C. M. KNEPPLER.

SHEET FEEDING MECHANISM FOR PRINTING PRESSES.

APPLICATION FILED OCT. 12, 1910.

1,041,302.

Patented Oct. 15, 1912.

6 SHEETS—SHEET 1.

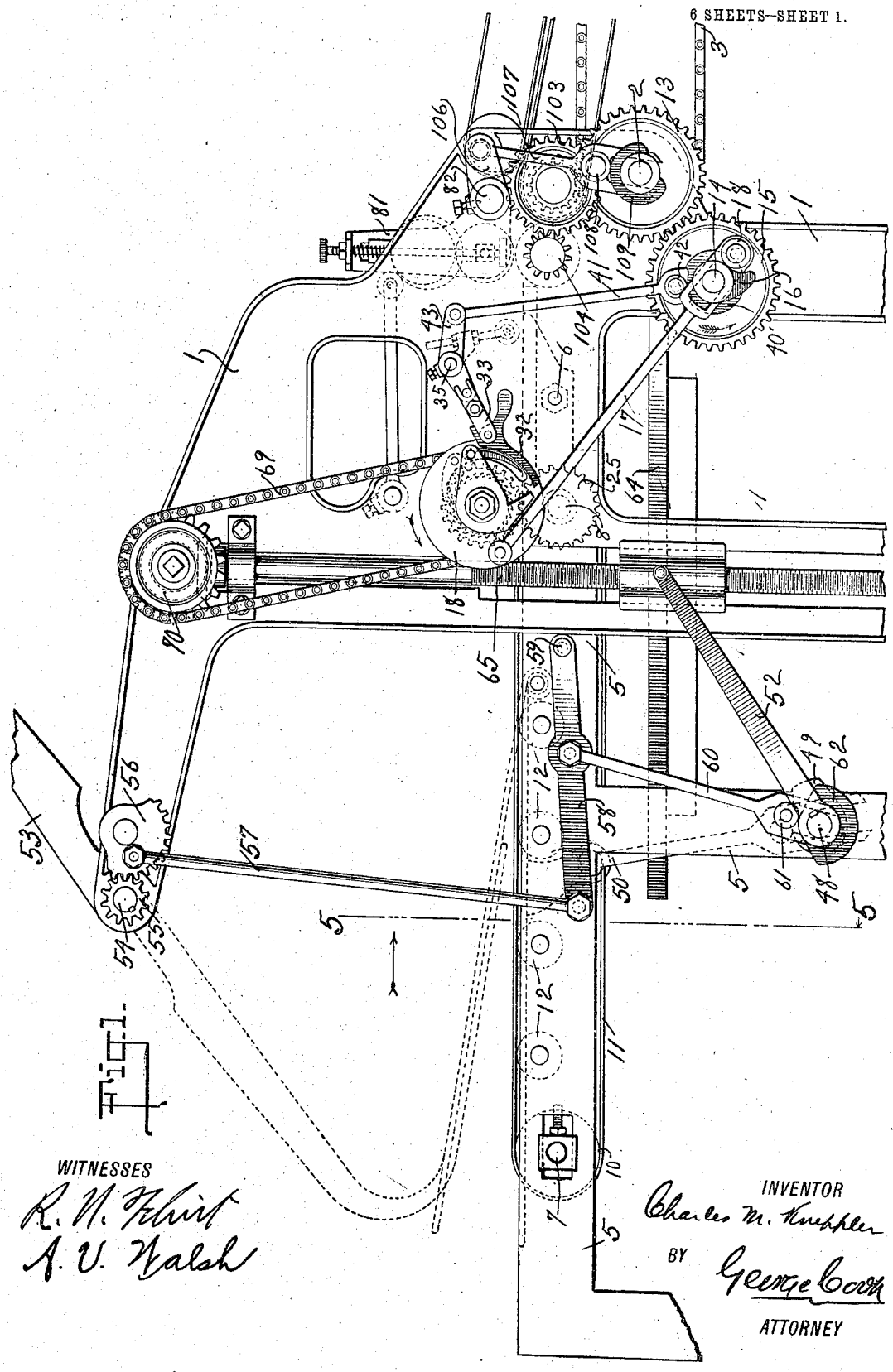

Fig. 1.

WITNESSES

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6 SHEETS—SHEET 2.

