T. C. DEXTER.

SHEET CONVEYING MACHINE.

APPLICATION FILED FEB. 5, 1909.

961,587

Patented June 14, 1910.

5 SHEETS—SHEET 1.

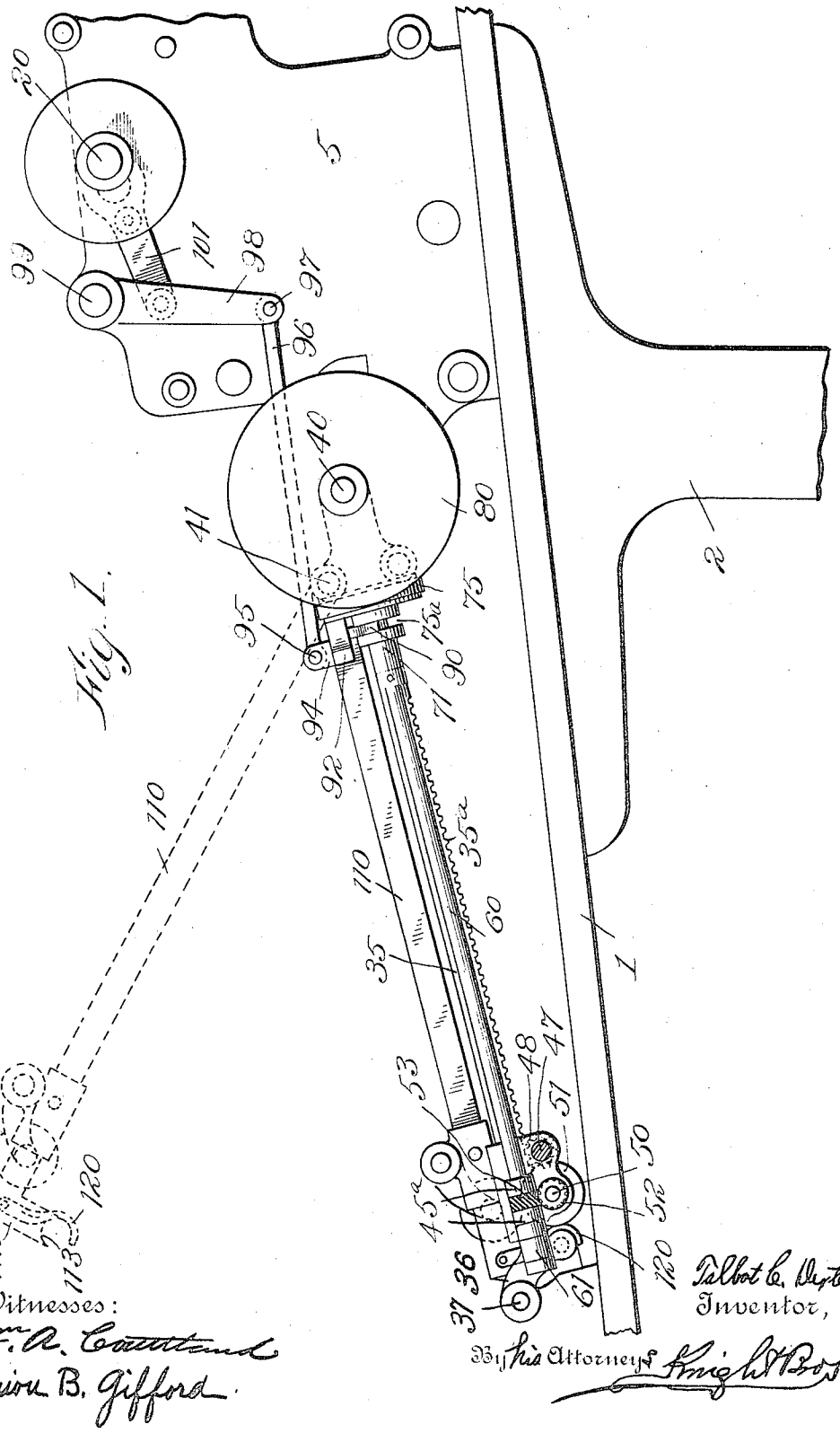

Fig. 1.

Witnesses:

Wm. A. Cartland

Marion B. Gifford.

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By his Attorneys Knight Bros.

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5 SHEETS—SHEET 2.

