970,028.

J. S. DUNCAN.

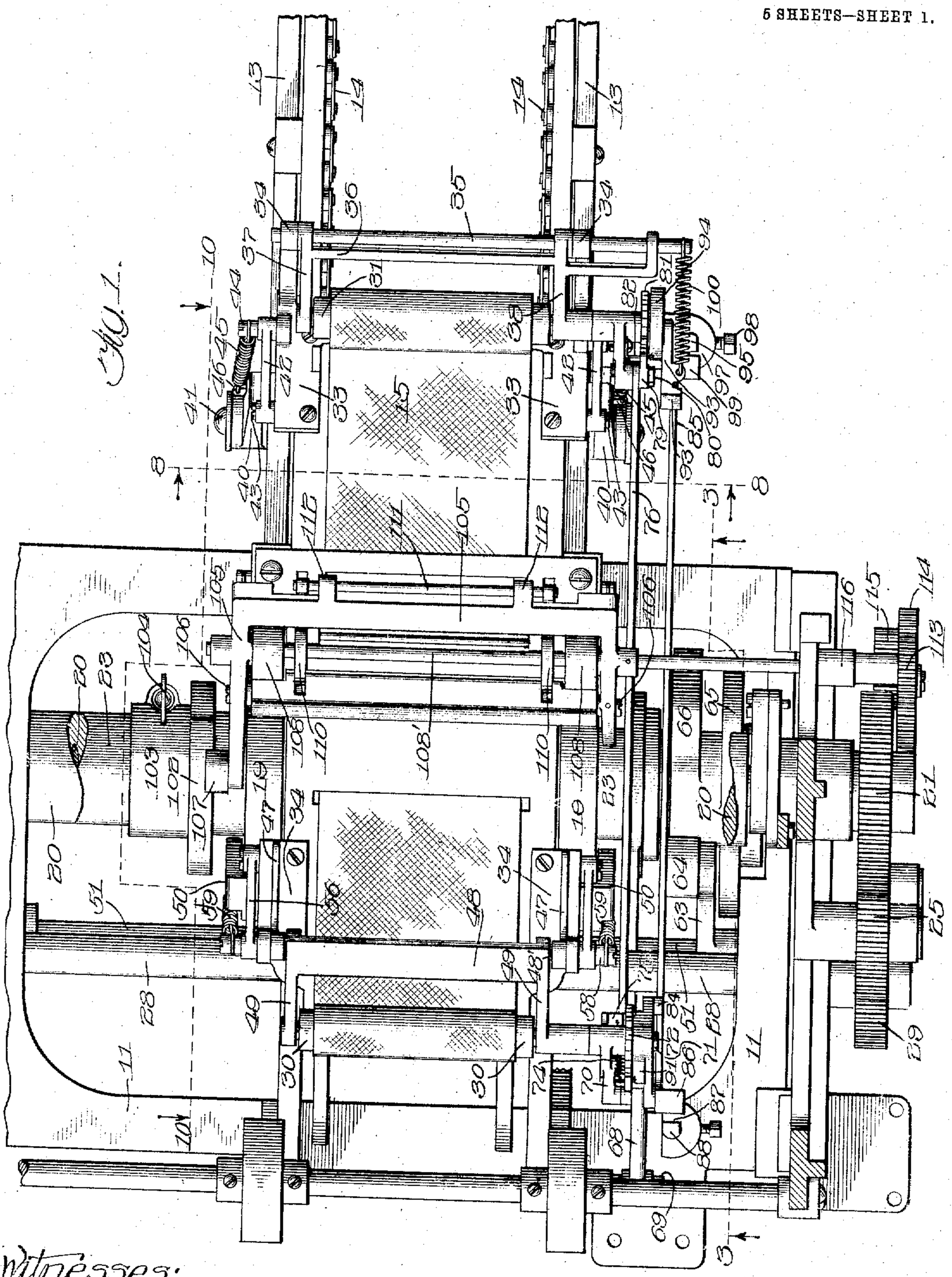
RIBBON FEEDING MECHANISM.

APPLICATION FILED APR. 6, 1910.

Patented Sept. 13, 1910.

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

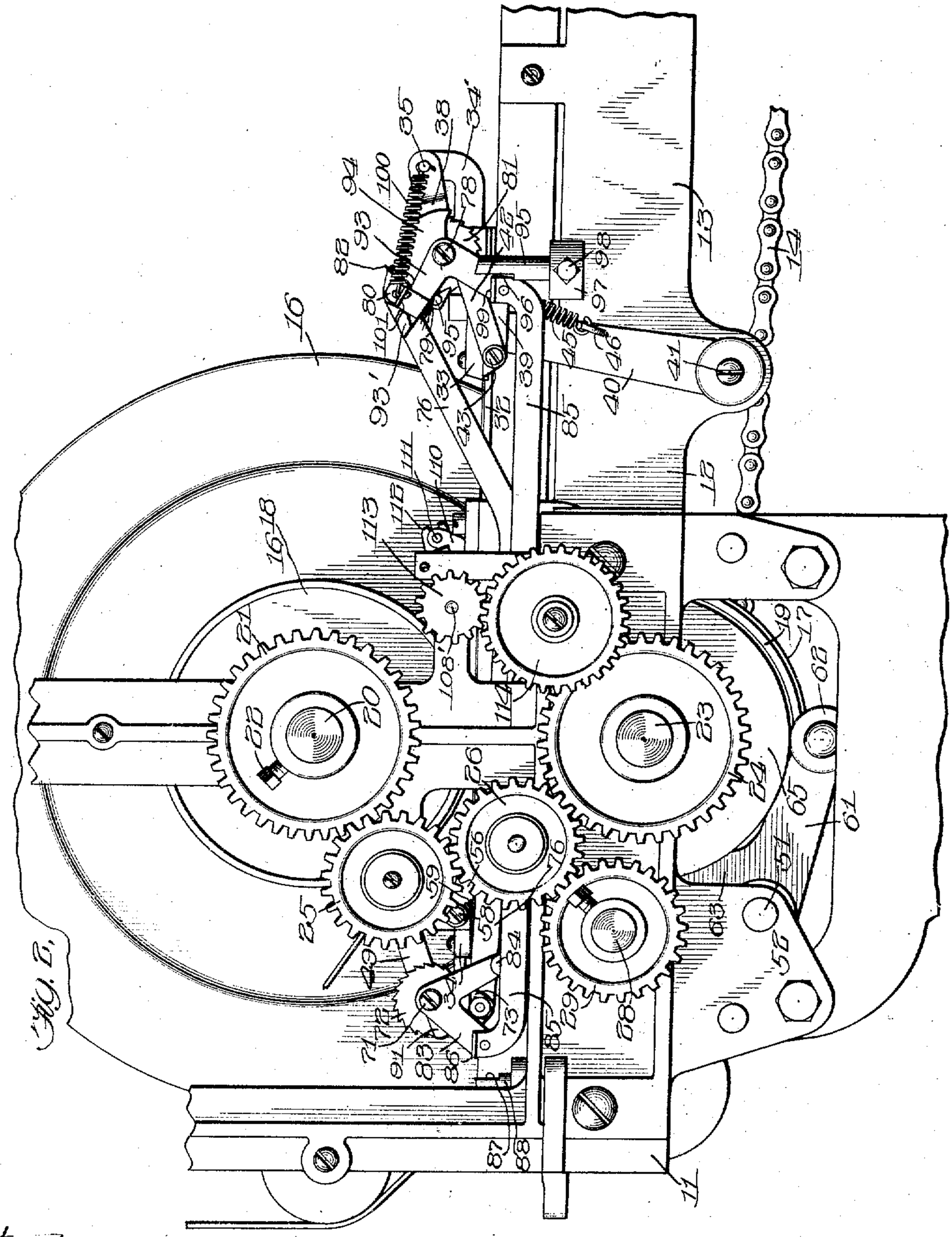

Fig. 2.

