T. C. DEXTER,

PAPER FEEDING MACHINE.

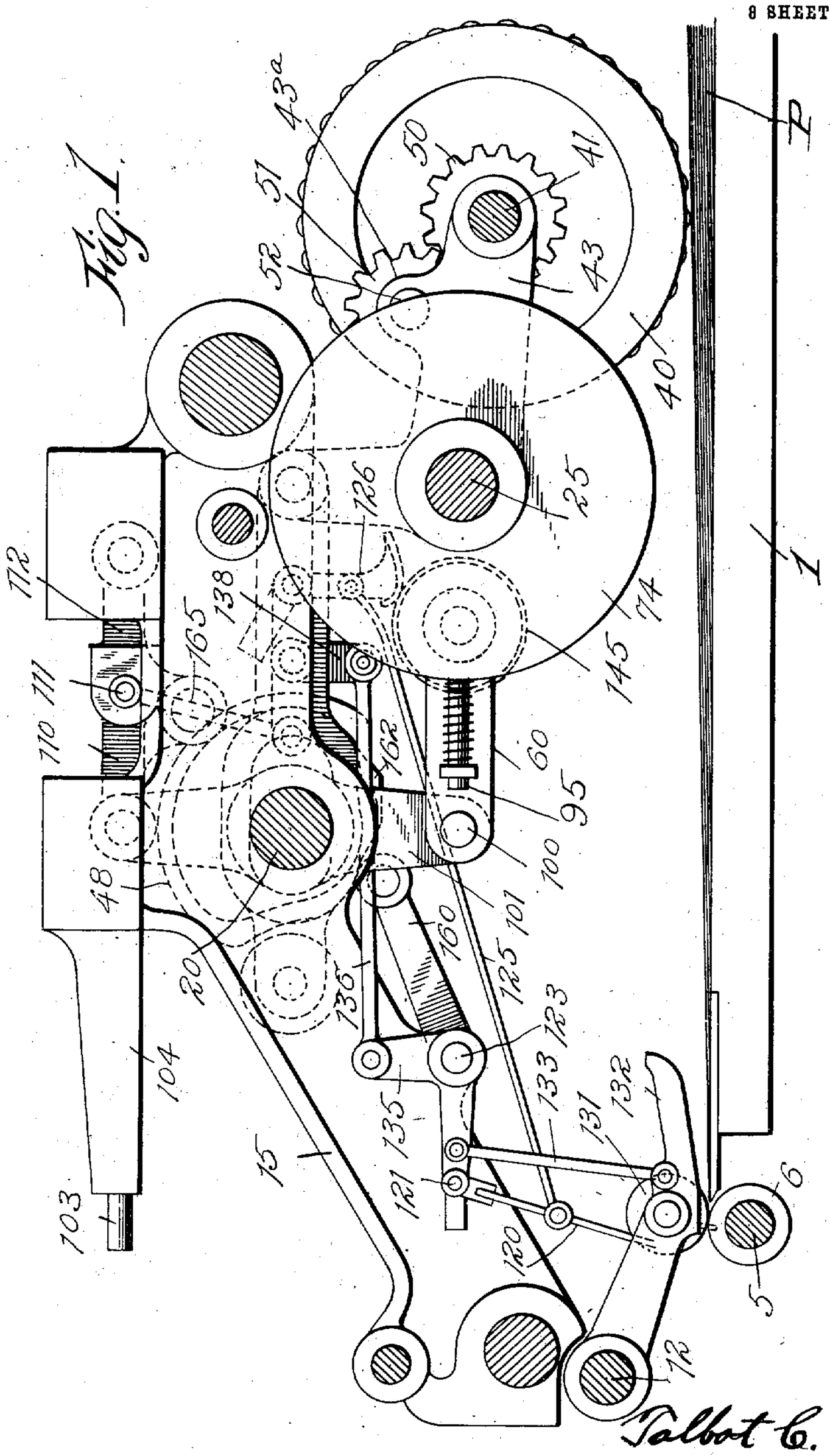
APPLICATION FILED SEPT. 21, 1908.

975,123.

Patented Nov. 8, 1910.

8 SHEETS—SHEET 1.

Fig. 1.



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8 SHEETS—SHEET 2.

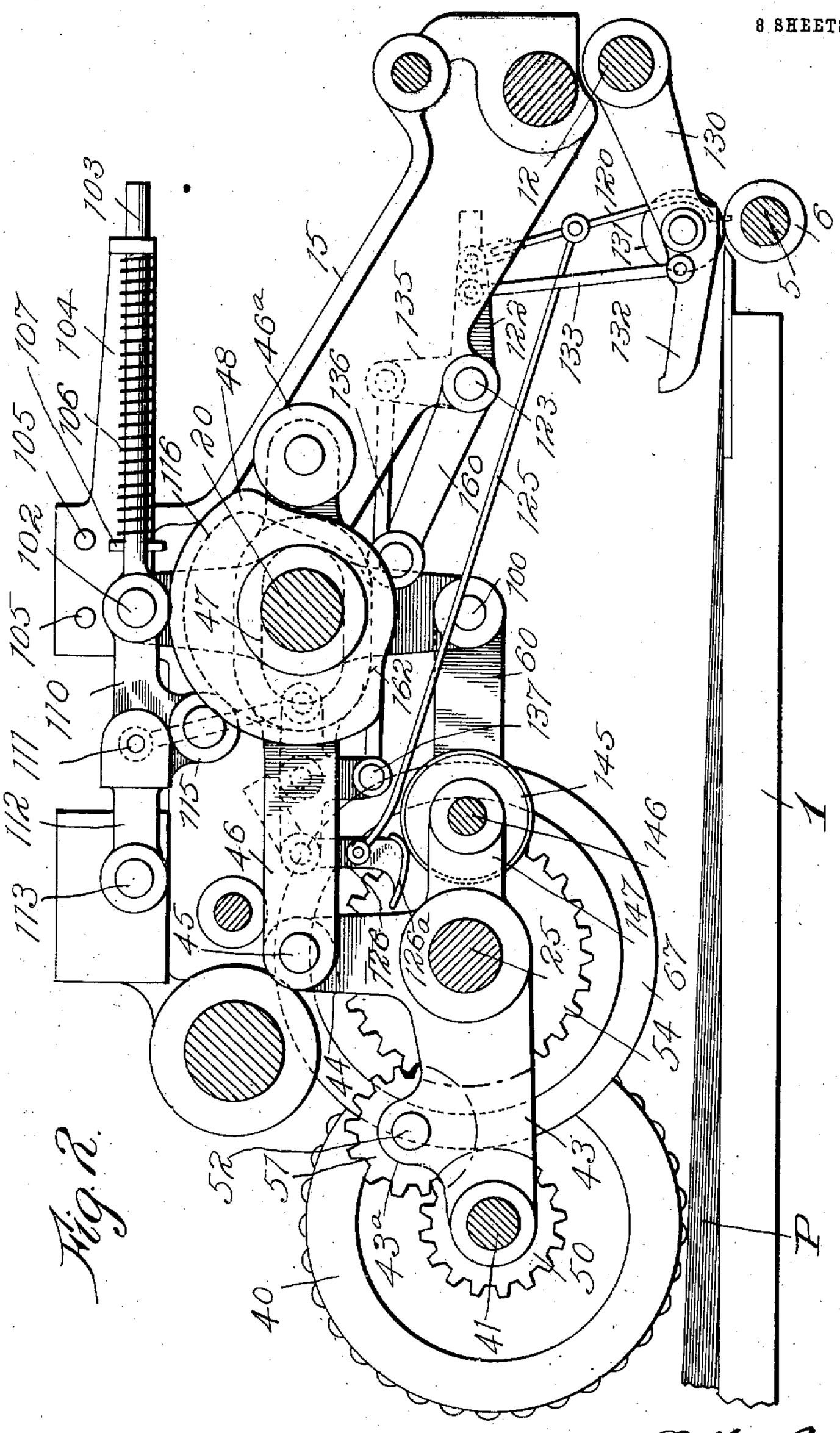

Fig. 2.

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8 SHEETS—SHEET 3.