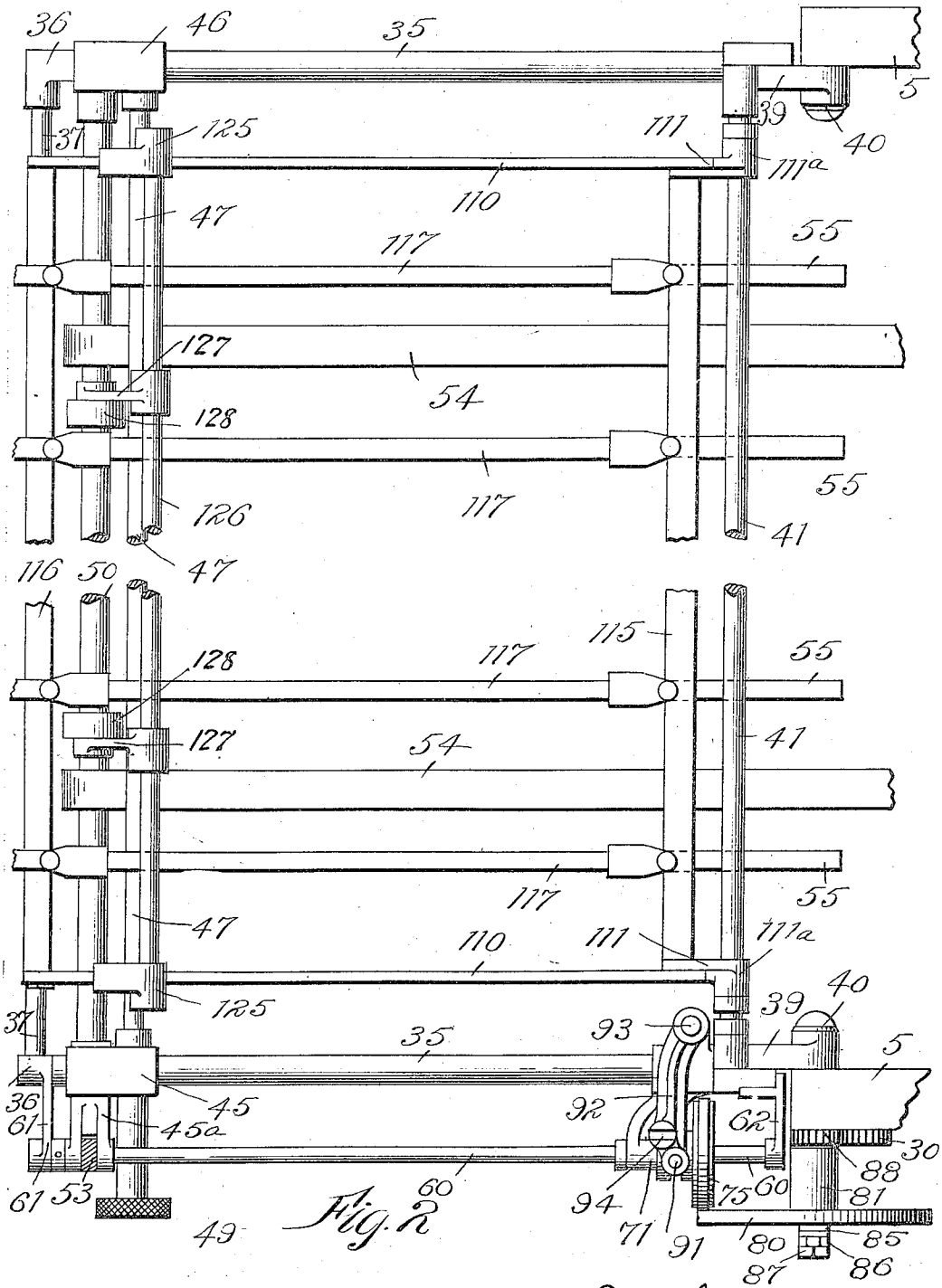

Fig. 2.

Witnesses:

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5 SHEETS—SHEET 3.