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5 SHEETS—SHEET 3.

Fig. 3.

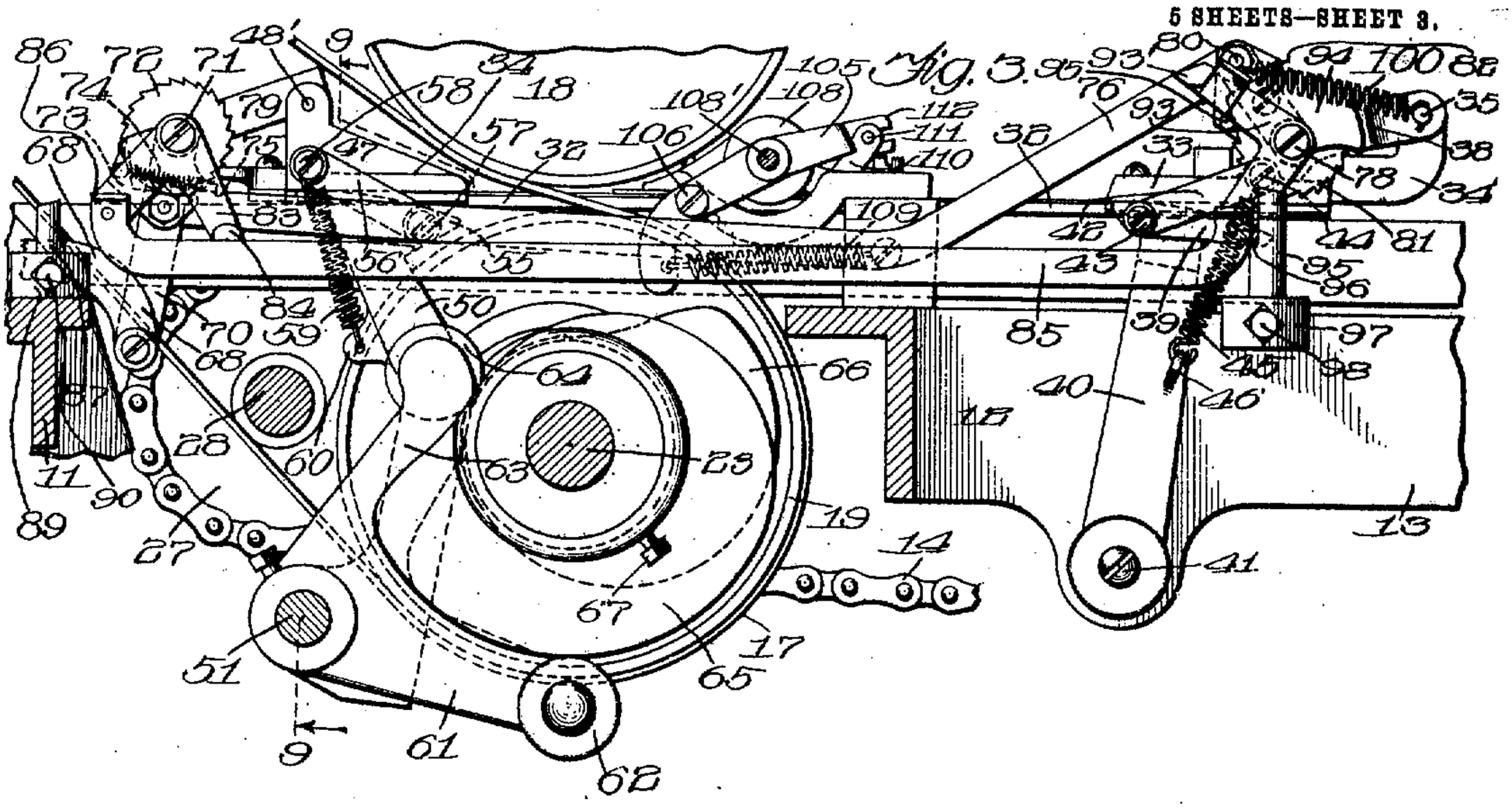

Fig. 4.

