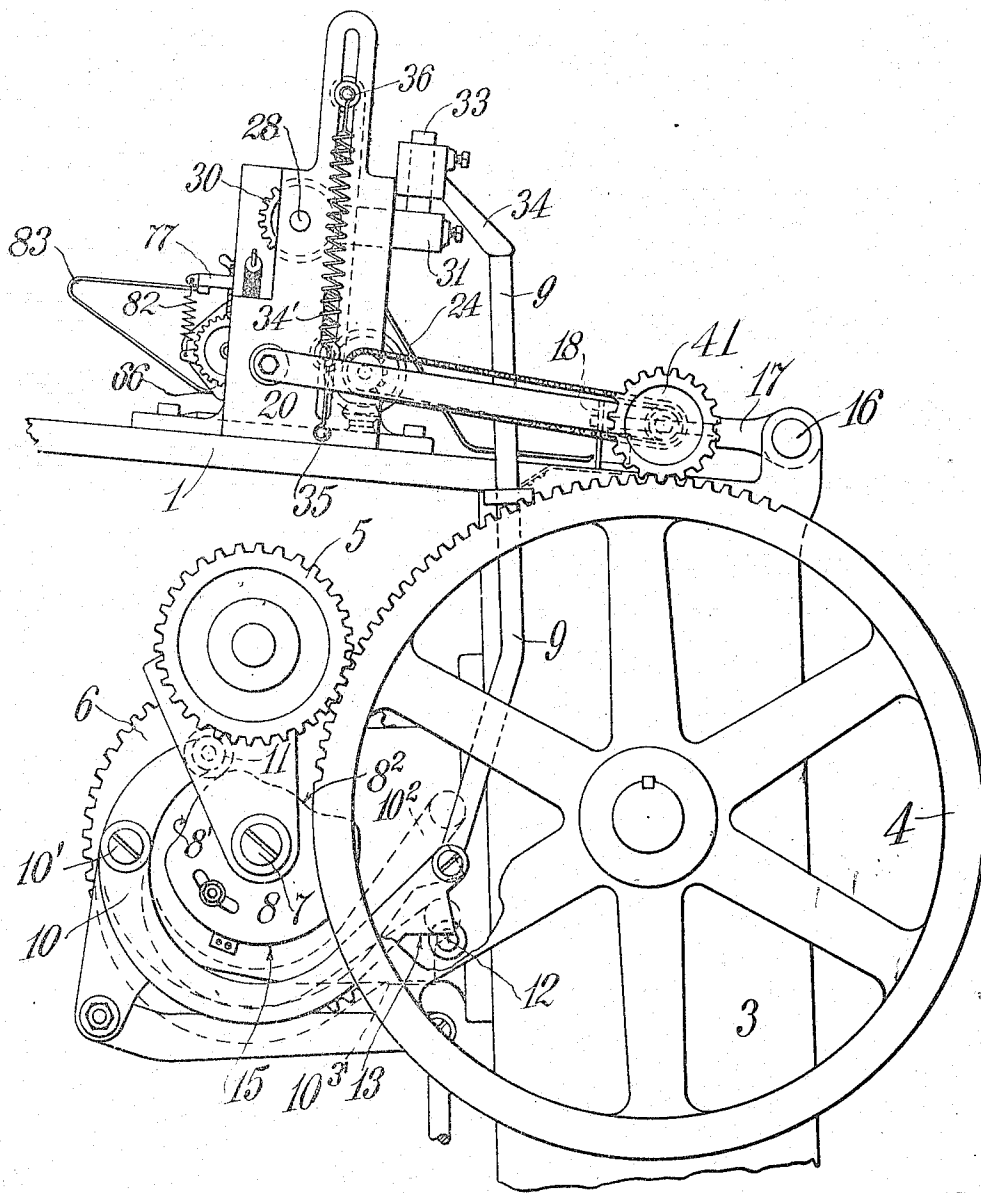


M. M. KANDLE.
 PAPER FEEDING, DETECTING, AND REJECTING DEVICE FOR PRINTING PRESSES.
 APPLICATION FILED JUNE 15, 1914.

1,145,840.

Patented July 6, 1915.
 6 SHEETS—SHEET 1.

Fig. 1.



