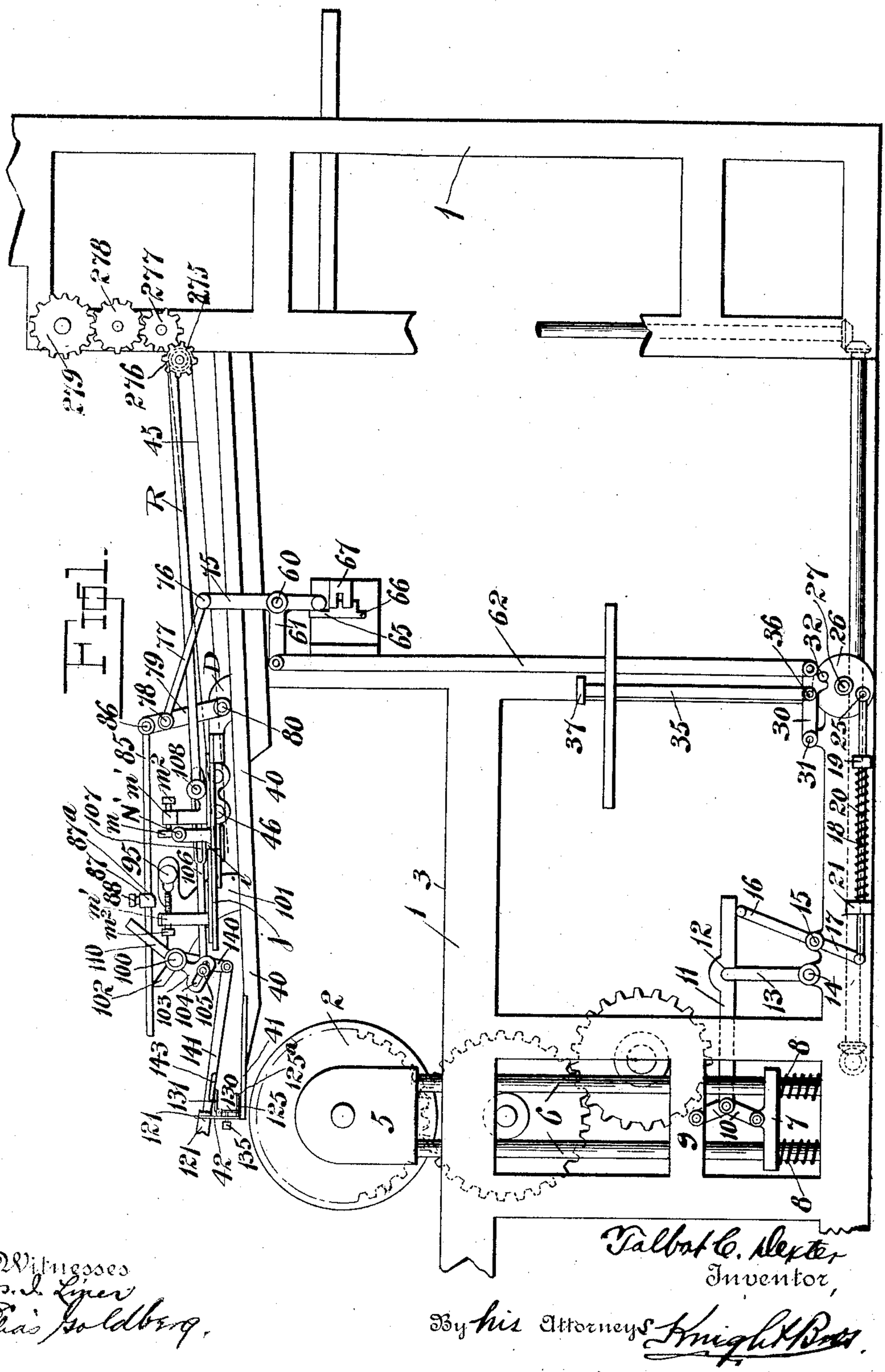
No. 765,414. PATENTED JULY 19, 1904.

T. C. DEXTER.

FEEDING MACHINE AND PRINTING PRESS CONTROLLING MECHANISM.

APPLICATION FILED SEPT. 29, 1902.

NO MODEL. 4 SHEETS—SHEET 1.



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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2