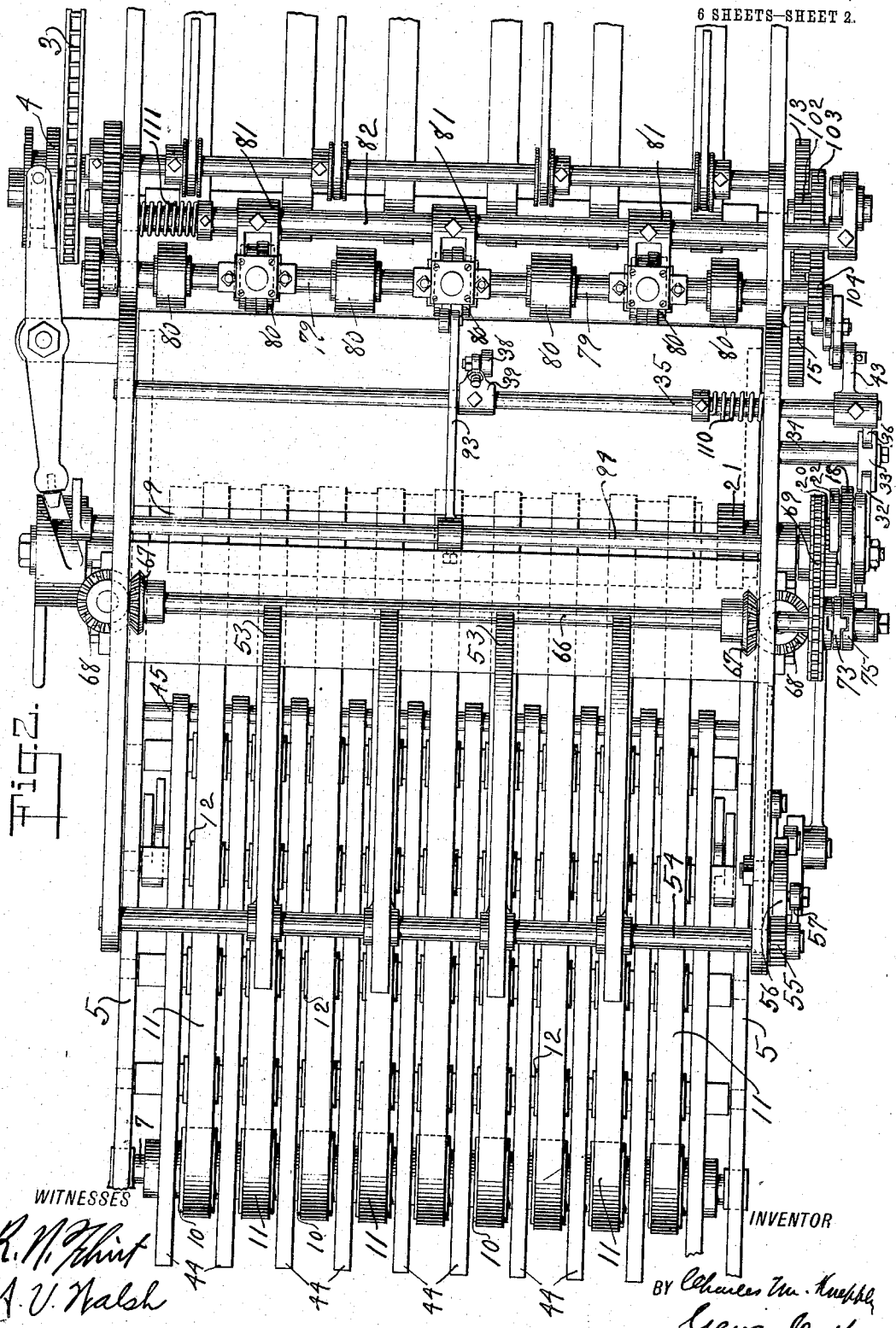

Fig. 2.

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6 SHEETS—SHEET 3.

Fig. 3.

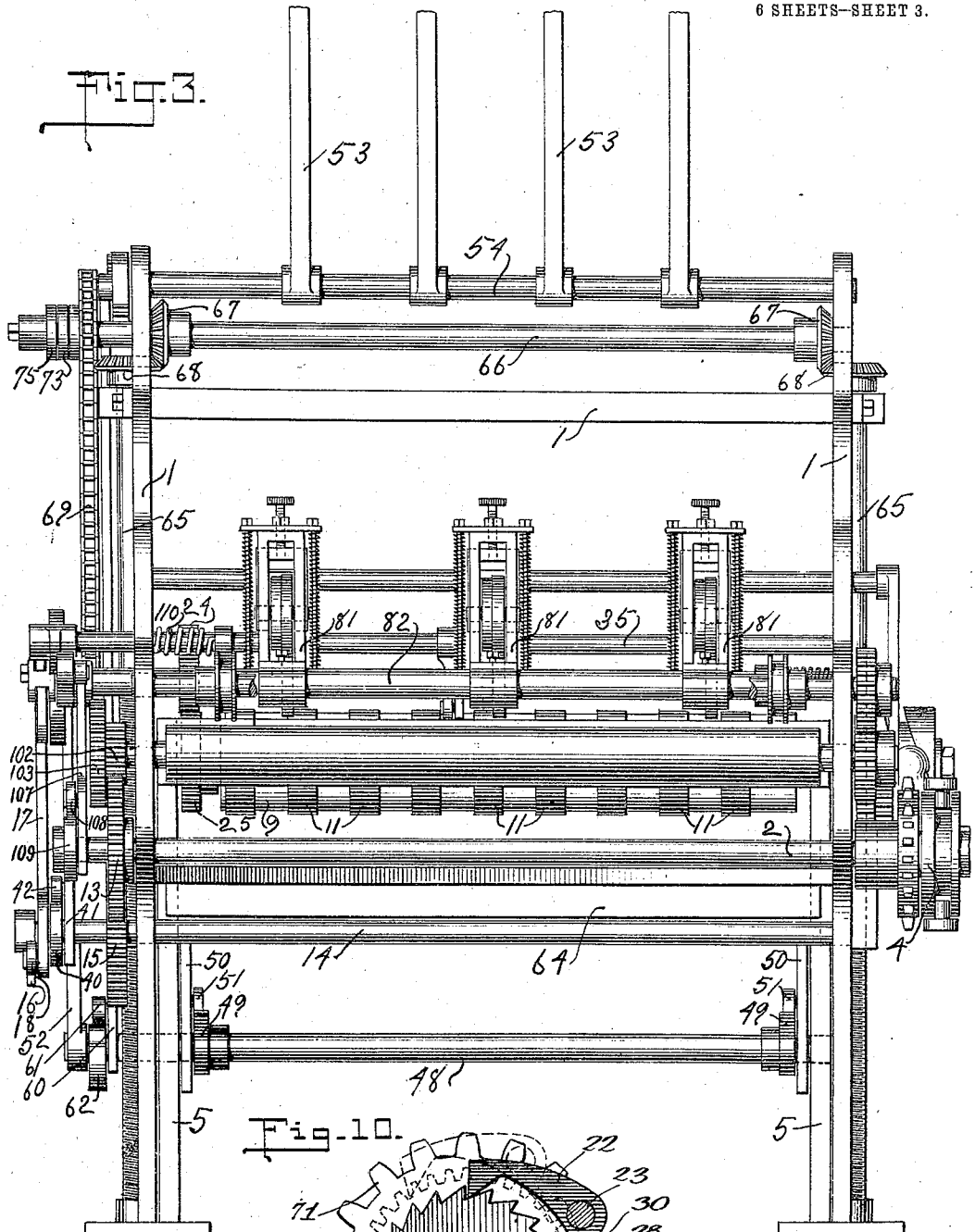
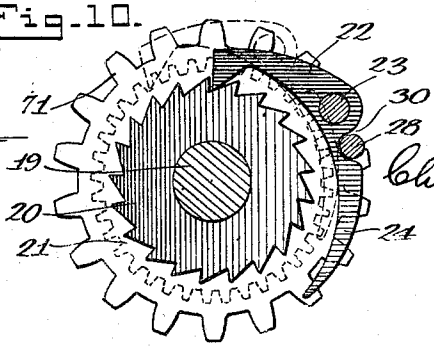


Fig. 10.