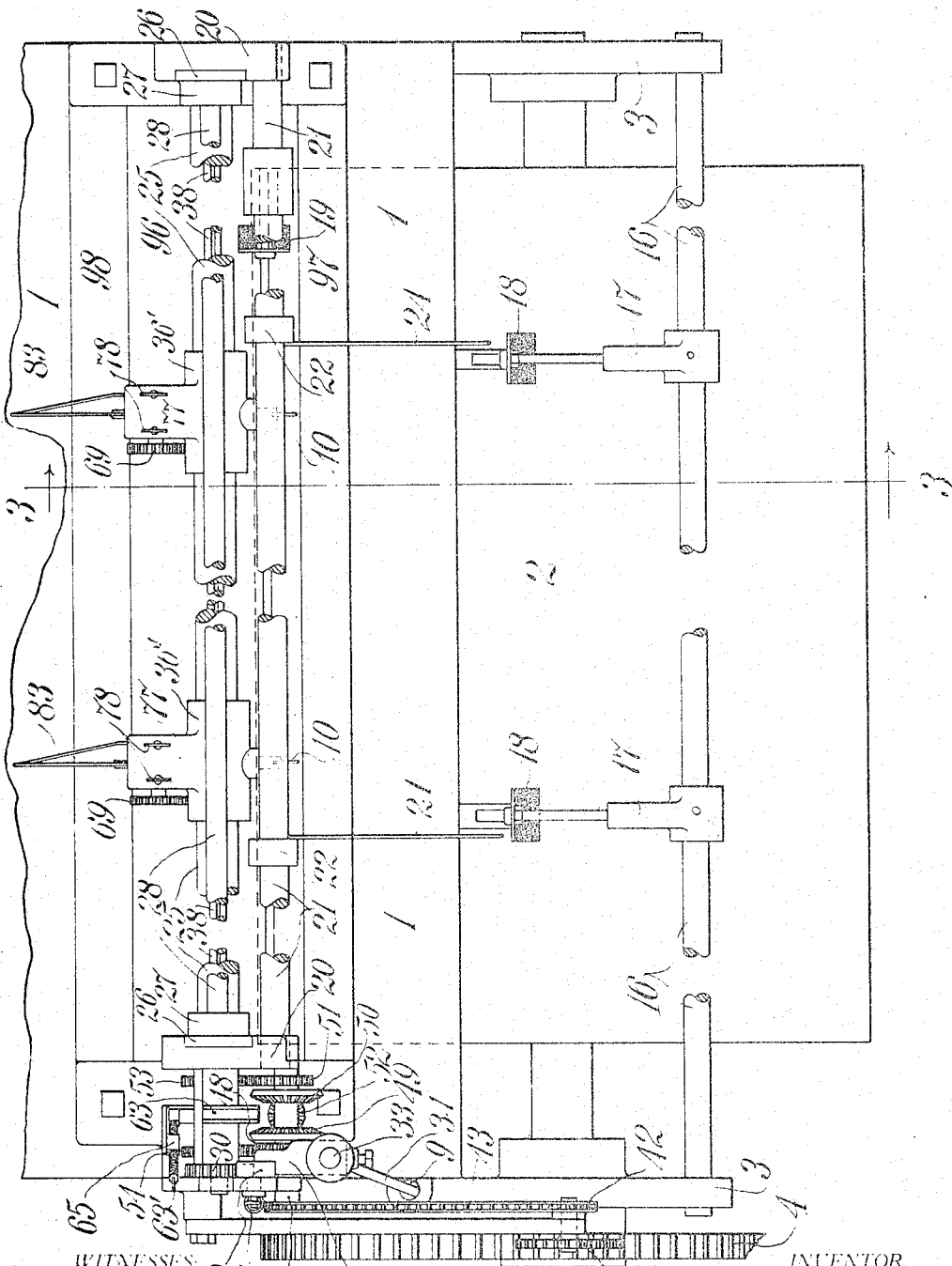
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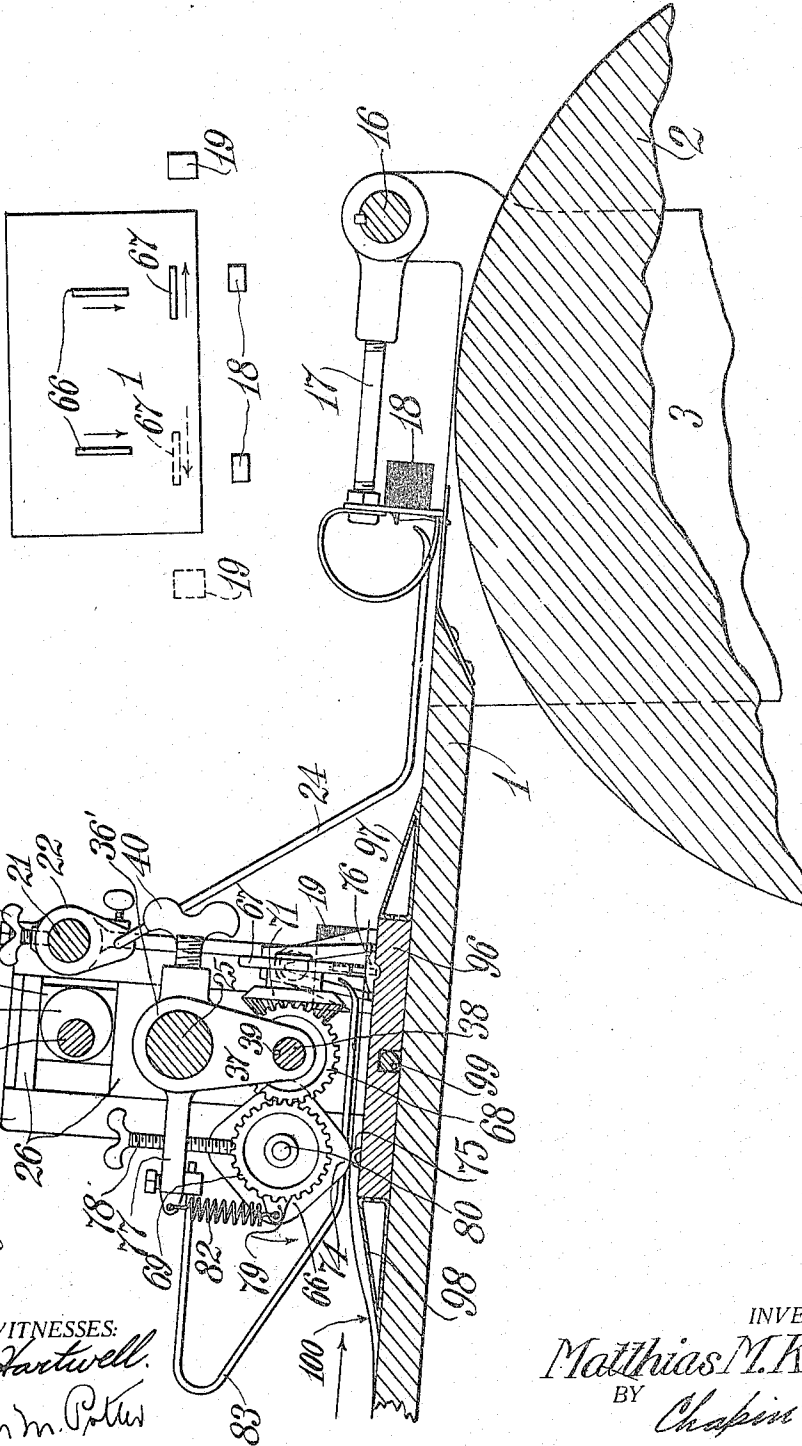
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 6 SHEETS—SHEET 3.

Fig. 4.