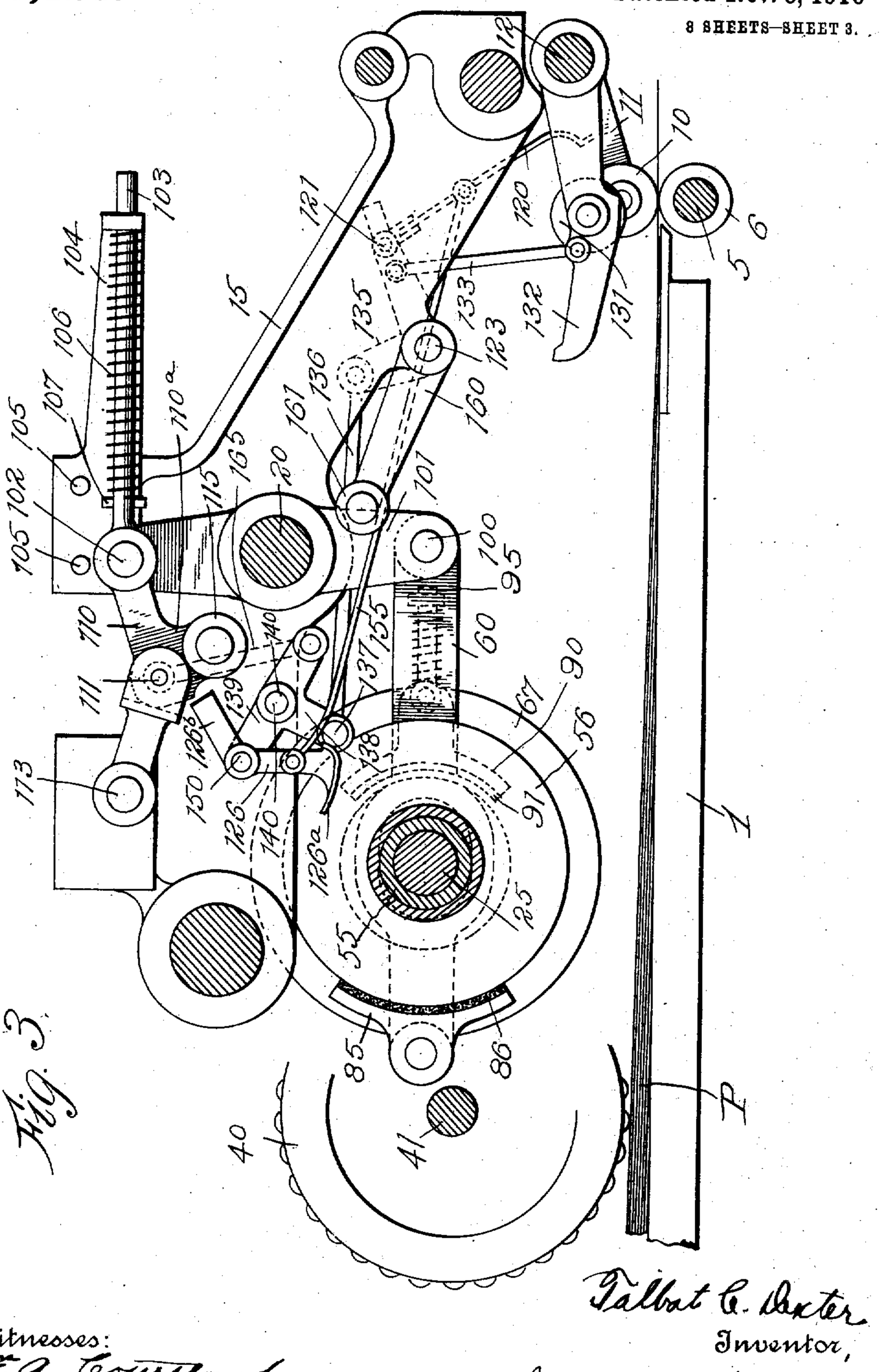

Fig. 3.

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8 SHEETS—SHEET 4.

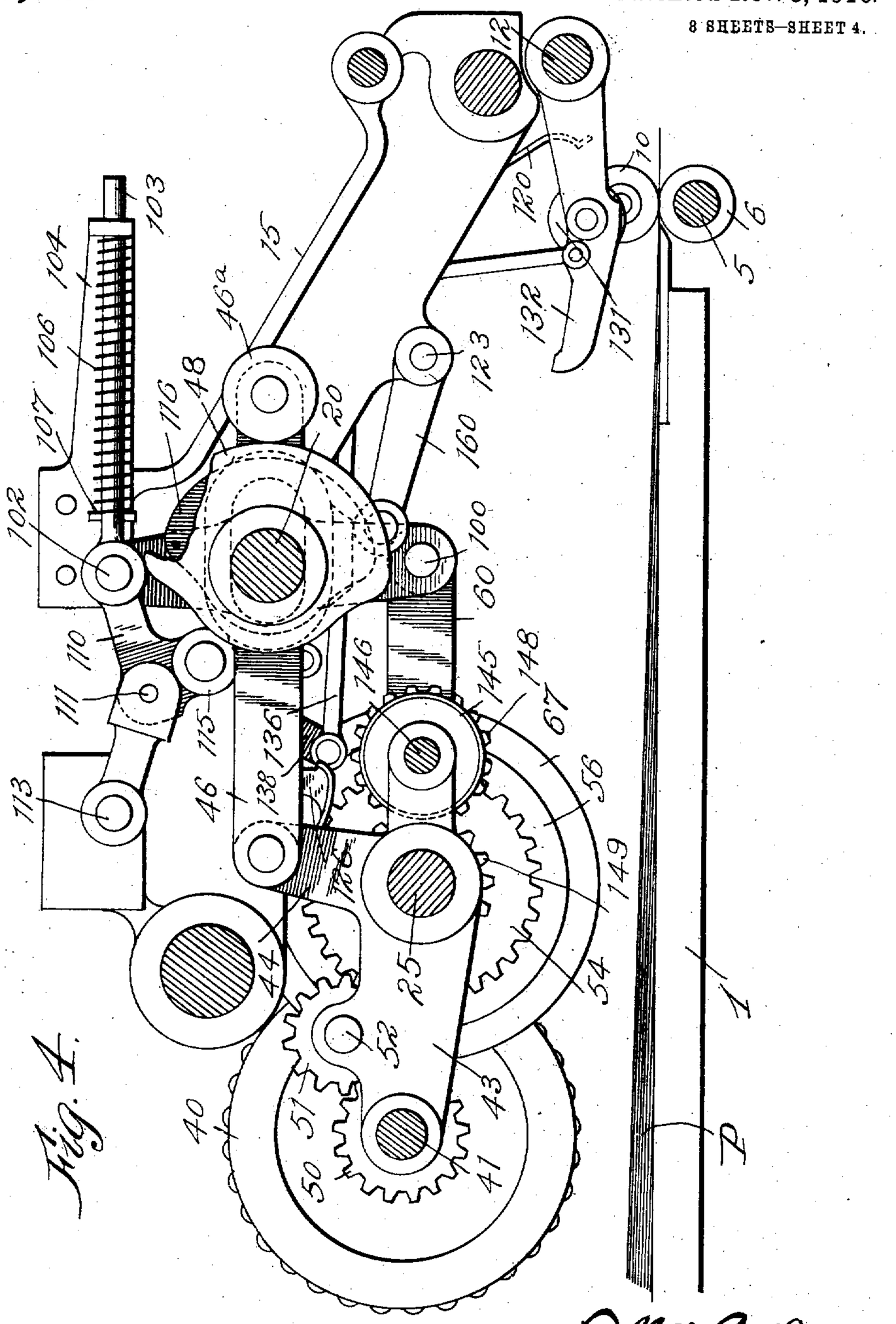

Fig. 4.

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8 SHEETS—SHEET 5.