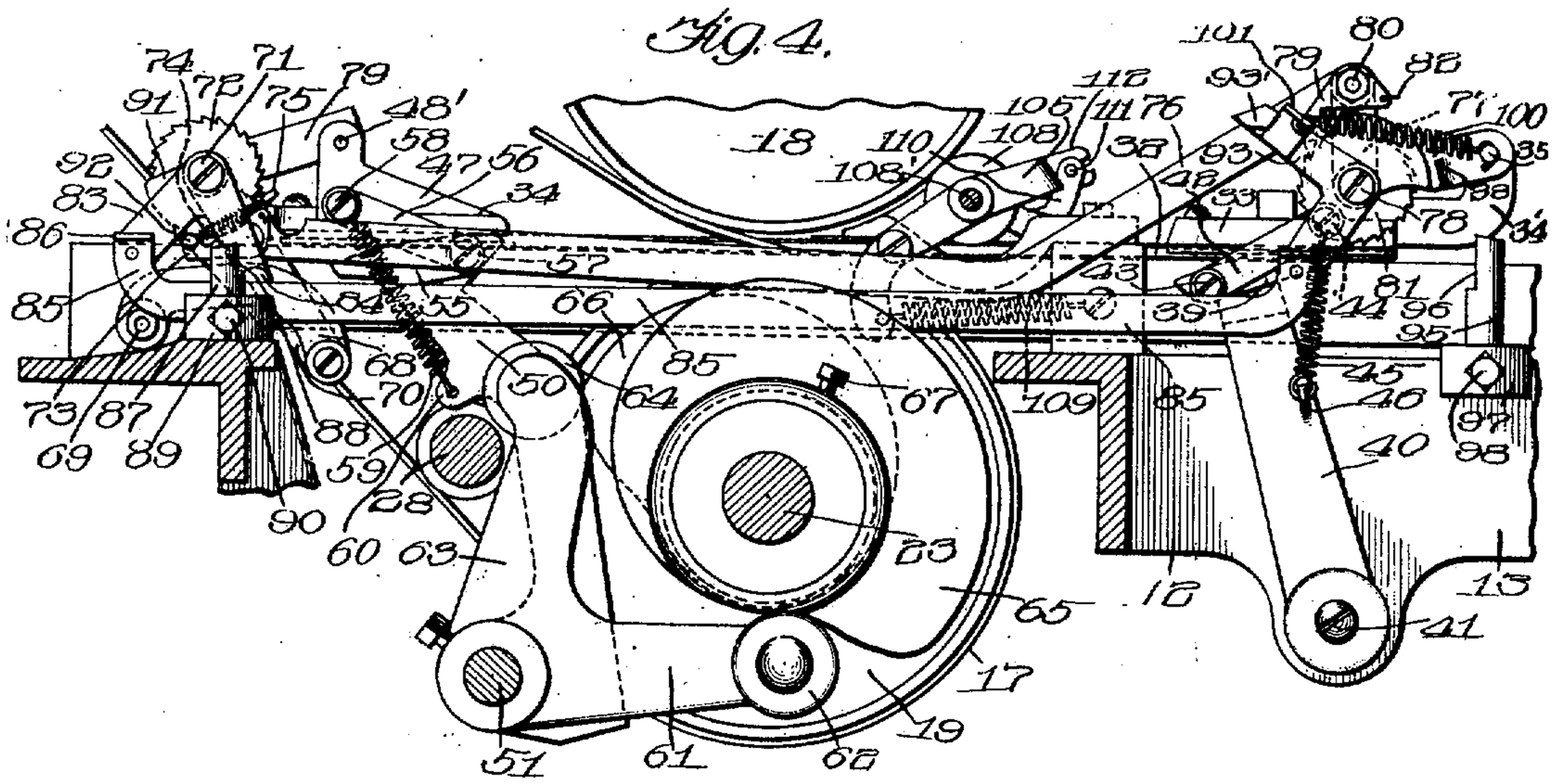

Fig. 5.

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5 SHEETS—SHEET 4.

Fig. 6.

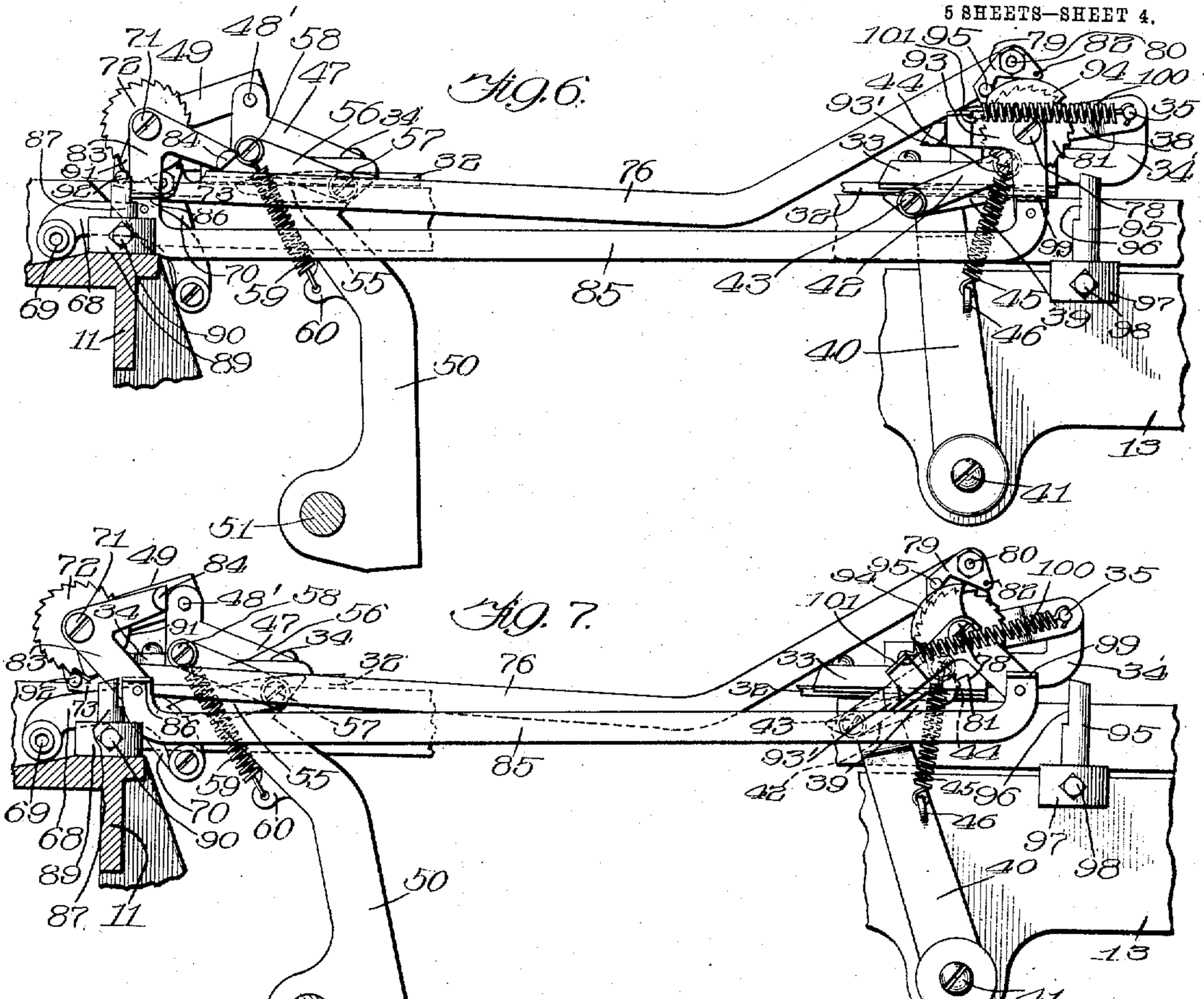
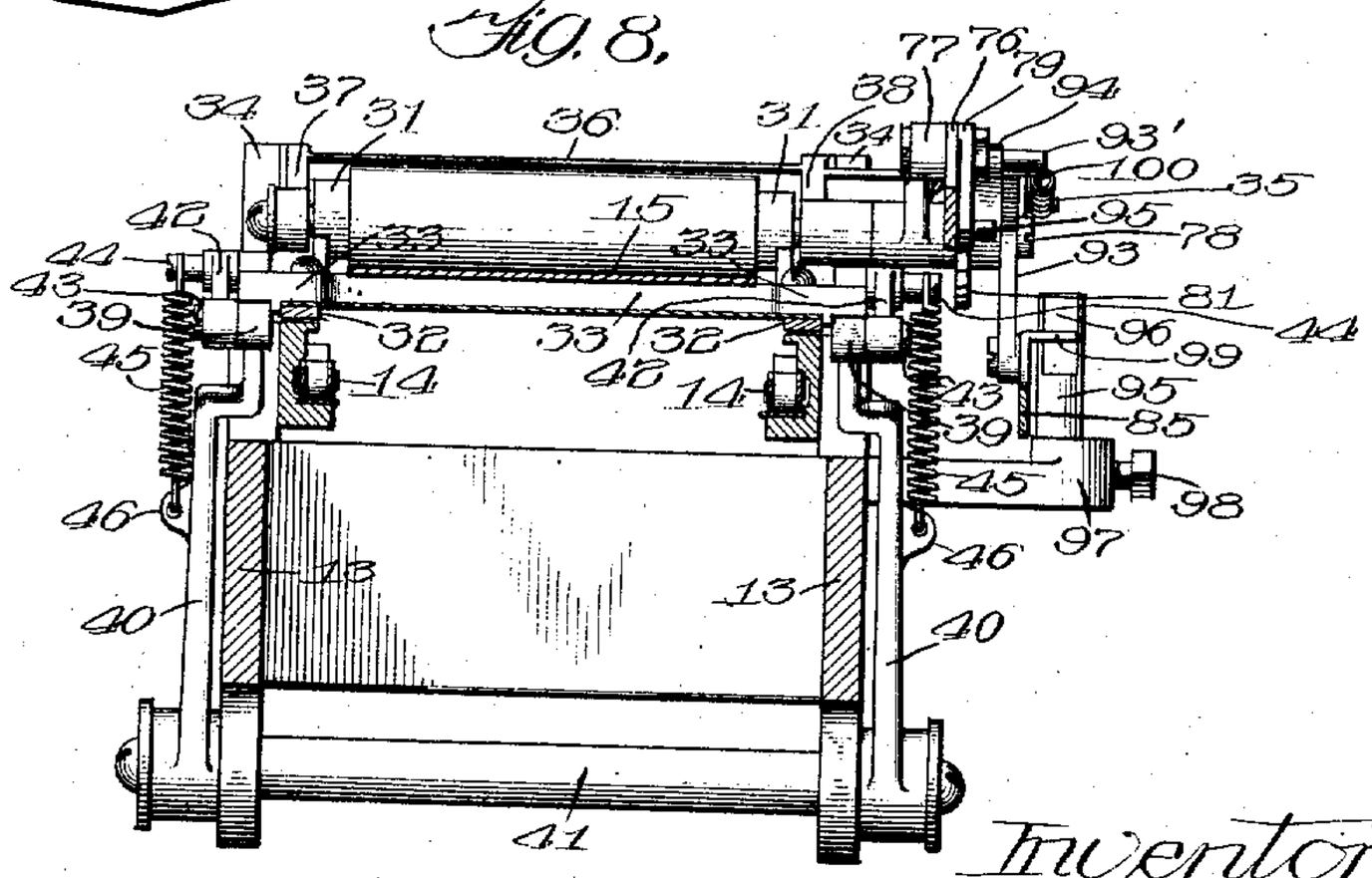


