reel by the feed-rolls 61, 62, 63, and 64, (see Fig. 14,) one pair of these rolls, preferably the first pair 61 and 62, being constructed so as to form double creases at intervals in the wrapper-paper. The means for forming these creases consists of double ribs 61' on two opposite sides of the periphery of the roller 61 and transverse to said periphery and double grooves 62' parallel to the axis of the roller 62 and on opposite sides thereof, so that in the operation of the rollers 61 and 62 at every half-revolution thereof one pair of the ribs 61' and 61' are brought into engagement with the meeting grooves 62', thereby forming a double crease in the paper wrapper transverse to its length. These double creases are formed at such a distance apart between each pair of creases that after the paper has been cut after passing through the rolls, the cutting occurring between the double scoring or creasing, as in Fig. 30, the length of the completed cigarette will be equal to the distance between  $a$   $a$ , as indicated in Fig. 30.

The paper feeding and scoring rolls are supported in the frame 65. The rolls on one side, as 62 and 64, revolve in stationary bearings, and the rolls 61 and 63 revolve in movable bearings 66 and 67. These bearings 66 and 67 have springs 68 and 69 to set the rolls 61 and 63 against the rolls 62 and 64. To vary or adjust this pressure between these rolls, adjusting-screws 70 and 71 are used. To permit this pressure between the rolls to be relieved, so that fresh paper can be inserted or also that the paper which may be already between the rolls may be taken out, two levers are used in the form of a yoke, (numbered 72 and 73.) These levers are ful-

crumed about screws 74 and 75. At this end of the levers there is an extension, so that when the rolls 61 and 63 are forced against the rolls 62 and 64 by the springs 68 and 69 the extensions at the ends of the yoke-levers 72 and 73 are against the edges of the movable bearings. Now to move the rolls 61 and 63 from 62 and 64 the handles of the levers 72 and 73 are compressed together. To feed the paper, scoring-rolls 61 and 62 and 63 and 64, as mentioned above, are provided, and through the revolving of these rolls they draw the required amount of paper off of the reel and also at the proper time. This movement is effected by means of the following mechanism, Figs. 6 and 15: The lower end of the shafts of the rolls are provided with gears 76, 77, 78, and 79, all in mesh, and gearing with this train of gears, as shown, are the gears 80 and 81. Secured to the gear 81 is the miter-gear 82, meshing with the miter-gear 83. Miter-gear 83 is mounted on the shaft 84, which has on its outer end the ratchet-wheel 85, ratchet-arm 86, and pawl 87, (see Fig. 7,) and connected therewith are the connecting-lever 88, cam-lever 89, and cam 90, by means of which motion is imparted to the feed and scoring rolls 63 and 64 and 61 and 62. The paper having been fed the required amount at the proper time will then extend beyond the cutting-face 95 and the front of the knife 91, (see Fig. 15,) so that when the knife 91 is moved the paper is severed by means of the shearing action which is effected between the knife 91 and the cutting-face 95. When the paper is being fed between the cutting-face 95 and the knife 91, it also enters between the gripping-plates 97 and 98, which are a part of the wrapper-carrier. (See Figs. 4, 19, 20, 21, 22, 23, and 24.) After the wrapper has been fed between the gripping-plates 97 and 98 they close or come together, as herein set forth, and the wrapper is clamped between them. Then the knife 91 is caused to move, as hereinafter explained, and the wrapper held by the gripping-plates is cut from the rest of the paper. The wrapper which is clamped between the grippers 97 and 98 has now been severed from that on the reel and is now ready to receive the paste.

Referring to Fig. 21, the wrapper is shown in dotted lines between the gripping-plates 97 and 98, which should be closed, but to show the paper are shown as open. The relative position of the grippers 97 and 98 is such that the paper at the left of the gripper 97 is uncovered, as at 100, and a portion of the wrapper extends to the right of the grippers, as at 101. The object of this will be explained later on.

The wrapper-carrier, which carries the wrapper to the pasting mechanism and then transfers the pasted wrapper to the apron and table on which the cigarette is rolled, will be next described.

Referring to Fig. 19, the wrapper-carrier and its operating mechanism are constructed