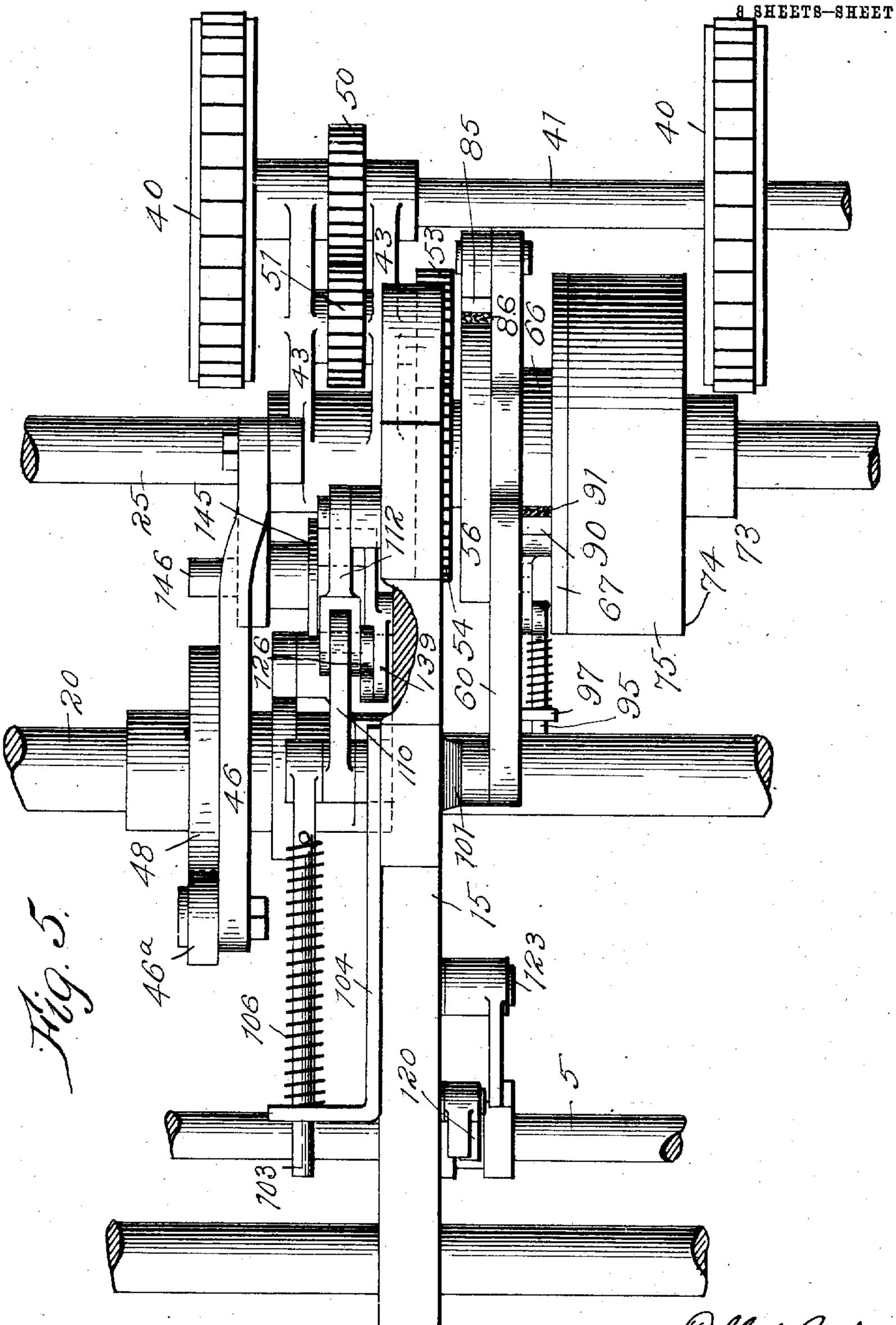

Fig. 5.

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8 SHEETS—SHEET 6.

Fig. 6.

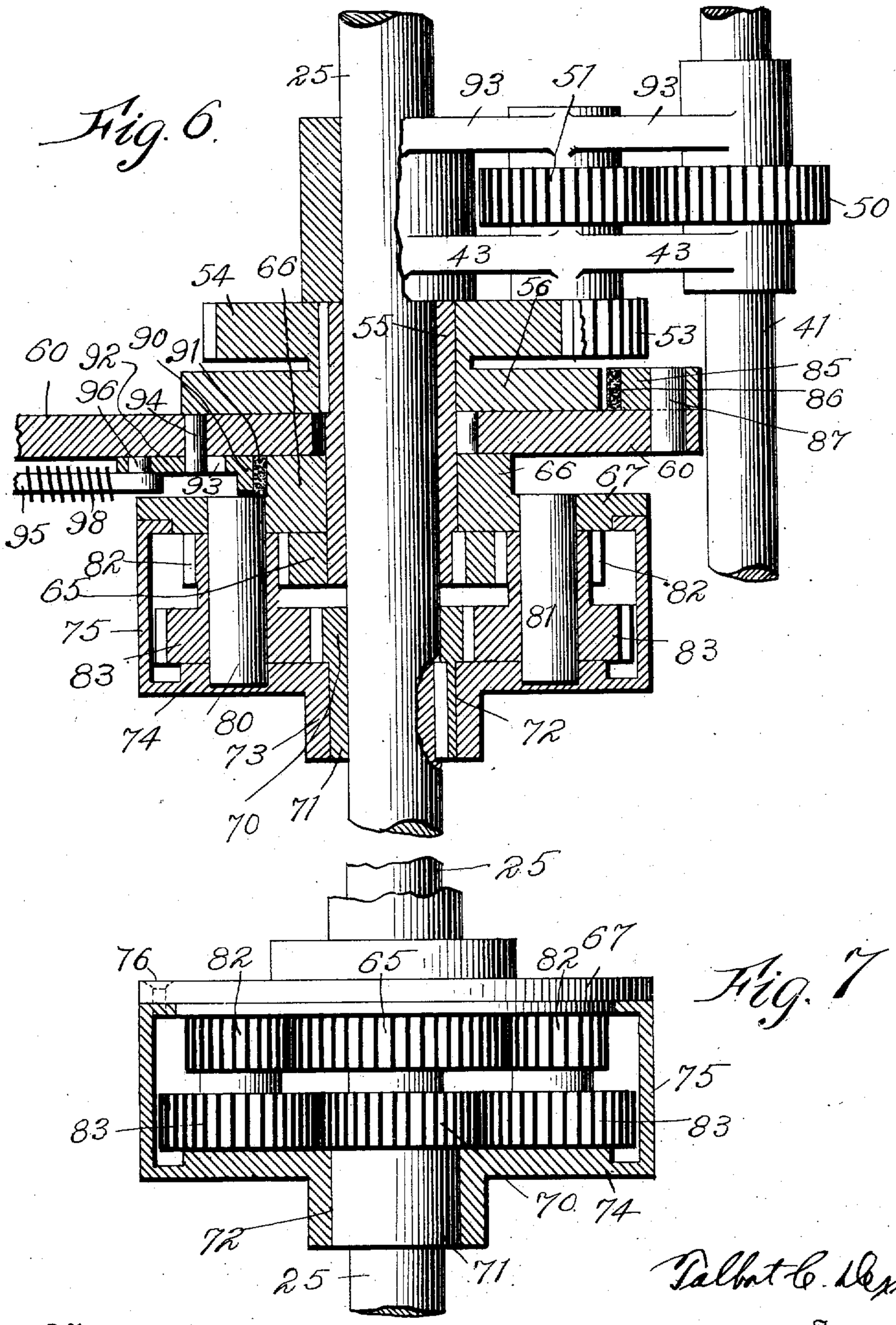

Fig. 7

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APPLICATION FILED SEPT. 21, 1908.

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8 SHEETS—SHEET 7.

Fig. 8.