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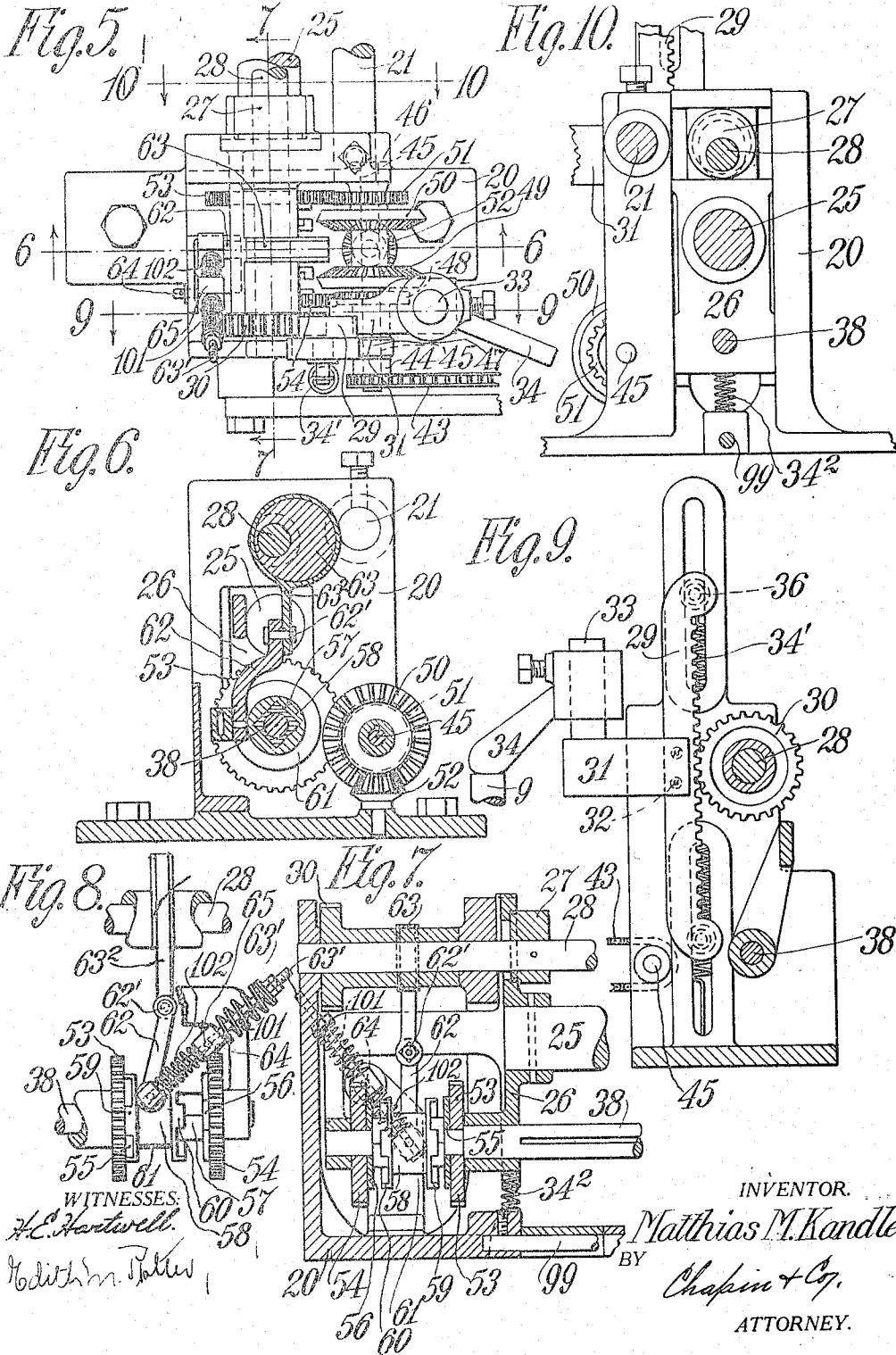
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6 SHEETS—SHEET 4.

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1,145,840.

Patented July 6, 1915.
6 SHEETS—SHEET 5.

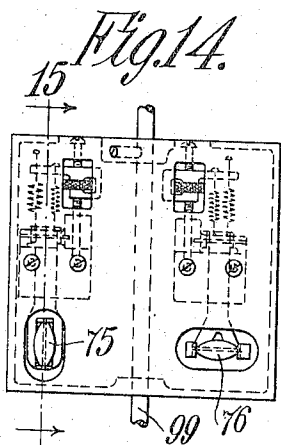
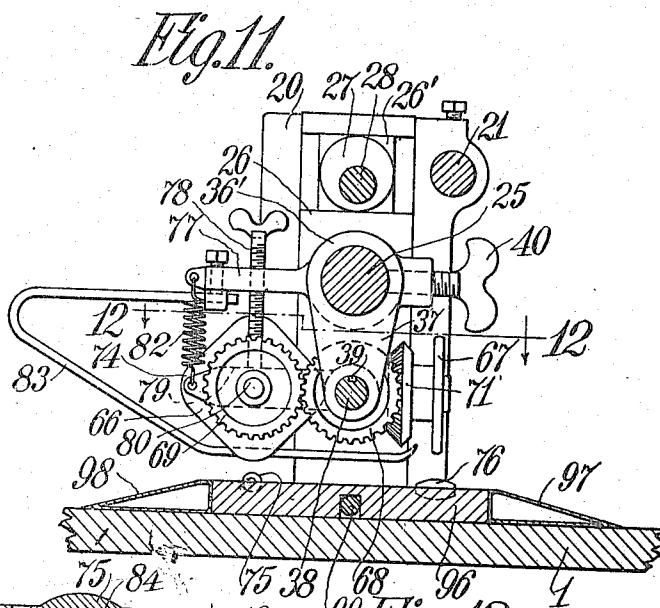
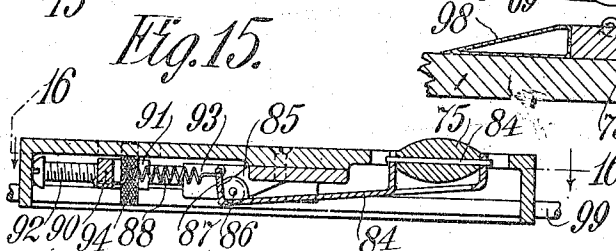
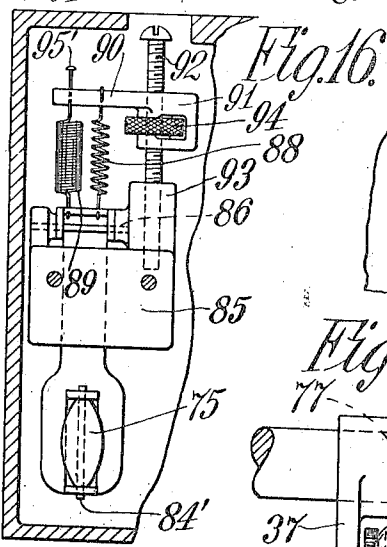
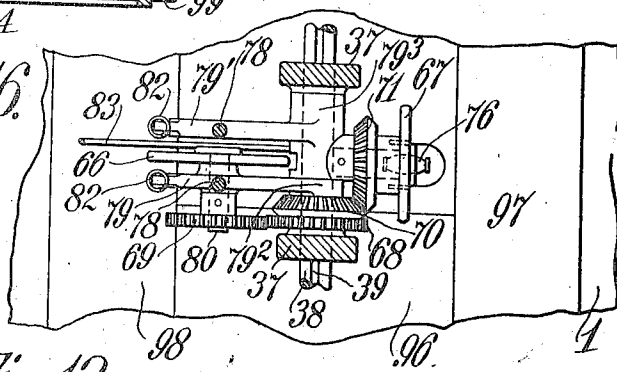
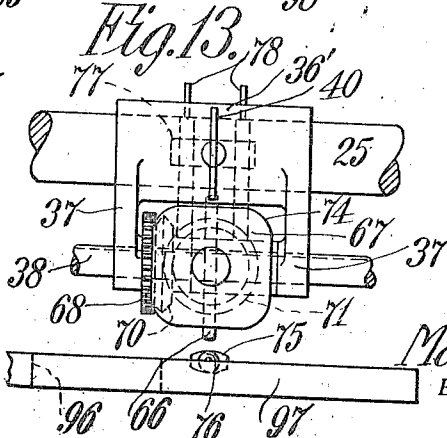