and arranged as follows: 103 is a hollow shaft supported in the bearing 104. On one end of the hollow shaft 103 is fastened the bracket-arm 105, which supports the gripping-plates 97 and 98 with their respective connections. On the other end of the shallow shaft 103 the segmental gear 117 is fastened. This gear has meshing with it the segmental gear 124, which has an extension with which the connecting-rod 125 is coupled. (See Figs. 26, 4, and 5.) This last-mentioned segmental gear 124 is pivoted on the stationary pin 126, fastened in the side frame of the machine. The connecting rod 125 is coupled to the cam-lever 127, and through the operation of the cam 128 the necessary movement is imparted to the wrapper-carrier. Through the hollow shaft 103 extends the shaft 123. These two shafts have entirely independent motions. On one end of the shaft 123 is fastened the arm 118. Coupled with this arm is the connecting-rod 119, the other end of the connecting-rod being coupled to the cam-lever 130, to which lever and its several connections motion is imparted in the proper amount and time from the cam 131, (see Fig. 6,) so that the resultant motion of the shaft 123 is a portion of a revolution. The other end of the shaft 123 is shaped as shown in Figs. 19 and 22, and consists of a flattened portion 120 and another flattened portion 122 at a right angle to each other. The portion 122 is provided with a small circular extension 121, to which is connected one end of the spring 110. The gripper-plate 98 is mounted on one end of the arm 109, the other end of which is formed with the opening 109', having one end 109<sup>2</sup> straight and the other end 109<sup>3</sup> oval, as shown in Fig. 23. The gripper plate 97 is mounted on one end of the arm 106, the other end of which is provided with the opening 106', having one end 106<sup>2</sup> straight and the other end 106<sup>3</sup> oval, as shown in Fig. 24. The gripper-plate 97 has two guide-pins 133 and 134, which extend into sockets in the arm 105, as shown in dotted lines. On the arm 106, as shown in Figs. 19 and 21, is fastened the set-collar 107, and pressing against this collar and also against the shoulder 105' of the arm 105 is a spring 108, which serves to retract the gripper-plate 97 from the plate 98. Mounted on the arm 109 of the gripper-plate 98 is a pin 135, and to this pin the end of the spring 110 is fastened, the spring 110 having a tendency to pull the gripper-plate 98 toward the plate 97. A portion of the arm 109 has a bearing upon and slides over a portion 105<sup>2</sup> of the arm 105, and in the portion 105<sup>2</sup> is a slot 105<sup>3</sup>, as shown in dotted lines, in alignment with the slot 109' in the arm 109. Through the slot 109' project headed bolts or pins 109<sup>2</sup>, engaging the portion 105<sup>2</sup>. The inner end of the pin 135, as shown in dotted lines, projects into and moves lengthwise in the slot 105<sup>3</sup>. The action of the gripper-plates is as follows: When the shaft 123 moves from its gripping position through a portion of a revolution, (just a quar-

ter in this case,) the flattened portion 120 will be turned to the position shown in Figs. 19 and 20 and allow the spring 108 to move the gripper 97 toward the arm 105 and away from the plate 98, and the flattened portion 122, which is at right angles to 120, will, when the shaft 123 moves, be turned to the position shown in Figs. 19 and 20 and force the gripping-plate 98 from the plate 97, at the same time exerting a tension on the spring 110. In this way the gripping-plates 97 and 98 are separated. In the opposite motion of the shaft from that just described the gripping-plates 97 and 98 are brought toward each other and closed.

The wrapper-carrier (shown in Figs. 19 and 26) in its operation swings through a portion of an arc. In Figs. 4 and 26 it is in its first position or ready to receive the paper. Then after the paper has been fed into it the gripping-plates 97 and 98 close, and the paper is then cut off, and the wrapper-carrier swings upward, so as to bring the edge 100 of the wrapper, clamped between the grippers, in contact with the endless paste-cord 99, which causes paste to be applied to the edge of the wrapper. The wrapper-carrier now swings to its last position, as shown in dotted lines in Fig. 26, and the edge 101 of the wrapper is laid on the edge of the supplemental table 45, on which the cigarette is rolled, the primary table 44, on which the cigarette is rolled, having previously dropped or been moved to a lower position. Now the filler having been fed the proper amount from the feeder and the pocket also having been formed in the apron and the tobacco having been deposited in the said pocket and the pocket-forming device having been raised to its highest position, the apron-roll 226, mounted on arms 102, (shown in Figs. 5, 9, 10, 11, 26, and 28,) swings down to its lowest position against the rolling-table, as in Fig. 28. The take-up arm 47 then recedes, and the slack of the apron is all taken up. The tobacco is now condensed and enveloped by the rolling-apron. Continuing the description of the movement just above of the take-up arm 47 and the roller-apron, the vibrating frame (hereinafter described, and shown in Figs. 9, 10, and 11) now moves from the right toward the left, and the edge 101 of the wrapper having been placed on the supplemental table 45 the movement of the vibrating frame brings the tobacco on the top of the wrapper. The gripping-plates 97 and 98 in the wrapper-carrier are now opened, as shown in Figs. 19 and 21. The wrapper-carrier now swings to its first position and, the grippers being open, are ready to receive the following wrapper. After the wrapper-carrier has swung to its first position, as in Fig. 26, the primary rolling-table 44 is then moved from the position shown in dotted lines in Fig. 26 to its highest position, ready to admit of the continued rolling of the cigarette which is now being rolled, and the movement of the vibrating frame continues.



The operation of the knife for cutting off the wrappers and its mechanism will now be described.