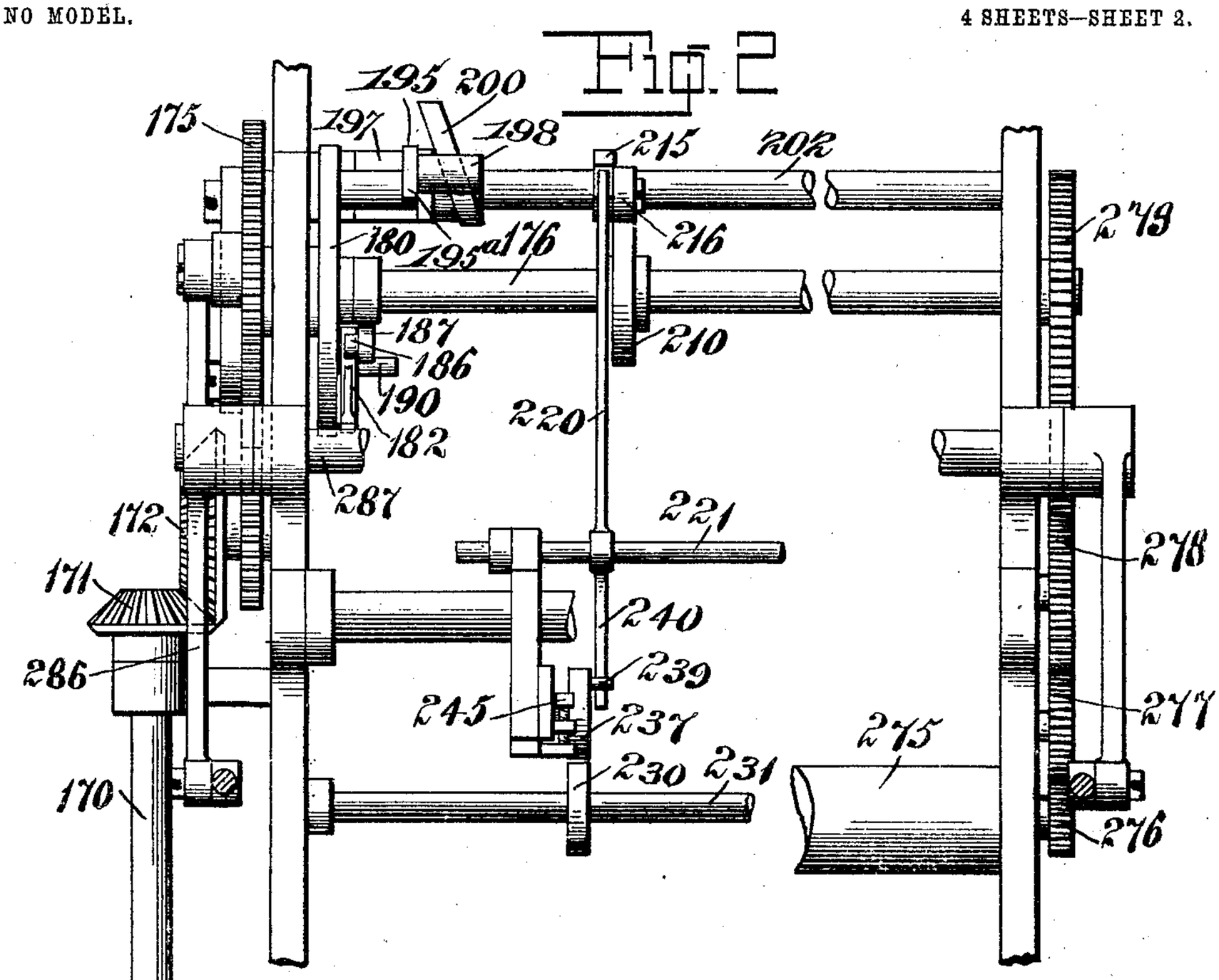
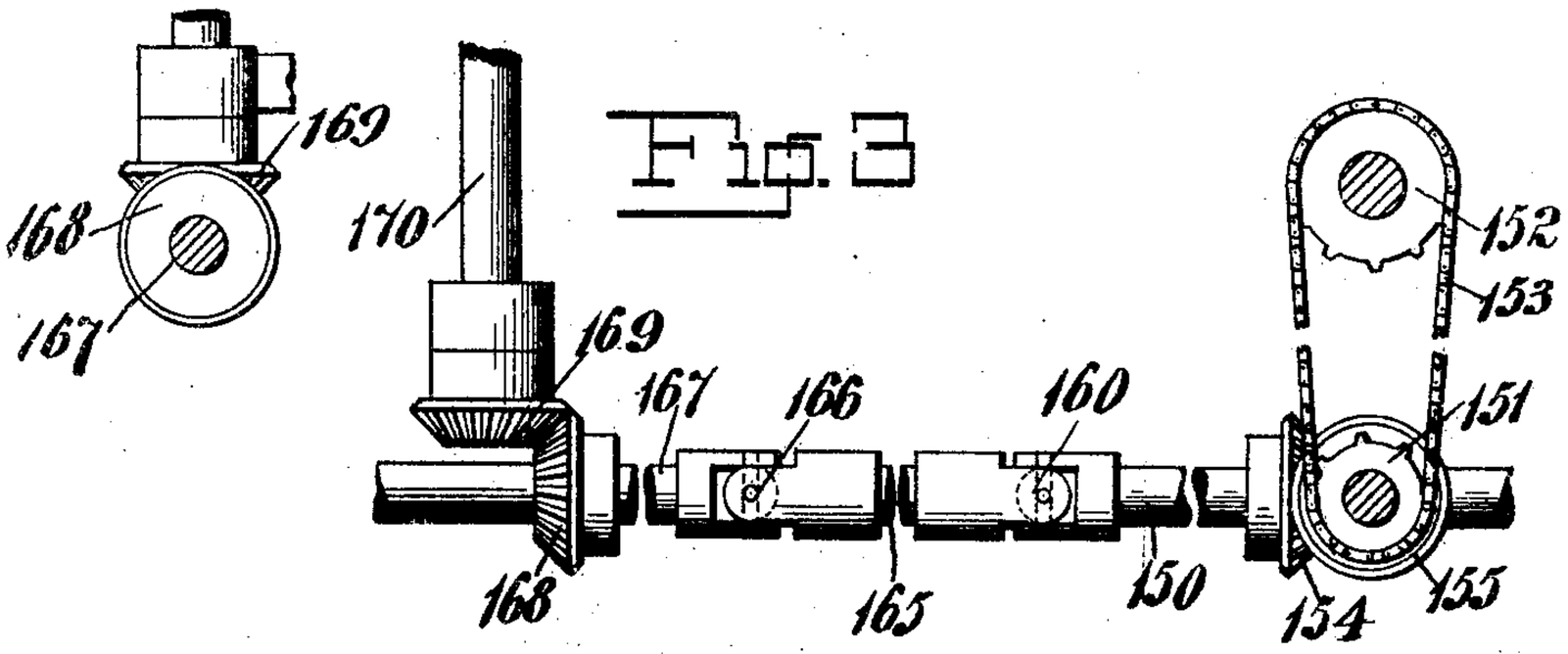


