No. 856,122. PATENTED JUNE 4, 1907.

C. WILLIAMS.

PAPER FEEDING MECHANISM.

APPLICATION FILED JUNE 27, 1904. RENEWED APR. 15, 1907.

4 SHEETS—SHEET 1.

Fig. 1

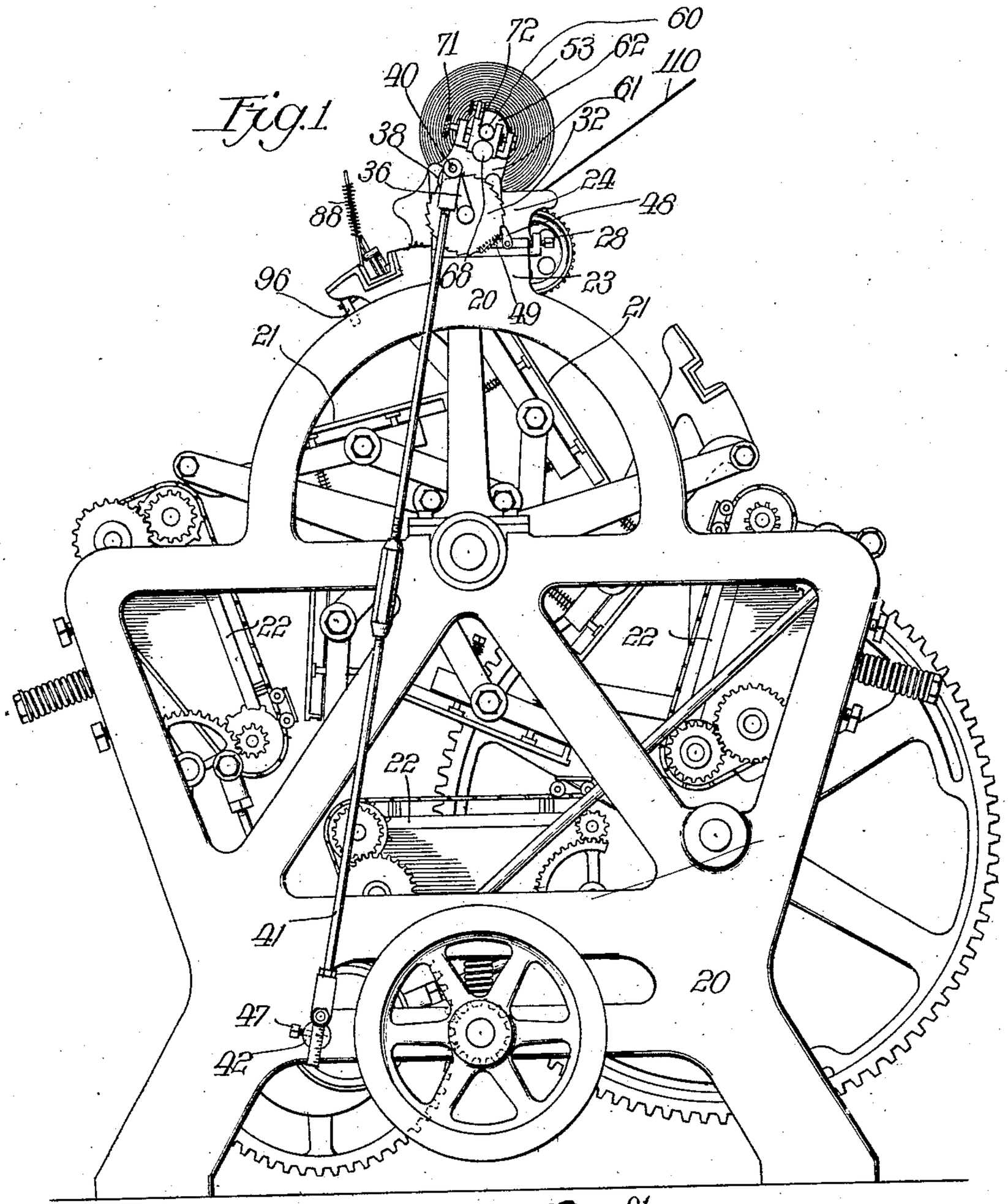
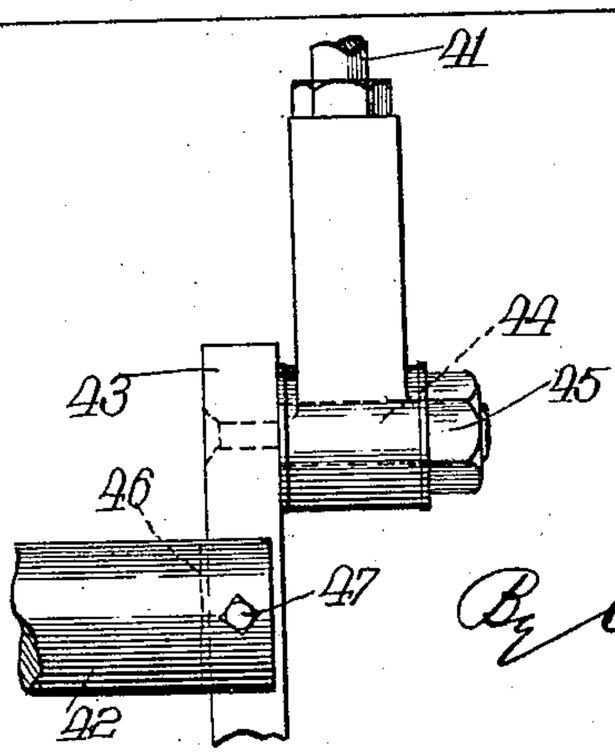


Fig. 2



Witnesses;
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Arthur B. Seibold.

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4 SHEETS—SHEET 2.