Referring to Figs. 3, 4, 6, 7, and 8, on the outer end of the shaft 136 is fastened the knife 91, and about midway of said shaft is fastened the arm 92. Coupled to the arm 92 is the connecting-rod 93, the other end of said connecting-rod being coupled to the cam-lever 94. The connecting-rod 93 is controlled by a spring 137, which has a tendency to pull it up, and thus open or draw the knife away from the cutting-plate 95. The cam-lever 94 is in the shape of a bell-crank, and on the other end of said cam-lever is the cam-roller 94', bearing against and operated by the peripheral cam of the cam 131, by means of which cam-motion a timed movement is imparted to the cutting-knife, so that the knife cuts off the proper length of wrapper-paper at the proper intervals. The lever 94, pivoted on the pin 137, is supported in the bracket 138.

The pasting device and its operative mechanism will now be described.

Referring to Figs. 3, 5, 6, and 7, the pasting mechanism consists of the arm 142, fastened on one end of a hollow shaft 164. The arm 142 is caused to move through a portion of a revolution by the partial rotation of the hollow shaft 164. This arm 142 carries on its outer end the paste-pot 141 for receiving the paste. Pivoted in this pot 141 is the idler-wheel 140, having a groove upon its periphery to receive the endless paste-cord 99. The cord 99 also extends around the grooved driving-wheel 143, which is fastened to one end of a short shaft 143', on the other end of which is mounted the bevel-pinion 151. Meshing with the bevel-pinion 151 is the beveled gear 150, fastened on one end of the shaft 165, on the other end of which is fastened the ratchet toothed wheel 144. The ratchet-wheel 144 is pivoted on the shaft of the ratchet-arm 146, carrying on one end the pawl 145 and having its other end coupled to the connecting-lever 153 by the link 155, which in turn is pivoted on the pin 152, mounted in the frame 1. Motion is imparted to cam-lever 153 by the cam 159. By the action of the cam 159 the ratchet-wheel 144 is caused to move through a quarter of a revolution, and through the medium of the shaft 165 and the beveled gears 150 and 151 the driving paste-cord wheel 143 is caused to revolve, so that an intermittent motion is imparted at the proper time to the endless paste-cord 99, which in passing through the paste in paste-pot 141 thus presents a fresh supply of paste to each wrapper in turn.

The motions of the shaft 165 and the hollow shaft 164 are entirely independent of each other. On one end of the hollow shaft, as mentioned above, is fastened the arm 142, and on the other end is fastened the lever-arm 156, as shown in Figs. 3, 5, 6, and 7. Coupled to the lever-arm 156 is the connecting-rod 147, pivoted to the cam-lever arm 148. The con-

necting-rod 147 is governed by a spring 158, one end of which is fastened thereto and the other to the frame; but this spring has a tendency to pull the connecting-rod and its other connections downward, the upward or reverse motion thereof being imparted by a peripheral cam on the cam 90, so that by the action of this spring and cam the arm 142 receives its required motion, and this arm 142 as it supports the paste-pot 141, the cord-wheels 140 and 143, and paste-cord 99 will cause the cord to move to and from the edge of the wrapper as it is presented to it, thus supplying paste to the wrapper. It will be understood that the endless paste-cord has an intermittent motion of its own independent of the motion of the arm 142. The motion of the paste-cord is to constantly present or expose a supply of fresh paste, while the motion of the arm 142 is such as to carry the paste-cord to and from the wrapper as the latter is brought into the proper position to receive the paste.

Referring to Figs. 4, 5, 8, 18, 25, 26, 27, and 28, the table for rolling the cigarette, hereinbefore referred to, consists of two separate parts 44 and 45, which have independent movements. The primary table 44 is mounted on arms 113, pivoted on the stud 116, mounted on the frame of the machine, (see Fig. 4,) and the table 44 is connected to and operated by the cam-lever 169 by means of the connecting-rod 112, pivoted thereto and to a stud 112' on one of the arms 113. (See Figs. 5, 8, and 25.) The supplemental table 45 is supported on the arm 114, pivoted on the stud 116 and connected to and operated by the cam 166, cam-lever 168, and connecting-rod 115, pivoted to said cam-lever and to a stud 115' on the arm 114. (See Figs. 5, 8, and 25.)

The object in having the supplemental table move is so that when the wrapper is being delivered to the wrapper-carrier 105 the edge 101 of the wrapper in its position between the gripping-jaws 97 and 98, as shown in Fig. 21, will have a clear path of travel and so that there will be no danger of the edge 101 of the wrapper striking and bending up against the supplemental table 45. For the same reason also the primary table 44 is dropped down out of the path of movement of the wrapper-carrier.