Fig. 3



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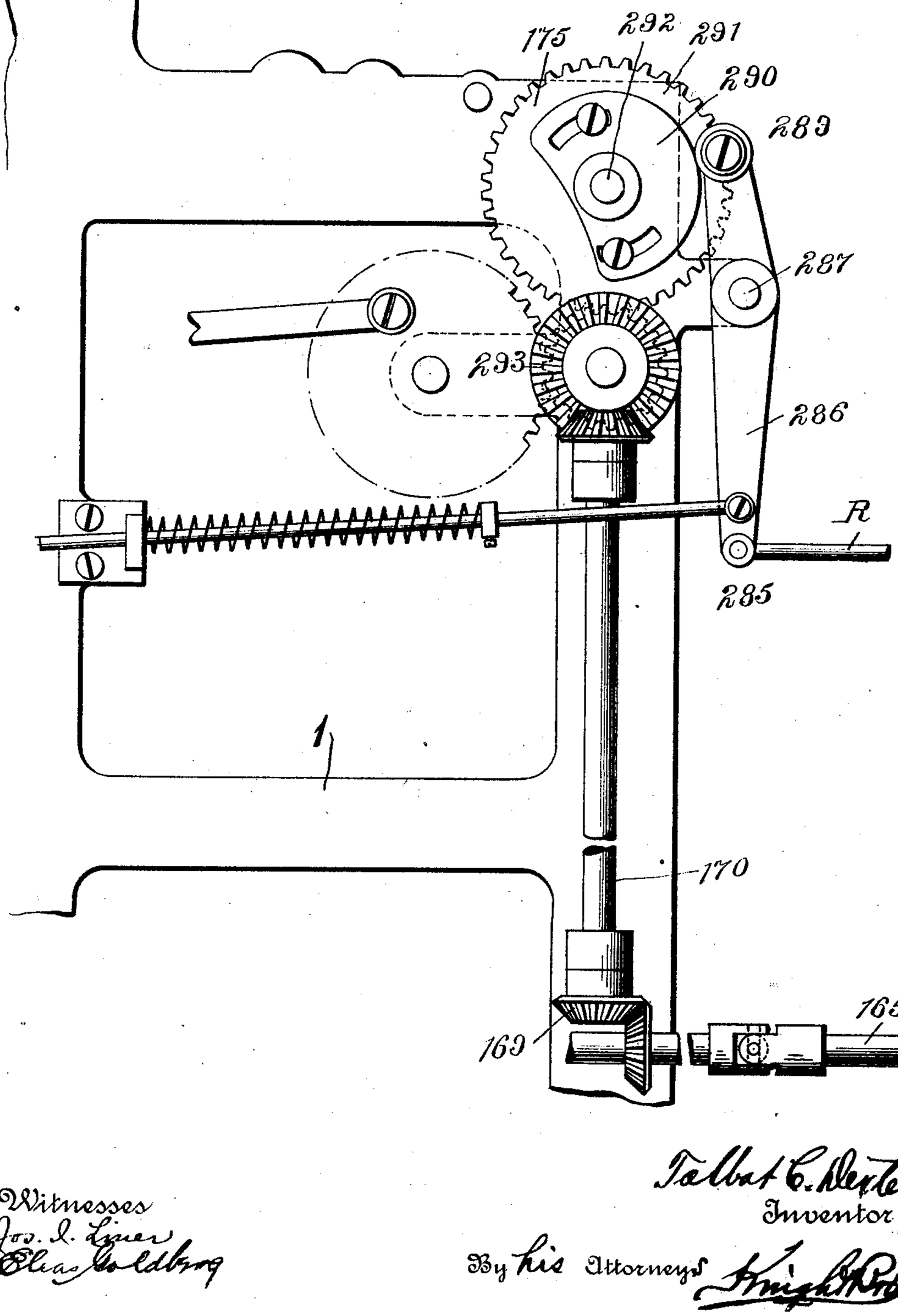
NO MODEL. 4 SHEETS—SHEET 3.