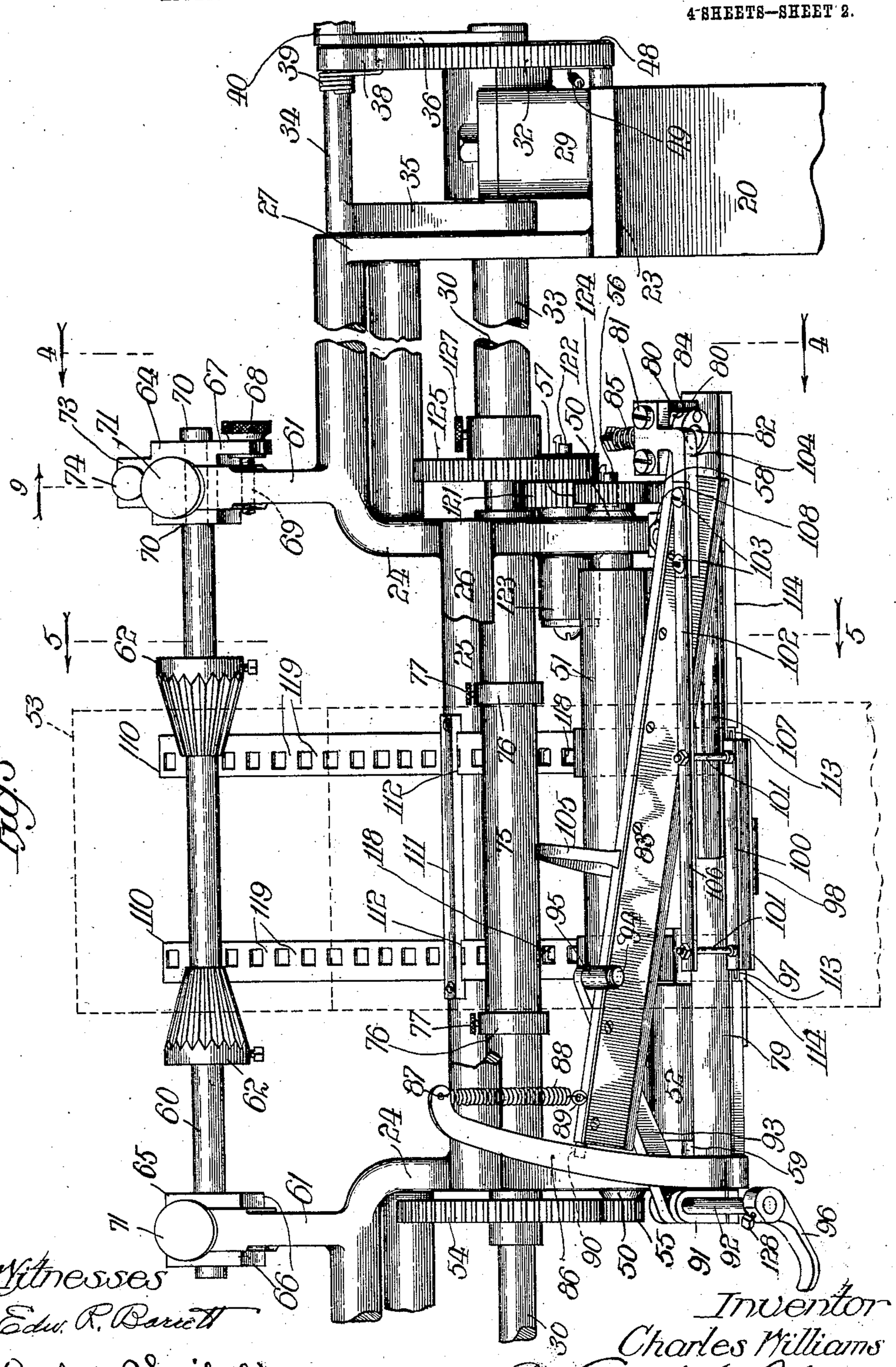

Fig. 3

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4 SHEETS—SHEET 3.

Fig. 4

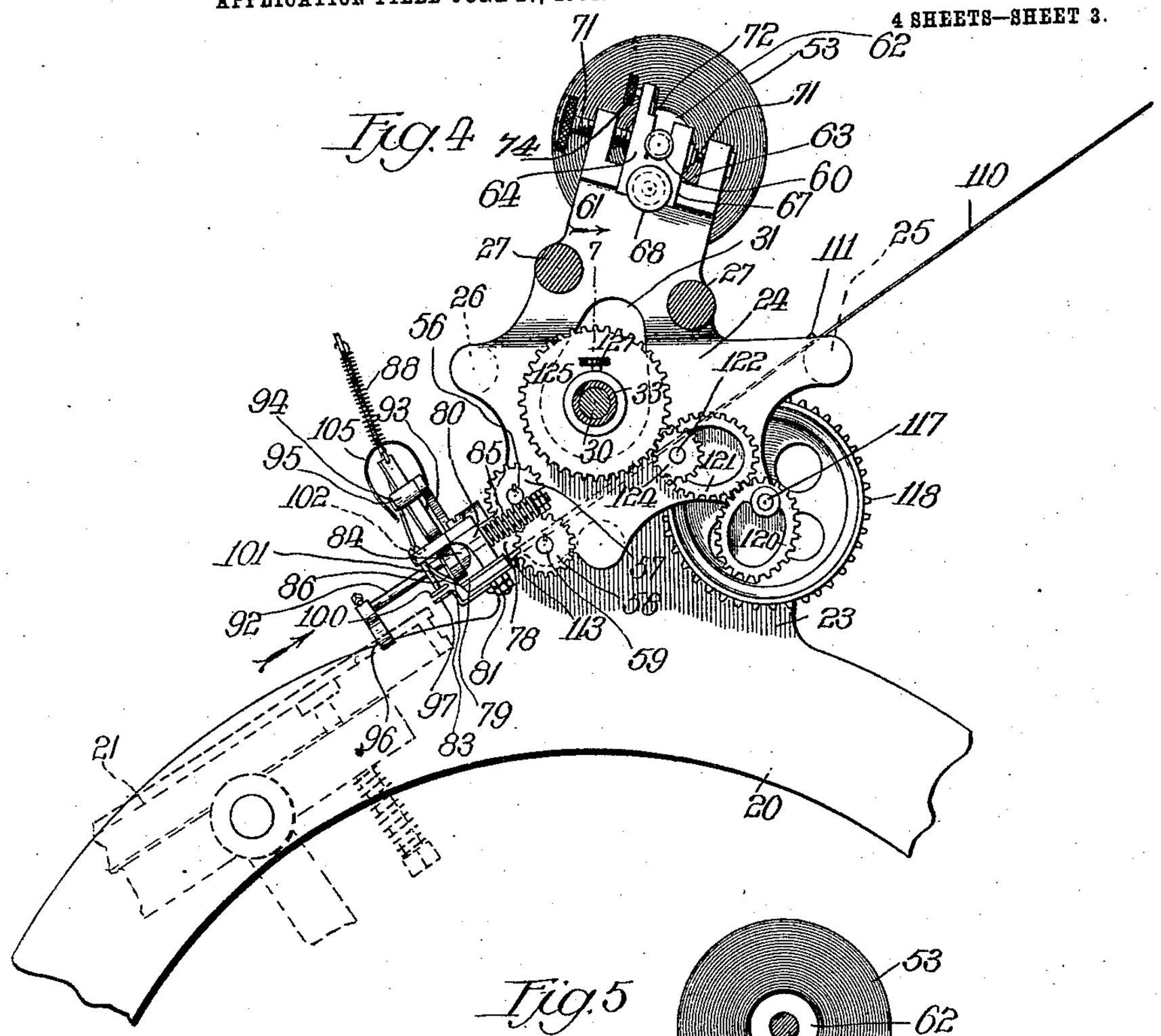


Fig. 10.

