

No. 747,865.

PATENTED DEC. 22, 1903.

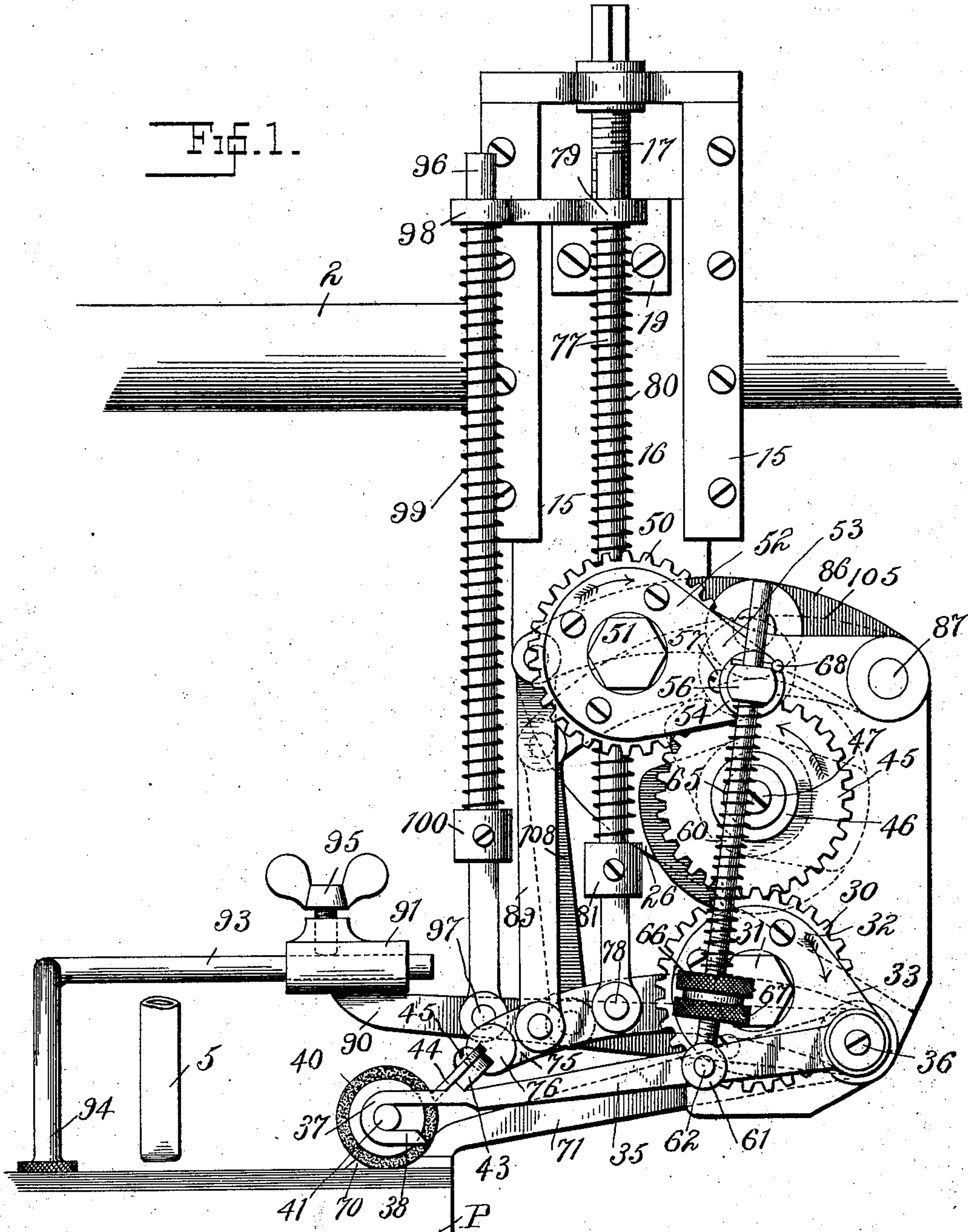
T. C. DEXTER & H. HALLSTREAM.

PAPER FEEDING MACHINE.