Referring to Figs. 4, 6, 7, 8, 17, and 27, a device for receiving and holding the rolled cigarette will now be described. The object of this device is to hold the rolled cigarette while the ends are being tucked in. The device for holding the rolled cigarette (particularly shown in Figs. 4, 6, and 17) consists of two arms 183 and 184, pivoted together by means of the pin 186, supported in the bracket 185, the arms 183 and 184 being pivoted together and operating similarly to a pair of scissors and having on their outer ends jaws 183' and 184', which when closed hold the rolled cigarette. The arms 183 and 184 are



operated by means of the connecting-rods 178 and 179, pivoted to the ends of a bell-crank lever 180, pivoted in the bracket 177 and receiving its motion from the cam 173, which is on the side of the cam 172, and the reverse motion is obtained by means of the spring 182, one end of which is fastened to a connecting-rod 178 and the other to the bracket 185.

Referring to Figs. 1, 2, 17, 30, 31, 32, 33, and 34, the device for crimping, folding, and tucking the ends of the cigarette will now be described. This comprises a pair of crimping, folding, and tucking heads 189, similar in construction. These heads are carried on the vibrating frame, hereinbefore referred to, and are caused to perform their several movements simultaneously, as hereinafter particularly described, the principle of such movements being now only described. Referring to Figs. 31, 32, and 33, each head 189 consists of a main body 190, having a cylindrical extension 191. In the main body 190 and across its face are six holes, and this number may be either increased or diminished as desired, in which are located the six tuckers 192. The location of these tuckers is such that their longitudinal axes are tangent to a circle, the diameter of which is as nearly the diameter of the intended cigarette as is practicable. The crimping, folding, and tucking end of the tuckers, as shown in detail in Fig. 34, is at an angle of sixty degrees, there being six tucks. Each tucker is provided with an annular groove 193. In this groove is located a stationary pin 194 to hold the tucker in position. On the outer end of each tucker is fastened the gear-pinion 195. Each gear-pinion 195 meshes with the face-gear 196. This face-gear 196 has a segment of a gear 197 fastened to its back and meshing with the segment-gear 198, fastened on the shaft 199. The shaft 199 is mounted across Fig. 9, the vibrating frame, and on its outer end is mounted the segment-gear 200. Meshing with the gear 200 is the segment-gear 201, having on its extension a cam-roller 201. The segment-gear 201 is pivoted on a stationary pin 202, Fig. 10, which is in the side of the vibrating frame, as shown in Figs. 3, 5, and 11. In this way motion is imparted by cam 176 through the segment-gear lever 201, segment-gear 200, shaft 199, segment-gears 198, and the segment-gears 197 to the face-gear 196 to the gear-pinions 195 on the ends of the tuckers 192, thus causing the tuckers to revolve through one-quarter of a revolution. In Fig. 32 the tuckers are shown in their open position and in Fig. 33 as closed. The cylindrical extension 191 of the main portion 190 has a bearing in the sleeve 202, which in turn has a bearing in the upper portion 203 of the vibrating frame. The cylindrical extension 191 has a feather or keyway 191', which engages a key or feather 202' in the sleeve 202, by means of which the main portion 190 can be moved lengthwise through the sleeve 202, the body and sleeve revolving

together, the sleeve 202 being adapted to revolve in its bearings and the main portion 190 revolving with it. A portion of the periphery of the sleeve 202 is provided with gear-teeth 204', with which the segment-gear lever 204 meshes. The segment-gear lever 204 is fastened to the shaft 205. On the outer end (see Fig. 9) of the shaft 205 is fastened the gear-segment cam-lever 206, which is connected with the cam 96. In this way motion is imparted through the cam 96, through the cam-segment gear-lever 206, the shaft 205, and the segment-gear 204, thus causing sleeve 202 to revolve through a portion of a revolution and also the tucking-head 189. In this particular instance this amount of movement is one-twelfth of a revolution.

Referring to Figs. 31 and 9, located in the portions 203 of the vibrating frame are fulcrum-pins 208, and pivoted on these pins are the links 207, each of which is coupled to the ends of the cylindrical extension 191. Connected to the end of each link 207 is a link 209, which is coupled to one end of lever 210, the other end of the lever 210 being fulcrumed on the pin 221 of the vibrating frame. Pivoted about midway of the lever 210 is one end of the connecting-rod 211, which is pivoted at its other end to the wrist-plate 234. The wrist-plate 234 is fastened on one end of a short shaft 212, and on the other end of this shaft is fastened the gear-segment 213. The shaft 212 has its bearing in a bracket 217, bolted to one side of the vibrating frame. Meshing with the gear-segment 213 is the gear-segment lever 214, pivoted on a pin 215, located in the bracket 217. The lower end of the gear-segment lever 214 engages with the cam 174, and by this means motion is transmitted from the latter through lever 214, segment-gear 213, shaft 212, through the medium of the wrist-plate 234, connecting-rods 211, lever 210, and link 209 to the end of the extension 191. In this way the heads 189 are caused to move in a straight line to or from each other simultaneously. Referring to Fig. 11, there is also located in each upper portion 203 a fulcrum-pin 222, and pivoted on the pin 222 is a link 223, which is connected on one side to one end of the rod 188. Pivoted to the link 223 is a link 224, which is pivoted to one end of the lever 225. The other end of the lever 225 is pivoted on a pin 229, located on the vibrating frame. About midway on each lever 225 is pivoted a connecting-rod 228, pivoted to the wrist-plate 227. The wrist-plate 227 is fastened to one end of a short shaft 218. The short shaft 218 has its bearing not only in the bracket 217, but also in the vibrating frame. Fastened to the other end of the shaft 218 is a gear-segment 219, Fig. 9. Meshing with this gear-segment is a gear-segment lever 220, pivoted on the pin 216, located in the bracket 217. The gear-segment lever 220 engages the cam 175, and by this means motion is transmitted from the latter through segment-gear lever 220, segment-gear 219,