Fig. 7.

Fig. 8.



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5 SHEETS—SHEET 5.

Fig. 9.

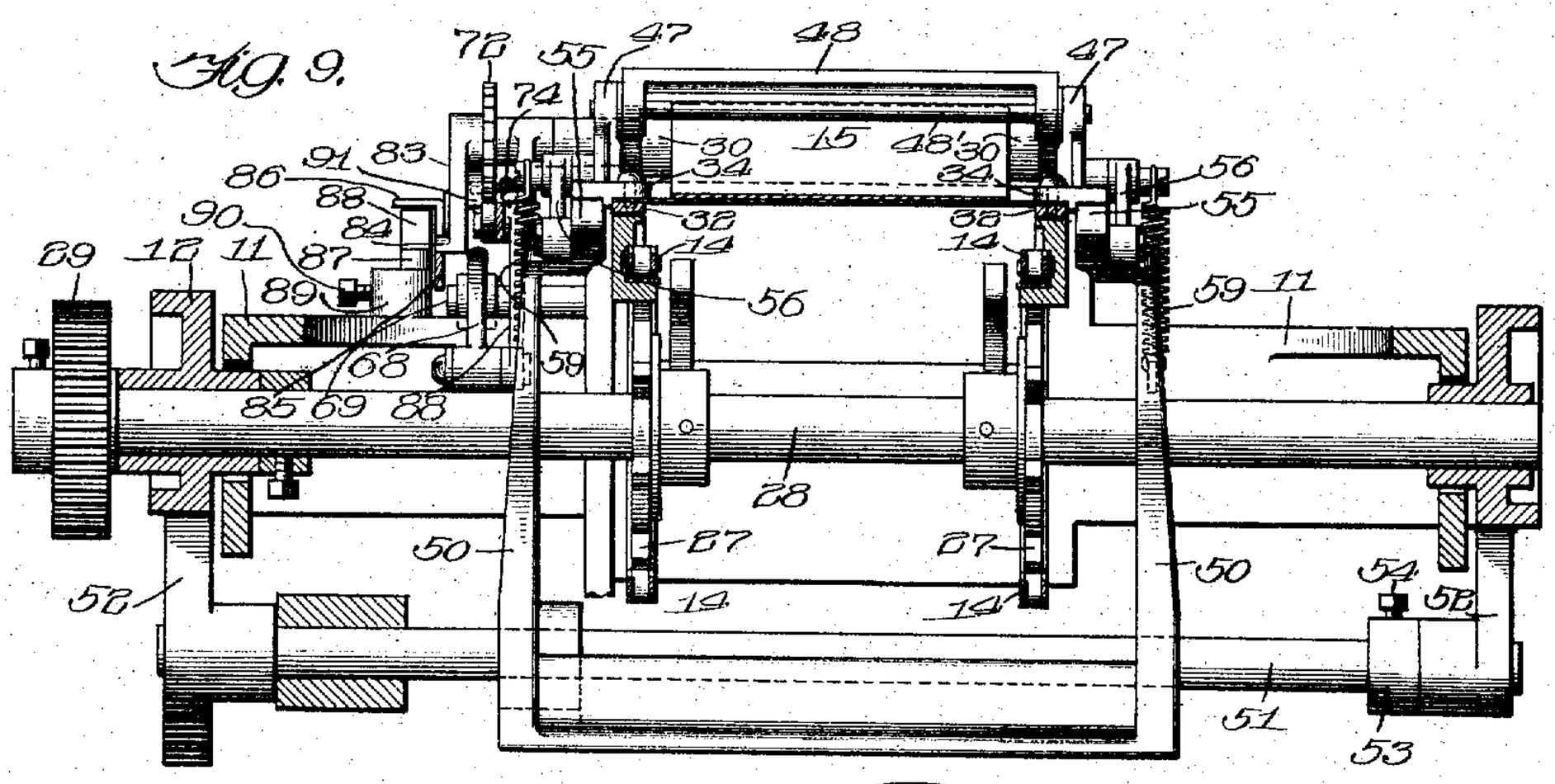
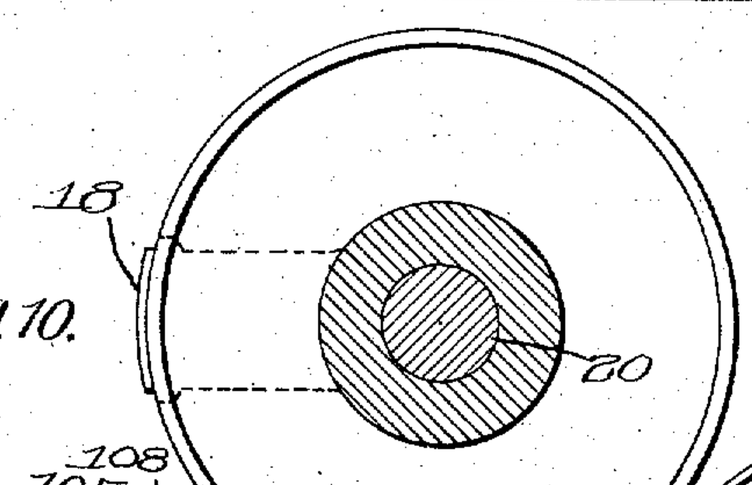
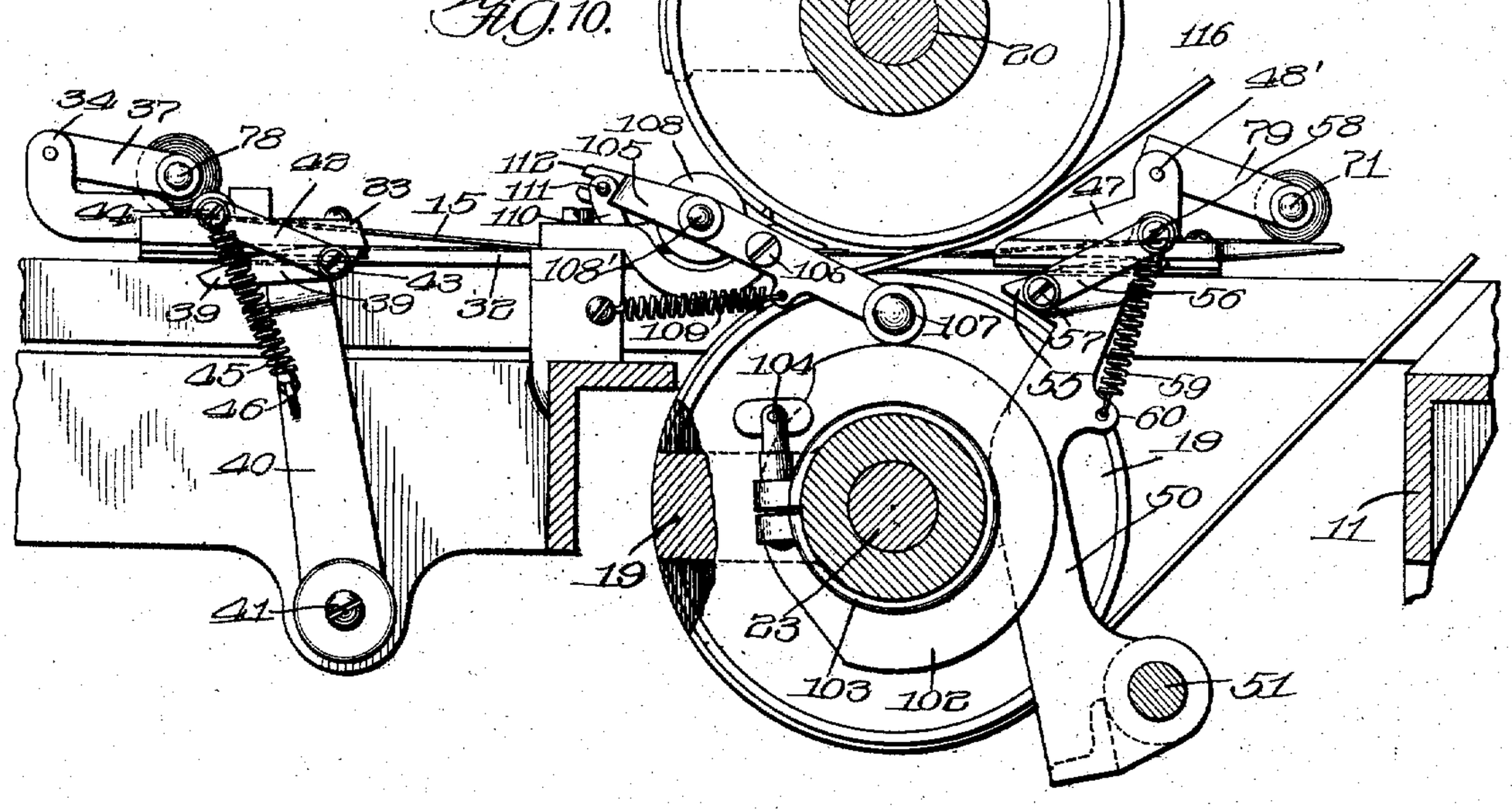