APPLICATION FILED MAY 17, 1902.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses,  
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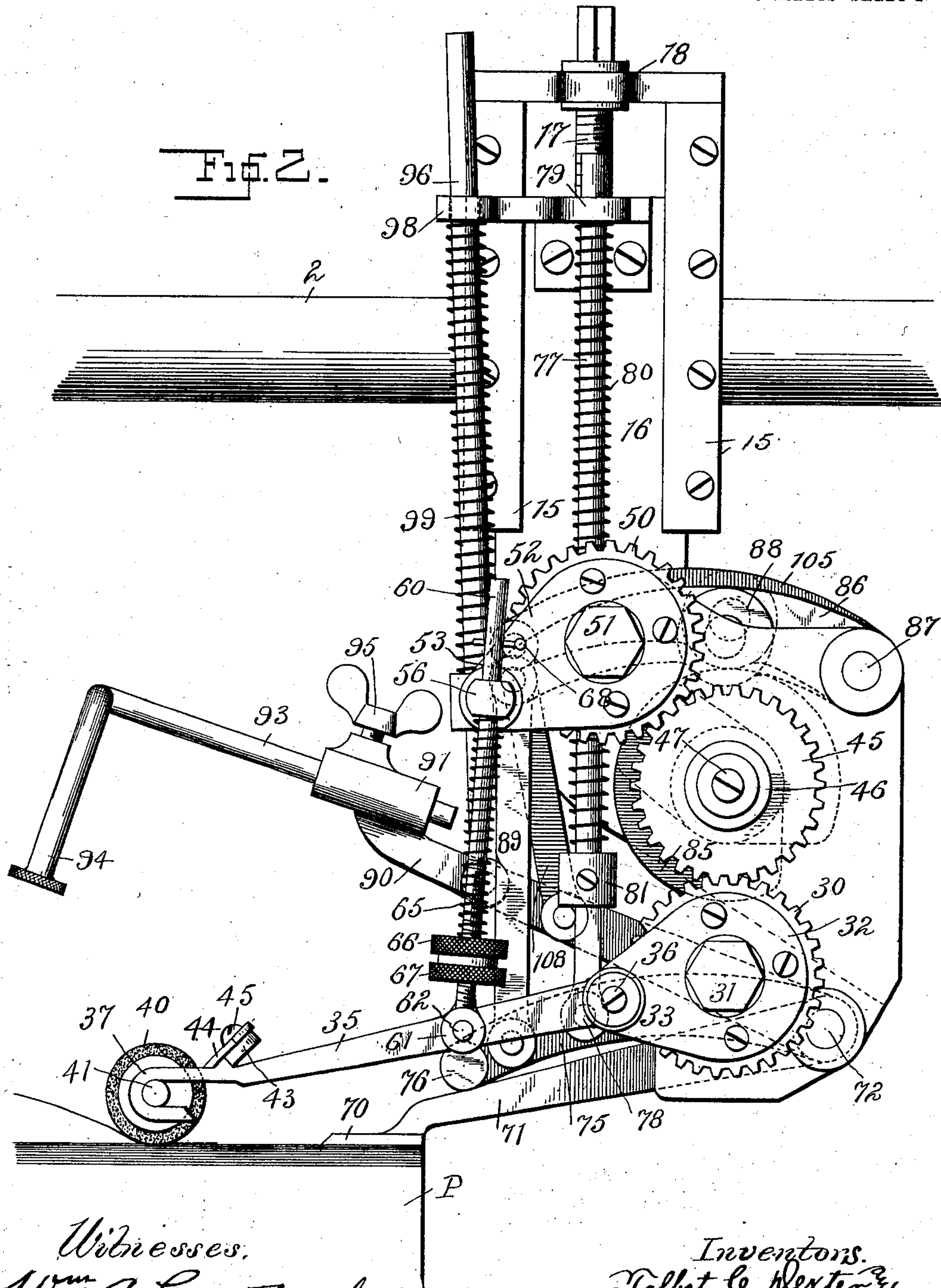
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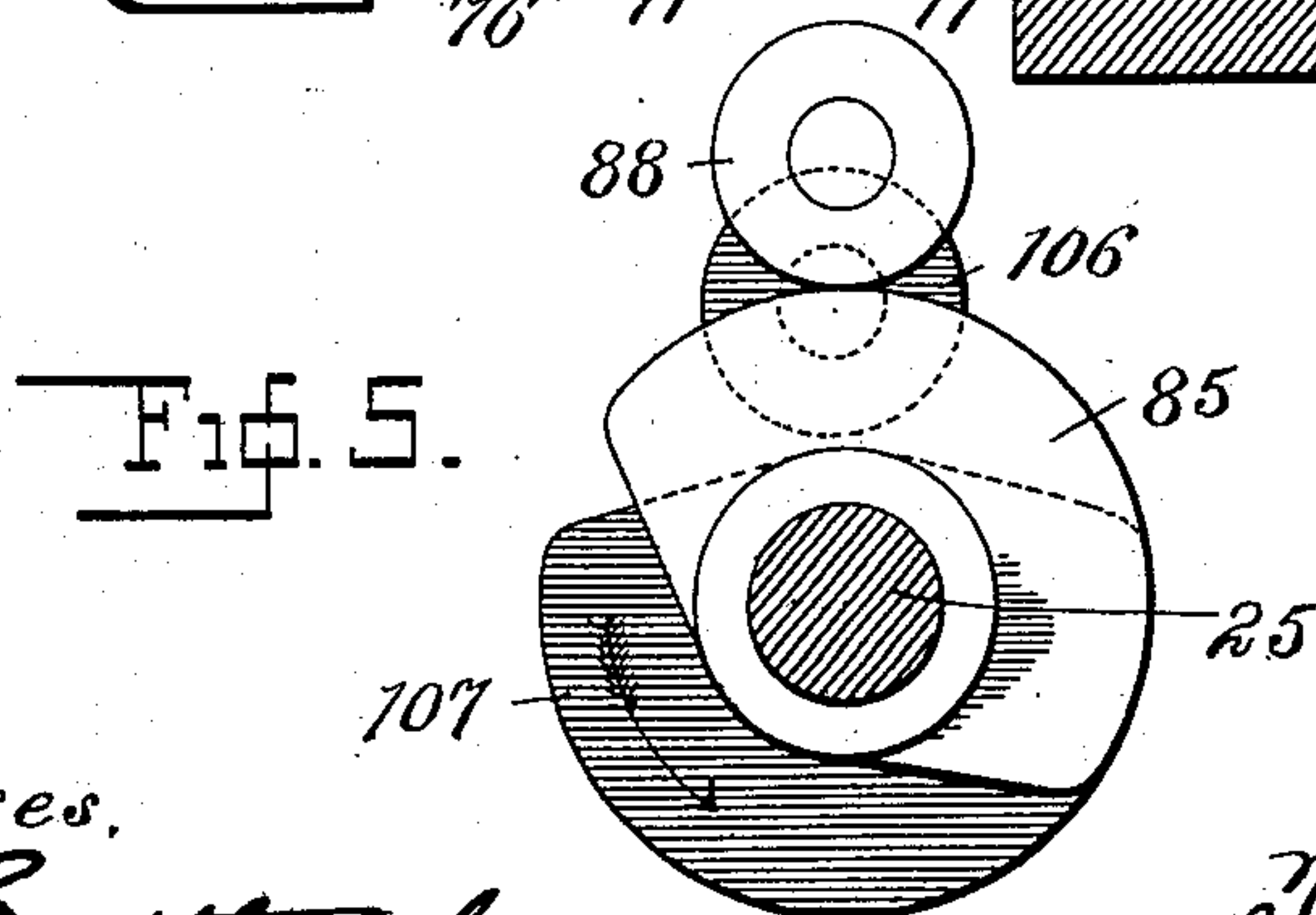