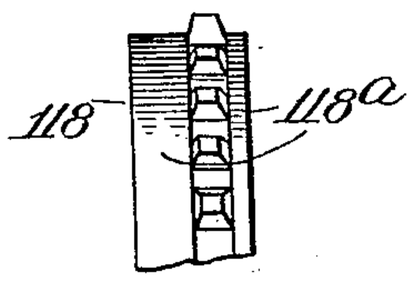
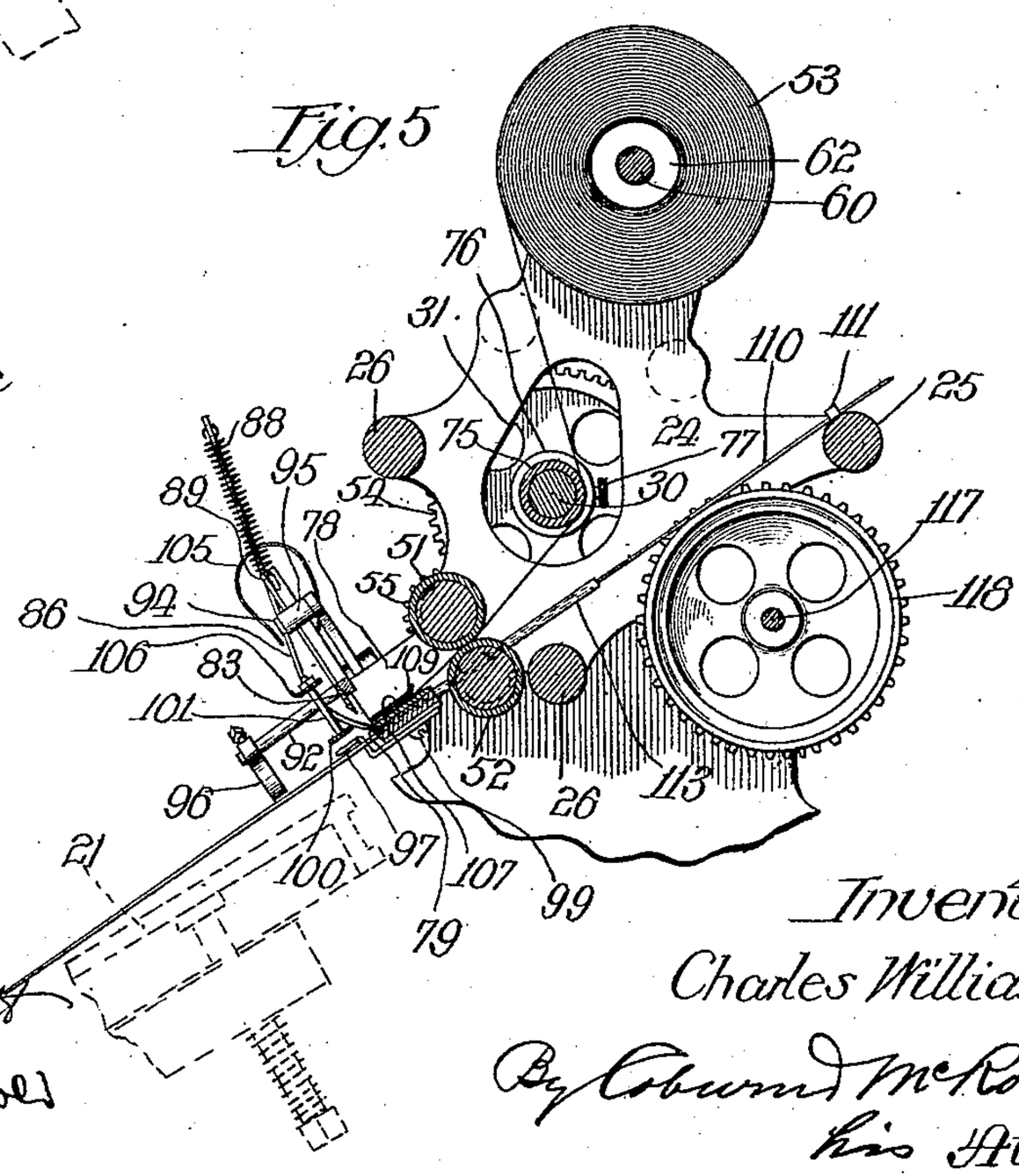


Fig. 5



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4 SHEETS—SHEET 4.