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6 SHEETS—SHEET 4.

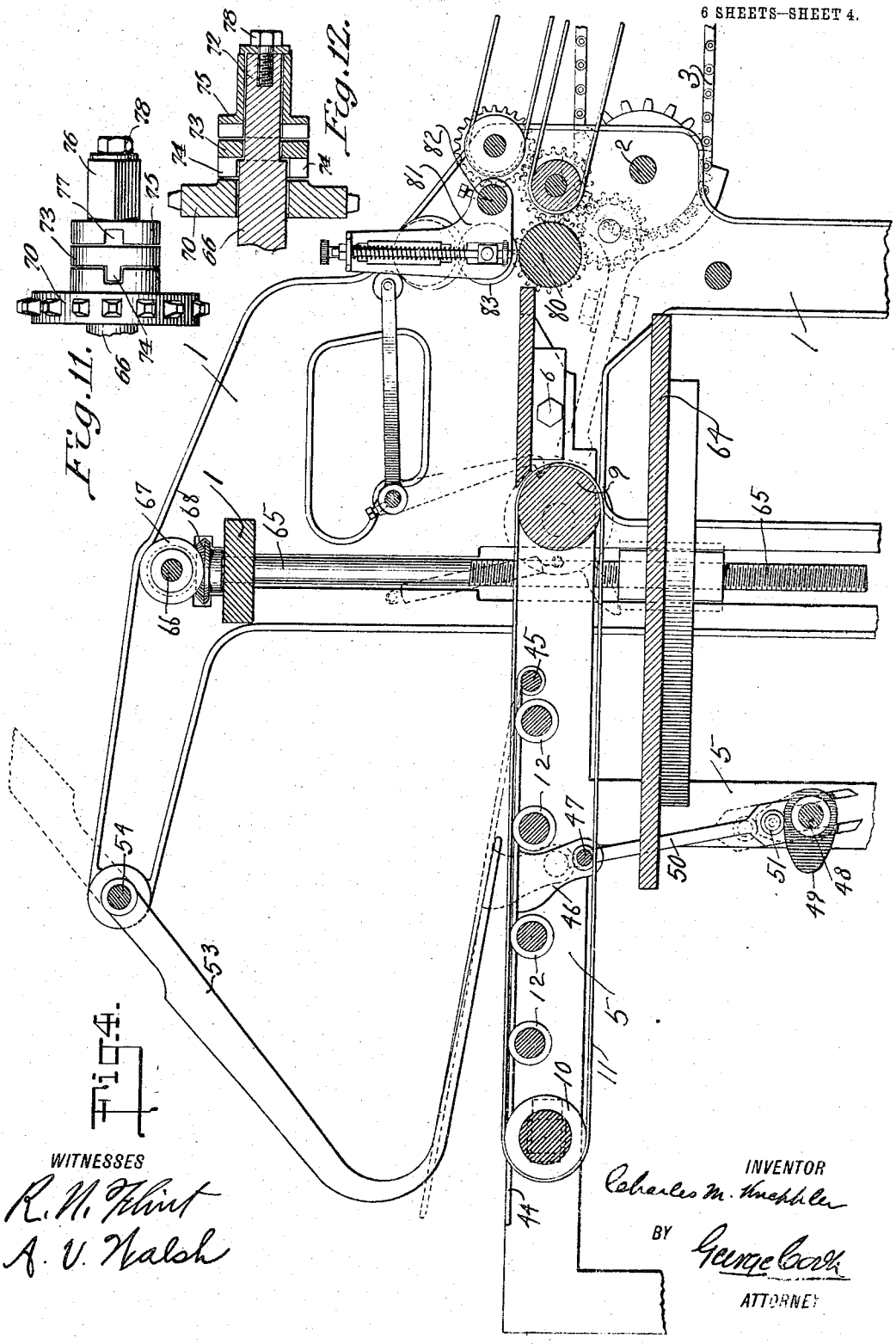

Fig. 11.

Fig. 12.

Fig. 4.

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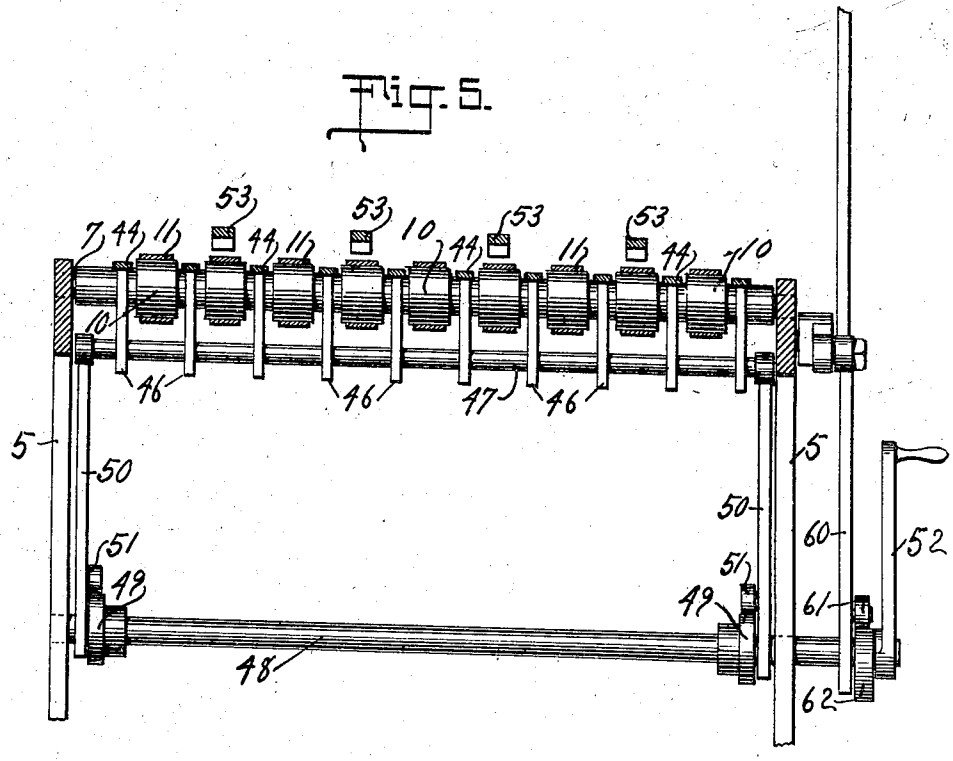
6 SHEETS—SHEET 5.