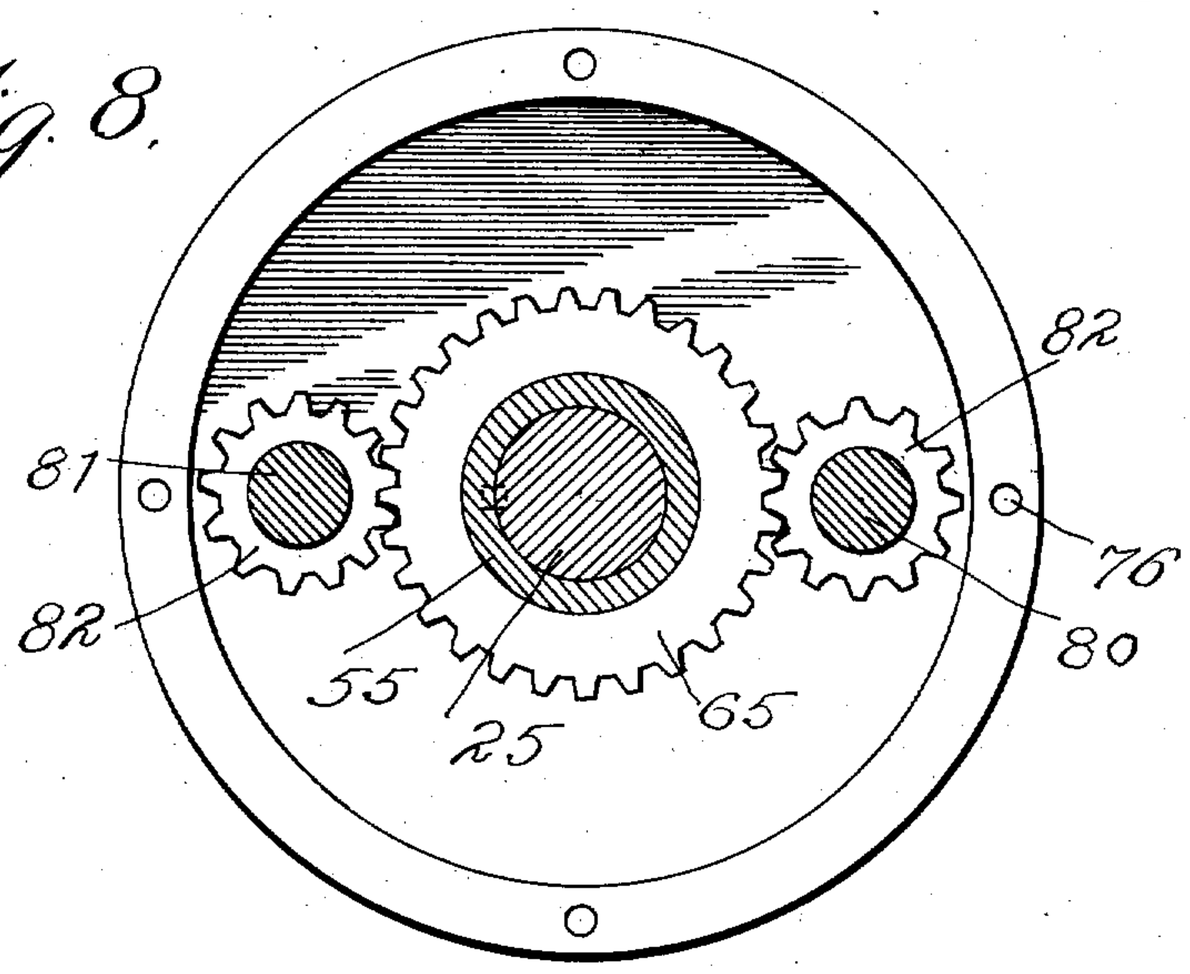
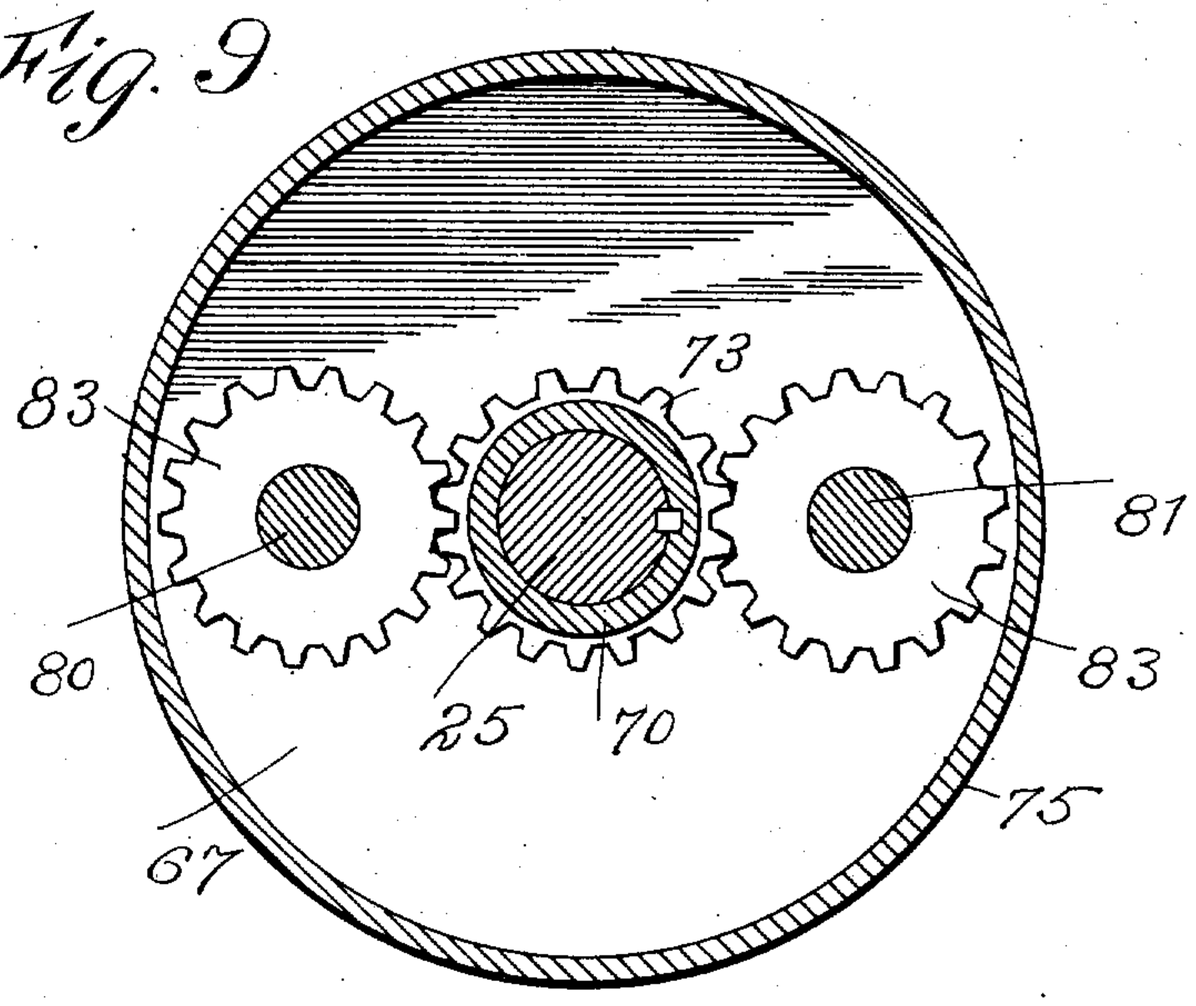


Fig. 9



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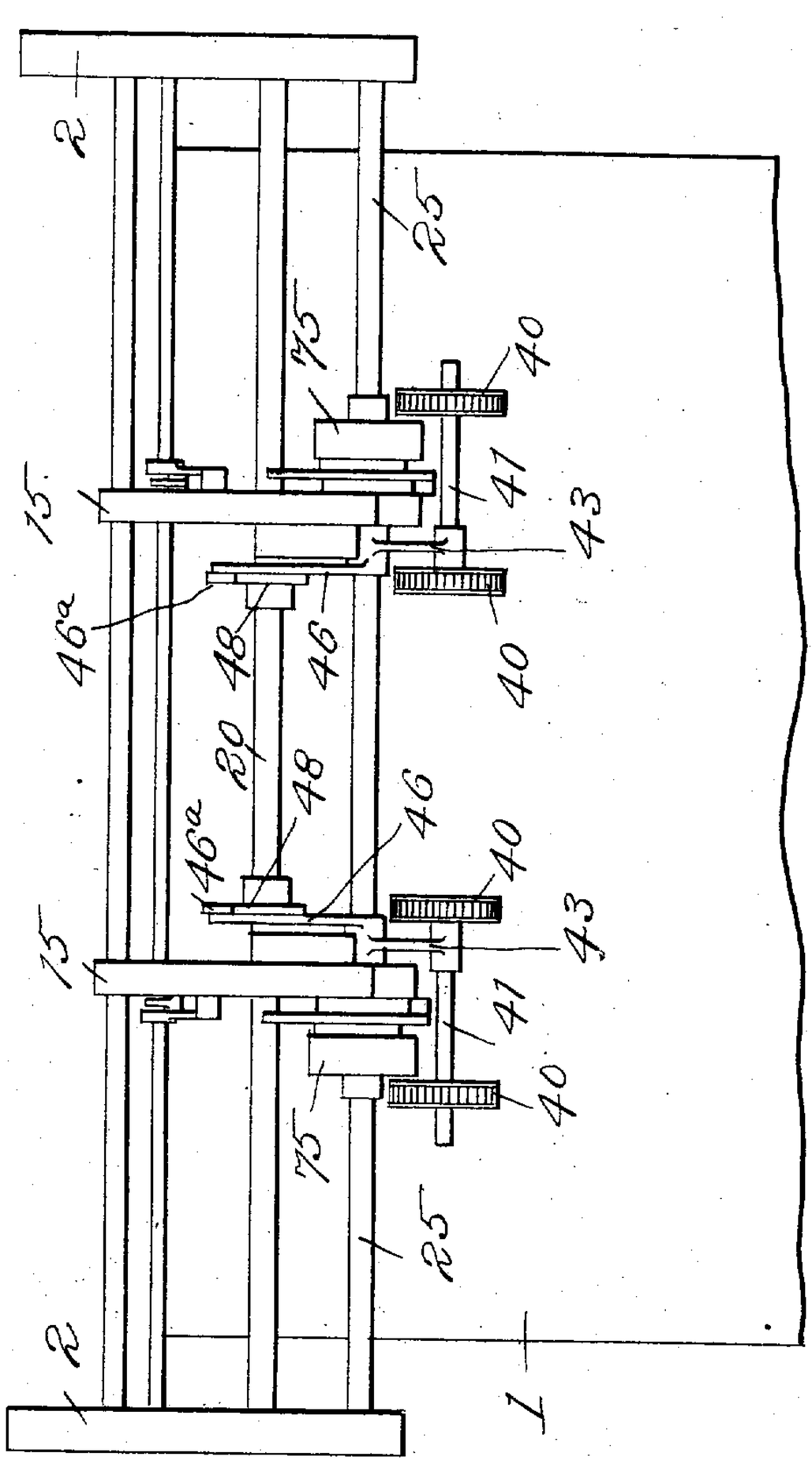
Patented Nov. 8, 1910.

8 SHEETS—SHEET 8.

Fig. 10.



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UNITED STATES PATENT OFFICE.

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PAPER-FEEDING MACHINE.

975,123. Specification of Letters Patent. Patented Nov. 8, 1910.

Application filed September 21, 1908. Serial No. 453,948.

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 Paper-Feeding Machines, of which the following is a specification.

My present invention relates to improvements in the type of machine covered by my application Serial No. 442,753, filed July 9th, 1908. The distinguishing feature of this type of machine, which is broadly covered in my said application, is the arrangement and control of the combing wheels at opposite sides of the pile of sheets to cause the operation of said combing wheels to be independently arrested while they are in engagement with the top sheet of the pile, whereby said combing wheels, in addition to their feeding operation, perform the functions, first, of accurately holding the top registered sheet during the interval between the arrest of operation of the combing wheels and the coming into action of the sheet delivery mechanism, thereby taking the place of auxiliary sheet engaging devices which have been heretofore employed for holding the registered sheet during this interval, and, second, acting independently as pivots upon which the successive separated sheets are straightened prior to the operation of the delivery mechanism, thereby avoiding the objectionable use of the sheet actuated tripping fingers as sheet straightening points. In the specific design of this type of machine illustrated and described in my above named application, I employ automatically controlled clutch mechanisms interposed between the combing wheels and their driving mechanism and arrest the operation of the combing wheels through the automatic sheet-actuated control of said clutches.