Fig. 6

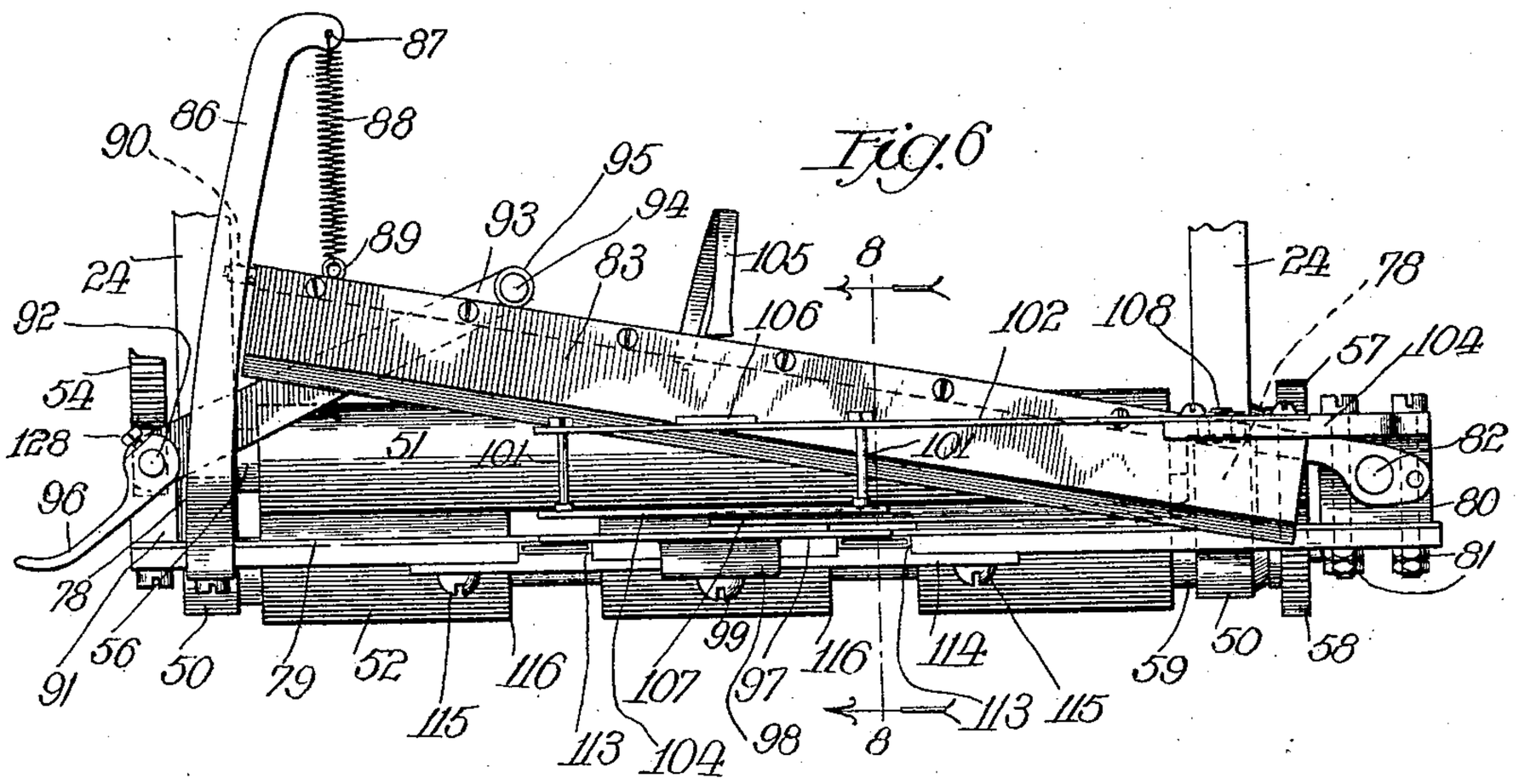


Fig. 7

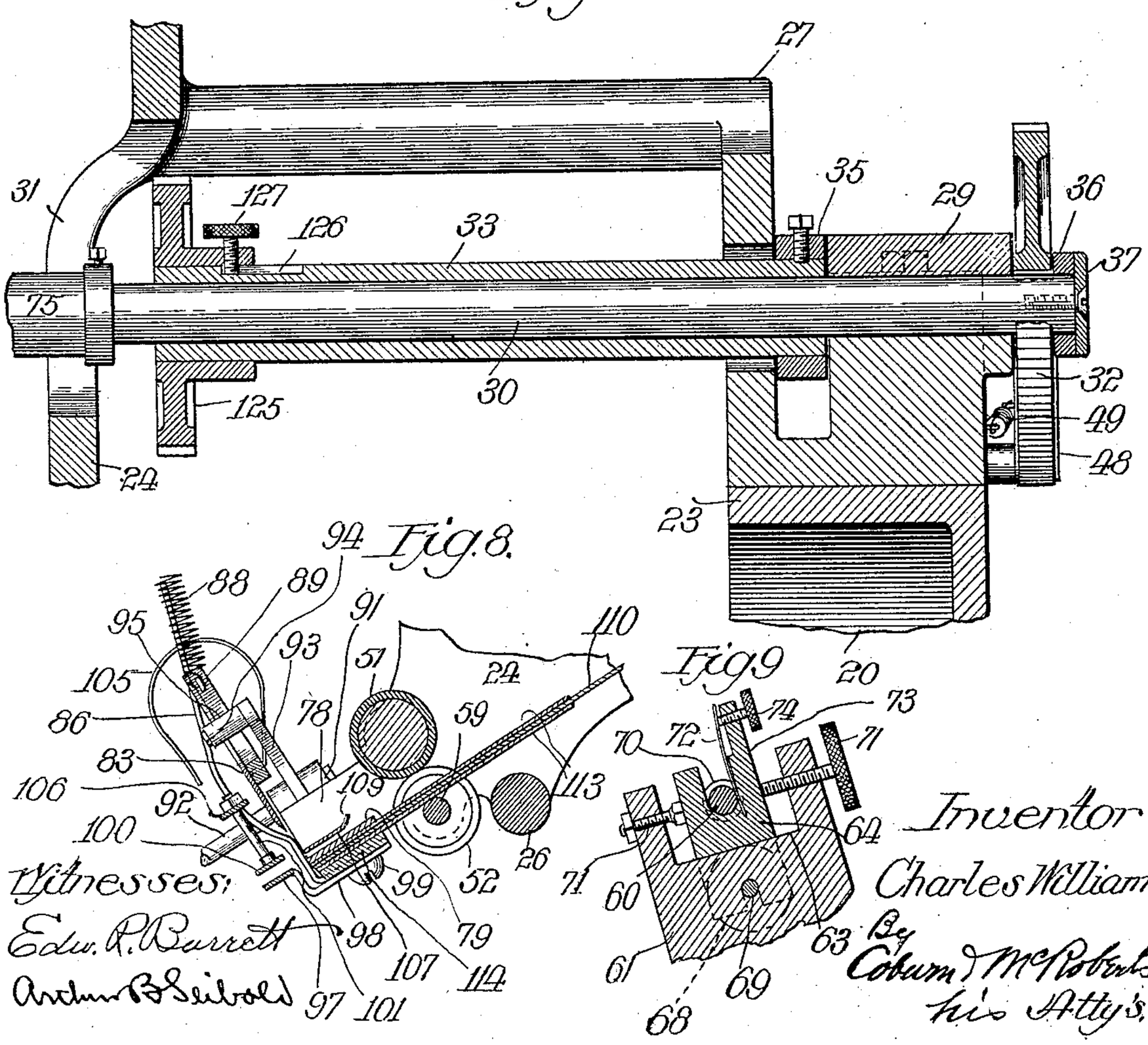
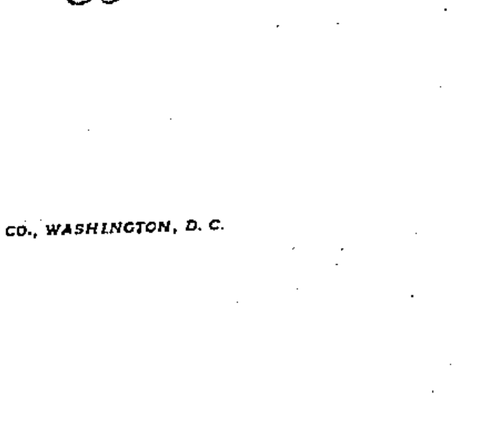