Fig. 10.





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UNITED STATES PATENT OFFICE.

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RIBBON-FEEDING MECHANISM.

970,028. Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed April 6, 1910. Serial No. 553,738.

To all whom it may concern:

Be it known that I, JOSEPH S. DUNCAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ribbon-Feeding Mechanisms, of which the following is a specification.

This invention relates in general to ribbon feeding mechanisms and more particularly to mechanisms of this kind which are adapted for use in connection with addressing machines. In machines of this character the addresses are set up in type in suitable holders or produced on plates and fed one at a time from a magazine to a printing position.

It is an object of my invention to provide improved means for feeding and reversing the direction of the feeding of the inking ribbon.

Another object of my invention is to so adapt the ribbon feeding mechanism that it shall be capable of use in connection with a machine employing rotary platens, between which the inking ribbon and the printing plates are adapted to be fed; and to prevent abrasion of the ribbon by the rotating platens. I have provided mechanism whereby the ribbon rolls may be moved bodily with the printing plate between the platens at the time that the printing operation takes place.

Still another object of my invention is to provide simple and effective means for reversing the feeding operation when the ribbon shall have been substantially exhausted from one of the ribbon rolls.

A further object of my invention is the provision of mechanism for carrying the ribbon feeding and reversing mechanisms in their reciprocatory movements, so that all sliding frictional resistance is obviated.

Still another object is to so mount the ribbon rolls that they shall be capable of independent transverse movement in a vertical plane, and to provide mechanism which shall be controlled by the position of the rolls to set in operation the feed reversing mechanism.

Additional aims and objects will become apparent as the invention is better understood by reference to the following description when taken in connection with the accompanying drawings illustrating a preferred embodiment thereof.

Referring to the drawings—Figure 1 is a plan view showing as much of the addressing machine as is considered necessary for an understanding of the adaptation and operation of the invention. Fig. 2 is a side elevation looking toward the left in Fig. 1. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a section similar to Fig. 3 but showing the ribbon feeding and reversing mechanisms in a different position. Fig. 5 is a detail elevation of the double cam and levers for imparting a reciprocatory movement to the ribbon feeding mechanism. Fig. 6 is a view similar to Fig. 3 with some of the parts omitted, and showing the parts in a position assumed during the reversing operation. Fig. 7 is a similar view showing the reversing operation as completed. Fig. 8 is a section on the line 8—8 of Fig. 1. Fig. 9 is a section on the line 9—9 of Fig. 3, and, Fig. 10 is a section on the line 10—10 of Fig. 1.

In the particular embodiment of the invention illustrated in the drawings, 11 represents the frame of the machine at the delivery end thereof; 12 is a portion of the frame between the printing mechanism and the magazine (not shown); and 13—13 are side pieces connecting the magazine and delivery end of the machine, and provided with a grooved track in which the chain carrier 14 is adapted to travel.

The printing plates, which may be of any well known type upon which the addresses are provided, are stacked in a magazine (not shown) at the right end of the machine, Figs. 1 and 2, and are carried by the chain carrier 14 provided with suitable engaging members disposed upon its upper side, from the magazine at regular intervals, beneath the inking ribbon 15 and between the upper and lower platens 16 and 17, respectively. The envelops or other articles to be printed are fed between the upper platen and the inking ribbon simultaneously with the passage of a printing plate between the platens,

and the printed envelops are then delivered by any suitable delivery mechanism upon a delivery carriage, while the printing plates are discharged at the rear of the machine into a suitable receptacle.