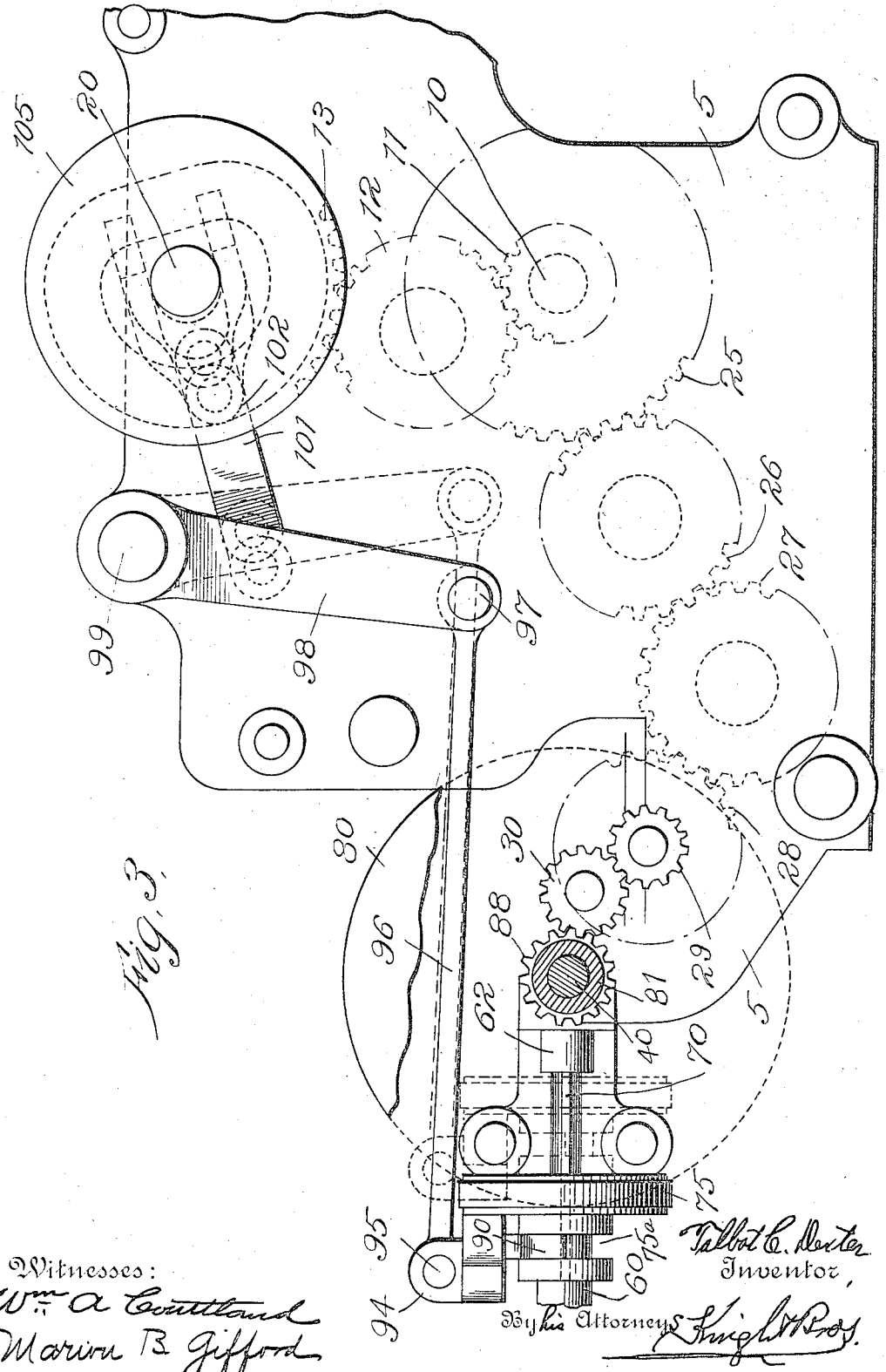

Fig. 3.

Witnesses:
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5 SHEETS—SHEET 4.