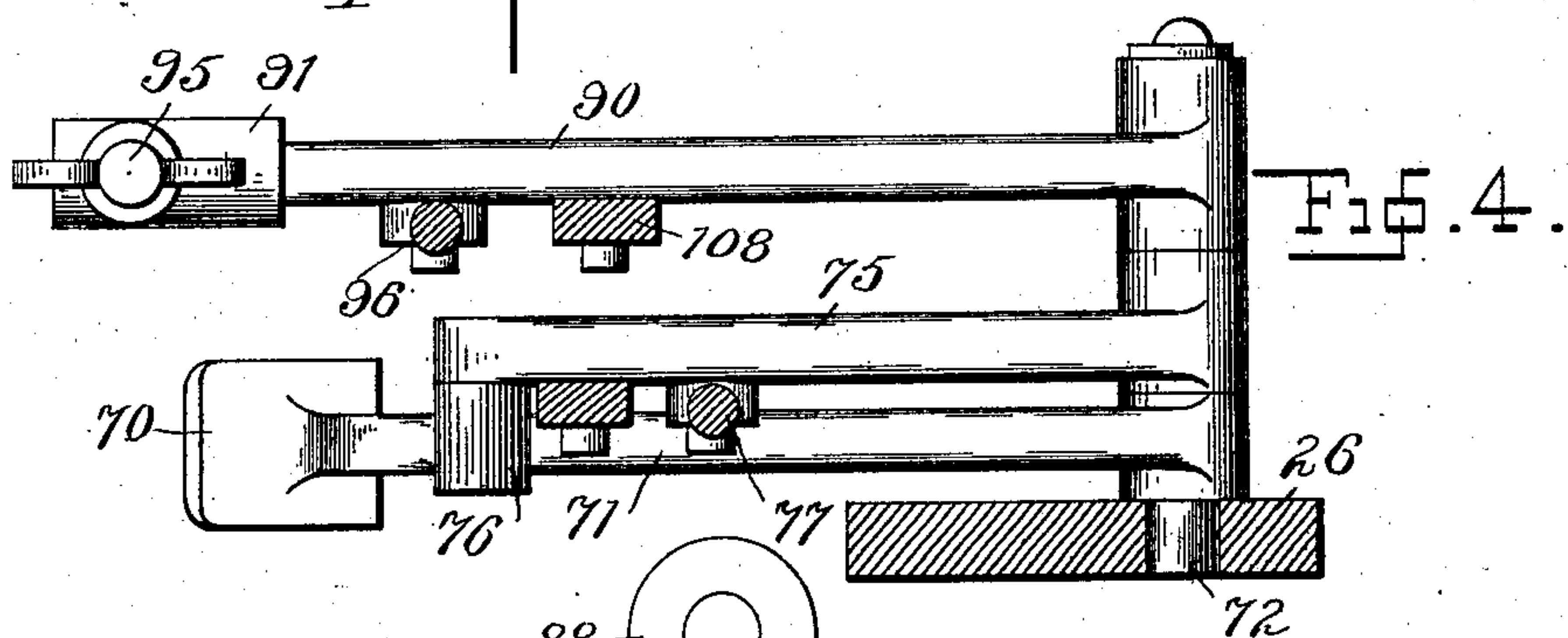
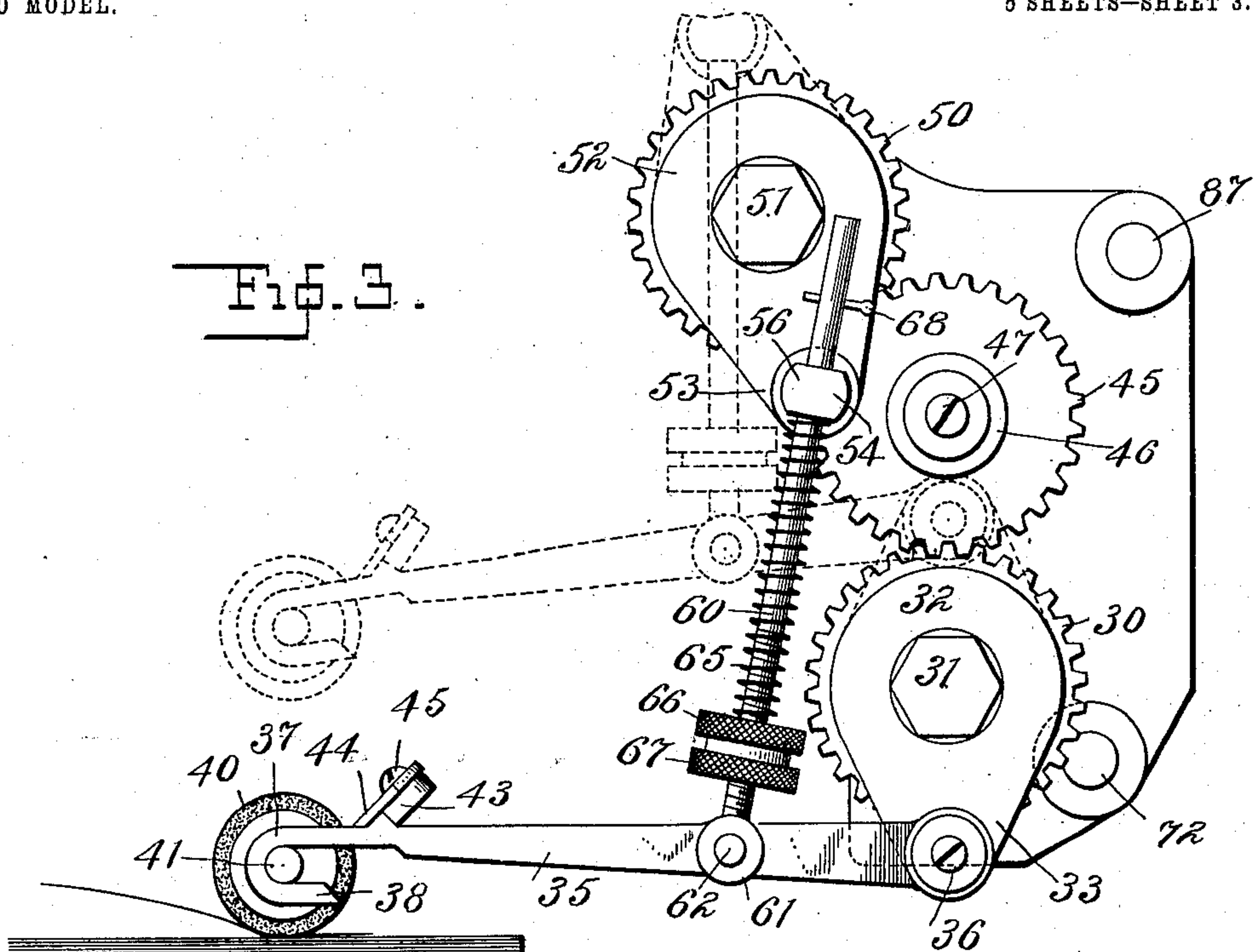
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