Fig. 5.



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6 SHEETS—SHEET 6.

Fig. 6.

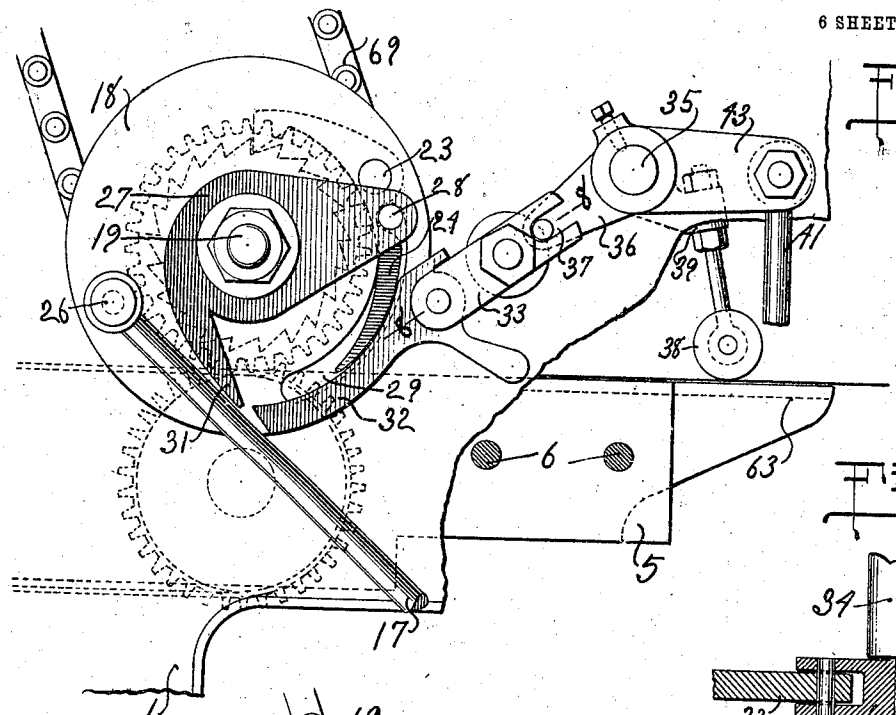


Fig. 8.

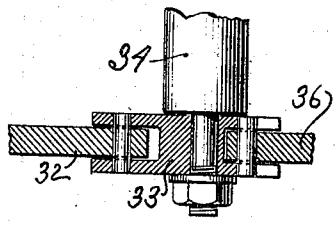


Fig. 7.

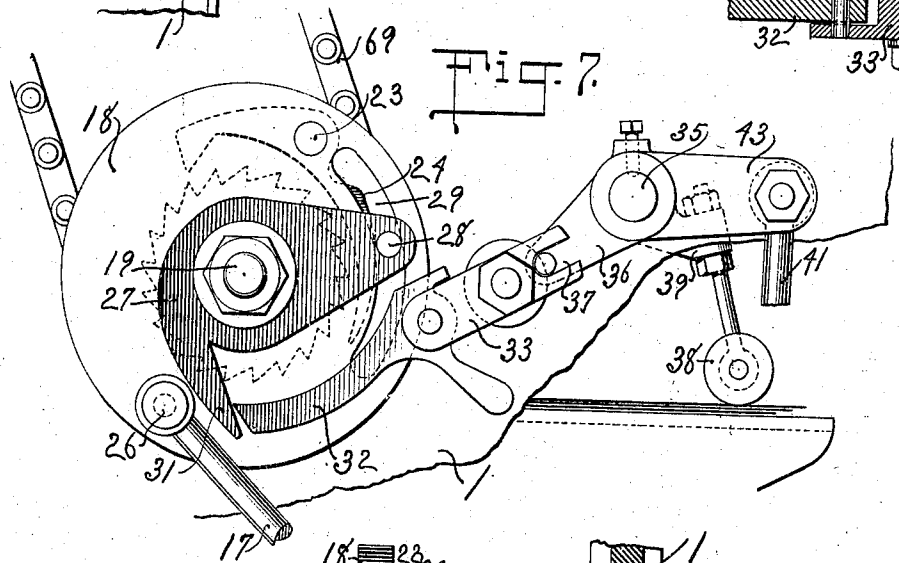
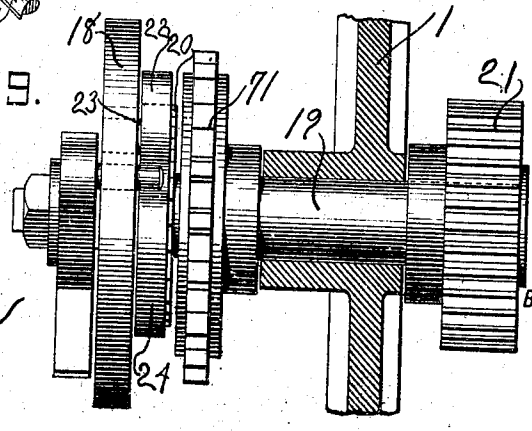


Fig. 9.



WITNESSES

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CHARLES M. KNEPPLER, OF NEW YORK, N. Y.