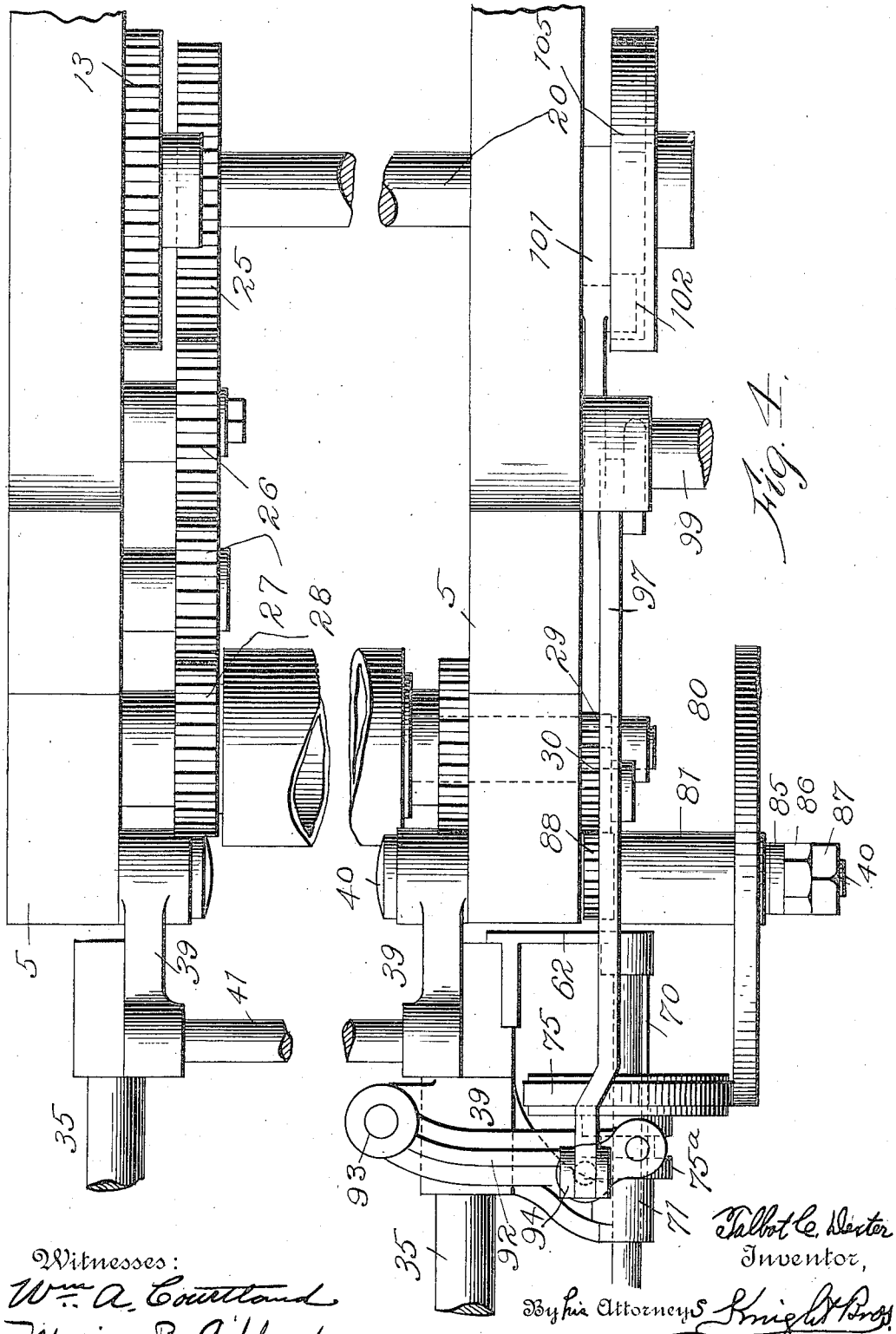

Fig. 4.

Witnesses:

Wm. A. Courtland

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SHEET CONVEYING MACHINE.

APPLICATION FILED FEB. 5, 1909.

961,587. Patented June 14, 1910.