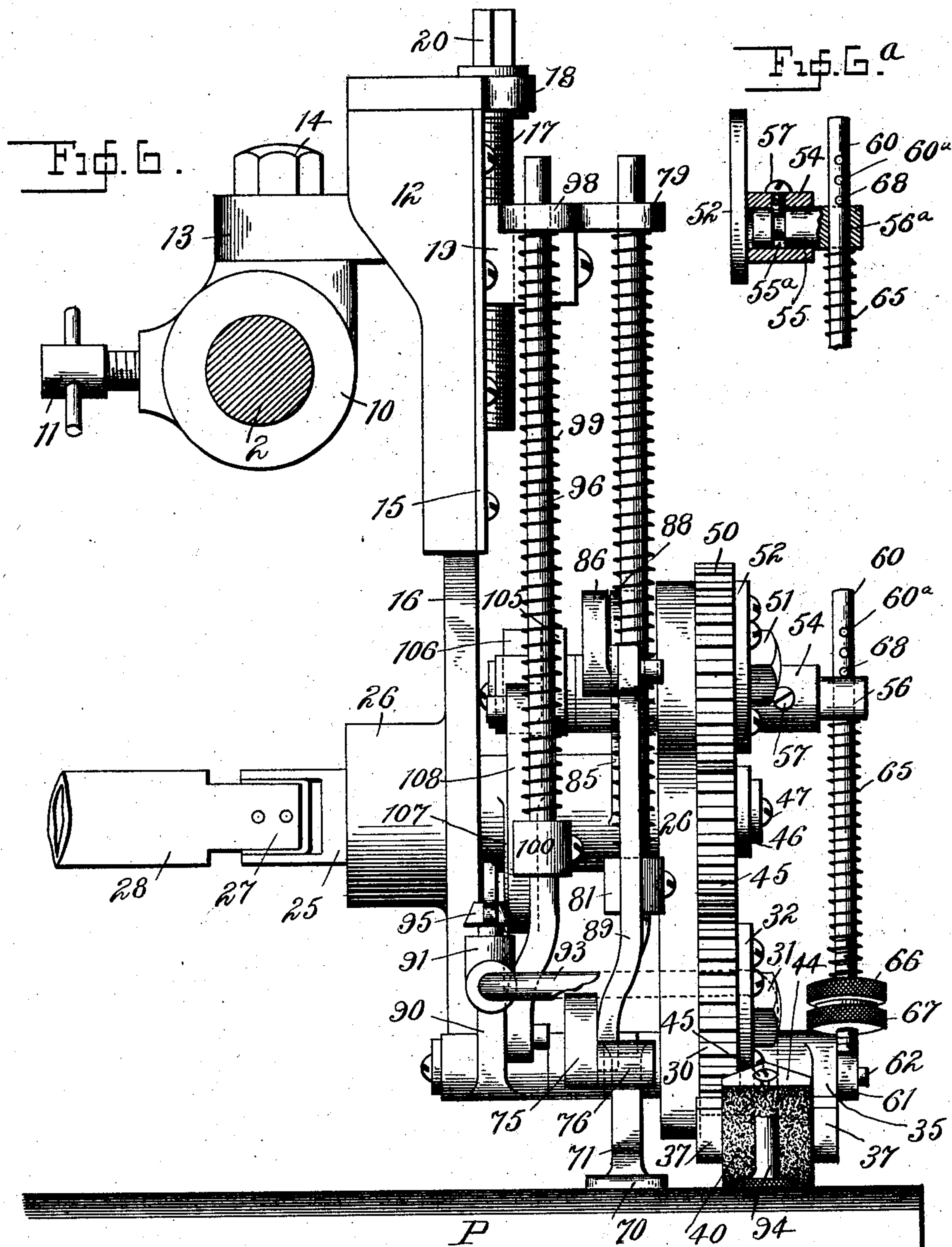
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5 SHEETS—SHEET 4.