Fig. 4



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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 6.

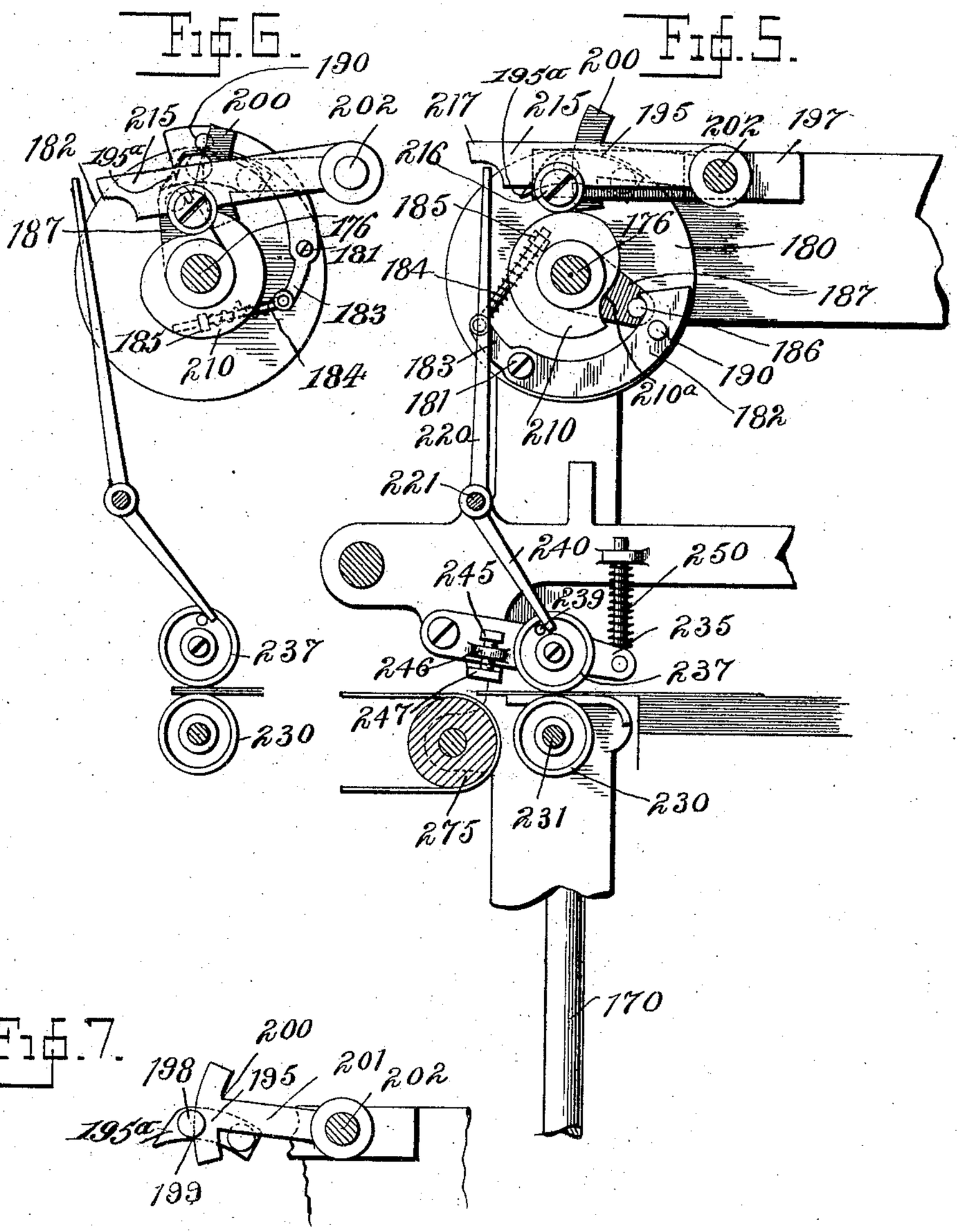

Fig. 7.

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No. 765,414. Patented July 19, 1904.

UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER, OF PEARL RIVER, NEW YORK.

FEEDING-MACHINE AND PRINTING-PRESS CONTROLLING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 765,414, dated July 19, 1904.

Application filed September 29, 1902. Serial No. 125,314. (No model.)

To all whom it may concern:

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

The object of the present invention is to improve the general construction and operation of mechanism for controlling automatic feeders and printing-presses with a view to reducing to a minimum the wear and tear upon the machinery, the loss of time in printing, and the waste of paper.

In the machine of my present invention the transfer-tapes are driven from the main cam-shaft of the feeding-machine, which is in turn driven from a shaft operated by the printing-press, a suitable caliper-controlled clutch being interposed between the driving-shaft and cam-shaft of the feeder, so as to arrest the operation of the feeding-machine and transfer-tapes independently of the operation of the printing-press. I also employ side-register gages and suitable sheet-detecting devices at the front gages of the printing-press adapted to throw out the press when a sheet fails to reach registered position.

My invention consists of the general arrangement and combination of parts for producing the desired results, and 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 annexed claims.