The present invention has been designed to improve the general construction of this type of machine, with particular reference to the comber operating mechanism, with a view to improving and strengthening the construction and increasing its accuracy, and reducing to a minimum the shock of stopping and starting the rotation of the combing wheel. With this end in view, I have devised a planetary gear system between each combing wheel and its driving shaft and automatic sheet-actuated controlling mechanisms operating upon said planetary gear systems for arresting and starting the operation of the combing wheels without the use of clutches and without the necessity of arresting the operation of the driving mechanism. These automatic sheet-actuated controlling mechanisms include for each independent combing mechanism, two braking devices, one of which, under the control of an automatic sheet actuated tripping device, is adapted to engage and arrest the operation of one part of a planetary gear system to instantly stop the rotation of the combing wheel, while the other braking device is arranged to operate alternately with the first named automatically controlled braking device, and, through a suitable cam mechanism, arrest the operation of another part of the planetary gear system to instantly start the operation of the combing wheel and cause the continued operation of said combing wheel until the reversal of the braking devices takes place through the action of the sheet actuated tripping device.

Each combing wheel remains in engagement with the top sheet after its feeding operation is arrested as described until the moment of operation of the sheet delivery mechanism, when both combing wheels are simultaneously raised from the top sheet and held in elevated position until the top sheet is fed from the machine, when the combers are simultaneously lowered into engagement with the next sheet of the bank and their feeding operation again performed in the manner explained. This periodic raising and lowering of the combing wheels is accomplished through suitable cams, and suitable means are provided for insuring the return of the controlling mechanism to active position in readiness for a repetition of the operation.

In addition to the above mentioned main features of my present invention, there are numerous auxiliary structural features of importance, all of which will first be fully described with reference to the accompanying drawings, and the novelty afterward pointed out in the annexed claims.

In said drawings Figure 1 is a vertical longitudinal sectional view of a paper feeding machine embodying my improvements,

showing the sheet combing device and sheet actuated controlling mechanism in operative positions. Fig. 2 is a similar view of the parts in the same position taken from the opposite side of the machine. Fig. 3 is a view similar to Fig. 2, showing the sheet actuated controlling mechanism in tripped position with the comber arrested, but still in engagement with the top sheet of the pile, some of the parts shown in Fig. 2 being broken away to illustrate the braking devices, and one of the brakes being shown by dotted lines. Fig. 4 is a view similar to Fig. 2 showing the combing wheel raised away from the top sheet of the pile to release the top registered sheet to the action of the sheet delivery mechanism. Fig. 5 is a plan view of the mechanism as shown in Fig. 1. Figs. 6, 7, 8 and 9 are detail sectional views illustrating the planetary gear driving mechanism for the combing wheels. Fig. 10 is a detail diagrammatic plan view of my improved machine.

Sheet feeding machines of the types to which my present invention relates are provided with two sets of sheet moving devices arranged to operate at opposite sides of the machine, as shown diagrammatically in Fig. 10 of the accompanying drawings. It will be understood that each of said devices is independently controlled by a sheet actuated tripping device, as hereinafter explained.

The frame-work of my improved machine may be of any suitable construction to properly support the working parts hereinafter referred to.

The pile or bank of sheets indicated at P is supported upon a table or platform 1, the particular form of table or platform shown being of the type of machine in which there is a supply table arranged above the feed table or platform, and connected by a curved guiding throat through which the partially fanned out bank of sheets is passed by suitable feeding mechanism. This arrangement of supporting table or platform is immaterial to my present improvements, and in fact my improvements may be applied to the form of feeding machine known as a pile feeder in which the table or platform is automatically moved vertically and supports a pile of sheets beneath the feeding devices.

2, 2 represents parts of the side frames in which are supported the transverse stay rods and shafts carrying the auxiliary longitudinal frame pieces or saddles 15. These saddles 15 carry the sheet moving devices.

It is essential to machines of the types to which my present improvements may be applied, that some suitable sheet delivery mechanism be provided for feeding the successive sheets from the pile or bank. This delivery mechanism may be of any suitable construction, so far as my present improvements are concerned, and to illustrate this essential feature of the machine, I have shown a constantly driven lower shaft 5 carrying lower feed rollers 6, over which the successive sheets pass, and the upper drop rollers 10 journaled in rock arms 11, mounted upon a transverse rock shaft 12. This rock shaft 12 is designed to be operated by any of the usual forms of mechanism, preferably including a controlling cam, whereby said drop rollers are periodically lowered and raised into and out of engagement with the coöperating under feed rollers 6, for performing their function of delivering or feeding off the successive sheets separated from the bank upon the feed board. In addition to the drop roller delivery mechanism, I preferably provide other drop rollers which coöperate with the sheet tripping fingers in the manner hereinafter explained, for the purpose of confining the leading edge of the sheet as it engages and operates the tripping fingers. These parts will be hereinafter referred to.

20 is the main cam shaft of my machine. This shaft 20 extends transversely of the machine and is suitably journaled in the side frames (not shown), and in the auxiliary longitudinal frame pieces or saddles 15. This shaft 20 is continuously rotated by any suitable mechanism which I have not thought necessary to show. I prefer to operate all other parts of my improved machine from the cam shaft 20.

25 is the comber operating shaft which extends transversely of the machine parallel to the cam shaft 20, and is driven from the cam shaft by suitable gearing not shown. This shaft 25 is journaled in the lower ends of bracket arms or downward projections of the auxiliary frame pieces or saddles 15, and also in the main side frames of the machine.

40, 40 represent sheet combing wheels of the ordinary construction. These combing wheels are mounted upon a transverse shaft 41, it being understood that the pair of combing wheels shown in Fig. 5 of the drawings constitutes the active portion of one sheet combing mechanism, of which each machine must be provided with two arranged in different longitudinal planes adjacent to opposite sides of the machine. While I have shown in said Fig. 5 of the drawings two combing wheels mounted upon the shaft 41, I would have it understood that I employ two combing wheels at each side of the machine only when operating upon large sheets of paper, and that sometimes perfectly satisfactory results can be obtained, particularly when operating upon relatively small sheets of paper, by having only a single combing wheel to operate at each side of the machine. To enable me to employ a single combing

wheel or a pair of combing wheels at each side of the machine, I arrange for the convenient removal and mounting of the inner combing wheel of each pair.

The shaft 41 which supports the combing wheels 40 is freely journaled in the rear ends of a pair of connected parallel rock arms 43, which are freely journaled upon the comber operating shaft 25. Formed integral with and projecting upwardly from the connected comber supporting rock arms 43, is a rock arm 44, the upper end of which is pivotally connected at 45 to the rear end of a pitman or link 46, formed between its ends with a horizontal guide loop or slot 47, through which the cam shaft 20 extends for supporting and guiding the pitman. The forward end of this pitman 46 carries an antifriction roller 46ª, which runs in peripheral engagement with a cam 48 keyed to the shaft 20 along side of the pitman 46. The purpose of this cam and pitman connection with the comber supporting rock arms, is to intermittently raise the combing wheels from the pile of sheets at times corresponding with the operation of the sheet delivery drop roller mechanism with which the combing wheels coöperate. This cam mechanism for raising the combing wheels operates independently of the automatic tripping mechanism which arrests the operation of the combing wheels without elevating them, it being necessary to provide some periodically operating mechanism for the comber for two reasons. In the first place it is necessary to elevate the combing wheels to permit the delivery mechanism to feed off the partially separated and registered sheet, since in this type of my improved machine the combing wheels are utilized to hold the registered sheet in position after performing their separating action until the delivery mechanism operates. In the second place, some periodic mechanism for timing the release of the registered sheet is necessary to release the sheet at the moment of operation of the delivery mechanism.

The comber supporting shaft 41 has keyed to it between the rock arms 43, a small gear wheel 50, which meshes with and is driven by a similar gear wheel 51 keyed to a short shaft 52 journaled in the upwardly projecting bosses 43ª of rock arms 43. This short shaft 52 has keyed to its opposite end similar gear 53, which meshes with and is driven by a large gear 54 keyed to or formed integral with a bearing sleeve 55, which is freely journaled upon the shaft 25. Formed integral with or otherwise rigidly secured to the gear wheel 54 and bearing sleeve 55, is an enlarged friction wheel 56, which rotates with the gear 54 and controls the stopping and starting of the rotation or feeding motion of the combing wheels in a manner which will be presently described.

60 is the horizontally arranged braking member in the form of a plate or bar, formed with a central longitudinal slot which fits over the bearing sleeve 55 above referred to, and rests alongside of the friction wheel 56. The central guide slot of this braking member permits it to be moved longitudinally of the machine upon said bearing sleeve 55. This braking member carries two braking devices, and is operated under the control of the sheet actuated tripping device in the manner presently to be described, for the purpose of controlling the operation of a planetary gear system arranged between the comber driving shaft 25 and the sleeve 55 of the comber driving train. I will first explain the planetary gear system referred to and then refer to the sheet actuated braking mechanism by which said planetary system is controlled.