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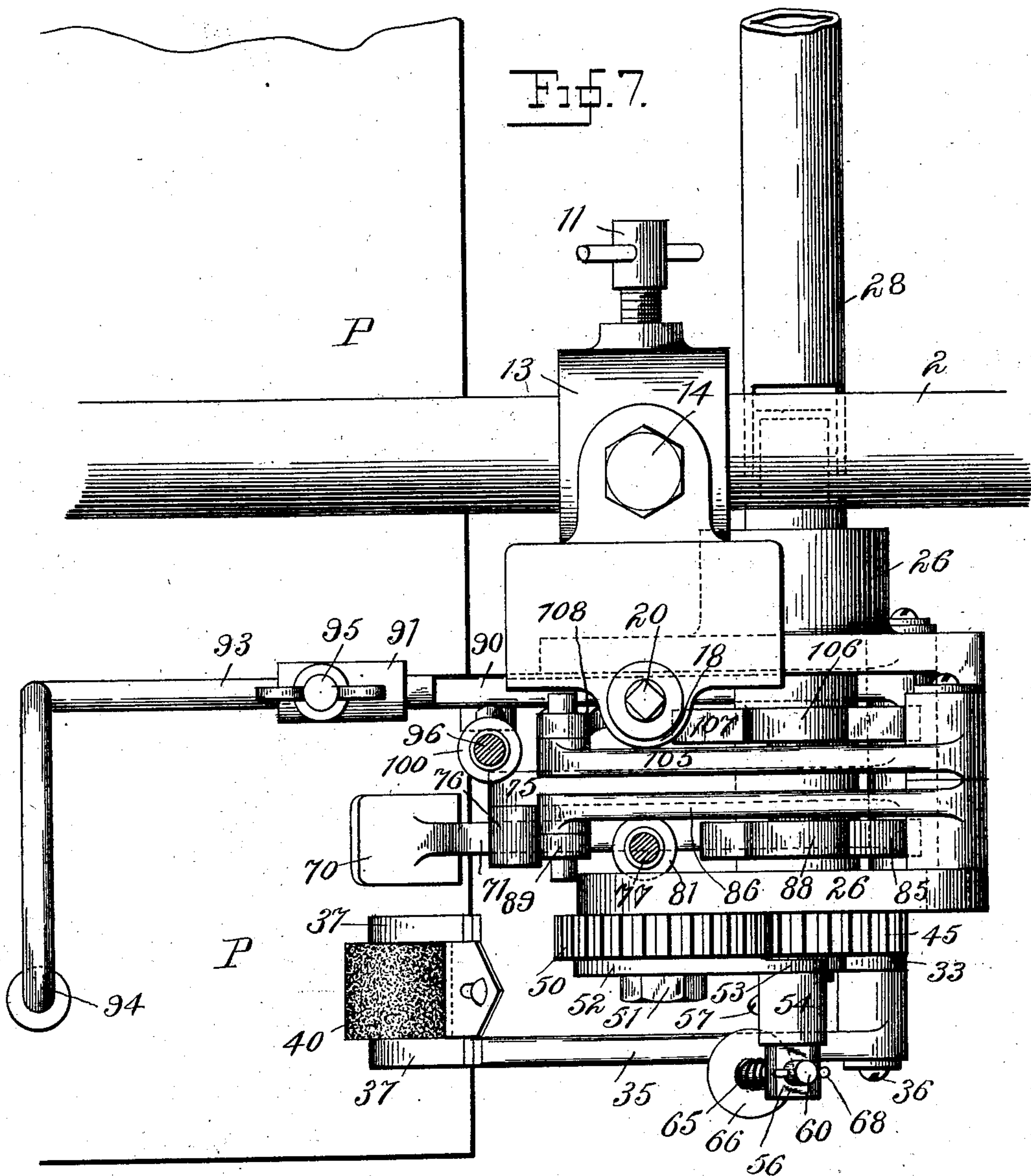
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5 SHEETS—SHEET 5.