Fig. 8.

Fig. 9



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UNITED STATES PATENT OFFICE.

CHARLES WILLIAMS, OF CHICAGO, ILLINOIS, ASSIGNOR OF THREE-FOURTHS TO WILLIAM H. COWLES AND ONE-EIGHTH TO JOHN F. YOUNG, OF SPOKANE, WASHINGTON.

PAPER-FEEDING MECHANISM.

No. 856,122. Specification of Letters Patent. Patented June 4, 1907.

Application filed June 27, 1904. Renewed April 15, 1907. Serial No. 368,242.

To all whom it may concern:

Be it known that I, CHARLES WILLIAMS, 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 Paper-Feeding Mechanism, of which the following is a specification.

My present invention relates to certain new and useful improvements in paper feeding mechanisms of that character designed to feed paper from a roll and cut it into strips of the proper length and deliver it to a printing press or other machine employing or acting upon sheets of paper in the operation thereof.

The invention consists of the combinations and arrangements of parts hereinafter particularly described and designated in the appended claims.

In the accompanying drawings—Figure 1 is a side elevation of a printing press, such as a multi-color press, showing my paper feeding mechanism adapted thereto; Fig. 2 relates to a detail of the connection for transmitting motion from the press to the paper feeding mechanism; Fig. 3 is a front elevation on an enlarged scale of the feeding mechanism and the cutter associated therewith; Fig. 4 is a section on the line 4—4 of Fig. 3; Fig. 5 is a section on the line 5—5 of Fig. 3; Fig. 6 is a detail front elevation particularly illustrating the cutting blade and feed rollers, looking in the direction of the arrow, Fig. 4; Fig. 7 is a vertical sectional view, substantially on the line 7—7 of Fig. 4, and illustrating the driving connection for operating the sheet carrier or support; Fig. 8 is a section on the line 8—8 of Fig. 6; Fig. 9 is a detail sectional view on the line 9 of Fig. 3; and Fig. 10 is a fragmentary view of one of the toothed wheels for moving the paper carrier.

For convenience of illustration I have shown my invention as applied to a multi-color printing press. The press with which my invention is shown adapted in the present instance is provided with a pair of standards 20, by which the operating mechanism of the press is supported, and is of that character employing a series of intermittently rotating platens 21 which are successively advanced to the feeder to receive a sheet therefrom, and are then moved to suitable printing forms 22 to present the sheets thereto to receive the impression. The particular type of press illustrated is a multi-color press having three printing forms and adapted to make three impressions at each cycle of operations, but it is to be understood, however, that my invention is not restricted in its employment with any particular character of printing press but may be applied to other forms than that illustrated. Upon the tops of the standards 20, which are provided with seats 23 for this purpose, is mounted the frame of the feeding mechanism. This frame may be of any preferred form and in the present instance consists of end members 24 suitably spaced apart and tied together by rods 25 and 26. Extending outwardly from each end member 24, as shown in Figs. 3 and 7, is a bracket 27, adapted to rest upon and be supported by the seat of the adjacent standard 20, such bracket being secured in position by any suitable means, as by the bolt 28, as shown in Fig. 1. Only one of the brackets 27 is shown in the drawings, but it is understood that the opposite end of the frame is provided with a corresponding bracket mounted in the same manner as that shown.

Journaled at each end in a bearing 29, formed on the bracket 27 at the adjacent end of the frame, is a shaft 30 which extends longitudinally of the frame, passing through alined openings 31 provided in the end members 24. This shaft has keyed to one end a ratchet wheel 32. Loosely mounted on the shaft 30 between the end member 24 and the bearing 29 adjacent the ratchet wheel 32, as shown in Fig. 7, is a sleeve 33. Straddling the ratchet wheel 32 is a pawl carrier consisting of a yoke 34, one of the legs of which, as 35, is fixed to the sleeve 33 while the other leg, 36, is pivoted on the projecting end of the shaft 30, being secured thereon by a screw retained cap p ate 37. Pivoted on the yoke is a pawl 38 which is held in engagement with the ratchet whee 32 by a spring 39. The yoke 34 has an outwardly extending pin 40 upon which is pivoted one end of a pitman 41 whose other end is operatively connected with the driving mechanism of the press to operate the feeding mechanism. To this end the shaft 42 of the press is provided with a crank arm 43 (Figs. 1 and 2) having a crank pin 44 upon which the end of the pitman 41 is pivoted, the pitman being retained upon the pin as by means of a nut 45.

In order to vary the movement of the feeding mechanism to advance a sheet of greater or lesser length, the connection of the p tman with the drive shaft is made adjustable, as shown in Fig. 2. This is accomplished by providing the end of the shaft 42 with a diametrical slot 46, shown in dotted lines in Fig. 2, the crank arm 43 being slidably seated in said slot and held in position by a set screw 47. By moving the crank arm through or in the slot 33 the effective radius of the crank arm may be increased or decreased, thereby correspondingly increasing or decreasing the throw of the pitman and varying the forward movement of the ratchet wheel. The crank arm may be graduated as shown in order to facilitate the adjustment of the same to effect the delivery of sheets of predetermined lengths. Backward movement of the ratchet wheel is prevented by a dog 48 which is pivoted on the bracket 29 and held in engagement with the ratchet wheel by a spring 49.