shaft 218, wrist-plate 227, connectors 228, levers 225, and links 224 to the rods 187 188. These rods 187 and 188 are of the same diameter as the cigarette and are perfectly free to revolve with the cigarette when it is being rolled, and they have an intermittent motion in a straight line to or from each other simultaneously.

Referring to Figs. 10 and 11, there is pivoted on the shaft 230 a rotary sleeve 230', provided with arms 102, on the ends of which is pivoted the roller 226. One end of the sleeve 230' is provided with a segment-gear 231, which meshes with the segment-gear lever 232, pivoted on the pin 233, mounted in the vibrating frame. The segment-gear lever 232 is connected with the cam 172, and by this means motion is transmitted from the latter through the segment-gear lever 232 and gear 231 to the rotary sleeve 230'. The arms 102 and the sleeve 230', on which they are mounted, are caused to move intermittently through a portion of a revolution from the position shown in Figs. 10, 7, and 27 to that shown in Fig. 28. The function of the arms 102 and roller 226 is to keep the rolling-apron and the wrapper encircled about the filler while the cigarette is being rolled.

Figs. 9, 10, and 11 are different views of the vibrating frame complete. The vibrating frame is pivoted on the cam-shaft 3, and to the rear side of the vibrating frame is coupled the connecting-rod 181, the other end of which is fulcrumed to the cam-lever 171, engaging in cam 170. By this means motion is transmitted through a portion of a revolution by the action of the cam 170 through the cam-lever 171 and connector 181 to the vibrating frame.

Supposing the paper has been fed from the reel in the proper amount and it has entered the gripper of the paper-carrier, the grippers have closed on the paper, the paper has been cut off, the paper-carrier has moved upward, so as to bring the edge of the paper in the proper position, so that when the arm which carries the pasting mechanism moves the paste-cord will come in contact with the edge of the paper and apply the proper amount of paste. Then the wrapper-carrier carries the paper down to the rolling-tables. Both the primary and supplemental tables having moved down out of the way, the pocket has been formed in the apron, the tobacco has been fed from the feeder, and the pocket-forming device has raised up out of the way. The vibrating frame is, of course, all the way back toward the right. The paper having been brought to the proper location, the supplemental rolling-table moves under it. The pivoted arm 102 and apron-roller 226 on the vibrating frame now swing to the lowest position against the rolling-up table, the take-up arm is moved and the apron drawn up on the edge of the paper, and the filler condensed to the proper size of the cigarette. The tucking-heads are now in their farthest position

apart and the tuckers are open, while the central rods are in toward each other as close as they are required to move. The distance between the ends of the central rods is equal to the length of the filler of the cigarette. The paper-carrier now returns to its original position, the primary rolling-up table now raises to its proper position, and the vibrating frame now moves through the distance which it has to travel, the cigarette thus being rolled and the central rods rolling with it; but they still retain their shortest or closest distance between each other. When the vibrating frame has gotten to the end of its stroke, the cigarette-holders close on the cigarette, which has just been rolled and is suspended between the two central rods. After the cigarette-holders have closed on the cigarette the central rods are drawn apart and inside of the tucking-heads. The tucking-heads now move in toward each other to the closest position. That portion of the ends of the paper which extended beyond the filler (and encircled the ends of the central rods when they were in toward each other) has entered the tucking-heads until the scored or creased portion is even with the centers of the tuckers. (Note.—The distance between the creases on each end of the wrapper is also the distance that is between the ends of the central rods when they are closest together, and this same distance is also the length that the filler is made to conform to by being located between the ends of the central rods.) After the tucking-heads have moved in toward each other the proper amount the tuckers are closed and then they are opened, and the ends of the cigarette then have the appearance as in Fig. 2. There being six tuckers in the head, the tucking-heads now revolve through one-twelfth of a revolution. The tuckers are closed again, thus bringing the faces of the tuckers against the ridges of the paper, and thus pushing the paper in, as is shown in Fig. 1. The tuckers now open and the tucking-heads recede and the rods return to complete the tucking-in of the ends of the wrapper and press it lower, and after the tucking-heads have separated to their original positions the cigarette-holders open and the completed cigarette drops out.