Fig. 12.



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 APPLICATION FILED JUNE 15, 1914.

1,145,840.

Patented July 6, 1915.
 6 SHEETS—SHEET 6.

Fig. 18.

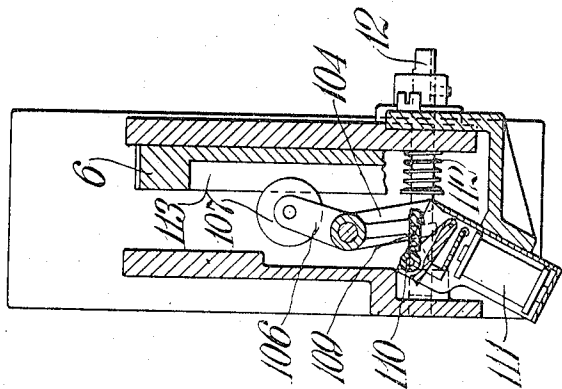


Fig. 19.



Fig. 20.

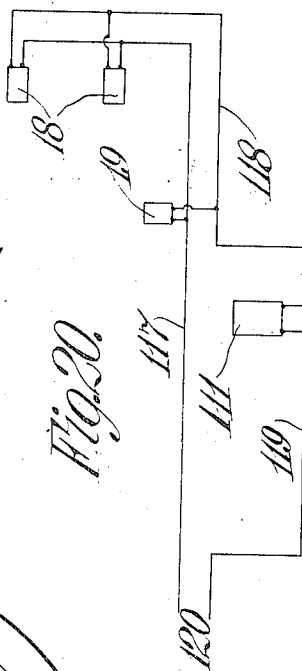
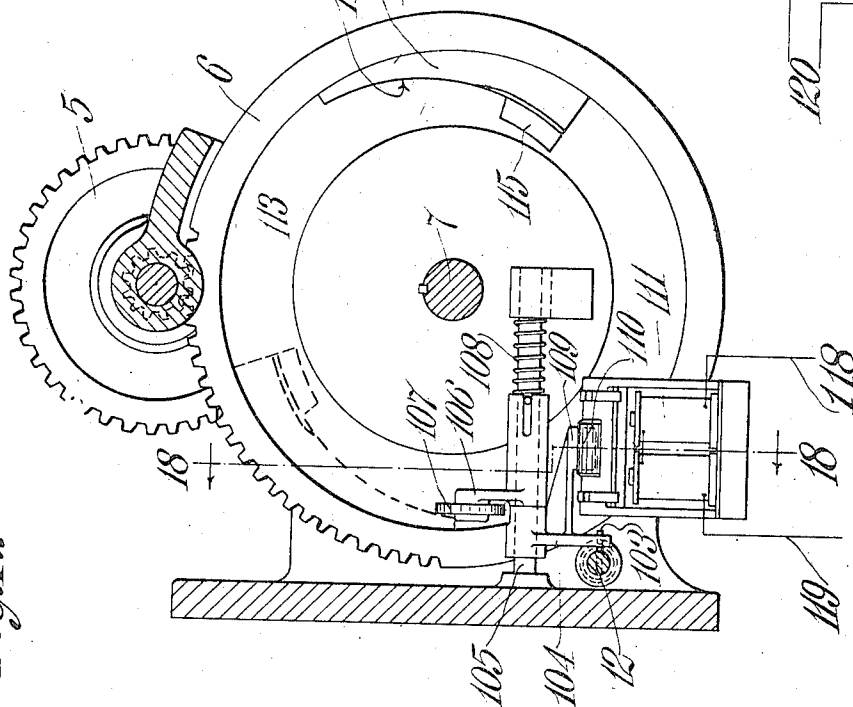


Fig. 17.



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UNITED STATES PATENT OFFICE.

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PAPER FEEDING, DETECTING, AND EJECTING DEVICE FOR PRINTING-PRESSES.

1,145,840.

Specification of Letters Patent.