Suitably journaled on the end members 24, as at 50 is a pair of feed rollers 51 and 52 designed to advance the paper from the roll of paper 53. Motion is communicated to these rollers through the medium of a gear 54 fixed upon the shaft 30 and meshing with a pinion 55 on the adjacent end of the shaft 56 of the roller 51, the opposite end of such shaft being provided with a pinion 57 which meshes with a corresponding pinion 58 on the shaft 59 of the roller 52.

The paper roll 53 is mounted upon a shaft 60 carried by brackets 61, extending upwardly from the frame of the feeding mechanism. A pair of conical adjusting plugs 62 are secured by set screws in proper position on the shaft 60 to prevent longitudinal movement of the roll upon the shaft. The upper ends of the brackets 61 are provided with rectangular seats 63 to receive bearing boxes 64 and 65 in which the ends of the shaft 60 are journaled. These seats, as shown, are of greater length than the width of the bearing boxes. One of these bearing boxes as 65, is held against movement in the direction of the length of the shaft 60, by means of a pair of downwardly projecting ears 66 which embrace the opposite sides of the bracket on which the bearing box is mounted. The other bearing box 64, is provided with an ear 67 having an aperture in which is rotatably mounted a screw 68, entering a threaded aperture 69 shown in dotted lines in Fig. 3 in the bracket 61 on which the bearing 64 is mounted. The shaft 60 is adapted to move longitudinally in the bearing 65, while its other end is provided with shoulders 70 at opposite sides of the bearing 64 preventing independent longitudinal movement of the shaft in such bearing. By turning the screw 68 it will be apparent that the shaft 60 may be moved longitudinally to properly position the roll of paper held on the shaft The bearings 64 and 65 may be adjusted in the seats 63 to adjust the shaft 60 transversely by means of adjusting and holding screws 71. One of the bearing boxes, as 64, is provided with a retarding spring, consisting in the present instance of a leaf spring 72, which is secured in such bearing, so that the roll shaft 60 rotates in contact with the same. Passing through an ear 73 of the bearing 64 is a thumb screw 74 which engages the upper free end of the spring. This spring is designed to act as a brake for the shaft 60 to prevent the paper from unwinding too freely, and the frictional engagement of the spring with the shaft may be increased or decreased to the extent desired by adjustment of the screw 74.

Preferably mounted upon the shaft 33, between the end members 24, is a loose sleeve 75 which has thereon suitably spaced adjustable collars 76 held in adjusted position by set screws 77. As the paper is fed forward by the rollers 51 and 52 from the roll 53, it passes under the sleeve 75; and the collars 76 serve to guide the paper and keep it in proper alinement. By loosening the screws 77 the guiding collars 76 may be spaced to correspond with the width of the paper and also adjusted with proper relation to the position of the roll.

Suitably secured in advance of and parallel with the feed rollers 51, 52 and to forwardly projecting portions 78 of the end members 24 is a stationary cutter blade 79. This blade, as shown in Fig. 3, is provided at the end adjacent the ratchet wheel 32, with an upstanding lug 80, suitably secured by bolts 81, in which is pivoted as at 82, a cutter blade 83, provided with the usual cam 84 and spring 85, designed to secure by the coöperation of the pivoted blade with the stationary blade the usual shearing cut. Fixed to the end of the cutter blade 79, opposite the pivot of the cutter 83, is an upstanding arm 86 to the upper end of which, as at 84, is one end of a helical contractile spring 88 whose other end is attached, as at 89, to the free end of the cutter blade 83, as clearly shown in Figs. 3 and 6. This spring is designed to return or elevate the movable blade after the cutting operation and to maintain the same in its normal elevated position. The end of the blade 83 adjacent the arm 86 is provided with an antifriction roller 90 which engages the rear face of the arm 86 to guide the blade, such arm being curved or bent to conform to the line of movement of the cutter bar caused by the action of the cutter blade cam. Pivoted on a lug 91, mounted on the end of the blade 78 adjacent the arm 86, is a spindle 92, to which is attached a lever 93 whose free end extends across and back of the movable blade. Mounted on the free end of the lever 93 is a pin 94 on which is journaled an

antifriction roller 95 engaging the upper edge of the cutter blade as shown in Figs. 3 and 6. The end of the spindle 92 extends in advance of the cutter, as shown in Figs. 4 and 5, and has fixed to its forward end a finger or trip 96 designed to be engaged by the platens to operate the cutter blade to sever the sheet. As the platen advances it engages the trip 96, thereby rocking the spindle 92 and causing the lever 93 to press upon the movable cutter blade and move the latter into coöperation with the stationary blade, severing the strip of paper. As soon as the trip 96 is released, by the retraction of the platen, the spring 88 elevates the cutter.

In order to prevent the lifting up of the rear edge and displacement of a sheet upon the withdrawal of the cutter blade upon the severing of such sheet, I provide a sheet holder or clamp located in front of the cutter for holding the sheet until the grippers (not shown) of the platens have taken the sheet. In the present embodiment of the invention this clamp comprises a pair of parallel gripping members or plates, one of which, as 97, is stationary and supported by a bracket 98 secured as by screws 99 to the under side of the blade 78, while the coöperating member consists of a movable plate 100 parallel with the member 97 and attached, as by bolts 101, to a flexible or spring arm 102 secured as by screws 103 to an extension 104 of the lug 80. Attached to the movable cutter blade 83 is a spring arm 105 which is bent in the present instance in the form of a loop the free end of the same being bent downwardly in advance of the movable blade 83 and into such position as to be moved into engagement with the flexible arm 102 when the cutter blade 83 is lowered. In order to prevent the end of the spring 105 from slipping off the arm 102 when moved into engagement with the latter, the arm 102 is provided with a rib or flange 106 at the front edge of the same, which serves to hold the end of the spring upon the arm.

When the cutter blade is lowered through the medium of the mechanism heretofore described the free end of the leaf spring 105 engages the upper face of the arm 102 and presses the movable clamp member 102 into engagement with the member 97. This action bends the spring 105 and puts it under tension to such an extent that upon the elevation of the cutter blade the end of the spring continues to hold the movable clamping member in its clamping position until after the partial elevation of the cutter blade and until the grippers of the platen grip the sheet. A plate 107 extending parallel with the cutter blade 78 and secured as by a bolt 108, to one of the front portions 78 of the frame, as shown in dotted lines in Fig. 6, forms with the stationary cutter blade 78 a contracted throat to guide the paper to the cutter. The rear edge of this plate, as at 109, is preferably flared upwardly to facilitate the entrance of the edge of the paper between the guide plate and the stationary blade when a new roll of paper is put on the feeding mechanism.