The upper platen is provided with a printing segment 18, and the lower platen is provided with a similar segment 19, the remainder of the peripheries of the platens being cut away to permit free movement of the ribbon between the platens except at the moment the printing segments are disposed in printing position one above the other. The upper platen is carried upon a drive shaft 20 having a spur-gear 21 secured upon one end thereof, preferably by a set-screw 22. The lower platen is secured upon the shaft 23 having the gear 24 which is driven from the gear 21 through the intermediary of the idlers 25 and 26, as shown in Fig. 2. The gears connecting the upper and lower platens are so proportioned that the platens rotate at the same rate of speed to bring the printing segments 18 and 19 in alinement one with the other at each rotation of the platens. The carrier chain 14 is driven at the same linear speed as the perimeters of the platens between which it runs by means of a sprocket wheel 27 secured upon the shaft 28, which shaft is driven by means of a gear 29 adapted to mesh with the idler 26. All of the above mentioned shafts are mounted in suitable bearings in the side members of the machine frame.

The ribbon 15 is wound at either end upon a rear roll 30 and a front roll 31. The movement of the ribbon and the rolls bodily with the printing plate during the printing operation, is accomplished by mounting the rolls in a frame which is supported so as to be capable of a reciprocatory movement. The frame comprises the longitudinally extending side members 32, Figs. 3, 4, 8, and 9, secured at their forward ends to the end member 33. The end member 33 comprises a flat base portion having upwardly extending arms 34′ at its forward side, providing bearings for the rod 35 upon which is pivotally supported the frame 36 having forwardly extending arms 37 and 38 between which the roll 31 is rotatably mounted. It will be evident that the roll is capable of a swinging movement in a vertical plane about the rod 35 as a center. The plate 33 is provided at either side on its lower surface, with flat bearing portions adapted to rest upon and be supported by the curved shoes 39 upon the upper end of the supporting arms 40, pivotally mounted at 41 on the frame of the machine so as to be capable of an oscillatory movement about their pivotal bearings. In order to maintain the member 33 in position upon the shoes 39, links 42 are provided which are pivotally connected to the shoe at 43 and to the base of the member 33 at 44. Coiled tension springs 45 secured to the pivotal points 44 at one end and to the lateral projections 46 from the supporting arms 40, yieldingly retain the member 33 in position upon the shoes 39 while permitting a slight vertical movement as the arms oscillate back and forth. The shoes 39 are curved substantially on an arc struck from the point 41 as a center so that the members 33 reciprocate substantially in a right line as the supporting arms oscillate back and forth.

The end member 34 which is secured to the other ends of the side members 32, is likewise provided with upwardly extending portions 47 serving as bearings for the frame 48 pivotally mounted therein and having rearwardly extending arms 49 between which the roll 30 is rotatably mounted. The end member 34 is also adapted to be carried upon the upper ends of arms 50 secured upon the rock-shaft 51, which is mounted to oscillate in bearings in arms 52 extending downwardly from the main frame of the machine, as shown in Fig. 9. A collar 53 secured upon the rock-shaft by means of a set-screw 54 prevents the shaft from longitudinal displacement to the right, viewing Fig. 9. The arms 50 are provided with curved shoes 55 at their upper ends upon which the lower surfaces of the end member 34 are adapted to be supported. The shoes and the member 34 are connected together by links 56 pivoted to the shoes at 57 and to the end member at 58, and tension springs 59 secured to the end member at 58 and to the supporting arms at 50, yieldingly maintain the end members and the supporting arms in coöperative relation.

It will be evident that an oscillatory movement of the arms 40 and 50 about their pivotal centers, will impart a reciprocatory movement to the frame carrying the ribbon rolls. In order to impart this reciprocatory movement, the rock-shaft 51 has secured thereon a double-armed lever, the lower arm 61 of which is provided with an anti-friction roll 62, and the upper arm 63 of which is provided with an anti-friction roll 64, as shown in Figs. 4 and 5. The shaft 23 has secured thereon a double cam comprising the member 65 adapted to coöperate with the arm 61 and the member 66 adapted to cooperate with the arm 63. The cams are so shaped that they will impart positive oscillation to the rock-shaft 51 through the double-armed lever mounted on the shaft. The double cam is adjustable upon the shaft 23 and is normally held in adjusted position by the set-screw 67. The cam, when properly adjusted, is adapted to impart an oscillatory movement to the shaft 51 in a counter-clockwise direction; thus moving the inking ribbon and rolls to the left, viewing Figs. 1 to 4, at the time that the segments 18 and 19

on the platens are in printing relation one to the other. After the printing segments have separated in the further rotation of the platens, the double-cam returns the inking ribbon and rolls to their normal position shown in Fig. 2.

At each reciprocation of the ribbon rolls, as above described, the ribbon is fed from one roll onto the other by the mechanism which will now be described. A curved link 68 is pivotally mounted at one end on the frame of the machine at 69, and this pivotally connected at its other end with a link 70 (Fig. 3), having mounted at its other end the shaft 71 carrying the ribbon roll 30. Upon the shaft 71 outside the link 70, is secured a ratchet-wheel 72, and on the link 70 there is pivotally mounted the pawl 73 normally held together in engagement with the ratchet-wheel 72 by means of a coiled tension spring 74 secured to the pawl at one end and to a lateral extension 75 from the link at its other end. It will be evident that as the ribbon is moved to the left from the position shown in Fig. 3, that the roll 30 will swing in an arc about the lower end of the link 70, and that the pawl 73 will slide back over the teeth of the ratchet-wheel 72 until it assumes the position shown in Fig. 4, when the ribbon carrying frame has reached the extreme limit of its movement toward the left. When the frame is moved to the right from the position shown in Fig. 4, the ratchet-wheel traveling in a greater arc than the pawl 73, will be rotated by the pawl, thereby winding the ribbon from the roll 31 onto the roll 30. A curved link 76 is pivotally connected at one end to the link 70, and is pivotally attached at its other end to one end of a link 77 loosely mounted on the shaft 78 carrying the roll 31. A pawl 79 is pivotally mounted upon the pin 80, connecting links 76 and 77, and is normally held in operative engagement with a ratchet-wheel 81 secured upon the shaft 78 by a spring 82 (Fig. 1), engaging with an arm extending outwardly from the pawl. The oscillation of the link 70 about its pivotal connection with the link 68, will impart a similar oscillatory movement to the link 77 through the intermediary of the connecting link 76, and the pawl 79 engaging with the teeth of the ratchet-wheel 81, will rotate the roll 31 to wind the ribbon thereon at each oscillation.