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# UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER AND HENRY HALLSTREAM, OF PEARL RIVER, NEW YORK; SAID HALLSTREAM ASSIGNOR TO SAID DEXTER.

## PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 747,865, dated December 22, 1903.

Application filed May 17, 1902. Serial No. 107,717. (No model.)

*To all whom it may concern:*

Be it known that we, TALBOT C. DEXTER and HENRY HALLSTREAM, citizens of the United States, residing at Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Paper-Feeding Machines, of which the following is a specification.

The present invention relates to improvements on the paper-feeding machine covered by our application, Serial No. 101,777, filed April 7, 1902. In said application we have covered a sheet-buckling mechanism for paper-feeding machines in which the buckling instrument is so constructed and arranged that it will be capable of moving inwardly and outwardly with relation to the pile and in addition to its inward and outward movement the active surface of its frictional sheet-engaging pad will have a forwardly-rotating movement while it is in engagement with the pile. This forward rotation of the active surface of the frictional pad in addition to the ordinary reciprocating movement of the buckling-finger exaggerates or increases the buckling effect.

In our present application we cover specifically one of the modified forms of the broad invention which is partly illustrated and described in our above-named application.

Our present invention consists of a sheet-buckling mechanism having a sheet-buckling finger journaled upon a rotatable support, means for rotating said support, a combined tension and raising and lowering device connected with the buckling-finger and with a second rotating support, and means for driving said second rotating support. We prefer to provide three intermeshing gear-wheels, to one of which the buckling-finger will be journaled and to another of which the tension and lifting device will be connected, while the third one of which will be mounted upon the buckler-operating shaft and will drive the other two.

The arrangement of our sheet-buckling mechanism is such that the rear supporting end of the buckling-finger describes a complete circle during each buckling operation, the forward active end of the buckling-finger

being held down into engagement with the pile during its inward stroke and raised from the pile during its outward stroke. The tension and lifting device which is connected with the buckling-finger and with a rotating controlling-support imparts to the buckling-finger a gradually-increasing pressure during the initial part of its inward stroke and a gradually-decreasing pressure during the latter part of its inward buckling stroke. The rotating controlling-support of the tension and lifting device is arranged to rotate in unison with the rotating support of the buckling-finger.

The feature of our present invention of applying a gradually-increasing pressure to the buckling-finger during the initial part of its buckling stroke is of great importance in operating upon certain kinds of paper.

In an application filed by us April 7, 1902, Serial No. 101,776, improvements in paper-feeding machines, we have claimed, broadly, a buckling mechanism having differential spring mechanism and controlling means adapted to apply a different spring-pressure to the buckling-finger during each of its two buckling impulses. In the mechanism of said application, Serial No. 101,776, the heavy spring-pressure is applied during the initial part of the buckling stroke, while the lighter spring-pressure is applied during the second buckling impulse. Such an arrangement is very effective when working upon some classes of paper and particularly when the buckling-finger is operated a little inside of the edge of the pile and close to or in line with the holding-down foot or clamp. In other cases, however, when operating upon other kinds of paper and the buckling-finger is arranged nearer the edge and corner of the pile and is not so close to the holding-down foot or clamp the application of a very heavy pressure at the start of the buckling operation is apt to separate the corners of more than one sheet. It is in such cases as this that our present invention is of importance, because the buckling operation starts with a very light pressure, which will tend to separate the corner of the top sheet only, and the pressure is gradually increased as the buckling-finger moves inwardly, so as to afford



sufficient pressure to insure the separation of the corner of the top sheet if the starting pressure should have proven to have been insufficient, the increased pressure being applied after the buckling-finger has moved inwardly a little and the danger of buckling two sheets has passed.

In said drawings, Figure 1 is a rear elevation of one of a pair of the improved sheet-buckling mechanisms, showing the parts in their initial position. Fig. 2 is a similar view representing the parts at the completion of the inward active movement of the buckling-finger. Fig. 3 is a detail view representing in full lines the intermediate lowered position of the buckling-finger and in dotted lines the intermediate raised position of the buckling-finger. Fig. 4 is a detail sectional plan view illustrating the pile-holding foot or clamp and part of the buckler-stop. Fig. 5 is a detail sectional view representing the relative position of the controlling-cams of the pile-holding clamp and the buckler-stop. Fig. 6 is an inside edge elevation of the buckling mechanism as seen when looking from the center of the pile of sheets, part of the buckler-stop being broken away. Fig. 6<sup>a</sup> is a detail sectional view of the guide-block for the buckling-finger tension and lifting rod. Fig. 7 is a plan view of the buckling mechanism, the guide for the tension-rods of the pile-holding clamp and buckler-stop being removed.

The pile of paper P to be fed to the folder, printing-press, or other machine is mounted upon an automatically-adjustable platform or table, (not shown,) which may be mounted and operated in the usual manner. The side frames of the feeding-machine to which the improvements are applied are not illustrated in the drawings. Suitably supported from the ordinary side frames above the pile-supporting table is a suitable frame, upon which the sheet-buckling separating mechanisms are adjustably mounted. We have shown only the rear transverse bar 2 of this supporting-frame. This bar 2 is adapted to be adjusted longitudinally of the feeding-machine, so as to support the sheet-separating mechanisms and the air-blast devices in proper position above the rear edge of a pile of any sized sheets which is to be fed from the table or platform. The two sets of sheet-separating mechanisms are adjustably mounted upon this rear supporting-bar 2, so as to be capable of adjustment transversely of the pile.