In order to prevent the sheet from sagging and to hold the same in proper position to be received by the platens, I associate with the feeding mechanism a movable carrier or support which is designed to move with the paper in advance of the cutter and support the paper until the platen 21 has advanced far enough to receive the same. This carrier or support may be of any suitable construction adapted to the attainment of the desired end. In the present embodiment of the invention it consists of a pair of reciprocating flexible strips or plates 110 which advance simultaneously with the sheet of paper being delivered and are then retracted to permit of the severing of the strip of paper by the cutter. These plates or strips, in the present embodiment of the invention, pass diagonally between the end members 24, and are supported at the rear by the cross rod 25 which has secured thereto a retaining piece 111 having ways 112 through which the plates reciprocate. Extending under the blade 79 are guide sleeves 113 which terminate at the front edge of the blade 79 and are secured at their forward ends by a clamping plate 114 secured by screws 115 to the bottom of the cutter blade 79. The sleeves 113 extend rearwardly beyond the feed rollers and between the shafts of the latter, the roller 52 being provided with annular recesses, as shown in Fig. 6, to accommodate the sleeves. Suitably journaled at its ends on the end members 14, at the rear of the feed rollers is a shaft 117 which is provided with a pair of toothed wheels or gears 118 spaced apart a distance corresponding to the spacing of the reciprocating strips of the paper carrier. These strips 110 are provided with teeth 119 formed by cutting openings in the strips, with which mesh the bevel teeth of the wheels 118. To insure the free movement of the reciprocating strips and to prevent the binding of the teeth of the wheels 118 with the strips, the teeth of the wheels are quite short and terminate at the pitch line, the wheels being provided with flanges 118^a (Fig. 10) in contact with which the under surface of the strips at the sides of the teeth 119 rest during the reciprocation of the paper supporting strips. Fixed on one end of the shaft 117 which extends beyond the member 24 adjacent the sleeve 33, is an elliptical gear 120 meshing with a corresponding elliptical gear 121 fixed on a stub shaft 122 journaled in a bearing 123 on the frame. This shaft 122 has thereon a pinion 124 with which meshes a gear 125 secured on the

sleeve 33. The shaft 42 being driven continuously in one direction an intermittent rotary motion will through the medium of the pawl and ratchet mechanism be imparted to the shaft 33, and this rotation will be transmitted and increased through the gearing to the feed rollers 51 and 52 and cause the paper strip to be fed between such rollers a distance depending on the adjustment of the crank arm 43 of the shaft 42. While an intermittent rotary motion is imparted to the shaft 30, owing to the attachment of the yoke arm 35 to the loose sleeve 33, this sleeve has imparted to it an oscillatory movement, thereby effecting, through the mechanism of the elliptical gear driven from such shaft, the reciprocating movement of the paper carrier.

At the beginning of the operation of the feeding mechanism the parts are in the position shown in Fig. 4, the paper support or carrier being in its retracted position. As the feed rollers turn, the paper supporting strips are advanced, moving such strips out in front of the feed rollers so that the strip of paper rests thereon and is fed forward upon and with the strips. At the time that the strips have reached the limit of their forward movement as shown in Fig. 5 the platen 21 has reached the position shown in dotted lines in that figure and the sleeve 33 now being oscillated in the opposite direction the strips are retracted permitting the paper to rest on the platen in position to be taken by the grippers of the latter. By means of the elliptical gears, 120, 121, the retraction of the paper carrier may be made relatively faster than its advance in order to withdraw the carrier quickly after it has performed its office.

The movement of the parts is so timed that immediately upon the retraction of the paper carrier, the trip 96 is engaged by the upper surface of the platen, actuating the movable cutter blade 83 to sever the strip of paper, and during this cutting operation and until the platen grippers grip the sheet, the rear edge of the latter is held by the clamp. Immediately after the platen grippers take the sheet, the cutter blade 83 is moved upwardly far enough to release the movable clamping member, and the platen is then advanced to the form for the impression.

When very short sheets are to be fed by the feeding mechanism the reciprocating paper support is not required and may be thrown out of operation. To accomplish this result the gear 125 is arranged to slide longitudinally on the sleeve 33 so as to be moved out of engagement with the pinion 124. To this end the sleeve is provided with a slot 126 as shown in Fig. 7 into which extends a screw 127 passing through the hub of the said gear. By sliding the gear along the sleeve and out of engagement with the pinion 124, while the sleeve continues to rotate, motion will not be communicated to the shaft 117 and therefore the paper support will remain inoperative.

1. In a device of the class described, the combination with intermittently operating paper feeding means, of a cutter, a reciprocating paper support, means for advancing the support with the paper and beyond the cutter during the operation of the feeding means, and means for operating the cutter while the feeding means are at rest.

2. In a device of the class described, the combination with paper feeding means, of a cutter, a support movable with respect to the cutter for supporting the paper delivered beyond the cutter by the feeding means, and means for operating the cutter.

3. In a device of the class described, the combination with paper feeding means, of a cutter, a reciprocating support movable with the paper to support the same beyond the cutter, means to retract the support, and means for operating the cutter after the retraction of the support.

4. In a device of the class described, the combination with paper feeding means, of a cutter, a reciprocating paper support, and means for advancing the support with the paper beyond the cutter and then for retracting the support upon the delivery of the paper and before the operation of the cutter.

5. In a device of the class described, the combination with paper feeding means, of a reciprocating paper support, means for advancing the support with the paper and then for retracting the support upon the delivery of the paper at a higher rate of speed than upon its advance, and a cutter for severing the paper upon the retraction of the support.

6. In a device of the class described, the combination with a pair of intermittently rotating feed rollers, of a reciprocating support for supporting the paper during its delivery, means for advancing the support during the rotation of the feed rollers and then retracting the support while the feed rollers are at rest, and a cutter for severing the paper.

7. In a device of the class described, the combination with a frame, and a pair of feed rollers mounted on the frame, of a pair of toothed plates for supporting the paper during its delivery, a shaft journaled on the frame, gears on the shaft for reciprocating the plates, intermeshing elliptical gears for driving the shaft, and a driving connection for oscillating the gears.

8. The combination with paper feeding means and an associated machine to which the paper is fed, a cutter, a lever for actuating the cutter, and a trip connected to the lever and actuated by the associated machine.