Patented July 6, 1915.

Application filed June 15, 1914. Serial No. 245,311.

To all whom it may concern:

Be it known that I, MATTHEIAS M. KANDLER, a citizen of the United States of America, residing in the city of Springfield, county of Hampden, and State of Massachusetts, have invented certain new and useful Improvements in Paper Feeding, Detecting, and Rejecting Devices for Printing-Presses, of which the following is a specification.

This invention relates to improvements in paper feeding, detecting and rejecting devices for printing presses.

The invention has for its object to provide means for accurately positioning a sheet of paper on the press board of a printing press prior to its being drawn into the press. Heretofore, as far as I am aware, in paper feeding devices for printing presses it is necessary when a sheet of paper is to be accurately positioned on the press-board to employ the services of a skilled workman in order to prevent unnecessary waste.

The present invention has for a further object to provide means for quickly and accurately ejecting the sheet prior to its being drawn into the press if it is not accurately positioned on the press-board for printing.

A further object is to provide a yielding roller over which and with which the sheet pulling rollers cooperate in order to provide a means for varying the tractive or pulling force on the sheet.

A further object is to provide a means for imparting a pulling force in order to intermittently move the sheets of paper at right angles to each other to finally and accurately position the same on the press-board and against the detecting stops or gages before it is drawn into the machine for printing.

The present invention is an improvement on the construction shown, described and claimed in my prior Patent #1,093,190, dated April 14, 1914.

Referring to the drawings: Figure 1 is a side elevational view showing the devices for operating the ejector and feeding mechanism, which includes the connecting mechanism between the main drive-wheel and the shaft upon which the pull wheels are mounted. Fig. 2 is a general plan view of the upper surface of the press-board feed table showing the arrangement of the paper engaging gages, the driving and reversing means for the pull and ejector wheels. Fig.

3 is an enlarged transverse sectional view on the line 3--3 of Fig. 2, looking in the direction of the arrows, showing in detail two of the pull wheels, arranged at right angles to each other, the vertical adjusting means therefor, one of the gages; the lift shaft with the eccentric thereon. This view also shows a sheet of paper being pulled into the machine, and a portion of the press roll. Fig. 4 is a detail plan view showing in outline the pull-wheels arranged at right angles to each other and the sheet-engaging gages. Fig. 5 is a detail plan view showing the operating mechanism for the pull-wheels, comprising driving means for the pull-wheels, lifting and reversing means for said wheels. Fig. 6 is a sectional view on the line 6--6 of Fig. 5 showing the eccentric construction for operating the clutch for changing the direction of rotation of the pull-wheel shaft to eject a sheet if improperly placed, also the cone-gear for changing the direction of rotation of this shaft. Fig. 7 is a sectional view on the line 7--7 of Fig. 5, showing the clutch mechanism for changing the direction of rotation of the pull-wheel shaft and the double compression spring for retaining the clutch in its neutral position, or at the end of its travel in either direction, also the connection of the double compression spring with eccentric on the eccentric shaft. Fig. 8 is a view of the reversing clutch mechanism in position to forwardly rotate the pull-wheel-shaft. Fig. 9 is a detail sectional view on the line 9--9 of Fig. 5, showing the rack and pinion mechanism for operating the eccentric shaft. Fig. 10 is a sectional view on the line 10--10 of Fig. 5 showing the lifting block and the eccentric means therefor. Fig. 11 is a side elevational view of the sheet pulling mechanism in its inoperative or elevated position. Fig. 12 is a sectional plan view on the line 12--12 of Fig. 11, showing the means for driving the pull-wheels at right angles to each other. Fig. 13 is a front elevational view of Fig. 11. Fig. 14 is a general plan view in dotted lines of the mechanism to adjust the lower paper engaging rollers for varying the pressure of contact between said rollers and the pull-wheels. Fig. 15 is a vertical sectional view on an enlarged scale on line 15--15 of Fig. 14, showing the ellipsoidal form of the lower rollers. Fig. 16 is a horizontal sec

tional plan view on the line 16—16 of Fig. 15, showing the tension adjusting means for the lower rollers. Fig. 17 is a rear sectional elevation of a portion of the driving mechanism shown in Fig. 1, and illustrates the devices for controlling the stop. Fig. 18 is a sectional view taken on the line 18—18 of Fig. 17, looking in the direction of the arrows. Fig. 19 is a detail elevational view of the cam shown in Fig. 17. Fig. 20 is a diagrammatic view showing the electrical connections between the front and side gages and the electromagnetic latch for releasing the stop.

Referring to the drawings in detail; 1 designates the press-board upon which the sheets to be printed are placed.

2 is the usual press cylinder, 3 is one of the uprights of the machine in which the main drive wheel 4 is journaled, which in turn drives the gear-wheel 5, and this in turn drives the gear wheel 6 on the shaft 7. On this shaft is secured the cam wheel 8 having the concentric portions 8', 8" and 15 that controls the movement of the lift rod 9 by means of the lever 10 which is pivoted to the frame work at the point 10'. The roller 11 on the end of the lever 10 engages the peripheral surface of the cam wheel 8 for alternately imparting vertical movements to the lift rod.

12 is a horizontally arranged stop rod for normally supporting the lift rod 9 and lever 10, the lever 10 having a shoulder 13 which engages the stop-rod 12 on its downward motion. The concentric surfaces 8', 8" and 15 cause the lift rod 9 to maintain or assume three stationary positions. The surface 15 moves the lever 10 into the position 10², the surface 8' holds the lever 10, in the full line position, 8" allows the lever 10 to fall to the position 10³ when the stop-rod 12 is withdrawn.

The mechanism for controlling the stop 12 will now be described and particular reference is made to Figs. 17, 18 and 19. Mounted above and at right angles to the stop rod 12 is a short shaft 105 and fixed thereto is a depending forked arm 104. The latter engages with a pin 103 fixed in the stop rod 12 in such a manner that a rotative movement of shaft 105 will slide the stop rod 12. Integral with the forked arm 104 is an outwardly extending arm 109 which engages with a roller 110 of an electromagnetic latch 111. The latter is of the well-known form such as is commonly used for the opening of doors from a distant point and is indicated in conventional form only. The arm 109 is forced against the roller 110 by a spring 112 which acts between a portion of the frame and a washer fixed on the stop rod 12. Consequently, when the coils of the latch 111 are energized by an electric current the roll 110 will be released and the

rod 12 will be drawn inwardly by the spring 112.