SHEET-FEEDING MECHANISM FOR PRINTING-PRESSES.

1,041,302. Specification of Letters Patent. Patented Oct. 15, 1912.

Application filed October 12, 1910. Serial No. 586,768.

To all whom it may concern:

Be it known that I, CHARLES M. KNEPPLER, a citizen of the United States, and a resident of New York, borough of Brooklyn, in the county of Kings and State of New York, have made and invented certain new and useful Improvements in Sheet-Feeding Mechanism for Printing-Presses, of which the following is a specification.

My invention relates to sheet feeding mechanism for printing presses of the type designed to print upon separate and distinct sheets of paper as distinguished from presses designed to print upon a continuous web, the same comprising devices whereby the separate sheets may be conveniently supplied to the press in comparatively small quantities for continuous operation, or, as an alternative method, supplied in quantities of a definite number of sheets for an edition of predetermined size; devices for feeding the sheets separately from the collection of sheets above referred to to the printing mechanism of the press; and devices for controlling the feeding mechanism so that the separate sheets may be advanced toward the printing mechanism uniformly and at a proper rate; all as illustrated in the accompanying drawings, described in the following specification, and particularly claimed in the concluding claims.

In the drawings: Figure 1 is a view showing my improved feeding mechanism as seen in side elevation; Fig. 2 is a view showing the same in plan; Fig. 3 is a view showing the same in end elevation as seen from a position to the right of Fig. 1; Fig. 4 is a view showing a section upon a vertical central plane extending longitudinally of my improved feeding mechanism; Fig. 5 is a view taken upon a transverse vertical plane indicated by the line 5—5 Fig. 1 looking toward the right as indicated by the arrow in said figure; Fig. 6 is an enlarged detail view showing a portion of the mechanism for advancing the sheets toward the printing mechanism; Fig. 7 is an enlarged detail view corresponding with Fig. 6, but showing the parts in a different position; Fig. 8 is a similar view taken upon a plane indicated by the line 8—8 Fig. 6; Fig. 9 is a similar view of the mechanism shown in Figs. 6 and 7 as seen from a position to the right of such figures, certain of the parts, however, being omitted to better show the elements to be explained; Fig. 10 is a similar view serving to further illustrate and explain the mechanism shown in Figs. 6, 7 and 9; Fig. 11 is a view illustrating certain mechanism for use when the method of storage of the sheets preparatory to feeding them to the printing mechanism is to be changed; and Fig. 12 is a view illustrating the elements shown in Fig. 11 in a different position.

In the drawings, 1 is the frame of the machine and 2 is the main driving shaft through which motion is transmitted to the various elements of my improved feeding mechanism, said shaft being driven by any suitable means as by means of the sprocket chain 3, a clutch 4 being interposed between the driving means and the shaft 2 so that motion of the entire feeding mechanism may be arrested as will hereinafter appear.

5 is a supplemental frame secured to the frame 1 by means of bolts 6, and which frame, upon the removal of the bolts 6 may be moved to the left and away from the other portions of the machine. The supplemental frame 5 has two shafts 7 and 8, extending transverse thereto, the forward shaft 8 having as shown a single roll or drum 9 while the rear shaft 7 has a plurality of pulleys 10 corresponding in the embodiment of my invention shown, in diameter with the drum 9, which shaft and pulleys are preferably adjustable longitudinally of the frame 5 as shown. A plurality of feeding belts extend about the drum 9 and pulleys 10, and 12 are a plurality of idle rolls supported by shafts the ends of which have bearings in the side members of the supplemental frame 5, and the purpose of which is to support the pile of paper resting upon the belts 11. The belts 11 are driven from the shaft 8 and drum 9 in a series of intermittent movements by mechanism as follows:

13 is a gear upon the shaft 2, and 14 is a shaft driven by the gear 13 through a gear 15, which shaft has a cam 16 at its free end by means of which cam reciprocatory motion is transmitted to a connecting rod 17, the lower end of which rod is bifurcated and continues as branches upon either side of the shaft 14 whereby the lower end of the rod is guided, said rod having a roller 18 at its lower end with which the cam 16 engages. The upper end of the rod 17 is con-

nected at 26 with and operates an oscillating member 18 carried by and capable of rocking upon the outer end of a short shaft 19 having a bearing in the frame 1.

20 is a ratchet wheel secured to and adapted to drive the shaft 19 and 22 is a pawl secured at 23 to the oscillating member 18 and having an extended tripping arm 24, which pawl rides over the teeth of the ratchet wheel 20 when the oscillating member 18 is moved in a clockwise direction referring to Figs. 6 and 7, and engages the teeth and thus rotates the shaft 19 when the oscillating member is moved in a reverse direction. The shaft 19 has a gear 21 at its inner end which engages with a gear 25 upon the shaft 8 whereby as reciprocating motion is imparted to the connecting rod 17 the oscillating member 18 is operated and intermittent movement imparted to the shaft 19, and, through the gears 21, 25, to the drum shaft 8 and 9, whereby the belts 11 are driven in a series of intermittent step-by-step movements.

The movement of the traveling belts as they operate to advance a new supply of paper to the feeding mechanism will tend to force the sheets beneath which the new supply has been placed, forward, and, in order that the sheets may not be advanced too rapidly in which case two or more sheets might be fed together to the printing mechanism, means are provided for disengaging the pawl 22 from the ratchet wheel 20 to thereby stop the shaft 19, although the oscillating member 18 is continuously operated whereby the step-by-step movement of the belts 11 is arrested, as follows:

27 is a trip member loose upon the end of the shaft 19 and normally partaking of the oscillating movements of the oscillating member 18, said trip member having a pin 28 which projects through a slot 29 in the oscillating member and lies within a notch or recess at 30 formed in the tripping arm 24 of the pawl 22. Normally, when the sheets are being advanced at a proper rate, the pin 28 remains within the recess 30 and the trip member 27 and oscillating member 18 move together, which condition is illustrated in Fig. 6. If, however, the motion of the trip member is arrested the oscillating member 18 and pawl 22 will be carried forward and, as the depression or recess 30 is moved away from the pin 28, the trip arm 24 will be moved beneath the pin and the pawl 22 thereby disengaged from the ratchet 20, which action will obviously arrest the motion of the shaft 19. This condition is illustrated in Fig. 7 of the drawing.