5 SHEETS—SHEET 5.

Fig. 5

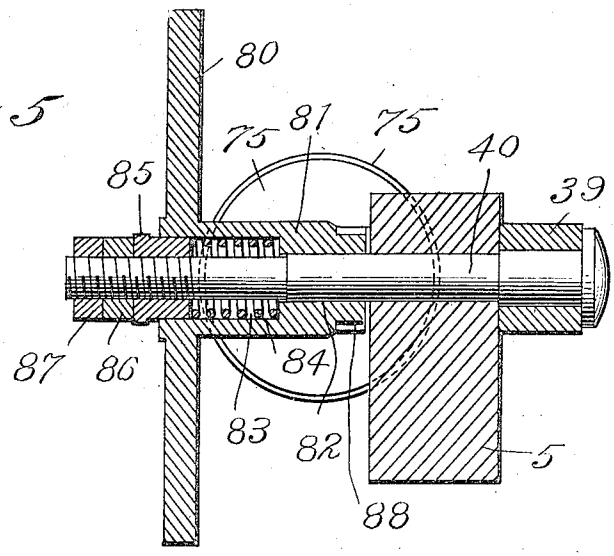


Fig. 6

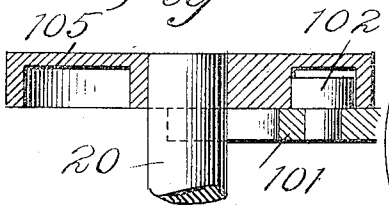
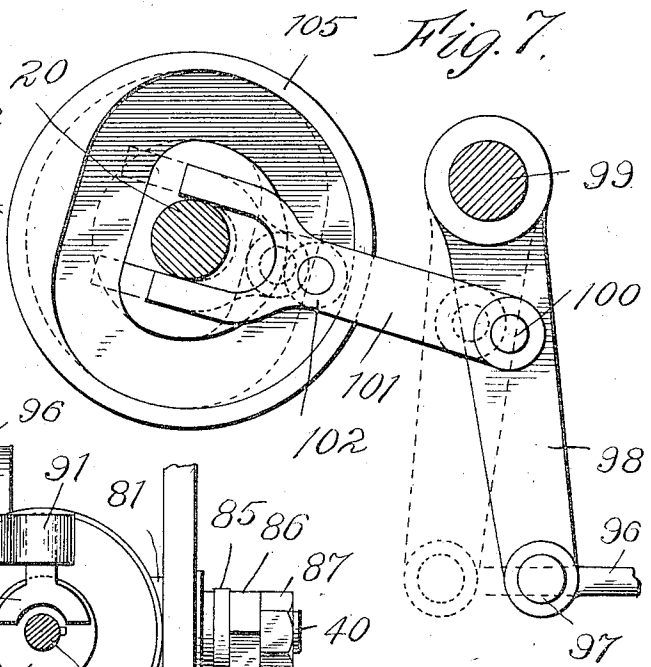


Fig. 7.



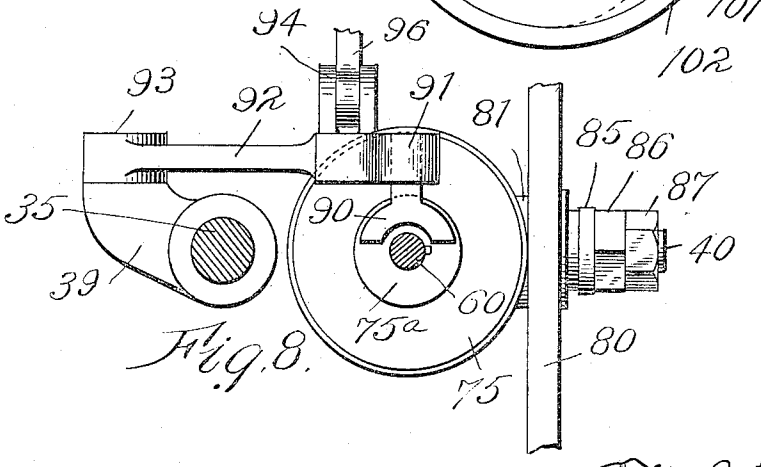


Fig. 8.

Witnesses:
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UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER, OF PEARL RIVER, NEW YORK, ASSIGNOR TO DEXTER FOLDER COMPANY, OF PEARL RIVER, NEW YORK, A CORPORATION OF NEW YORK.

SHEET-CONVEYING MACHINE.

961,587. Specification of Letters Patent. Patented June 14, 1910.

Application filed February 5, 1909. Serial No. 476,296.

To all whom it may concern:

Be it known that I, TALBOT C. DEXTER, a citizen of the United States, residing at Pearl River, county of Rockland, State of New York, have invented certain new and useful Improvements in Sheet-Conveying Machines, of which the following is a specification.

The present invention relates to improvements in sheet feeding mechanism for conveying successive sheets of paper from an automatic paper feeding machine to a printing press, folding machine, ruling machine, or other machine, designed to operate upon sheets of paper.

The object of my present invention is to provide a simple and effective sheet forwarding mechanism which will rapidly feed the successive sheets of paper from an automatic feeding machine and pass them accurately to the feed gages of a press or other machine, effectively slowing down a sheet as it approaches the feed gages to avoid the rebounding of the sheet from the gages, or the injury or buckling of the sheet against the gages. The improved mechanism is adjustable to suit it to the handling of sheets of various sizes, and the driving mechanism is such that the rapid forwarding speed, as well as the slow-down delivery or registering speed, may be easily regulated to suit the requirements of any automatic feeding machine and press or other machine to which my improvements may be applied.