The stop 12 is automatically reset by devices now to be described. Slidably and rotatably mounted upon the shaft 105 by means of the pin and slot connection shown in Fig. 17 is an arm 106 which bears a roll 107. The latter is normally restrained in the position shown by the spring 108 on shaft 105. An annular recess 113 is formed in the gear 6 and the roll 107 is adapted to lie therein as shown in Fig. 18. Mounted in this recess is a flat curved member 114 formed with a cam surface 114' adapted to engage the face of the roll 107. Adjacent to the member 114 is a cam 115 having an inclined surface adapted to engage the periphery of the roll 107. It is to be noted that in the position shown in the drawings, the roll 107 does not engage the bottom of the recess 113 but rides on the upper surface of the member 114 as indicated diagrammatically in Fig. 19. When the latch 11 is operated and the stop 12 is withdrawn, the roll 107 moves into the recess 113 and engages the bottom thereof. Then as the gear 6 rotates the point of the member 114 engages the face of the roll 107, as indicated in dotted lines, and wedges the latter and the arm 106 inwardly against the spring 108. Thus the roll is moved into the path of the cam 115 to be moved thereby. This latter action forces the stop 12 outwardly by means of the forked arm 104 and pin 103 until the arm 109 drops behind the roll 110. The arm 104 then holds the stop 12 in the position shown in the drawings. Fig. 20 shows the electrical connections necessary to operate the latch 111 when a sheet is inaccurately fed to the gages 18 and 19. The latter are fully described in my prior patent heretofore mentioned and consist of contact members operated by the pressure of the paper thereagainst. The front gages 18 and the side gage 19 are connected in parallel by the wires 117 and 118. The wire 118 is connected to one terminal of the electromagnetic latch 111 and the other terminal thereof is connected to a wire 119. The wires 117 and 119 are connected to a source of electrical energy at 120. When a sheet is accurately fed to each of the three gages the contacts therein are open and consequently no current can pass to the latch 111 and therefore the sheet passes to the press roll. However, should a sheet fail to touch one of the gages a closed circuit is formed allowing current to pass through the latch 111 to withdraw the stop 12 and permit the rejection of the sheet.

The construction and operation of this trip mechanism which has been briefly referred to, therefore, forms no part of the present invention.

16 is a fixed rod or shaft that extends longitudinally of the machine and to which the

arms 17 are secured. This shaft is momentarily elevated at the proper time to allow a sheet of paper to be drawn into the press after it has been accurately positioned.

5 These arms support the two forward gages 18 against which the forward edges of the paper engage when it is accurately positioned. The end gages 19 are indicated in Figs. 2 and 4.

10 20 designates a pair of uprights that are secured to the sides of the press-feed-board 1 near its forward edge (see Figs. 1 and 2). 21 designates a fixed shaft rod which is secured to the uprights 20 and on which the 15 movable blocks 22 are mounted. They are secured in position by means of the thumb screws 23. Secured to each of the blocks 22 are the downwardly and forwardly extending paper guides 24.

20 25 is a shaft for supporting the pull wheel mechanism above the press feed board, the ends of which are mounted in the vertically slidable blocks 26 (see Figs. 2, 3, and 10).

Located above the movable blocks 26 and 25 engaging the same are two blocks 26', in which eccentric wheels 27 are mounted for raising the blocks 26, the supporting shaft 25, and the parts carried thereby. The 30 eccentric disks 27 are secured to the shaft 28.

This shaft is designed to be normally rotated in opposite directions by means of the toothed rack 29 (see Fig. 9) which meshes with the wheel 30 that is secured to the shaft 28 on which the eccentric disks 27 are 35 mounted. Attached to the rack 29 is a bracket arm 31 by means of the screws 32, and secured to this arm 31 is an upright 33 to which the arm 34 is secured. The outer

and lower end of the arm 34 engages the upper end of the lift rod 9 which is actuated from the cam wheel 8 that is driven from the source of power. The depressions 3' and 8" cause the rack 29 to alternately rise and fall a definite amount. It will be seen 40 therefore, that upon the rotation of the cam wheel 8 that the rack 29 will be periodically operated and the pull wheel mechanism supported by the supporting shaft 25 will be periodically raised and lowered from the 45 rotary motion imparted to the shaft 28. In order to return the supporting shaft after each elevation thereof, springs 34' are attached, one end to uprights 20, the other to the blocks 26 at their other ends as indicated at 35 and 36 respectively.

36' designates slidable brackets mounted on the supporting shaft 25 (see Figs. 2 and 3), depending from the shaft engaging portion of the brackets 36' are arms 37, through 50 the lower ends of which passes a drive shaft 38 which operates the pull-wheels and which may be termed a pull wheel drive shaft. This shaft is formed with a spline 39 clearly shown in Fig. 7.

60 40 is a set screw for locking the bracket

36 to the shaft 25 in any desired position depending upon the width of the paper to be fed into the machine.

Referring now to the mechanism by means of which the pull-wheel drive shaft 38 is 70 operated, 41 is a gear or pinion which engages the main drive wheel 4; this in turn drives a sprocket wheel 42 over which passes a sprocket chain 43 which engages the wheel 44 on the end of the shaft 45, that has a 75 bearing in the supports 46 and 47. Loosely mounted on this shaft is the spur-gear 48 and bevel-gear 49. These gears are themselves secured together. Pinned or keyed to the shaft 45 is the bevel gear 50 and the 80 spur gear 51. Located between the bevel gears 49 and 50 is the bevel pinion 52 whereby the direction of rotation of the gears 48 and 49 is reversed. Loosely mounted on the pull-wheel shaft 38 are two spur 85 gears 53 and 54. The opposite faces of these gears are formed with projections 55 and 56. Slidably mounted on a squared portion 57 of the shaft 38 between the gears 53 and 54 is clutch block 58, the ends of which 90 are formed with projections 59 and 60 to engage the projections 55 and 56 of the wheels 53 and 54.