The means whereby motion of the trip member 27 is arrested is shown as comprising a shoulder 31 upon the trip member 27, and a dog 32 adapted to engage said shoulder as shown in Fig. 7, or to miss the same as in Fig. 6. This dog is carried by a rocking member 33 supported from the frame of the machine by a support 34. 35 is an oscillating shaft and 36 is an arm operatively connected with the rocking member 33 by a sliding connection at 37. 38 is a roller supported from an arm 39 upon the shaft 35, which roller comes into contact with the sheets of paper as they pass to the printing mechanism to control the rate at which the sheets are advanced.

Referring now to Fig. 6, if there be but a single sheet, or a number not greater than is desirable, in position to be engaged by the roller 38 as it descends due to the oscillatory motion of the shaft 35, the rocking member 33 is moved sufficient to carry the dog 32 into such a position that it may not engage the shoulder 31, the trip member 27 remains inoperative and the forward movement of the bands 11 continues. If, however, there be an excessive number of sheets beneath the roller 38 as it descends, as shown in Fig. 7, the rocking member 33 is moved farther and the dog 32 is brought into a position such that it engages the shoulder 31 disengages the pawl 22 from the ratchet 20, and arrests the forward movements of the bands 11 as above explained. This position of the parts is shown in Fig. 7.

The roller 38 partakes of a rising and falling movement as above explained, it being essential that the roller be out of contact with the paper at such times as the upper sheet is being advanced to the printing mechanism, to which end motion is communicated to the oscillating shaft 35 above referred to from the shaft 14, 40 being a cam upon said shaft and 41 a connecting rod bifurcated at its lower end and extending upon either side of the shaft 14 and having a roller 42 with which the cam 40 engages. The upper end of the rod 41 is pivotally connected with an arm 43 upon the shaft 35. From the above it will be seen that the roller 38 is lifted at each rotation of the shaft 14, and the mechanism for feeding the sheets to the printing mechanism, the same being shown at the right hand end of Figs. 1 and 4, is so timed that the sheets are fed to the printing mechanism while the roller 38 is being held up and out of contact with the paper.

In order that a new supply of paper may be supplied to the bands or belts 11 when the pile of sheets upon them is nearly used up, I provide mechanism for lifting the rear portion of sheets remaining upon the bands and supporting the same so that a new supply of paper may be placed directly upon the bands beneath such sheets as have not been fed to the printing mechanism, so that by the time the old sheets have been fed to the press the sheets of the new supply will have been advanced into position to be grasped

and fed to the printing mechanism, whereby a continuity of operation is maintained.

The preferred form of such mechanism is as follows: The reference numerals 44 refer to a plurality of slats arranged between and parallel with the belts 11 and the forward ends of which are connected with a transverse rod 45 the ends of which have bearings in the side members of the frame 5. The rear ends of the slats are free, and 46 are arms upon the under sides of the slats through which arms a rod 47 passes, so that the entire series of slats may swing about the rod 45 as a center thereby lifting the rear portion of such sheets as may be unused free from the bands 11. 48 is a transverse shaft, 49 are cams at either end thereof, and 50 are connecting rods or links the upper ends of which are connected with the ends of the rod 47 and the lower ends of which are bifurcated so as to be guided by the shaft 48. 51 are rollers at the lower ends of the connecting rods 50. 52 is a crank whereby the shaft 48 may be operated and the rear ends of the slats 44 lifted through the mechanism above described.

53 are a plurality of curved supporting arms secured to a shaft 54 supported in bearings in the side members of frame 1, the purpose of which is to pass beneath the rear end of the pile of sheets lifted as above and support the same while a new supply of paper is being placed upon the belts 11; said arms being swung into a position to support the sheets, as shown in Fig. 4, by means of a pinion 55 upon the end of the shaft 54 and a segmental gear 56 supported by the frame 1 and operated by a connecting link or rod 57 the lower end of which is connected with the end of a lever 58 pivoted at 59 to the frame 5. The lever 58 is operated from the shaft 48 through a link 60 the upper end of which is connected with said lever and the lower end of which is bifurcated and provided with a roller 61 which rides upon a cam 62 upon the shaft 48. It will be observed that the cam 62 is greater in extent, circumferentially, than the cam 49.

From the premises it will be obvious that as the handle 52 is turned in a counter-clockwise direction the cam 49 will tilt the slats 44 and raise the rear ends of the sheets remaining upon the bands 11, and at the same time the cam 62 will swing the supporting arms 53 downward and beneath the pile of paper. The cam 49 being shorter than the cam 62 the slats 44 as the handle 52 is further operated are presently released and return to their position between and parallel with the belts 11, leaving the rear end of the pile of paper supported by the hook-shaped supporting members 53. A new supply of paper may now be placed upon the belts 11 beneath the paper supported by the hooks 53, whereupon and by a continued movement of the handle 52 the supports 53 are permitted to return to their initial position and the sheets of paper supported by them to descend and rest upon the new supply, after which and as the bands 11 are operated as aforesaid the new supply of paper will be advanced beneath the sheets formerly upon the bands and reach a position such that they may be fed to the press by the time the old supply of sheets has been used up.

63 is a table upon which the forward ends of the sheets rest and across which they are fed to the printing mechanism of the press.

When it is desired to feed from a single pile of sheets of considerable height the frame 5 and table 63 are removed and the pile of sheets placed upon a vertically movable table 64, the same being adjustable by means of the screws 65 so as to bring the upper end of the pile to about the level of the mechanism for grasping the sheets and advancing them to the printing mechanism. The screws 65 are driven by means of the transverse shaft 66 and bevel gears 67, 68 to raise the pile as sheets are fed from the top thereof, which shaft 66 is driven by means of a sprocket chain 69 extending about a sprocket wheel 70 on the shaft 66 and another 71 upon the shaft 19.