In said drawings, Figure 1 is a general side elevation of parts of a printing-press and parts of an automatic paper-feeding machine arranged to feed sheets to the press and controlling devices for said machines. Fig. 2 is a detail front elevation of part of the feeding-machine, showing particularly the caliper-controlled clutch for arresting the operation of the feeding-machine and transfer-tapes. Fig. 3 is a detail view illustrating the feeder-driving mechanism. Fig. 4 is a detail elevation of one side of the forward part of the paper-feeding machine. Fig. 5 is a detail vertical longitudinal sectional view of the sheet-calipering mechanism and the feeder throw-out clutch. Fig. 6 is a similar view showing the tripped position of the caliper-controlled clutch. Fig. 7 is a detail of a part of the clutch mechanism.

1 represents the frame of a printing-press in which is mounted the impression-cylinder 2 and the reciprocating bed or form 3. The impression-cylinder 2 is mounted in vertically-movable bearings 5, from which depend the rods 6, connected to a yoke 7 adjacent to their lower ends. Heavy spiral springs 8 surround the rod 6 and tend to hold the impression-cylinder 2 in printing position. The yoke 7 is connected with a stationary part 9 of the press-frame by means of the toggle-links 10, to the knuckle of which is pivoted a reciprocating controller-bar 11, formed with a notched recess 12, in which engages a rock-arm 13, extending from a rock-shaft 14, journaled in the press-frame. This shaft 14 is constantly rocked during the operation of the press for alternately moving the impression-cylinder into and out of printing position. A rock-shaft 15, journaled in the machine-frame, carries a rock-arm 16, which rests directly beneath the front end of the controller-bar 11 for raising said bar out of engagement with the rock-arm 13. This shaft 15 has a depending arm 17, pivoted to the end of a spring-actuated rod 18, which passes through a guide 19, journaled upon the machine-frame, and carries an expansion-spring 20, confined by the adjustable collar 21. This spring-actuated rod 18 is pivoted at 25 to the throw-out disk 26, journaled to the machine-frame at 27. This mechanism as far as described is similar in construction and operation to that shown in my Patent No. 665,072, dated January 1, 1901. Other forms of impression-cylinder throw-out mechanism may be employed.

A latch or hook 30, journaled at 31, engages a pin or lug 32, carried by the throw-out disk 26, for holding the impression-cylinder throw-out mechanism in normal position to allow the operation of the press.

35 is a trip-rod journaled to the hook 30 at 36 and provided at its upper end with a step 37.

40 is a feed-board of ordinary construction suitably mounted in proper relation to the impression-cylinder 2 of the printing-press.

Projecting forwardly from the inner end of the feed-board 40 are the usual under-guide fingers 41, which will be hereinafter more fully referred to. A series of transfer conveyer bands or tapes 45, passing over a roller 46, suitably journaled above the upper face of the feed-board 40, are arranged to convey successive sheets of paper from the automatic feeding-machine to the printing-press. These bands or tapes 45 deposit the sheet upon the feed-board with its forward edge in contact with the printing-press front guides in readiness for the operation of the side-registering mechanism. This latter mechanism will now be described.

The specific construction of the side-registering mechanism forms no part of the present invention, and any suitable side-registering mechanism may be employed in combination with the other devices hereinafter referred to. For the purpose of illustrating the invention I have shown in the drawings and will now describe in a general way the side-registering mechanism covered by my Patent No. 669,724, granted March 12, 1901, for improvements in sheet-conveyer frames.

The mechanism set forth in this patent comprises two laterally-operating paper-shifting grippers disposed in reverse positions in relation to each other and adjacent to the opposite sides of the feed-board. The operating devices are constructed so that either one of the side-registering grippers may be employed, so that the sheets can be registered from either side.

I have shown but one of the side-registering devices. *i* is one of the reciprocating transverse bars, having a spring for moving it inwardly and supported in suitable guides on the brackets D. The outward movement of the bar *i* is effected by means of a longitudinally-movable cam-plate *j*, mounted in suitable guides on the bracket D. The cam-plate *j* is adapted to engage a roller (not shown) carried by the bar *i* for moving the bar *i* outwardly. A rod R is connected with the cam-plate *j* and reciprocated by any suitable cam mechanism, which may be operated from the feeding-machine, as hereinafter explained. The gripper-finger (not shown) is fastened to a transverse shaft N′, suitably journaled in brackets mounted upon the bar *i*. To the other end of the shaft N′ is rigidly secured a radially-projecting lug *m*, and in front and rear of said portion of said shaft are posts *m′*, projecting up from the face of the cam-plate *j*, to which are adjustably connected studs or tappets m^2, disposed to strike the lug *m* alternately upon opposite sides during the reciprocating movement of the cam-plate *j*. The operation of this side-registering mechanism will be clearly understood after referring to the above-named Patent No. 669,724, the corresponding parts of the structure being indicated in the present case by the same reference characters that are used in said patent.

60 is a controller rock-shaft suitably journaled in the machine-frame and carrying a rock-arm 61, which is connected, through a downwardly-projecting link 62, with the hook or latch 30 of the impression-cylinder throw-out mechanism above described.