61 designates an annular groove in the clutch-block 58 to receive the lower end of 95 the shift-lever 62 that is operated from the eccentric cam 63 on the shaft 28. Pivotally attached to the lower end of the link lever 62 is a rod 63' that is pivotally secured to a part of the framework, as shown at 64, by means of a block 65 through which loosely 100 passes the rod 63'. The link 62 is pivotally connected at 62' to the rod 63'. When the shaft 28 is rotated by the rack 29, that is driven from the cam 8 (see Fig. 1) and the 105 eccentric 63 moved to the position shown in Fig. 8, the block 58 is shifted to cause this block to become locked to either one or the other of the wheels 53 or 54, which, as stated, are driven in opposite directions 110 from the wheels 48 and 51, depending whether or not the sheet is to be fed into the machine or rejected as will be fully set forth in the statement of operation.

Referring now in detail to the construction and operation of the paper pull wheels, (see Fig. 12) 66 and 67 designate the pull-wheels that are arranged at right angles to each other and are constantly rotated so as to alternately engage the upper surface of 120 the sheet of paper. As previously stated the brackets 36' are adjustable along the splined-shaft 38. This shaft rotates the spur gears 68 and 69, and also the bevel gears 70 and 71. The gear 69 drives the 125 pull-wheel 66; the gear 71 drives the pull-wheel 67. In side elevation, these wheels are shaped as shown in Figs. 11 and 13. The rounded corners 74 contact with the lower rollers 75 and 76 which are also ar- 130

5 ranged at right angles to each other (see Fig. 14) in order to feed the sheets of paper in directions that are arranged at right angles to each other.

10 In order to raise and lower the pull-wheels with relation to the lower rollers 75 and 76, arms 79 and 79' are rotatably mounted upon the supporting shaft 38. Passing through an arm 77, which is integral with the bracket 36', is a thumb screw 78, their lower ends engaging the arms 79 and 79', in which the pull-wheels 66 and 67 respectively are mounted. When one of the thumb-screws 78 is rotated one of the pull-wheels 66 or 67 is moved toward and away from the lower roller 75 or 76. A spring 82 for each of the arms or bars 79 and 79' is employed to normally retain its pull-wheel 66 or 67 in an elevated position. The independent adjustment of each of the pull-wheels is accomplished as follows: The inner end 79² is loosely pivoted on the shaft 38 and the inner end 79'² of the arm 79' is loosely pivoted on the same shaft. A paper guiding device is shown at 83.

25 Referring now to the mechanism which supports and carries the lower paper engaging rollers 75 and 76, with which the pull-wheels 66 and 67 engage, 84 designates an arm, in the outer end of which, one of the ellipsoidal wheels 75 and 76 are pivotally mounted on the pin 84'. This is pivotally mounted on a bracket arm 85 at 86.

30 87 designates an upwardly extending portion of the arm 84 to which is attached the two tension springs 88 and 89. The other ends of these springs are attached to an arm 90 of a member 91, movable on the screw 92, the inner end of which enters the block 23. A thumb-screw 94 is mounted on the screw 92. When the thumb-screw is rotated the arm 90, as stated, is moved. The springs 88 and 89 are of different tensile strength, the springs 88 being weaker than the spring 89, which does not come into action until the head 95 engages the arm 90.

35 It will be observed that the rollers 75 and 76 are mounted in a member 96 that is placed on press feed table 1 with inclined platforms 97 and 98 leading thereto. This member is retained in place by means of the rod 99. It will be seen that this member does not require any change or alteration whatever in the existing machines in order to apply the attachment. An object of placing this elevational member on the press-board table is to prevent the paper from passing into the press in a wrinkled or uneven condition.

40 In order to cushion the downward motion of the blocks 26 with the parts carried thereby, compression springs 34² are employed as indicated in Fig. 10.

45 The operation of the device is as follows: Consider a sheet of paper to be placed upon the press board 1, it being understood that

the pull-wheels 66 and 67 are adjusted so as to engage the lower ellipsoidal rollers 75 and 76; the sheet of paper (see Fig. 3) being indicated at 100 and is shown as being pinched on opposite sides by the curved corners 74 of the pull-wheel 66 and the ellipsoidal roller 75. The rotation of the pull-wheels 66 will serve to feed the sheet of paper forward a short distance each time a corner 74 engages the paper. After the corner 74 leaves the paper the pull-wheels 67, which are arranged at right angles to the wheels 66, next engages the sheet of paper to move it in a direction at right angles to its first direction against the stop 19. This alternate step by step feeding operation takes place until the forward and side edges of the sheet are brought squarely up against the forward and end gages 18 and 19. When this position of the sheet is reached the pull-wheels 66 and 67 simply slip over the upper surface of the paper without imparting any wrinkled or uneven appearance to the sheet. The delicate adjustment of the pull-wheels and the lower rollers permits sheets of paper of any grade of thickness or thickness to be fed into the press. After the sheet has been accurately positioned the gages 18 are elevated in the usual manner to permit the sheet to be pulled into the press for printing. Should, however, the sheet of paper be inaccurately placed on the press-board table, that is to say, so that the electric contact of one of the gages 18 or 19 is closed to the electro-magnetic crank which controls the stop rod 12, as previously described, causing the stop rod 12 to be quickly withdrawn. The lift rod 9 then suddenly falls causing the rack 22 to turn the shaft 23 through an arc of about ninety degrees. This movement of the shaft 23 causes the eccentric disk 63 to move the link 62 downward which in turn pulls the rod 63' downward compressing the upper spring 101 as shown in Fig. 3; the rod 63' then raises about the pivotal connection 34 causing the clutch block 58 to slide to the right on the shaft 33 and engage the gear 54. This operation causes the shaft 33 to be driven in an opposite direction, by reason of the reverse driving connections shown in Fig. 2. The pull-wheels 66 and 67 are then driven in an opposite direction to eject the sheet of paper. The position of the lever 10, when this operation takes place is shown in dotted lines at 10' in Fig. 1. The stop-rod is moved to the rest position by means of the mechanism previously described. When the clutch block 58 is to be returned to the opposite position the cam disk 63 will pull upward on the link 62 compressing the lower spring 102 on the rod 63' causing this rod to rotate about the pivot 64 in the opposite direction and forcing the clutch block 58 to the left to engage the gear 52, whereby the pull-wheels

66 and 67 will be again rotated in a forward direction. It is to be understood that the cam-wheel 8 serves to reset the shaft 28 in its normal position. It is also clear that the double spring construction on the rod 63 will permit the clutch block to remain in a neutral position, as shown in Fig. 7.