From the above it will be seen that the oscillating member 18 drives the screws 65 when paper is to be fed from a pile in a way similar to the way it drives the bands 11 when a continuous feed is used, and it is obvious that the upper end of the pile of sheets upon coming in contact with the roller 38 will arrest the movement of the sprocket wheel 71 and stop upward movement of the table 63 in the same way as above disclosed when describing the operation of the bands 11.

Figs. 16 and 17 show means for connecting the sprocket wheel 70 with the shaft 66 when sheets are to be fed from a pile, or for disconnecting the wheel and the shaft when a continuous feed is to be used. The end of the shaft 66 is made square at 72 and a disk 73 having a square hole is placed thereupon said disk having projections 74 adapted to fit into recesses formed in the hub of the sprocket wheel 70 as best shown in Fig. 16. which shows the parts in position such that the shaft is driven from the sprocket wheel through the disk 73. If, however, the disk be removed and reversed in position so that the projections 74 may not be in the recesses aforesaid, the shaft 66 will not be driven although the sprocket wheel will continue to move. 75 is a sleeve having a squared portion 76 to receive an operating handle carried by the squared end of the shaft 66 and which sleeve has recesses 77 to receive the projections 74 when the disk

is reversed in position the purpose of the sleeve being to hold the disk in position upon the end of the shaft 66. 78 is a screw for holding the sleeve in place and for permitting its removal and the reversal of the disk as above explained.

The reference character 79 designates a shaft the same being driven from the main shaft 2 through gears 13, 102, 103, 104, which shaft is shown having a series of rolls 80, although the shaft and rolls may obviously be replaced by a single continuous roll, and 81 are supports carried by a transverse shaft 82. The supports have each a rotary disk 83 which coöperates with the rolls 80 to forward separate sheets of paper toward the press; and coöperates also with certain mechanism for arresting the entire feeding mechanism in case two or more sheets start for the press at the same time, which stopping mechanism, however, forms no part of the invention described and claimed in this application.

The sheets of paper are grasped between the rolls 80 and the disk 83 and advanced toward the press to which they are conveyed by the mechanism one end of which is shown at the right of Figs. 1 to 4, and which forms no part of my present invention, the mechanism for this purpose being preferably that disclosed and claimed in my Patent No. 953273, Mar. 20, 1910. The shaft 82 is oscillated to raise the disks 83 at such times as a sheet is to be advanced into position to be grasped between the rolls 80 and disks 83 by means of an arm 106 upon the end of the shaft 82 to which the upper end of a connecting rod 107 is connected, the lower end of said rod being guided by the shaft 2 and having a roller 108 with which a cam 109 upon the main shaft 2 engages.

When my improved feeding device is in use, a pile of sheets of paper will rest on the belts 11 with their forward ends lying upon the table 63, and the sheets will be separated from the pile by any suitable combing mechanism, and moved from the top of the pile into position to be grasped by the rolls 80 and disks 83 and advanced to the mechanism which conveys them to the press, this being accomplished by any suitable sheet feeding mechanism, which sheet feeding mechanism, however, is not shown as it forms no part of the invention to which this application relates.

Having thus described and explained the operation thereof, I claim and desire to secure by Letters Patent:

1. In sheet feeding mechanism for printing presses, a support adapted to receive a pile of sheets of paper; means for lifting the rear portion of said pile of sheets from said support; and means for supporting the rear portion of said pile of sheets in an elevated position to thereby permit a new supply of sheets to be placed upon said support and beneath said first mentioned sheets.

2. In a sheet feeding mechanism for printing presses, a support adapted to receive a pile of sheets of paper; a series of slats connected with said support adjacent the forward end thereof; means for elevating the rear ends of said slats to thereby lift the rear portion of the pile of sheets from said support; and means for supporting the rear portion of said pile of sheets in an elevated position to thereby permit a new supply of sheets to be placed upon said support and beneath said first mentioned sheets.

3. In a sheet feeding mechanism for printing presses, a support adapted to receive a pile of sheets of paper; a series of slats connected with said support adjacent the forward end thereof; means for elevating the rear ends of said slats to thereby lift the rear portion of the pile of sheets from said support; means normally inactive adapted to support the rear portion of said pile of sheets in an elevated position, and means for operating said elevating means and said supporting means to thereby raise the rear portion of the pile of sheets and bring said supporting means in position to support said sheets.

4. In a sheet feeding mechanism for printing presses, a support adapted to receive a pile of sheets of paper; a series of slats connected with said support adjacent the forward end thereof and the rear ends of which may be elevated to thereby lift the rear portion of the sheets from said support; means normally inactive adapted to support the rear portion of said pile of sheets in an elevated position; a shaft; a handle for operating said shaft; a cam upon said shaft; a connecting rod operated by said cam and operatively connected with said slats; a second cam upon said shaft; and a connecting rod operated by said second cam and operatively connected with said supporting means.

5. In a sheet feeding mechanism for printing presses, a support adapted to receive a pile of sheets of paper; a series of slats connected with said support adjacent the forward end thereof; arms upon the under side of said slats and by means of which the rear ends and of the pile of sheets may be lifted from said support; means normally inactive adapted to support the rear portion of said pile of sheets in an elevated position; a shaft; a handle for operating said shaft; a cam upon said shaft; a connecting rod operated by said cam and operatively connected with said arms; a second cam upon said shaft; and a connecting rod operated by said cam and operatively connected with said supporting means.

6. In a sheet feeding mechanism for printing presses, a series of belts adapted to re-

ceive and support a pile of sheets of paper; means for driving said belts to thereby move the pile toward the press; means for lifting the rear portion of said pile of sheets from said support; and means for supporting the rear portion of said pile in an elevated position to thereby permit a new supply of sheets to be placed upon said belts and beneath said first mentioned sheets.