65 is the main switch-lever pivoted at 66 and controlling the contacts (indicated at 67) which are included in the electric circuit which supplies current to the motor which operates the printing-press. In place of the switch-lever 65 a belt-shifting lever may be used when the press is operated by steam.

A rock-arm 70 depends from the rock-shaft 60 just behind the switch-lever 65, so as to open the switch when shaft 60 is rocked.

The specific form of the controlling mechanism just described is immaterial to the present invention, and, in fact, it is not essential whether the controlling mechanism is electrical or mechanical.

A rock-arm 75 projects upwardly from the rock-shaft 60 and has pivoted at its upper end 76 a link 77, which is pivotally connected at 78 to a rock-arm 79, journaled at 80 to the bracket D. Projecting forwardly from the rock-arm 79 is a rod 85, which is journaled to the rock-arm at 86 and carries an adjustable block or tappet 87, formed with a rear curved or cam face 87^a and secured in the desired adjusted position upon the rod 85 by any suitable means, such as a set-screw 88. The rod 85 is controlled by the mechanism presently to be described. When the rod is in its lowermost position and the cam-plate *j* is moved rearwardly, a part 90, projecting from the forward post *m′*, will engage the tappet 87, forcing the rock-arm 79 rearwardly to operate the controller-shaft 60 and cause it to break the electric circuit and actuate the impression-cylinder throw-out mechanism. If, on the other hand, the rod 85 is in its raised position, the tappet 87 will not be engaged by the part 90, and the controlling mechanism will therefore not be operated. A stud 95 is adjustably mounted on a stationary part of the frame to one side of the line of travel of part 90 and in the path of tappet 87. When the tappet 87, engaged by part 90, is forced rearwardly for operating the throw-out mechanism, the cam-face 87^a engages stud 95 and lifts the tappet 87 out of engagement with the part 90, thereby stopping the movement of rod 85 and allowing cam-plate *j* to complete its stroke.

100 is a rock-shaft journaled in a bracket 101 and carrying a finger 102, which rests directly beneath the forward portion of the rod 85. The rock-shaft 100 also carries an arm 103, formed with a lateral slot 104, in which is adjustably mounted a pin 105, carried by a link 106. The pin 105 can be clamped in any desired adjusted position upon arm 103.

The link 106 is formed at its opposite end with an elongated slotted yoke 107, in the slot of which engages a pin or stud 108, mounted upon the rear post m' of the cam-plate j.

110 is a forked or bifurcated arm mounted upon the rock-shaft 100 and straddling the rod 85 for holding it against lateral displacement. A spiral spring (not shown) surrounds the rock-shaft 100 and tends to rotate shaft 100 to throw the finger 102 into engagement with rod 85 for raising the rod and holding the tappet 87 out of the path of the post m'.

120 represents the front guides of the printing-press, adjustably mounted upon the arms 121, which are secured upon a rock-shaft operated, as usual, by the press. Each front guide has projected from its sheet-engaging face a plate 125, formed with an upturned end 125^a. This plate 125 rests above and parallel with the under guides 41 of the feed-board when the front guides are down in operative position for the purpose of confining the forward edge of the sheet between the under guide and the plate to prevent the sheet from buckling at its forward edge.

130 is a tripping-plate pivoted to the face of each front guide 120 and formed with a bifurcated lower end, the legs of which straddle the plate 125 and the under-guide finger 41. Formed integral with and projecting rearwardly and laterally from the plate 130 is an arm or dog 131. A counterbalance-weight 135 is attached to the rear face of the plate 130 for holding the plate 130 and attached arm 131 in normal operative position.

Rock-shaft 100 carries a depending rock-arm 140, to the lower end of which is pivoted a reciprocatory rod 141, which rests and slides in a notch cut in the upper edge of the front guide 120. This rod 141 is formed on its lower face with a shoulder 143, which is adapted under certain circumstances to engage the arm or dog 131 of the sheet-actuated tripping-plate 130.

When the sheet is fed to the press by the automatic feeding-machine, its forward edge comes in contact with the front guides of the press and is arrested in this position. After the sheet reaches the proper registered position against the front guides it will be clear that the tripping-plates 130 will be pushed inwardly against the front guides 120, which will depress the arms or dogs 131 to a position below the path of the shoulders 143. Immediately following this the cam-plate j moves forwardly and allows the spring to rock the shaft 100 to cause the finger 102 to raise the rod 85. When the cam-plate j reaches the end of its forward movement, the side-registering gripper will engage the sheet, and immediately after this the cam-plate j will move rearwardly, throwing the side-registering gripper laterally to register the sheet, and at the end of this stroke the stud 108 will engage the outer end of the slot in the yoke 107 of rod 106 to rock the shaft 100 against the action of its spring to depress the finger 102 and throw rearwardly the rod 141 in readiness for the operation upon a second sheet. If the sheet fails to reach the proper position against the front guides 120, the arms or dogs 131 will not be depressed, and upon the return of the cam-plate j one of said dogs 131 will engage shoulder 143 on the rod 141 and prevent the spring moving the shaft 100 back to raise the finger 102. The result of this will be that the rod 85 will remain in its lowered position and the tappet 87 will rest in the path of the part 90 on post m', so that when the cam-plate j returns to register the sheet laterally the rod 85 will be forced rearwardly, causing the arm 79 to rock upon its bearing and move the controller-shaft 60 upon its bearing, with the result that the circuit will be broken at contacts 67 and the machine will be thrown out of operation, as above explained.