Since the pawl 73 is adapted to actuate the roll 30 to wind the ribbon thereon from the roll 31, and the pawl 79 is adapted to actuate the roll 31 to unwind the ribbon from the roll 30 and onto the roll 31, it is necessary that one of the pawls be maintained in inoperative position during the winding operation by the other pawl. For the purpose of alternately permitting the operation of the respective pawls to wind the ribbon first in one direction and then in the other, I have provided the following reversing mechanism:

Upon the shaft 71 outside the ratchet-wheel 72, there is pivotally mounted a bell-crank member 83, the end of one arm being projected laterally to provide a bearing shoulder 84, the other and shorter arm being pivotally connected to a link 85 having its end bent outwardly, as at 86, into the plane of an abutment pin 87 flattened on its front face, as at 88, which is secured in a hollow stud 89 on the main frame by means of a set-screw 90. The abutment pin may be adjusted vertically by loosening the set-screw 90 to bring the upper end of the pin to the proper height. A cam sector 91 is made integral with the bell-crank member and is adapted to engage with a laterally projecting pin 92 on the pawl 73 to withdraw the pawl from engagement with the ratchet-wheel 72, when the bell-crank member assumes the position shown in Figs. 3 and 4. The other end of the link 85 is pivotally connected to the shorter arm of a bell-crank member 93, loosely mounted on the shaft 78 carrying the ribbon roll 31, the outer end of the longer arm of the bell-crank member being laterally projected at 93 to provide a bearing shoulder similar to the shoulder 84 on the bell-crank member 73. The bell-crank member 93 is also provided with a cam sector 94 adapted when the bell-crank lever is rotated into the position shown in Fig. 7, to engage with the laterally projecting pin 95 on the pawl 79, and maintain said pawl out of operative engagement with the ratchet-wheel 81. An abutment pin 95 having a flat rear surface 96, is adjustably held in a socket 97 by means of a set-screw 98, and is disposed in the path of the outwardly bent end 99 of the link 85. A tension spring 100 is connected at one end to a laterally extending lug 101 on the long arm of the bell-crank lever, and at its other end to the end of the rod 35. This spring is adapted to maintain the reversing mechanism in either the position shown in Fig. 3 or the position shown in Fig. 7. When the parts are in the position shown in Fig. 3, the shoulder 84 engaging with the top of the link 85 prevents further rotation of the bell-crank members under the influence of the spring 100, and when the parts are in the position shown in Fig. 7, the shoulder 93′ on the bell-crank member 93 performs a similar function and prevents forward movement in the opposite direction under the influence of the spring 100.

Assuming the parts to be in the position shown in Fig. 3, the reversing mechanism being held in that position by the spring 100, the cam 94 is withdrawn from beneath the pawl 79, permitting it to engage with the teeth of the ratchet-wheel 81, while the

cam 91 on the bell-crank member 83 is in engagement with the pin 92 on the pawl 73 withholding it from operative engagement with the ratchet-wheel 72. As the whole feeding mechanism is now moved to the left by the oscillation of the rock-shaft 51, the ribbon rolls 30 and 31 which are relatively fixedly mounted on the ribbon carrying frame, move a greater distance than the pivotal connection between the links 70 and 76. Since the link 76 is pivotally connected to the outer end of the link 77, and since the pawl 79 is mounted at the pivotal connection 80 between these two links, it will be evident that the roll 31 will travel to the left farther relatively than the point 80, and the parts will assume the position indicated in Fig. 4, the pawl 79 having been moved in a clockwise direction, looking at Fig. 4, relatively to the ratchet-wheel 81. When the ribbon carrying mechanism is now moved to the right, the ratchet-wheel 81 again moves relatively to the pawl 79, thus imparting a partial rotation to the roll 31 as the parts again assume the position shown in Fig. 3. A partial rotation is imparted to the roll 31 at each reciprocation of the ribbon carrying frame, until the roll 30 has become substantially depleted whereupon the reversing operation takes place as follows:

As has been previously explained, the roll 30 is mounted in the frame 48 which is pivoted in the end member 47. The roll is supported upon the transversely extending portion of the member 47 upon which the bottom of the roll rests. As the ribbon is unwound from the roll it gradually decreases in size and its shaft 71 swings downwardly about the pivotal point 48′. The height of the abutment pin 87 is so adjusted that the outwardly bent end 86 of the link 76, will pass over the end of the pin as the ribbon carrying mechanism reciprocates, until the ribbon on the roll 31 has become practically exhausted. The shaft 71 has lowered sufficiently upon the practical exhaustion of the ribbon, to bring the outwardly bent end 86 below the top of the abutment pin 87. As will be evident from the drawings, the top of the pin is slanted rearwardly so that if the end 86 should engage with the top of the pin when the mechanism is moving toward the right, it will simply slide up over the pin and drop off without producing any result. If, however, the end 86 engages the flat front face of the abutment 87 when the mechanism is traveling toward the left, the bell-crank members 83 and 93 will be turned upon their axes from the position shown in Fig. 3 to the position shown in Fig. 7. Fig. 6 shows the position of the parts after the bent end 86 has engaged the abutment and the mechanism is still moving toward the left, the reversing operation having been partially completed. The turning of the bell-crank members on their axes withdraws the cam 91 from operative engagement with the pawl 73, permitting it to engage with the teeth of the ratchet-wheel 72, while the movement of the bell-crank member 93 brings the cam 94 into operative engagement with the pawl 79 and raises it from its operative relation to the ratchet-wheel 91. As the ribbon carrying frame continues to reciprocate, the ribbon will now be wound from the roll 31 onto the roll 30 by means of the pawl 73 coöperating with the ratchet-wheel 72. When the ribbon has been practically all wound upon the roll 30 and the roll 31 is substantially exhausted, the bent end 99 of the link 85 will be lowered sufficiently to engage the rear face of the abutment pin 95 in the same manner that the bent end 86 engages the front face of the abutment pin 87 upon depletion of the roll 30. Engagement of the bent end 99 with the abutment 95, before the ribbon feeding mechanism has reached the limit of its movement to the right, will move the parts from the position shown in Fig. 7 to the position shown in Fig. 3, thus reversing the ribbon feeding operation.

The envelops or other articles to be printed may be supported in front of the upper platen in any suitable manner, and may be automatically fed between the platens, or they may be manually inserted therebetween, the particular means for delivering the envelop to feeding position forming no part of the present invention. I have shown, however, in Figs. 1 and 10, mechanism adapted to coöperate with the upper platen roll to draw the envelops or other articles into printing position after they have been placed in feeding position.

Referring to Fig. 10, the shaft 23 has suitably mounted thereon, a cam 102 which is maintained in adjusted position by means of a collar 103 which engages with the shaft and is held in position thereon by means of a clamp-nut 104. A frame 105 pivotally secured to the main frame of the machine 106, is provided at one end with a roll 107 adapted to travel upon the cam 102. A plurality of feeding rolls 108 are carried upon a shaft 108′ in the frame beyond the pivotal point 106, so that they will be yieldingly pressed against the face of the platen 16 by the tension spring 109 whenever the roll 107 rides into the low part of the cam 102. The shaft 108′ is driven by a gear 113 securing the outer end thereof and meshing with an idler 114 integral with an idler 115 adapted to be driven from the gear 24. In order to permit the movement of the rolls 108 toward and from the platen, that part of the shaft 108′ between the frame 105 and the bearing 116 on the main frame, is composed of a series of universal connections to give the required flexibility thereto. A plural-

ity of curved fingers 110 are disposed over the roll carrying shaft 108', and are pivotally secured at their outer ends upon a rod 111 mounted in rearwardly extending ears 112 on the frame 105. The ends of the curved fingers adjacent the platen are bent upwardly to engage the surface of the platen, and prevent envelops which may be inserted between the platen and the roll 108 from being fed forward to printing position except at the proper time when the printing segments of the platens are positioned in the proper relative relation. The cam 102 is so adjusted on the shaft that the low part thereof will pass under the roll 107 just before the printing plate carried by the carrier chain enters between the platens. The frame 105 is rotated upon its pivots 106 by the spring 109 to bring the roll 108 into engagement with the platen to feed an envelop forward, and simultaneously the inner end of the curved fingers are withdrawn from engagement with the platen by the lifting of the rod 111 as the frame 105 is tilted.