9. The combination with paper feeding means and an associated machine to which the paper is fed, a pivoted cutter, a lever for slidingly engaging the cutter to actuate the

same, an oscillating spindle to which the lever is fixed, and a trip on the spindle and actuated by the associated machine.

10. In a device of the class described, the combination with a paper roll support and a pair of feed rollers, a stationary blade, a pivoted cutter blade, an oscillating spindle, a trip on the spindle, a lever fixed to the spindle and engaging the pivoted cutter blade, a guide arm, a spring attached to the guide arm and the cutter blade, and a roller on the free end of the cutter blade moving on the guide arm.

11. In a device of the class described, the combination with paper feeding means and a cutter for severing into sheets the paper delivered by such means, of means located in front of the cutter for holding the severed sheets against movement during the retraction of the cutter.

12. In a device of the class described, the combination with paper feeding means and a cutter for severing into sheets the paper delivered by such means, of a clamp located in front of and controlled by the cutter for holding the severed sheets.

13. In a device of the class described, the combination with paper feeding means and a cutter for severing into sheets the paper delivered by such means, of a clamp located in front of the cutter for holding the rear edge of each sheet.

14. In a device of the class described, the combination with paper feeding means and a cutter for severing into sheets the paper delivered by such means, of a clamp in front of the cutter for holding the rear edge of each sheet, and an arm carried by the cutter and adapted to actuate the clamp.

15. In a device of the class described, the combination with a pivoted cutter and means for operating the cutter, of means for holding the severed sheets until after the completion of the cutting operation and consisting of a pair of clamping members located in front of the cutter and one of which members is movable and moved into engagement with the other member by the cutter.

16. In a device of the class described, the combination with paper feeding means, and a pivoted cutter, of means for holding the severed sheets until after the completion of the cutting operation and comprising stationary and movable members, and a spring arm on the cutter adapted upon the advance of the latter to engage the movable member and press the same against the stationary member.

17. In a device of the class described, the combination with feed rollers, of a pivoted cutter, a pair of paper holding clamps, a flexible arm by which one of the clamping members is carried, and a spring arm attached to the cutter and adapted upon the advance of the latter to engage the movable clamping member and press the same against the other member of the clamp.

18. In a device of the class described, the combination with feed rollers, a cutter, a paper holding clamp controlled by the cutter, a paper support movable with the paper beyond the cutter to support the paper upon its delivery, mechanism for advancing and then retracting the paper support, and means for operating the cutter.

19. In a device of the class described, the combination with paper feeding rollers, of a pivoted cutter, a paper holding clamp comprising a stationary and a movable member, a spring arm fixed to the cutter and adapted to engage the movable clamping member, a reciprocating support to support the paper as delivered, mechanism for operating the feed rollers and advancing the support simultaneously and then retracting the carrier, and means for operating the cutter upon the retraction of the support.

20. In a device of the class described, the combination with a frame, a paper roll support mounted on the frame, a main shaft journaled on the frame, a pair of feed rolls driven from the shaft, a pivoted cutter, a paper holding clamp controlled by the cutter, means for actuating the cutter, a pair of reciprocating plates adapted to advance with and support the paper fed by the rolls, a shaft, gears on the shaft and engaging the reciprocating plates, a sleeve loosely mounted on the main shaft, a ratchet wheel on said shaft, a pawl carrier provided with a pawl engaging the ratchet wheel and an arm fixed to the sleeve, means for oscillating the yoke, and gear connections between the sleeve and the gear shaft.

21. In a device of the class described, the combination with a frame, a paper roll support mounted on the frame, a main shaft journaled on the frame, a pair of feed rollers driven from the shaft, a cutter, a reciprocating paper support adapted to advance with and support the paper fed by the rolls, a second shaft journaled on the frame, gears on the shaft and engaging the reciprocating support, a sleeve loosely mounted on the main shaft, a ratchet wheel on the shaft, a pawl carrier having a pawl engaging the ratchet wheel and an arm fixed to the sleeve, a connection for oscillating the pawl carrier, and a gear connection between the sleeve and the gear shaft.

22. In a device of the class described, the combination with paper feeding means and a cutter, of a support movable beyond the cutter to support the paper delivered by the paper feeding means and adapted to be thrown out of operation independently of the said feeding means.

23. In a device of the class described, the combination with an intermittently driven feed roll and a cutter, of a reciprocating sup-

port movable beyond the cutter to support the paper delivered by the feeding roll and adapted to be thrown out of operation independently of the feed roll.

24. In a device of the class described, the combination with a frame, a paper roll support mounted on the frame, a main shaft journaled on the frame, a pair of feed rollers driven from the shaft, a cutter, a reciprocating paper support adapted to advance with and support the paper fed by the rolls, a second shaft journaled on the frame, gears on the shaft and engaging the reciprocating support, a sleeve loosely mounted on the main shaft, a ratchet wheel on the shaft, a pawl carrier having a pawl engaging the ratchet wheel and an arm fixed to the sleeve, a connection for oscillating the pawl carrier, a gear rotating with but slidable longitudinally of the main shaft, a stub shaft, a pinion on such stub shaft into and out of engagement with which the said gear is movable, and a gear connection between the stub shaft and the shaft upon which the paper support driving gears are mounted.

25. In a device of the class described, the combination with a frame, a paper roll support mounted on the frame, a main shaft journaled on the frame, feed rollers driven from the main shaft, a cutter for severing the paper delivered by the feed rollers, a sleeve loose on the main shaft, and adjustable guide collars on the sleeve.

26. In a device of the class described, a support for paper rolls consisting of a shaft, a seat, a bearing block in the seat and in which one end of the shaft is mounted, means for moving the block to adjust the shaft longitudinally and transversely, a retarding spring seated in the bearing and frictionally engaging the shaft, and means for adjusting the spring.

27. A paper support for paper feeding mechanisms, comprising a pair of flexible strips having apertures, and gears having teeth terminating at the pitch line and entering the apertures of the strips to reciprocate the latter.

28. A paper support for paper feeding mechanisms, comprising a strip having openings providing teeth, of a wheel coöperating therewith and having teeth terminating at the pitch line and entering the openings of the strip to engage the teeth of the latter.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES WILLIAMS.

Witnesses:

ARTHUR B. SEIBOLD,

ELIZABETH MOLITOR.