7. In a sheet feeding mechanism for printing presses, a series of belts adapted to receive a pile of sheets of paper; means for driving said belts to thereby move the pile toward the press; a series of slats arranged in alternation with said belts; a support for the forward ends of said slats; means for elevating the rear ends of said slats to thereby lift the rear portion of sheets from said belts; and means for supporting the rear portion of said pile of sheets in an elevated position to thereby permit a new supply of sheets to be placed upon said belts and beneath said first mentioned sheets.

8. In a sheet feeding mechanism for printing presses, a series of belts adapted to receive and support a pile of sheets of paper; means for driving said belts to thereby move the pile toward the press; a series of slats arranged in alternation with said belts; a support for the forward ends of said slats; means for elevating the rear ends of said slats to thereby lift the rear portion of the pile of sheets from said belts; means normally inactive adapted to support the rear portion of said pile of sheets in an elevated position; and means for operating said elevating means and said supporting means to thereby raise the rear portion of the pile of sheets and bring said supporting means in position to support said sheets.

9. In a sheet feeding mechanism for printing presses, a series of belts adapted to receive and support a pile of sheets of paper; means for driving said belts to thereby move the pile toward the press; a series of slats arranged in alternation with said belts; a support for the forward ends of said slats and the rear ends of which may be elevated to thereby lift the rear portion of the sheet from said belts; means normally inactive adapted to support the rear portion of said pile of sheets in an elevated position; a shaft; a handle for operating said shaft; a cam upon said shaft; a connecting rod operated by said cam and operatively connected with said slats; a second cam upon said shaft; and a connecting rod operated by said second cam and operatively connected with said supporting means.

10. In a sheet feeding mechanism for printing presses, a series of belts adapted to receive and support a pile of sheets of paper; means for driving said belts to thereby move the pile toward the press; a series of slats arranged in alternation with said belts; a support for the forward ends of said slats; arms upon the under side of said slats and by means of which the rear ends thereof and of the pile of sheets may be lifted from said belts; means normally inactive adapted to support the rear portion of said pile of sheets in an elevated position; a shaft; a handle for operating said shaft; a cam upon said shaft; a connecting rod operated by said cam and operatively connected with said arms; a second cam upon said shaft; and a connecting rod operated by said second cam and operatively connected with said supporting means.

11. In a sheet feeding mechanism for printing presses, a series of belts to receive and support a pile of sheets of paper; means for driving said belts to thereby move the pile toward the press; means for lifting the rear portion of said pile of sheets from said belts; means for supporting the rear portion of said pile of sheets in an elevated position to thereby permit a new supply of sheets to be placed upon said belts and beneath said first mentioned sheets; and means controlled by the sheets as they pass to the press for interrupting the operation of said belt driving mechanism.

12. In a sheet feeding mechanism for printing presses, a series of belts adapted to receive and support a pile of sheets of paper; driving means for said belts comprising an oscillating member, a pawl carried by said member, a ratchet driven by said pawl, a shaft driven by said ratchet, and gearing whereby said belts are driven from said shaft; a trip member movable normally in unison with said oscillating member and having means for engaging said pawl to thereby prevent said pawl from engaging said ratchet and thus interrupt the motion of said belts; and means controlled by the sheets as they pass to the press for holding said trip member stationary with reference to said oscillating member.

13. In sheet feeding mechanism for printing presses, a movable support adapted to receive a pile of sheets of paper; means for operating said movable support; said means comprising an oscillating member, a pawl carried by said member, a ratchet driven by said pawl, a shaft driven by said ratchet, and gearing whereby said movable support is driven from said shaft; a trip member movable normally in unison with said oscillating member and having means for engaging said pawl to thereby prevent it from engaging said ratchet; and means adapted to engage the upper sheet of said pile of sheets for holding said trip member stationary with reference to said oscillating member.

14. In a sheet feeding mechanism for printing presses, a series of belts adapted to receive and support a pile of sheets of pa-

per; means for driving said belts to thereby move the pile toward the press, the same comprising an oscillating member, a pawl carried thereby, a ratchet engaged by said pawl, a shaft driven by said ratchet, and gearing whereby said belts are driven by said shaft; a reciprocating member adapted to contact with the sheets upon each of its successive downward movements, and to be lifted from the sheets, as they pass to the press; means for operating said reciprocating member; and means dependent upon the extent of downward movement of said reciprocating member for holding said pawl out of engagement with said ratchet to thereby interrupt the operation of said belt driving means.

15. In sheet feeding mechanism for printing presses, a series of belts adapted to receive and support a pile of sheets of paper; means for driving said belts to thereby move the pile toward the press, the same comprising an oscillating member a pawl carrier thereby, a ratchet engaged by said pawl, a shaft driven by said ratchet, and gearing whereby said belts are driven by said shaft; a trip member partaking of the movement of said oscillating member and having means for engaging said pawl to thereby prevent it from engaging said ratchet; a reciprocating member adapted to contact with and to be lifted from the sheets as they pass to the press; means for operating said reciprocating member; and means dependent upon the extent of downward movement of said reciprocating member for holding said trip member stationary, relative to said oscillating member whereby the operation of said belt driving means is arrested.

16. In a sheet feeding mechanism for printing presses, a series of belts adapted to receive and support a pile of sheets of paper; means for driving said belts to thereby move the pile toward the press the same comprising an oscillating member, a pawl carried thereby, a ratchet engaged by said pawl, a shaft driven by said ratchet, and gearing whereby said belts are driven by said shaft; a trip member partaking of the movement of said oscillating member and having means for engaging said pawl to thereby prevent it from engaging said ratchet, and having also a shoulder; a reciprocating member adapted to contact with and to be lifted from the sheets as they pass to the press; means for operating said reciprocating member; and a dog adapted to engage the shoulder aforesaid of said trip member and the position of which dog is dependent upon the extent of downward movement of said reciprocating member, whereby when said dog is in position to engage the shoulder of said trip member the same is held stationary with reference to said oscillating member and the operation of said belt driving means arrested.

Signed at New York, borough of Manhattan, in the county of New York and State of New York, this 8th day of October, A. D. 1910.

CHARLES M. KNEPPLER.

Witnesses:
R. N. FLINT,
A. V. WALSH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."