Keyed to the end of the bearing sleeve 55 farthest from the gear 54, is a gear wheel 65. Freely journaled upon the bearing sleeve 55 between said gear 65 and the braking member 60, is a circular friction wheel or ring 66 having formed integral with or otherwise rigidly secured to it, a circular end wall or disk 67 of the planetary gear case. Keyed to the shaft 25 to one side of the gear 65 and its supporting sleeve 55, is a small gear wheel 70 having a laterally projecting hub portion 71 upon which is freely journaled at 72 the hub portion 73 of the cylindrical gear case 75, the cylindrical wall of the gear case being formed integral with the end wall 74, which projects from the hub portion 73, and said cylindrical wall 75 being secured by screws or bolts 76, which pass into it through openings formed in the circular end wall or disk 67 above referred to. Freely journaled in the end walls 67 and 74 of the gear casing, are two short shafts 80 and 81, each one of which supports a connected pair of freely journaled differential gears 82, 83. As shown, each pair of gears 82, 83 is formed integral, but it will, of course, be understood that the same result may be accomplished by forming these gears of separate parts and rigidly connecting them together by any suitable means or by forming said gears as separate parts and rigidly mounting them in proper relation upon their supporting shafts. The described gears of this planetary gear system within the casing, mounted as explained, are so arranged that the two small gears 82 are in mesh with the larger gear 65 at diametrically opposite points, and that the two gears 83 are in mesh with the gear 70 at diametrically opposite points. The result of this construction will be fully explained after the description of the sheet actuated controlling mechanism.

Referring to the braking member 60, it will be observed that a curved brake shoe

85 having some suitable friction material 86 upon its active face, is pivotally mounted at 87 upon the rear end of the braking bar 60 by means of a pin 87. This brake shoe 85 is supported in this way in operative relation to the friction wheel 56, which is connected with the gear wheel 54. By reason of the pivotal connection of the brake shoe with the brake bar, the brake shoe can automatically adjust itself to the periphery of the friction wheel to correspond with the gradual wearing of the parts. 90 is a second curved brake shoe having a suitable friction material 91 upon its active face, and formed with a forwardly projecting blade or bar 92 by which it is supported. Said bar 92 has a longitudinal slot at 93 through which projects a pin 94 mounted in braking bar 60, and by which the brake shoe is guided into proper braking relation with the frictional ring or wheel 66 which forms one of the hub portions of the gear case above referred to. A rod 95 is pivotally connected at 96 to the rear end of the plate 92 of the brake shoe 90, said rod passing freely through a guide lug 97 and supporting an expansion spring 98, which is confined between lug 97 and the head of the rod 95. Lug 97 projects laterally from one face of the brake bar 60.

Pivotally connected to the forward end 100 of the braking bar 60, is a vertical rocking lever 101, which is freely journaled upon the cam shaft 20. This rocking lever 101 extends above and below the cam shaft, the upper and lower arms being in different vertical planes to properly clear the auxiliary frame or saddle 15 and coöperate with the parts to which they are connected. The upper arm of rocking lever 101 carries a laterally projecting pivot pin 102, upon which is mounted the rear end of the forwardly projecting rod 103, which extends through a guide bracket 104 secured at 105 to the auxiliary frame 15. This rod 103 supports an expansion spring 106, which is confined between the guide bracket 104 and a pin or collar 107, upon rod 103, so as to give the said rod a spring tendency to move the rocking lever 101 in one direction. Also pivotally mounted upon the pin 102 is the forward end of a toggle link 110 which is pivoted at 111 to its companion toggle link 112 mounted at its rear end upon a stationary pivot 113 projecting from one face of the auxiliary frame piece 15. The toggle link 110 is formed with a downwardly projecting lug 110^a carrying a freely journaled antifriction roller 115, which, when the toggle links are broken as shown in Figs. 3 and 4, rests in the path of a cam 116 keyed to the cam shaft 20, which is adapted to engage said antifriction roller 115 and straighten out the toggle links to restore the braking bar and other operative parts hereinafter referred to to normal position. This operation will be hereinafter more fully explained.

Referring now to the sheet actuated controlling mechanism for the arrest of the operation of each combing wheel, it will be observed that 120 is a sheet actuated tripping finger freely journaled at 121 upon a pin projecting laterally from the rock arm 122, which is mounted upon a short rock shaft 123 journaled in the machine frame. The lower end of this tripping finger 120 is shaped to present a vertical face across the plane of feed of the sheets when said tripping finger is in tripping position, as shown in Figs. 1 and 2. This tripping finger 120 is connected through a light rod 125 with the toggle breaking arm 126, said rod being pivotally connected at its opposite ends to the finger 120 and the arm 126. The construction and operation of this toggle breaking arm is hereinafter explained.

130 is a rock arm freely journaled upon the transverse shaft 12 and carrying in its forward end freely journaled roller or rollers 131, which are adapted to operate periodically in peripheral contact with some of the rollers 6 upon the lower constantly driven shaft 5, for the purpose of confining the leading edge of the sheet as it engages and operates the tripping fingers. The rock arm 130 has a rearwardly projecting guide finger 132 projecting over the forward end of the feed board slightly for confining the leading edge of the sheets against vertical displacement as they pass into registered position between rollers 131 and 6 under the action of the combing wheels. The rock arm 130 is connected with the rock arm 122 through a link 133 which is pivoted to these parts at opposite ends.

The rock shaft 123 carries an upwardly projecting rock arm 135, which is pivotally connected at its upper end with a rearwardly extending rod 136, which is pivoted at 137 to the downwardly projecting arm 138 formed on a rocking lever 139 centrally pivoted at 140 to auxiliary frame piece 15.

145 is a constantly driven friction wheel or roller mounted upon a short shaft 146 freely journaled in the forwardly projecting bracket arms 147 of the auxiliary frame. This shaft 146 has keyed to it a gear wheel 148 which meshes with and is driven by a similar gear 149 keyed to the comber operating shaft 25.

The toggle breaking arm 126 is freely pivoted at 150 upon one end of the rocking lever 139 above referred to, and hangs down from its pivotal support into operative relation to the continuously rotating friction wheel or roller 145. This arm 126 is formed at its lower end with a curved friction shoe 126^a, which is adapted to be automatically moved into contact with friction wheel or

roller 145 and operated thereby in the manner now to be explained. A weighted arm 126[b] is connected with the toggle breaking arm 126 to hold the friction shoe of said arm normally out of engagement with the friction wheel or roller 145. This arm 126 is connected through a rod 155 with the sheet actuated tripping finger 120, said rod 155 being pivotally connected at its opposite ends to the arm 126 and finger 120. By this means the engagement of the friction shoe 126[a] of arm 126 with the friction wheel or roller 145 is controlled by the tripping finger with the result which will be hereinafter explained.

Rock shaft 123 also carries a rearwardly projecting rock arm 160, having in its free end antifriction roller 161, which in the normal operative position of the parts rests in the path of the cam projection 162 formed on the lower edge of the pitman 46, by which the combing wheel is periodically raised and lowered. The purpose of this rock arm and cam is to periodically raise the tripping finger 120 and rollers 131 in the event of the failure of the automatic tripping mechanism.

The forward end of rocking lever 139 is connected through a link 165 with the pivotal point 111 of the toggle links 110 and 112, so that downward movement of said forward end of the rocking lever 139 will break the toggle and permit the spring 106 to rock the lever 101 in one direction, while the straightening of the toggle by the action of the cam 116 will rock the lever 139 in a reversed direction for resetting the parts connected therewith.

The operation of my improved machine will be understood from the following explanation: It being understood that a machine embodying my present improvements must be provided with two sets of sheet combing devices with an independent automatic controlling mechanism for each comber, and that the sheets to be operated upon are presented in proper position upon a feed board or table beneath the combing mechanisms, the machine is started with both sets of mechanism in the position shown in Figs. 1 and 2. In this position of the parts, it will be observed that the delivery drop rollers 10 are elevated, and that the registering drop rollers 131 are lowered and the tripping fingers 120 are in their operative position. The toggle breaking arms 126 are in their rearmost position with their friction shoes 126[a] held just out of engagement with the continuously rotating friction wheels or rolls 145. Toggle links 110 and 112 are straightened out in alinement, holding the springs 106 under compression, and rocking levers 139 are in horizontal position. Each of the main controlling levers 101 is in vertical position holding the braking bar 60 in its rearmost position, with the result that the braking shoe 90 will be in frictional engagement with the frictional hub 66 of the gear casing, so as to firmly hold gear casing against rotation.