More specifically my invention includes a suitable frame extending from the feeding machine toward the feed gages of the press and arranged above the feed board of the press. This frame carries a transversely arranged set or series of sheet forwarding surfaces (or rollers), which is adjustable upon the frame with relation to the feeding machine and press gages. The mechanism may be employed with or without the customary feed tapes. In the preferred form of the machine, I have provided the conveyer frame with a minimum number of feed tapes interposed between parallel bars or rods over which the successive sheets travel. The transverse supporting shaft of the series of sheet conveying surfaces (or rollers) is mounted in carriages which are adjustable longitudinally of the conveyer frame, and said shaft is geared at one end to a longitudinally extending driving shaft through gears which are adjustable lengthwise of said driving shaft. Said driving shaft has splined to it an automatically adjustable friction wheel, which runs in peripheral contact with the face of a large frictional driving disk. The driving disk is operated through gearing from the main power shaft of the feeding machine, and the driven friction wheel is automatically moved inwardly and outwardly over the surface of the driving disk, in a direction radial to said disk, by suitable cam mechanism driven from a part of the feeding machine, preferably the main cam shaft. By reason of the adjustable driving mechanism, the surface speed of the sheet forwarding surfaces is intermittently increased and decreased to effect the rapid feed of the successive sheets from the feeding machine and the slowing down and quiet delivery to the press or other machine.

Coöperating with the sheet forwarding surfaces or rollers are suitable pressure surfaces, preferably in the form of rollers, which are arranged to engage the sheets above the forwarding surfaces or rollers. These pressure surfaces (or rollers) are adjustably mounted upon an auxiliary frame, which is supported above the main conveyer frame. The said auxiliary frame is preferably hinged at one end to the main conveyer frame so as to permit the elevation of the auxiliary frame from the main conveyer frame and remove the pressure surfaces (or rollers) from their engagement with the forwarding surfaces (or rollers) to facilitate the ready removal of sheets from the conveying mechanism when, from any cause, said sheets become clogged in the machine. The movable feature of the auxiliary frame also affords ready access to the sheet conveying mechanism for repairs or minor adjustments. The pressure surfaces (or rollers) are adjustable upon the auxiliary frame to suit the adjustments of the main forwarding surfaces (or rollers). The free end of the auxiliary frame is preferably provided with a hook or some suitable device for fastening it in position upon the main conveyer frame. The auxiliary frame is also provided with a series of parallel rods or bars, which rest above the plane of feed of the sheets to confine them against accidental vertical displacement, as by drafts of air.

In order that my invention may be fully understood, I will first describe the same

with reference to the accompanying drawings, and afterward point out the novelty more particularly in the claims.

In said drawings Figure 1 is a side elevation of my improved sheet conveying machine, the auxiliary frame of the conveyer being shown in dotted lines in its elevated position. Fig. 2 is a plan view of the same, some of the operating mechanism being omitted. Fig. 3 is a detail side elevation partly in section of the driving mechanism of my improved machine. Fig. 4 is a plan view of the same, the interior parts of the mechanism being omitted. Fig. 5 is a vertical sectional view of the frictional driving disk. Fig. 6 is a transverse sectional view of the controlling cam of the frictional driven wheel. Fig. 7 is a detail vertical longitudinal sectional view of the same, showing in addition the main rocking lever and its connection with the cam operated pitman. Fig. 8 is a detail transverse sectional view of the frictional driving mechanism.

For the purpose of clearly illustrating the operation of my improved machine, I have represented it in the drawings as applied to and operated in conjunction with an automatic paper feeding machine of the general type set forth in my applications Serial No. 436,637, filed June 4th, 1908, and Serial No. 442,114, filed July 6th, 1908. The drawings show the delivery end of such a feeding machine above the feed board of the press to which the mechanism is attached, the only parts of the feeding machine proper which are referred to specifically in my present case, being the main driving shaft, the main cam shaft, and parts of the sheet delivery mechanism. While I have illustrated my present invention in connection with this particular form of paper feeding machine, I would have it understood at the outset that my present invention is not limited to its application to this or any other specific form of machine, but may be applied generally to any machine in which the successive sheets of paper are to be rapidly forwarded and slowed down prior to delivery to the gages of a press or other machine which is to operate upon these sheets.

In the drawing 1 represents a part of the feed board of an ordinary printing press mounted upon any suitable frame, such as indicated at 2. Supported above the rear part of the press feed board 1, are the side frames 5 of an automatic paper feeding machine, which is designed to separate and deliver sheets successively from a bank or pile. This automatic feeding machine of the type illustrated has a main power shaft 10, and a main cam shaft 20, which latter is driven from the power shaft by suitable gearing indicated at 11, 12 and 13. The cam shaft 20, which carries the several cams for operating the parts of the automatic feeding machine, is fully explained in my above named applications. This main power shaft 10 carries a gear 25 which drives a train of gears 26, 27, 28, 29 and 30, suitably journaled upon the machine frame. This train of gears operates the frictional driving mechanism of my improved sheet conveyer in the manner which will hereinafter be pointed out.