It is to be noted that as the clutch 58 is moved to the left, the spring 102, being compressed, tends to hold the clutch in position against the gear 53. Similarly, when the clutch 58 is moved to the right, the compression of the spring 101 tends to hold the clutch against the gear 54.

What I claim is:

1. The combination in a machine of the class described, of means to feed a sheet of paper forward, electrical detecting means, operable if the sheet is inaccurately positioned for printing, to reverse said feeding means and eject said sheet prior to the printing operations.

2. The combination, in a machine of the class described, of means to intermittently feed a sheet of paper forward, detecting means operable if the sheet is inaccurately positioned for printing, and means to eject the sheet prior to the printing operations should it be inaccurately positioned.

3. The combination, in a machine of the class described, of means to intermittently feed a sheet of paper forwardly and transversely, detecting means operable if the sheet is inaccurately positioned for printing, and means to eject the sheet prior to the printing operations should it be inaccurately positioned.

4. In a printing press, the combination, means for alternately feeding a sheet of paper in two directions that are at an angle to each other, gages against which the forward and one side edge of the sheet engages to finally position the sheet, and means to eject the sheet prior to the printing operations if inaccurately positioned for printing, said gages constituting detecting means operable if the sheet is inaccurately positioned for printing to operate said ejecting means.

5. In a printing press, the combination, means for feeding a sheet of paper in a step by step manner alternately in two or more directions, gages to limit the advance of the sheet and to position said sheet, and means to permit the feeding means to become ineffective when the sheet engages the gages.

6. In a printing press, the combination, means for feeding a sheet of paper in a step by step manner alternately in two or more directions, gages to limit the advance of the sheet and to position said sheet, and means to permit the feeding means to become ineffective when the sheet engages the gages, and means to eject the sheet should the same be inaccurately positioned with reference to the gages.

7. In a printing press, the combination, means for feeding a sheet of paper in a step by step manner alternately in two or more directions, gages to limit the advance of the sheet and to position said sheet, and means to permit the feeding means to become ineffective when the sheet engages the gages, and means for reversing the feeding means for ejecting the sheet should the same be inaccurately positioned with reference to the gages.

8. In a printing press the combination, means for feeding a sheet of paper in a step by step manner comprising a pull-wheel formed with spaced sheet engaging portions to engage the upper surface of the sheet, a roller cooperating with said wheel to engage the lower surface of the sheet, and means to vary the pressure of either of said wheel or roller on the sheet, whereby sheets of different thicknesses may be fed.

9. In a sheet feeding device for printing presses, the combination, of means to engage the upper and lower surfaces of the sheet, the upper surface engaging means comprising a pull-wheel formed with spaced contacting portions, and the lower surface engaging means comprising a roller formed with an elliptical surface.

10. In a sheet feeding device for printing presses, the combination, of means to engage the upper and lower surfaces of the sheet, the upper surface engaging means comprising a pull-wheel formed with spaced contacting portions, and the lower surface engaging means comprising a roller formed with an elliptical surface, and independent means for varying the pressure of each of said sheet engaging means.

11. In a sheet feeding device, the combination with the feed board of a printing press, means located thereon for elevating the sheet above the plane of said board, rollers mounted in said means, rotatable devices located above said rollers, means for independently moving the rollers and rotatable devices toward and from each other, whereby sheets of different thicknesses may be fed into the press, as described.

12. In a sheet feeding device, the combination with the feed board of a printing press, means located thereon for elevating the sheet above the plane of said board, rollers mounted in said means, rotatable devices located above said rollers, means for independently moving the rollers and rotatable devices toward and from each other, whereby sheets of different thicknesses may be fed into the press, means for automatically changing the direction of rotation of the rotatable devices to eject a sheet as described.

13. In a sheet feeding device for printing presses, the combination with the feed table, gage devices thereon to determine the posi-

tion of a sheet of paper before the printing operations, a rotatable shaft, substantially rectangular shaped sheet engaging devices carried thereby to intermittently advance the sheet, rectangular shaped sheet engaging devices to intermittently advance the sheet in a direction at an angle to the first mentioned direction, said devices being geared together for operating alternately upon the sheet to move the same against the gages, and means to reverse the direction of rotation of said shaft to eject the sheet if inaccurately positioned on said table.

14. A sheet feeding device comprising, in combination, an ellipsoidal roller, a device coöperating with the roller and formed with sheet engaging surfaces that are spaced from each other, whereby when a sheet is inserted between the roller and said coöperating device, an intermittent or step by step motion will be imparted to the sheet, gages against which the sheet is moved and means to move said coöperating device toward the roller for feeding sheets of different thicknesses as described, and whereby the

frictional contact pressure on the sheet can be varied to prevent advancing the sheet after the same is moved against the gages.

15. In a sheet feeding device, the combination, gages against which the sheet is fed, means to advance the sheet, elastically supported means to vary the pressure of said sheet advancing means on the sheet, whereby when the sheet is moved against the gages further advance of the sheet is prevented.

16. In a sheet feeding device designed and arranged to feed the sheet in a step by step manner, gages against which the sheet is fed, said device comprising upper and lower devices to engage the sheet, elastically supported means to vary the pressure of the lower device on the sheet to cause the advance movement of the sheet to cease when the sheet engages the gage devices, as described.

MATTHIAS M. KANDLE.

Witnesses:

HARRY W. BOWEN,
H. E. HARTWELL.