As the gear casing is held against motion and the shaft 25 rotates continuously, it will be observed that the gear 70 which rotates with the shaft 25, will cause gears 83 and 82 to rapidly rotate on their shafts 80 and 81, and that the gears 82 will transmit their motion to the interior gear 65, which is keyed to and drives the sleeve 55 carrying with it the gear 54 by which motion is rapidly transmitted through the train of gears 53, 51 and 50 for rapidly rotating the combing wheels, which, it will be observed, are in operative engagement with the top sheet of the bank. This operation continues at both sides of the machine until the leading edge of the sheet at one side reaches and actuates one of the tripping fingers 120, with the result that the movement of the tripping finger will throw friction shoe 126[a], of arm 126, into frictional contact with the rapidly rotating friction wheel or roller 145. As the length of the arm 126 is slightly greater than the distance between its supporting pivot and the periphery of friction wheel or roller 145 (assuming the rocking lever 139 to be in its horizontal position) it will be clear that when the friction shoe 126[a] engages the wheel or roller 145 and is rapidly carried thereby tangentially of the wheel or roller, the arm 126 will give a powerful upward thrust to the rear end of rocking lever 139, with the result that said lever will be moved upon its pivot and pull downwardly upon the center of the toggle links 110 and 112, breaking the toggle and permitting spring 106 to rock the lever 101 into the position shown in Fig. 3 of the drawings. The result of this shifting of the position of the mechanism will be the movement of the braking bar 60 forwardly to disengage the brake shoe 90 from the hub 66 to release the gear casing, and to immediately apply the braking shoe 85 into frictional engagement with the friction wheel 56, thereby stopping the rotation of the combing wheels at that side of the machine and arresting the movement of that side of the sheet being operated upon. When the gear casing is released and the journal sleeve 55 is arrested in the manner explained, it will be observed that interior gear 65 will be held against rotation, and that the rotation of the interior gear 70 with the shaft 25, will cause the connected gears 82 and 83 to travel around said interior gears 65 and 70, carrying with them the gear casing which has been freed as above explained. From this it will be clear that the driving shaft 25 can continue to rotate without interference with the arrested operation of the combining wheels.

The arrest of operation of the combing

wheels at the opposite side of the machine, takes place when the leading edge of the sheet at that side reaches registered position in exactly the same manner as above explained with reference to the first registered side of the sheet. When both sides of the partially separated sheet reach registered position, the sheet is held by the two arrested sets of combing rollers without the assistance of any other mechanism until the moment for the operation of the sheet delivery mechanism, it being observed that as each combing mechanism is arrested, the sheet tripping finger and coöperating register rollers are automatically raised away from the path of the sheets by the mechanism described, so that the sheet will be free the moment the combing rollers are elevated from it.

At the proper moment the sheet delivery drop rollers are lowered to engage the partially separated registered sheet, and at the same moment the cams which are timed to correspond with the operation of the delivery mechanism, come into play simultaneously, elevating from the top sheet the two sets of combing mechanism, so that the top sheet can be rapidly fed from the machine.

While I have not shown in the drawings illustrating my present improvements the tail grippers which hold the bank of sheets in place while the top sheet is being carried off by the delivery mechanism, I would have it understood that I employ some usual form of tail grip arranged to engage the rear edge of the second sheet just back of the top sheet for holding the under sheets in place upon the feed board while the top sheet is being carried away by the delivery mechanism.

In case of failure of the combing wheels to properly register a sheet in the time allowed, the combing wheels will be raised away from the pile through the action of their main controlling cams, and in this event the tripping fingers 120 and rock arms 130 are also elevated by the action of the cam projection 162 upon the rock arm 160.

It will be observed from the above description that each combing wheel or pair of combing wheels has its rotative or feeding motion arrested while in engagement with the top sheet of the bank, and that the combing wheels are held in engagement with said separated registered sheet after their feeding motion has been arrested for holding the sheet in position until it is engaged by the sheet delivery mechanism. It will also be observed that the combing wheels are arrested without stopping or retarding the motion of the comber operating shaft, and that the arrest of motion is accomplished through a braking device. These features of construction and operation are the same as in my above named application Serial No. 442,753, and I would have it understood that my present mechanism is subject to the broad claims found in my above named application. The essential difference between the mechanism of my present application and my above named application Serial No. 442,753, is that in my present case the combing wheels are thrown into and out of operation without disconnecting any part of the driving mechanism, whereas in the machine of my above named application, the combing wheels are thrown into and out of operation by clutching and unclutching parts of the driving train.

The main advantage in my present improvements, over the machine in my above named application, lies in the improved form of construction by which the rotative motion of the combing wheels can be more accurately controlled with materially less shock to the mechanism.

By the expression "planetary mechanism" employed in some of my claims, I would have it understood that I intend to cover broadly any transmitting mechanism arranged between a combing wheel and a driving shaft, in which one part or member rotates around another part or member in such manner that either one of said parts or members may be arrested for causing the rotation of the other part or member. Such a mechanism may, within the scope of my invention, be employed in combination with any suitable mechanism for engaging and arresting said parts or members for accomplishing the desired result, although I prefer to employ a sheet actuated controlling mechanism in the form of automatically applied braking devices as illustrated and described.

I claim:

1. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a driving shaft and planetary gear mechanism for operating said instrument, means for raising and lowering said instrument, and automatic means acting upon said planetary gear mechanism and adapted to arrest the operation of said instrument without stopping said shaft.

2. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a driving shaft and planetary gear mechanism for operating said instrument, means for raising and lowering said instrument, automatic means acting upon said planetary gear mechanism and adapted to arrest the operation of said instrument without stopping said shaft, and suitable sheet delivery mechanism.

3. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a driving shaft and planetary gear mechanism for operating said instrument, means for raising and lowering said instrument, and sheet-controlled means

acting upon said planetary gear mechanism and adapted to arrest the operation of said instrument without stopping said shaft.

4. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a driving shaft and planetary gear mechanism for operating said instrument, means for raising and lowering said instrument, sheet-controlled means acting upon said planetary gear mechanism and adapted to arrest the operation of said instrument without stopping said shaft, and suitable sheet delivery mechanism.

5. In a paper feeding machine, the combination with a sheet support, and a rotary sheet moving instrument, of automatically controlled driving mechanism constructed and arranged to arrest the rotation of said instrument without disconnecting any part of said driving mechanism from said instrument, and means for raising and lowering said instrument.

6. In a paper feeding machine, the combination with a sheet support, and a rotary sheet moving instrument, of automatically controlled driving mechanism constructed and arranged to arrest the rotation of said instrument without disconnecting any part of said driving mechanism from said instrument, means for raising and lowering said instrument, and suitable sheet delivery mechanism.

7. In a paper feeding machine, the combination of a sheet support, with a rotary sheet feeding instrument, a driving shaft and planetary gear mechanism for operating said instrument, and two automatically operated devices, one acting upon one part of said gear mechanism for arresting said instrument, and the other acting upon another part of said mechanism to cause the operation of said instrument.

8. In a paper feeding machine, the combination of a sheet support, with a rotary sheet feeding instrument, a driving shaft and a planetary gear mechanism for operating said instrument, an automatically operated device acting upon one part of said gear mechanism for causing said instrument to operate, and a sheet controlled device acting upon another part of said gear mechanism to arrest the operation of said instrument.

9. In a paper feeding machine, the combination of a sheet support, with a rotary sheet feeding instrument, a driving shaft and planetary gear mechanism for operating said instrument, two automatically operated devices, one acting upon one part of said gear mechanism for arresting said instrument, and the other acting upon another part of said mechanism to cause the operation of said instrument, and means for raising and lowering said instrument.

10. In a paper feeding machine, the combination of a sheet support, with a rotary sheet feeding instrument, a driving shaft and planetary gear mechanism for operating said instrument, two automatically operated devices, one acting upon one part of said gear mechanism for arresting said instrument, and the other acting upon another part of said mechanism to cause the operation of said instrument, and suitable sheet delivery mechanism.

11. In a paper feeding machine, the combination with a sheet support, and two independent rotary sheet feeding instruments arranged at opposite sides of the machine above said support, of an independent sheet controlled driving mechanism for each of said instruments, each of said driving mechanisms being constructed and arranged to arrest the rotation of one of said instruments without disconnecting any part of said driving mechanism from said instrument, and means for periodically raising and lowering said instruments.

12. In a paper feeding machine, the combination with a sheet support, and two independent rotary sheet feeding instruments arranged at opposite sides of the machine above said support, of an independent sheet controlled driving mechanism for each of said instruments, each of said driving mechanisms being constructed and arranged to arrest the rotation of one of said instruments without disconnecting any part of said driving mechanism from said instrument, means for raising and lowering said instruments, and suitable sheet delivery mechanism.

13. In a paper feeding machine, the combination with a sheet support for a plurality of sheets, two independent rotary sheet feeding instruments arranged at opposite sides of the machine to operate upon sheets above said support, and a driving shaft, of an independent planetary gear mechanism for operating each of said instruments, and independent sheet controlled means acting upon each of said planetary gear mechanisms and adapted to arrest the operation of one of said instruments without stopping said shaft.

14. In a paper feeding machine, the combination with a sheet support for a plurality of sheets, two independent rotary sheet feeding instruments arranged at opposite sides of the machine to operate upon sheets above said support, and a driving shaft, of an independent planetary gear mechanism for operating each of said instruments, independent sheet controlled means acting upon each of said planetary gear mechanisms and adapted to arrest the operation of one of said instruments without stopping said shaft, and means for raising and lowering said instruments.