The main conveying frame upon which the sheet forwarding or conveying mechanism is mounted, comprises the two main side bars 35 having corner brackets 36 at their forward ends in which the cross-bar or tie-rod 37 is mounted for rigidly connecting the bars 35, and brackets 39 at their rear ends pivoted at 40 to the delivery end of the side frames 5 of the automatic feeding machine. A cross bar or tie-rod 41 is also mounted in the rear bracket 39 for bracing the frame at the rear.

Adjustably mounted upon the pair of frame bars 35 are two carriages or journal boxes 45 and 46. These journal boxes are capable of adjustment upon the bars 35 longitudinally of the machine. Freely journaled in the journal boxes 45 and 46, is a transverse shaft 50, which carries a plurality, preferably two, of slow down under feed rolls 51. Keyed to the projecting end of the shaft 50 is a spiral gear 52, meshing with a similar spiral gear 53, adjustably splined upon a longitudinally extending driving shaft 60, which extends parallel with the frame bars 35, and is journaled at its opposite ends in the bracket arms 61 and 62. A bifurcated arm 45^a projects from the journal box 45 and embraces the spiral gear 53 to cause said spiral gear to move longitudinally upon the driving shaft 60 simultaneously with the adjustment of the journal boxes carrying the shaft 50.

For the purpose of convenience in adjusting the carriages or journal boxes 45 and 46 and parts mounted therein longitudinally of the main conveyer frame, I form rack teeth 35^a on the under surface of each frame bar 35, and journal an adjusting shaft 47 in boxes 45 and 46 and provide said shaft 47 with pinions 48 which mesh with the rack teeth 35^a. A hand wheel 49 is secured to one end of shaft 47, by which said shaft may be rotated to cause the boxes 45 and 46 and parts carried thereby to be moved longitudinally of the main conveyer frame.

55 indicates longitudinal rods or bars in the main conveyer frame over which the sheets pass. If preferred, two or more conveyer tapes 54 may be run from the usual tape drum or the under feed roller of the feeder drop-roller delivery mechanism to the shaft 50 (over pulleys, not shown, which are loosely mounted thereon) of the slow-down delivery mechanism. The tapes 54 are, however, not necessary, and their specific mount-

ing forms no part of my present invention. When used, such tapes are mounted in the usual and well known manner.

The driving shaft 60, adjacent to its rear end, carries a longitudinal spline 70 and upon the spline portion of said shaft is mounted a rubber tired frictionally driven wheel 75, said wheel 75 being free to move longitudinally of the shaft 60, but by reason of its spline connection with the shaft, compels said shaft to rotate with it. This friction wheel is automatically shifted upon the shaft 60 (which it drives) by means which will presently be explained. The movement of the friction wheel 75 upon the shaft 60 is limited rearwardly by the bracket bearing 62 and forwardly by a bracket bearing 71, extending from one of the corner brackets 39.

80 is a frictional driving disk formed of any suitable material, but preferably of aluminum, since this has been found to give satisfactory results. This frictional driving disk 80 is formed with an inwardly projecting hub 81 freely journaled at 82 upon a journal pin 40, which is the same pin which secures one of the brackets 39 of the conveyer frame to the frame 5 of the automatic feeding machine. The hub portion 81 of the driving disk is hollowed out as shown at 83 to receive an expansion spring 84, which is confined within the hollow of the hub by means of a bearing nut 85 threaded upon the outer end of the journal pin 40 and held in the desired adjusted position by clamp nuts 86 and 87, also threaded upon said pin 40. The bearing nut 85 not only confines the spring 84, but has a cylindrical bearing portion which has a journal bearing in the inner surface of the hollow 83 of the hub of the driving disk. The bearings 82, 85 afford effective means for holding the driving disk in proper alined position, while at the same time permitting the disk sufficient freedom for rotation. The arrangement of the spring 84 in the hollowed out hub of the driving disk 80 tends to press the driving disk into effective frictional engagement with the rubber tire of the driven wheel 75, the wheel 75 being arranged as shown in the drawings to operate upon the inner face of the driving wheel 80.