While the tucking-heads herein set forth are shown as adapted to crimp, fold, and close the ends of the wrapper, it is obvious that by enlarging the heads and the rods the mechanism may be adapted for closing in the wrappers about the cans and packages and other articles larger than a cigarette, and in that respect this feature of my invention is not confined to the folding or tucking of the ends of a cigarette. It will also be perceived that the form of the end of the cigarette or other article over which the end of the wrapper is to be folded may be made of any desired form—flat, hemispherical, conical, or compound conical. This result may be accomplished by simply countersinking the faces of the folding-jaws when they are in a closed



position, as shown in Fig. 33. That figure shows the surface of the jaws coming together to form a plane which will produce an end similar to that shown in Fig. 1. If the surface of the jaws when in the position shown in Fig. 33 be reamed out into any desired shape, they will give to the paper when folded they same form as they may have. The jaws may also be of any number—the more numerous the jaws the more numerous the folds. The body may be cylindrical or polyhedron. It will also be perceived that the folding may be accomplished by creasing the sides of the paper cylinder, as is done for a cigarette, a distance slightly in excess of the radius of the cylinder, when the creased portions will when folded in, being longer than the radius, spring inward when forced past one another and form an arch which will prevent the tucked end from escaping. If the contents of the paper cylinder be a solid body, such as candy or a can or bottle, the creases in the exterior of the paper cylinder may be of any length, and having been made they may be folded in toward each other and laid down upon the end of the covered body in any convenient manner by the rotation of the body or the rotation of the folding-head or by direct pressure from an auxiliary folder. The lines of crimping on the outside may be parallel to the axis of the cylinder or they may be at an angle to that axis. They may be as long as the radius of the cylinder or they may be shorter. After the creasing is accomplished it is only necessary to fold down the creased portions upon one another and secure them in any convenient manner.

What I claim is—

1. In a cigarette-machine, a mechanism for automatically and intermittently feeding a continuous strip of wrapper-paper, a mechanism movable to the strip of wrapper-paper to be cut off and adapted to grip and hold the blank of wrapper-paper, while being severed, and then after the blank has been cut off, carrying it to a pasting device, a cutting mechanism which severs the wrapper-blank, a pasting mechanism which automatically and intermittently moves toward the blank to be pasted, a cigarette-rolling mechanism having a cigarette-rolling apron on which the pasted wrapper-blank is deposited by the movable wrapper carrier or holder, a filler-measuring mechanism connected with a supply of tobacco and operating to deposit at predetermined intervals, a filler of tobacco on the rolling-apron, a cigarette-holding mechanism which grasps the rolled incompleter cigarette and holds it for a mechanism for crimping, folding and tucking the ends of the cigarette and holds it in position until said latter operation is completed, and a crimping, folding and tucking mechanism which crimps folds and tucks the ends of the cigarettes as herein set forth.

2. In a cigarette-machine, a rotating device for supporting a continuous strip of wrapper

cigarette-paper, in combination with feeding-rolls between which, said strip of wrapper-paper has a timed movement for presenting a sufficient length of the end of said strip to be cut off, said rolls carrying a device for marking or creasing transversely the wrapper-strip so as to present blanks of a greater length than the length of a completed cigarette, in combination with an automatic intermittently-acting cutting mechanism, which successively cuts off a blank of greater length than the length of the completed cigarette, as herein set forth.

3. In a cigarette-machine, a cigarette-rolling mechanism consisting of a primary table and a supplemental table, each independently movable of the other, a rolling-apron and a take-up arm, one end of the apron being secured to the primary table and the other to the take-up arm, a retaining roll arm, and cam mechanism for operating said arms and tables.

4. In a cigarette-machine, the combination with a wrapper-feeding device, a cutting device for cutting off a wrapper-blank, a vibrating pasting device, and a cigarette-rolling device, of a vibrating wrapper-blank carrier having gripping-jaws, the said wrapper-blank carrier gripping the wrapper-blank before it is cut off, then after it is cut off swinging with it to the pasting device, and then to the cigarette-rolling device where the blank is deposited, as herein set forth.

5. In a cigarette-machine, a pasting device consisting of an intermittently-running paste-cord, and a paste-pot through which the cord runs, mounted on a vibrating support and mechanism whereby said support carries the paste-cord to and from the wrapper-blank to apply the paste thereto, as herein set forth.

6. In a cigarette-machine, a device for crimping, folding and tucking the end of the wrapper of a cigarette, consisting of a reciprocating and rotary head movable to and from the end of a cigarette held with a wrapper having ends projecting beyond the filler, and having and carrying a mechanism, which in one movement of the head, is operated to crimp and fold the projecting end of the wrapper, and in another movement of the head is operated to tuck and compress inwardly, the crimped and folded end of the wrapper of the cigarette, as set forth.