A horizontal shaft-section 150 is driven from a part of the printing-press through sprocket-wheels 151 152 and chain 153 and bevel-gears 154 155. This shaft-section 150 has a universal-joint connection 160 with a central horizontally-extending shaft-section 165, which in turn is connected by universal joint 166 with a shaft-section 167, carrying a beveled gear 168, which meshes with the gear 169 on the vertically-extending feeder-operating shaft 170. The upper end of this shaft 170 carries a beveled gear 171, meshing with a similar gear 172, journaled on a stud 173 of the feeding-machine frame and having secured to it a small gear 174, which meshes with a large gear 175, freely journaled on the cam-shaft 176 of the feeding-machine. The gear 175 is mounted upon a sleeve, which also carries a disk 180, which constitutes one of the members of the feeder-clutch. This disk 180 has journaled upon it at 181 a curved clutch-hook 182, having a rearwardly-extending heel or finger 183, to which is pivoted a spring-actuated rod 184, which passes through a guide-nut 185 mounted upon the disk 180. The hook of the curved arm 182 normally engages a pin or lug 186, carried on an arm 187, which is keyed to the cam-shaft 176. The engagement of the hooked arm 182 with the lug 186 causes the shaft 176 to rotate with the disk 180. All of the parts of the feeding-machine are operated from shaft 176. The arm 182 also has a laterally-projecting pin or lug 190, which is adapted to engage the inclined face 195^a of a cam-block 195 when the latter is moved laterally into the path of said lug 190. This cam-block 195 slides in a suitable bracket 197 and has projecting from it the pin 198, formed with a slot 199, in which engages the segment-cam 200, mounted on the rock-arm 201, keyed to the throw-out rock-shaft 202.

210 is the throw-out controlling-cam of the

caliper-controlled mechanism. This cam 210 is keyed to the main cam-shaft 176 of the feeder and is formed with a low portion 210ª, the purpose of which will presently appear.

A rock-arm 215 is keyed to the rock-shaft 202 and carries adjacent to its forward end an antifriction-roller 216, which operates upon the periphery of the controlling-cam 210. This rock-arm 215 is also formed with a forwardly-projecting nose 217, which normally rests above the upper end of a pendulum-lever 220, which is journaled to the machine-frame at 221. This pendulum-lever is operated by the sheet-calipering device, which will now be explained.

230 is a roller keyed to a constantly-driven shaft 231 on the feeding-machine. This roller 230 constitutes the lower member of the sheet-calipering device.

235 is a rock-arm journaled to the machine-frame at 236 and carrying the normally stationary rotatable calipering-wheel 237, which is journaled to said rock-arm at 238 and has projecting from one face a pin or lug 239. An arm 240 projects downwardly from the journal 221 of the pendulum-lever 220 and is connected with said pendulum-lever. Arm 240 rests behind the lug 239.

245 is an adjustable limiting-screw threaded through a lug 246 on rock-arm 235 and engaging a rigid lug 247 on the machine-frame. By adjusting the screw 245 the relation of the upper calipering member 237 to the lower calipering member 230 may be regulated to a nicety. A spring-actuated rod 250 is connected to the free end of the calipering supporting-arm 235 for holding it downwardly with a yielding pressure. If an extra thickness of sheets passes between the calipering-wheels 230 and 237, the wheel 237 will be rotated by rock-lever 220 to move it from beneath the nose 217 of rock-arm 215. This will remove the support for said rock-arm when the low portion 210ª of cam 210 reaches the antifriction-roller 216, and hence the rock-arm 215 will drop, causing the shaft 202 to be rocked for throwing out the clutch above described. The disengagement of the clutch effects the disconnection of the feeding-machine from the driving-shaft operated by the printing-press.

The transfer-conveyer bands or tapes 45 are passed over the feed-board of the printing-press and are supported at their forward end upon the tape-roller 46 and supported at rear upon a driving tape-roller 275, having at one end a gear-wheel 276, which is driven through the intermediate gears 277 and 278 from the gear 279, keyed to the main cam-shaft 176 of the feeding-machine. It will be observed that the gear 279 is at the opposite end of shaft 176 from the driving-clutch above described. From this arrangement it will be observed that the transfer-tapes being driven by the feeder cam-shaft will be under direct control of the feeder throw-out mechanism, so that the said tapes will stop when the feeding-machine stops.

The rod R, which operates the side registering mechanism above described, extends from the said mechanism to the adjacent end of the feeding-machine, where it is connected at 285 with the lower end of a lever 286, journaled to the feeding-machine frame at 287. The upper end of the lever 286 carries an antifriction-roller 289, which operates upon the periphery of a cam 290, which is adjustably secured to the face of the gear 175 above referred to.