The extreme inner end of the hub 81 of the driving disk 80, has cut into it or otherwise rigidly secured upon it a small gear or pinion 88, which meshes with and is driven by the gear or pinion 30 of the train of gears above referred to.

The frictional driven wheel 75 is formed with an annularly grooved hub 75^a, in the groove of which engages a depending bifurcated arm 90 pivotally mounted at 91 in the outer end of a lever 92 pivoted at 93 upon an arm of the bracket 39. Upon the upper face of this lever 92, adjacent to the arm 90, is a bifurcated lug 94, in which is pivoted at 95, the forward end of a rod or link 96, which is pivoted at its rear end 97 to the lower end of a rocking lever 98 pivoted at 99 upon a stud or shaft of the feeding machine frame. This lever 98 has pivotally connected with it at 100, a link or pitman 101 formed with a bifurcated rear end which straddles the cam shaft 20 upon which is mounted a groove cam 105. This pitman or link 101 carries an antifriction roller 102, which operates in the groove of cam 105 to reciprocate the pitman and through the levers and rod connection referred to, intermittently move the frictional driven wheel 75 inwardly and outwardly over the surface of the driving disk 80 in a direction radial to said disk, for the purpose of periodically reducing the speed of driven shaft 60 and consequently slowing down the sheet forwarding surfaces or rollers. The tapes 54 being supported at the forward end of the conveyer frame upon pulleys (not shown) which are loosely mounted upon the shaft 50, it will be clear that the slow down feed rollers 51 can have their speed varied without interfering with the constant speed of the tapes.

The auxiliary or upper conveyer frame comprises the longitudinal side bars 110 connected at their rear ends to brackets 111 and formed at their forward ends with downwardly projecting arms 112 recessed at 113 to engage and rest upon one of the cross tie rods of the main conveyer frame. Braces or tie rods 115 and 116 connect brackets 111 at the rear and arms 112 at the front of the auxiliary frame. Rods or straps 117 are supported at their ends upon the tie rods 115 and 116 for confining sheets against upward displacement.

The brackets 111 are formed with journal sockets 111^a which are freely pivoted upon the rear tie rod 41 of the main conveyer frame.

120 is a hook pivoted to one of the angular arms 112 in position to engage a part of the main conveyer frame and latch the parts together in operative position.

Adjustably mounted upon the side bars 110 of the auxiliary frame, are three sliding boxes 125, in which is mounted a cross bar or shaft 126 carrying two or more rock arms 127 having freely journaled in their forward ends the pressure rollers 128, which are designed to engage a sheet against the under feed rollers 51 of the slow-down delivery mechanism to increase the frictional hold upon the moving sheet.

The operation of my improved machine will be clear from the foregoing description.

Claims.

1. A sheet conveyer having in combination a plurality of sheet conveying rollers, driving mechanism for said sheet conveying roll-

ers including a friction driving disk, and a frictionally driven wheel in engagement with said disk, and automatic means for periodically shifting said driven wheel radially of said driving disk to regularly vary the speed of said conveying rollers.

2. In a sheet conveyer, the combination of traveling tapes for conveying sheets from the feeding machine, slow down delivery rollers to which said tapes deliver the sheets, a driving shaft geared to said delivery rollers for operating them, a friction wheel mounted upon said driving shaft, a friction driving disk frictionally engaging said friction wheel, and means for automatically and periodically shifting said friction wheel inwardly and outwardly radially upon the surface of said driving disk for rotating said rollers at the speed of the tapes during the major part of their operation and then retarding said rollers to slow down a sheet just prior to its release from said rollers.

3. In a sheet conveyer, the combination of a plurality of sheet conveying rollers, a driving shaft geared to said rollers to operate them, a friction wheel splined upon said shaft and movable longitudinally of the shaft, a friction driving disk frictionally engaging said friction wheel, means for operating said disk at constant speed, and mechanism adapted to automatically and periodically shift said friction wheel upon the driving shaft to vary the speed of said conveying rollers at regular intervals.

4. In a sheet conveyer, the combination of a conveyer frame, a plurality of slow down conveying rollers mounted in said frame, a driving shaft journaled in and extending longitudinally of said frame, gearing between said shaft and said rollers, a friction wheel splined upon and movable longitudinally of said shaft, a friction driving disk journaled upon an axis at right angles to said shaft and frictionally engaging said friction wheel, a spring engaging said disk to yieldingly hold it in engagement with said friction wheel, means for operating said disk at constant speed, and means for automatically and periodically shifting said friction wheel upon the driving shaft to intermittently vary the speed of said conveying rollers.

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