7. In a cigarette-machine, a device for folding and tucking the end of the wrapper of a cigarette, consisting of a reciprocating and rotary head having rotary crimping and folding tuckers, and a reciprocating rod movable lengthwise through said head and serving to pack the filler of a cigarette supported at one end on said rod, the head and tuckers, after said rod is withdrawn, first crimping and folding the end of the wrapper of the cigarette and then tucking and compressing it, as set forth.

8. In a cigarette-machine, a reciprocating and rotary head, having a circumferential



face-gear in combination with a set of tuckers mounted in said head and having angular tucking ends, the tuckers being so disposed that their longitudinal axes are at a tangent to a circle, and said tuckers having pinions on their outer ends which mesh with the circumferential face-gear on the head, as set forth.

9. In a cigarette-machine, a rotary and longitudinally-movable head, a number of rotary tuckers with angular heads located in said rotary head, and having their longitudinal axes located at a tangent to a circle representing practically the diameter of a cigarette or other cylindrical-shaped body upon whose wrapper it may be desired to operate, which is located between the angular ends of said tuckers, mechanism for partly rotating said tuckers, mechanism for rotating said rotary head, and mechanism for reciprocating longitudinally said rotary head, as set forth.

10. In a cigarette-machine, a rotary and longitudinally-movable head, mechanism for rotating said head, mechanism for moving said head longitudinally, a number of rotary tuckers with angular heads, located in said rotary head and having their longitudinal axes located at a tangent to a circle between their angular heads, mechanism for partly rotating said tuckers, and a reciprocating rod movable lengthwise through said rotary head and between the angular heads of the tuckers, and mechanism for operating said movable head, as set forth.

11. In a cigarette-machine, the combination of a cam-operated vibrating frame, having mounted thereon an apron-roll for forming a cigarette and a device for folding and tucking the ends of a cigarette, consisting of two rotary and longitudinally-movable heads, a mechanism for advancing and withdrawing said heads from each other, a mechanism for rotating said heads, a number of rotary tuckers with angular heads, located in said rotary heads, said tuckers arranged so that their longitudinal axes are at a tangent to a circle representing practically the diameter of a cigarette located between said angular heads, mechanism for partly rotating said tuckers, rods longitudinally movable in said rotary heads which compress the filler in a cigarette, and mechanism for advancing and withdrawing said rods to and from the ends of a cigarette held between them, and a number of power-cams and cam-lever mechanisms connected with and operating the several parts and mechanisms hereinbefore recited, whereby said several parts and mechanisms operate by timed movements to perform the several steps in the formation of a completed cigarette with tucked ends, as set forth.

12. In a cigarette-machine, a pasting device consisting of an intermittently-running paste-cord and a pasting-pot, both mounted on a vibrating support, in combination with a vibrating wrapper-carrier and mechanisms connected with and operating the vibrating

pasting device and the wrapper-carrier, whereby timed movements are given to each so that the wrapper-blank carrier carries a wrapper to be pasted toward the pasting device, and the pasting device is swung to meet the wrapper-carrier.

13. In a cigarette-machine, a mechanism for automatically and intermittently feeding a continuous strip of wrapper-paper, said feeding mechanism having in conjunction with it means for creasing or scoring the wrapper transversely of its length, a vibrating arm carrying a knife which automatically and intermittently swings to sever a blank from the strip of wrapper-paper, a wrapper-gripping mechanism consisting of a vibrating arm having gripping-jaws, the jaws of said arm automatically and intermittently grasping a blank of wrapper-paper, and said arm, by a timed movement, swinging with the wrapper-paper blank to a pasting device, a pasting device consisting of a paste-pot and intermittently-movable endless paste-cord mounted on a vibrating support which swings by a timed movement to carry the pasting device to the wrapper-blank, a cigarette-rolling mechanism, a gripping device which grips the cigarette after it is rolled and pasted, and a device for folding and tucking the ends of the cigarette, consisting of two rotary heads movable toward and away from the ends of the cigarette held between them, two reciprocating plunger-rods movable toward the end of the cigarette to compress the filler and withdrawable therefrom, crimping and folding tuckers located in said rotary heads and consisting of rotary shafts having angular heads at their inner ends, the axes of said shafts being at a tangent to a circle represented by the diameter of a cigarette, said rotary heads and tuckers having timed movements whereby the ends of the wrapper of the cigarette projecting beyond the filler are first crimped and folded, and then said crimped and folded ends of the wrapper are compressed into the ends of the cigarette, and mechanisms connected with said several parts enumerated, and cam mechanisms connected with and operating said mechanisms, whereby a series of timed movements are given to the several parts of the machine to successively and intermittently carry out the steps of forming the cigarette.

14. In a machine for folding the end of a cigarette-wrapper, or other similar wrapper, a folding-head provided with movable jaws, the faces of said jaws constituting sectors of the surface of a circle, the apices of said sectors meeting at a point and completing the surface of a circle and so mounted on said head, that on separating, the jaws will swing beyond a circle, leaving a central bore between them, and means for moving the jaws into and out of crimping position.