When the machine is started, it will be observed that the automatic feeding-machine driven through the mechanism described will feed the successive sheets of paper to the transfer-tapes, which in turn carry the sheets down to the front guides of the printing-press. When the sheet reaches the front guides of the press, it is registered in the manner already described. If the sheet-calipering device detects an extra thickness of sheets, as in the case of two sheets being fed forward from the feeding-machine, the feed-clutch will immediately be thrown out to arrest the operation of the feeder and transfer-tapes. This will arrest the forward movement of any sheets which happen to be on the transfer-tapes on their way to the printing-press. The printing-press being under control of its independent sheet-actuated tripping devices will continue to operate upon any sheet which has reached the front guide or has gone part way through the press; but immediately after the passage of any sheet which has started through the printing-press the movement of the press will be arrested. The importance of this arrangement is the fact that the press is not stopped until the completion of an operation upon any sheet which happens to have reached the press, so that there is no danger of destroying any sheets of paper. It makes no difference whether the press throw-out mechanism fails to arrest the movement of the operating parts of the press instantly after it is tripped, since no more sheets can go into the press and no harm can be done.

I would have it understood that the construction illustrated and described in my present case is subject to the claims of my co-pending application, Serial No. 76,728, filed September 27, 1901, "Improvements in throw-out mechanism for printing-presses."

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of a printing-press, a paper-feeding machine, and a conveyer for transferring sheets from the feeding-machine to the printing-press, with power-transmitting mechanism driving the feeding-machine from the printing-press, a clutch interposed

in said power-transmitting mechanism, a sheet-actuated device supported in the path of the sheets and controlling said clutch, gearing between the feeding-machine and the transfer-conveyer for driving the latter, suitable throw-out mechanism adapted to arrest the operation of the press independently of the feeding-machine, and sheet-actuated means controlling said press throw-out mechanism and independent of the sheet-actuated clutch-controlling device, substantially as set forth.

2. The combination of a printing-press, suitable throw-out mechanism adapted to arrest the operation of the press, and sheet-actuated means controlling said throw-out mechanism, with a paper-feeding machine, a transfer-conveyer for feeding sheets from the feeding-machine to the printing-press, gearing between the feeding-machine and transfer-conveyer, power-transmitting mechanism driving the feeder from the printing-press, a clutch interposed in the power-transmitting mechanism between the feeding-machine and printing-press, and a sheet-calipering device arranged in the path of the sheets and adapted to disconnect the feeding-machine and transfer-conveyer from the printing-press, said calipering device being independent of the controlling means of the press throw-out mechanism, substantially as set forth.

3. The combination of a printing-press, a side-registering gripper operating upon the feed-board of the press, suitable throw-out mechanism controlled by said side-gripper mechanism and adapted to arrest the operation of the press, drop-gages operating to control said side-gripper mechanism, with a paper-feeding machine, a transfer-conveyer for feeding sheets from the feeding-machine to the feed-board of the printing-press, gearing between the feeding-machine and transfer-conveyer, power-transmitting mechanism driving the feeder from the printing-press, a clutch interposed between the feeding-machine and printing-press, and a sheet-calipering device arranged in the path of the sheets and adapted to disconnect the feeding-machine and transfer-conveyer from the printing-press, substantially as set forth.

4. The combination of a printing-press and suitable automatically-controlled throw-out mechanism adapted to arrest the operation of the press, with a paper-feeding machine including a main shaft from which the operative parts of said machine are driven, a driving-gear loosely mounted upon said main shaft, a clutch adapted to lock said loose gear upon said main shaft, sheet-actuated means controlling said clutch, power-transmitting mechanism connecting the printing-press with said loosely-mounted gear, a transfer-conveyer adapted to convey sheets from the feeder to the printing-press, and gearing between the main shaft of the feeder and said transfer-conveyer, substantially as set forth.

5. The combination of a printing-press, and suitable sheet-actuated means controlling the operation of said press, with a paper-feeding machine, a sectional driving-shaft geared to and driven by said printing-press, universal joints connecting the sections of said driving-shaft, a feeder-operating shaft geared to and driven by said sectional driving-shaft, a main cam-shaft operating the parts of the feeding-machine, a gear loosely mounted upon said cam-shaft and driven by the feeder driving-shaft, a clutch connecting said loosely-mounted gear with the cam-shaft, a sheet-calipering device controlling said clutch, a transfer-conveyer adapted to carry sheets from the feeder to the printing-press, and gearing between said conveyer and the feeder cam-shaft, substantially as set forth.

6. The combination of a printing-press, a feeding-machine, conveyer-tapes adapted to carry sheets from the feeding-machine to the printing-press, automatic means controlling the operation of the printing-press, suitable side-registering mechanism for registering the sheets in the printing-press, a feeder cam-shaft from which the operative parts of the feeder are driven, a gear loosely mounted upon said cam-shaft, a clutch connecting said loosely-mounted gear with the shaft, sheet-actuated devices controlling said clutch, power-transmitting mechanism operated by the printing-press and driving said loosely-mounted gear, a cam mounted upon said loosely-mounted gear, means operated by said cam for actuating the side-registering mechanism, and gearing between the tranfer-conveyer and the feeder cam-shaft, substantially as set forth.

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