It will be obvious that the printing segments of the platens, the envelops, the ribbon, and ribbon feeding mechanism, and the printing plate on the carrier chain, all move rearwardly during the printing operation at the same rate of speed. After the printing operation the envelop is delivered by any suitable mechanism to a delivery rack or carrier. I have shown for the purposes of illustration merely, a portion of a delivery mechanism comprising a plurality of belts 116 passing around rolls on on the shaft 23 and engaging with the lower side of the upper platen. The envelops when fed from the platen will be carried by the belts and delivered to any suitable receptacle.

While I have shown and described a preferred embodiment of my invention, it will be obvious that various minor mechanical changes may be resorted to without departing from the spirit of the invention or sacrificing any of the material advantages thereof.

What I claim is:

1. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls mounted to move in a direction transverse to their axes, means for feeding the ribbon from one roll onto the other, and means controlled by the position of the rolls for reversing the feeding operation.

2. In a ribbon feeding device, the combination of a pair of ribbon rolls, pivotally mounted frames in which said rolls are rotatably mounted whereby the rolls are capable of movement about the frame pivots, means for feeding the ribbon from one roll onto the other, and means for reversing the feeding operation upon substantial depletion of one of the rolls.

3. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, pivotally mounted frames in which said rolls are journaled, whereby each roll is capable of independent movement in a direction transverse to its axis, means for feeding the ribbon from one roll onto the other, and means controlled by the relative positions of the rolls for reversing the ribbon feeding operation.

4. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, pivotally mounted frames in which said rolls are mounted, plates upon which said rolls are adapted to rest, means for feeding the ribbon from one roll onto the other, and means controlled by the position of the axis of one of said rolls relatively to its plate for reversing the feeding operation.

5. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls mounted so as to be capable of movement transversely of the path of travel of the ribbon, means for feeding the ribbon from one roll onto the other, means adapted to move with said ribbon rolls for reversing the feeding operation and stationary means for actuating said reversing means.

6. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, shafts therefor, means for feeding the ribbon from one roll onto the other, and means for reversing the feeding operation, comprising a member pivotally mounted on each ribbon roll shaft, a connection between said members, and a stationary device adapted to turn said members on the ribbon roll shafts.

7. In a ribbon feeding mechanism, the combination of a movable frame, a pair of ribbon rolls mounted thereon, means for feeding the ribbon from one roll onto the other, comprising a ratchet-wheel mounted on a ribbon roll, a pawl adapted to actuate said wheel, means for operating said pawl and means for reversing the feeding operation, comprising a member pivotally mounted on the ribbon roll shaft and adapted to raise said pawl out of engagement with said ratchet-wheel and a stationary device for operating said pawl raising means.

8. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, means for intermittently feeding the ribbon from one roll onto the other, and means for moving said rolls transversely of their axes in a direction parallel with the direction of travel of the ribbon.

9. In a ribbon feeding mechanism, the combination of a frame, a pair of ribbon rolls, and means for pivotally supporting said rolls on said frame so that they are capable of movement in a direction parallel

with and in a direction transverse to the path of travel of the ribbon.

10. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, means for supporting said rolls, said means being capable of movement with the rolls in a direction transverse to the path of movement of the ribbon, and means for moving said rolls simultaneously in a direction parallel with the path of movement of the ribbon.

11. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, means for supporting said rolls so that they are capable of independent movement transversely of the direction of travel of the ribbon and mechanism dependent upon the position of the rolls for reversing the ribbon feeding operation.

12. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, means for moving the rolls with the ribbon thereon, bodily transversely of their axes, in a direction parallel with the path of travel of the ribbon, means for actuating said rolls to wind the ribbon from one roll onto the other, and means for reversing the winding operation.

13. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, a pair of pivotally mounted frames in which said rolls are rotatably mounted, means for rotating said rolls to wind the ribbon from one roll onto the other, and means for reciprocating said rolls, bodily, in a direction transverse to the longitudinal axes of said rolls.

14. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, means for feeding the ribbon from one roll onto the other, means for moving said rolls and ribbon in a direction transverse to the longitudinal axes of said rolls, and means for reversing the ribbon feeding operation.

15. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, means for feeding the ribbon from one roll onto the other, means for reversing the feeding operation, all carried upon a frame, means for actuating said reversing mechanism, and means for reciprocating said frame in the plane of travel of the ribbon.

16. In a ribbon feeding mechanism, the combination of a frame, a plurality of oscillatory supporting arms carrying said frame, a pair of ribbon rolls, means for feeding the ribbon from one roll onto the other, and feed reversing mechanism, all mounted on said frame, means for reciprocating said frame longitudinally of the ribbon and stationary means adapted to operate said reversing mechanism.

17. In a ribbon feeding mechanism, the combination of a ribbon roll, a ratchet-wheel secured to said roll, a link pivotally mounted at one end on the ribbon roll shaft and pivoted to a swinging member at its other end, a pawl carried by said link and adapted to engage with the ratchet-wheel, and means for moving the ribbon roll relatively to the pivoted end of the link, whereby a partial rotation is given to said roll by the pawl carried on the link.

18. In a ribbon feeding mechanism, the combination of a ribbon roll, a shaft therefor, a ratchet-wheel carried thereby, a link pivoted to the roll shaft, a pawl carried by said link and adapted to engage with said ratchet-wheel, and a cam loosely mounted on the ribbon roll shaft and adapted to be turned to a position to engage the pawl and withdraw it from operative engagement with the ratchet-wheel.

19. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls mounted for movement independently of each other, a ribbon, means for feeding the ribbon from one roll onto the other, and means for moving the ribbon and rolls, bodily, during the printing operation in a direction parallel with the path of travel of the ribbon.

20. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, shafts therefor, pawl and ratchet means connected with said rolls for feeding the ribbon from one roll onto the other, and means for reversing the feeding operation by maintaining one of the pawls out of operative engagement with its ratchet while permitting the other to coöperate therewith, comprising a plurality of cams mounted on the ribbon roll shafts, a link connecting said cams, means for yieldingly maintaining said cams in one of two positions, and a stationary abutment adapted to actuate said link to reverse the position of the cams.

21. In a ribbon feeding mechanism, the combination of a pair of ribbon rolls, means for feeding the ribbon from one roll onto the other and a reversing mechanism, all mounted to reciprocate bodily on the machine frame, and a stationary abutment disposed in the path of reciprocation of the reversing mechanism and adapted to be engaged thereby, whereby to reverse the feeding operation.

22. In a ribbon feeding mechanism, the combination of a ribbon roll, a pivotally mounted frame in which said roll is carried whereby the roll is capable of movement in a vertical plane, mechanism for rotating said roll, and means mounted upon the roll shaft for throwing out of operation the roll rotating mechanism, and means for yieldingly retaining said rotating mechanism in either its operative or inoperative position.

23. In a ribbon feeding mechanism, the combination of a main frame, a second frame mounted to reciprocate longitudinally of the main frame, a pair of ribbon rolls

mounted in said second frame so as to be capable of independent movement relatively to the frame, means for feeding the ribbon from one roll onto the other, a stationary abutment on the main frame, and means carried upon the ribbon roll shafts adapted to be brought into engagement with said abutment during the reciprocation of the said second frame when one of the rolls is substantially exhausted, to reverse the feeding operation.

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Witnesses:
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