15. In a machine for crimping and folding the end of a cigarette-wrapper or other similar wrapper, a crimping and folding head which



consists of a series of crimping and folding jaws suitably journaled on the head, and means for operating the same, the axes of the folding-jaws being approximately tangent to a circle circumscribing the tube or other shaped wrapper to be folded.

16. A folding-head for crimping and folding the end of a cylinder of paper, which consists of a series of jaws suitably journaled on the head, the axes of the crimping and folding jaws being approximately tangent to the tube and means for operating the same to be folded and the jaws projecting so as to meet at a point when they are rotated simultaneously.

17. In a machine for making cigarettes, the combination of the following mechanisms: means for scoring a cigarette-paper transversely of its length and a suitable distance from its ends, means for cutting off a cigarette-wrapper blank, means for folding the wrapper-blank into a tube, means for pasting the edges of the wrapper-blank together, and means for folding the ends of the wrapper-blank beyond the scores at the ends of the tube to close the ends of the cigarette.

18. In a cigarette-machine, the combination of means for scoring the cigarette-wrapper transversely of its length at a distance from its ends, approximately equal to half the diameter of the cigarette to be formed, means for cutting off a cigarette-wrapper blank, means for folding the wrapper-blank into a tube, means for pasting the overlapping edges of the wrapper, and means for creasing the wrapper on the outside beyond the score in lines parallel to one another and folding the creased laps down upon one another.

19. In a cigarette-machine, the combination of means for scoring the cigarette-wrapper transversely of its length at a suitable distance from its end, and approximately equal to half the diameter of the cigarette to be formed, means for creasing a wrapper on the outside beyond the score in lines parallel to one another, and means for tucking the creased portions into the interior of the cylinder, as herein set forth.

20. In a machine for making cigarettes, the combination of means for scoring the cigarette-wrapper in lines transversely of its length and a suitable distance from its ends, means for cutting off a wrapper-blank, means for folding the wrapper-blank into a tube to cover the cigarette, means for pasting the lapped edges of the wrapper to secure them, a folding-head for folding the ends of the cigarette-wrapper, which consists of a series of folding-jaws suitably journaled on the head and means for operating the same, the axes of the folders being approximately tangent to a circle circumscribing the cylinder to be folded.

21. In a cigarette-machine, the combination of means for scoring the ends of the wrapper, consisting of a pair of rolls, one of which is provided with a scoring edge, through which the wrapper is passed to score it a suitable distance from its ends, means for cutting off a

wrapper-blank, means for folding the wrapper-blank into a tube around the tobacco, means for pasting the lapped ends together, and means for folding the projecting ends of the tube beyond the score inward to close the end of the cigarette, substantially as described.

22. In a cigarette-machine the combination of a rolling-table having a rolling-apron, a roller suitably mounted to move over the table to roll the cigarette, a pair of crimping-heads on each side of the rolling-table, having centrally-located rods, which reciprocate through the heads and when extended lie on the table, the heads and roller being timed to move forward simultaneously and means for reciprocating the rods and the heads independently.

23. In a cigarette-machine the combination of a rolling-table having a rolling-apron, a roller suitably mounted to move over the table, to roll the cigarette, a pair of crimping-heads on each side of the rolling-table having centrally-located rods which reciprocate through the heads and lie on the table, and on the wrapper, the apron folding the wrapper around the tobacco and the rods, the heads and the roller being timed to move forward simultaneously and means for reciprocating the rods and the heads independently.

24. In a machine for folding the end of a cigarette, or other similar wrapper, the combination of means for holding the wrapped body opposite the folding-head, a folding-head having a series of folders mounted upon it in a plane at right angles to the axis of the wrapper to be folded, the axis of the folders on the face of the head being tangent to a circle, circumscribing the wrapper to be folded, means for inserting the wrapper into the folder, means operating the folder to crease the wrapper in suitable lines to permit it to fold flat and a follower reciprocating through the head to press down the creased wrapper.

25. In a cigarette-machine, the combination of means for rolling a wrapper of suitable size upon the cigarette having the ends of the wrapper projecting beyond its contents, means for creasing the wrapper at its ends on the outside in lines parallel to one another, to the axis of the cigarette, and means for folding the creased ends down upon the contents, substantially as described.

26. In a machine for making cigarettes, the combination of the following mechanisms: means for feeding a continuous wrapper-strip to the machine, means for cutting off a suitable wrapper, means for folding said wrapper into a tube, means for pasting the edges of the wrapper together, and means for creasing the wrapper on the outside beyond its contents in lines parallel to one another and folding the creased laps down upon one another.

Signed by me at Baltimore, Maryland, this 31st day of August, 1899.

HANSON ROBINSON.

Witnesses:

GEORGE KENT,  
JESSE B. RIGGS.