15. In a paper feeding machine, the combination with a sheet support for a plurality of sheets, two independent rotary sheet feed-

ing instruments arranged at opposite sides of the machine to operate upon sheets above said support, and a driving shaft, of an independent planetary gear mechanism for operating each of said instruments, independent sheet controlled means acting upon each of said planetary gear mechanisms and adapted to arrest the operation of one of said instruments without stopping said shaft, and sheet delivery mechanism.

16. In a paper feeding machine, the combination with a sheet support for a plurality of sheets, two independent rotary sheet feeding instruments arranged at opposite sides of the machine to operate upon sheets above said support, and a driving shaft, of an independent planetary gear mechanism for operating each of said instruments, independent sheet controlled means acting upon each of said planetary gear mechanisms and adapted to arrest the operation of one of said instruments without stopping said shaft, means for raising and lowering said instruments, and suitable sheet delivery mechanism.

17. In a paper feeding machine, the combination of a sheet support, with a sheet moving instrument, a driving shaft, planetary mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, and automatic controlling mechanism for arresting the rotation of either of said parts or members.

18. In a paper feeding machine, the combination of a sheet support, with a sheet moving instrument, a driving shaft, planetary mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, automatic controlling mechanism for arresting the rotation of one of said parts or members to cause the operation of said instrument, and sheet actuated controlling mechanism for arresting the rotation of the other of said parts or members to arrest the operation of said instrument.

19. In a paper feeding machine, the combination of a sheet support, with a rotary sheet moving instrument, a driving shaft, planetary gear mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, automatic controlling mechanism for arresting the rotation of one of said parts or members to cause the rotation of said instrument, and sheet actuated controlling mechanism for arresting the rotation of the other of said parts or members to arrest the rotation of said instrument.

20. In a paper feeding machine, the combination of a sheet support, with a rotary sheet moving instrument, a driving shaft, planetary mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, automatic cam actuated mechanism for arresting the rotation of one of said parts or members, and sheet-actuated controlling mechanism for arresting the rotation of the other of said parts or members.

21. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a planetary gear mechanism including a driving gear, a driven gear operating said instrument, and intermediate planetary gears arranged between said driving gear and said driven gear, means for holding said planetary gears against planetary motion to cause the operation of said instrument, and automatically controlled means for holding said driven gear against motion for arresting the operation of said instrument.

22. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a planetary gear mechanism including a driving gear, a driven gear operating said instrument, and intermediate planetary gears arranged between said driving gear and said driven gear, periodically operated means for holding said planetary gears against planetary motion to cause the operation of said instrument, and sheet-actuated controlling means for holding said driven gear against motion for arresting the operation of said instrument.

23. In a paper feeding machine, the combination of a sheet support, with two independent sheet feeding instruments arranged at opposite sides of the machine to operate upon sheets upon said support, two independent planetary gear mechanisms each including a driving gear, a driven gear operating one of said instruments, and intermediate planetary gears arranged between said driving gear and said driven gear, means for holding said planetary gears of both mechanisms against planetary motion to cause the operation of said instruments, and an independent sheet-controlled device for holding each of said driven gears against motion for independently arresting the operation of said instruments.

24. In a paper feeding machine, the combination of a sheet support, with a rotary sheet feeding instrument, a driving shaft and planetary gear mechanism for operating said instrument, and two automatically operated brakes, one acting upon one part of said gear mechanism for arresting said instrument, and the other acting upon another part of said mechanism to cause the operation of said instrument.

25. In a paper feeding machine, the combination of a sheet support, with a sheet moving instrument, a driving shaft, planet-

ary mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, and automatic double acting brake mechanism for arresting the rotation of either of said parts or members.

26. In a paper feeding machine, the combination of a sheet support, with a sheet moving instrument, a driving shaft, planetary mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, automatic braking mechanism for arresting the rotation of one of said parts or members to cause the operation of said instrument, and sheet actuated braking mechanism for arresting the rotation of the other of said parts or members to arrest the operation of said instrument.

27. In a paper feeding machine, the combination of a sheet support, with a rotary sheet moving instrument, a driving shaft, planetary gear mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, a periodically operated brake for arresting the rotation of one of said parts or members to cause the rotation of said instrument, and a sheet controlled brake for arresting the rotation of the other of said parts or members to arrest the rotation of said instrument.

28. In a paper feeding machine, the combination of a sheet support, with a rotary sheet moving instrument, a driving shaft, planetary mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, a braking bar carrying two braking devices, sheet controlled means for moving said braking bar in one direction to apply one of said braking devices to one of said parts or members, and automatic means for moving said braking bar in the opposite direction to apply the other braking device to the other of said parts or members.

29. In a paper feeding machine, the combination of a sheet support, with a rotary sheet moving instrument, a driving shaft, planetary mechanism arranged between said sheet moving instrument and said shaft and comprising two parts or members, one of which rotates around the other, a braking bar carrying two braking devices, sheet controlled spring actuated mechanism for moving said braking bar in one direction to apply one of said braking devices to one of said parts or members, and automatic means for moving said braking bar in the opposite direction to apply the other braking device to the other of said parts or members.

30. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a planetary gear mechanism including a driving gear, a driven gear operating said instrument, and intermediate planetary gears arranged between said driving gear and said driven gear, means for holding said planetary gears against planetary motion to cause the operation of said instrument, and an automatically controlled brake for holding said driven gear against motion for arresting the operation of said instrument.

31. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a planetary gear mechanism including a driving gear, a driven gear operating said instrument, and intermediate planetary gears arranged between said driving gear and said driven gear, periodically operated braking means for holding said planetary gears against planetary motion to cause the operation of said instrument, and sheet controlled braking means for holding said driven gear against motion for arresting the operation of said instrument.

32. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a planetary gear mechanism including a driven gear, a driven gear operating said instrument, and intermediate planetary gears arranged between said driving gear and said driven gear, a double acting automatically controlled brake mechanism adapted to arrest the planetary motion of said planetary gears or the rotary motion of said driven gear.

33. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a planetary gear mechanism including a driving gear, a driven gear operating said instrument, and intermediate planetary gears arranged between said driving gear and said driven gear, a double acting brake mechanism adapted to arrest the planetary motion of said planetary gears or the rotary motion of said driven gear, and a sheet-actuated tripper controlling the arrest of said driven gear.

34. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a planetary gear mechanism including a driving gear, a driven gear operating said instrument, and intermediate planetary gears arranged between said driving gear and said driven gear, a freely journaled rotary member upon which said planetary gears are mounted, automatic means for holding said planetary gears against planetary motion, and sheet actuated controlling means for holding said driven gear against motion.

35. In a paper feeding machine, the combination of a sheet support, with a rotary sheet feeding instrument, a driving shaft, a driving gear fast upon said shaft, a sleeve journaled upon said shaft, a driven gear

fast upon said sleeve, intermediate planetary gears arranged between said driving gear and said driven gear, a freely journaled frame or casing surrounding and supporting said planetary gears, and automatic means for holding said casing and planetary gears or said sleeve and driven gear against motion.

36. In a paper feeding machine, the combination of a sheet support, with a rotary sheet feeding instrument, a driving shaft, a driving gear fast upon said shaft, a sleeve journaled upon said shaft, a driven gear fast upon said sleeve, intermediate planetary gears arranged between said driving gear and said driven gear, a freely journaled frame or casing surrounding and supporting said planetary gears, friction wheels or rings upon said freely journaled frame and said sleeve respectively, braking devices mounted in operative relation to said friction wheels or rings, and automatic means controlling said braking devices.

37. In a paper feeding machine, the combination of a sheet support, with a rotary sheet feeding instrument, a driving shaft, a driving gear fast upon said shaft, a sleeve journaled upon said shaft, a driven gear fast upon said sleeve, intermediate planetary gears arranged between said driving gear and said driven gear, a freely journaled frame or casing surrounding and supporting said planetary gears, a braking bar carrying two brake shoes, friction wheels or rings upon said frame or casing and said sleeve respectively arranged to be engaged by said brake shoes, and automatically controlled operating mechanism acting upon said braking bar and adapted to move either brake shoe into action for arresting the planetary motion of said planetary gears, or for arresting the rotary motion of said driven gear.

38. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a driving shaft carrying a driving gear, a driven gear operating said instrument, intermediate planetary gears arranged between said driving gear and said driven gear, a braking mechanism adapted to arrest the planetary motion of said planetary gears or the rotary motion of said driven gear, a spring for actuating said braking mechanism, toggle links normally resisting the action of said spring, and sheet controlled means for breaking said toggle and permitting said spring to act.

39. In a paper feeding machine, the combination of a sheet support, with a sheet feeding instrument, a driving shaft carrying a driving gear, a driven gear operating said instrument, intermediate planetary gears arranged between said driving gear and said driven gear, a braking mechanism adapted to arrest the planetary motion of said planetary gears or the rotary motion of said driven gear, a rocking lever for operating said braking mechanism, a spring for moving said lever in one direction, toggle links for moving said lever in the opposite direction, sheet controlled means for breaking said toggle and permitting said spring to act, and means for straightening said toggle, resetting said spring, and restoring said braking mechanism to initial position.

TALBOT C. DEXTER.

Witnesses:
WM. E. KNIGHT,
LAURA E. MONK.