5 represents one of the ordinary air-blast tubes adjustably mounted upon the supporting-bar 2 and having air-pipe connections with any suitable blower. (Not shown.) There may be any desired number of these air-blast pipes 5, the number and disposition of them depending upon the size of the sheets to be operated upon and the nature of the paper and of the printing upon the paper if the sheets have been previously printed.

We will now describe the improved sheet-

buckling separating mechanism, of which two sets are designed to be arranged at opposite sides above the rear edge of the pile.

Both sheet-buckling mechanisms are of the same construction and a description of one will be sufficient for both.

We have shown only one of the buckling mechanisms in the accompanying drawings.

10 is a suitable bracket adjustably mounted upon the supporting-bar 2 and secured in the desired adjusted position by a set-screw 11.

12 is a vertically-extending guide-bracket formed with a horizontal ear 13, through which passes a vertical set-screw 14 for securing the bracket 12 to the bracket 10 in the desired adjusted position. The bracket 12 is formed in its rear vertical face with guide-flanges 15, between which is mounted the vertically-adjustable buckler-frame 16, formed with an upper oblong portion which fits between and slides in the guide-flanges 15 of bracket 12 and a lower bracket portion of suitable shape to properly support the operative parts of the mechanism hereinafter referred to. An adjusting-screw 17 is journaled in a lug 18 on bracket 12 and threaded through a nut 19, secured to the vertically-sliding buckler-frame 16. This adjusting-screw 17 has a squared head 20 for operating it. By operating the screw 17 the buckler mechanism can be adjusted vertically with relation to the pile of sheets.

25 is the buckler-operating shaft, which is journaled in suitable bearings 26, formed upon the lower bracket portion of buckler-supporting frame 16. This short shaft 25 has universal-joint connection 27 with an operating-shaft 28, which is adapted to be driven from the main shaft of the feeding-machine in any suitable manner. (Not shown.) Mounted upon the shaft 25, between its supporting-bearings, are two cams for controlling the operation of the pile-holding clamp or foot and the buckler-stop hereinafter referred to, and upon the outer end of the shaft 25, outside of one of the bearings 26, is mounted a gear-wheel for driving and controlling the buckling-finger proper. These mechanisms will now be described.

30 is a gear-wheel freely journaled upon a bolt or stud 31, secured to the lower bracketed portion of the buckler-supporting frame 16. This gear-wheel 30 has secured to its outer face a plate 32, formed with an arm 33, which projects beyond the gear-teeth.

35 is the buckling-finger proper, which is freely journaled at its rear end upon a screw-bolt 36, which is rigidly attached to the eccentric arm 33 of the plate 32. The forward end of the buckling-finger is formed with a yoke 37, having rearwardly-opening hook-shaped arms 38.

40 is the pad of soft rubber, preferably in the shape of a roll, which is rigidly mounted upon an axle having outwardly-projecting trunnions or bearings 41, which are supported loosely in the hook-shaped arms 38 of



the yoke 37. The yoke 37 has a rearwardly-inclined lug or plate 43, upon which is adjustably mounted a knife-blade 44 by means of a set-screw 45. This knife-blade is so presented with relation to the rubber roll 40 that its sharp edge will engage the periphery of the roll when the buckling-finger is moved inwardly over the pile and bind the roll in the buckling-finger to prevent its rotation and to cause it to frictionally engage and buckle the corner of the sheet.

The gear-wheel 30 is in constant mesh with a similar gear 45, which is rigidly secured to the outer end of the buckler-operating shaft 25. This gear-wheel may be secured in any suitable manner—such, for instance, as by a washer 46 and screw 47.

50 is a third gear-wheel freely journaled upon a screw-bolt 51, which is threaded into the lower bracketed portion of the buckler-supporting frame 16, and 52 is a plate secured to the outer face of the gear 50 and formed with an eccentric arm 53. The eccentric arm 53 carries a socketed cylindrical lug or boss 54, in which is freely journaled the stem 55 of a guide-block 56. The stem 55 is formed with an annular groove 55<sup>a</sup>, in which engages a set-screw 57, threaded through the wall of the boss 54. The engagement of screw 57 in the groove 55<sup>a</sup> allows the guide-block 56 to rotate freely on the boss and at the same time prevents the guide-block being displaced.

60 is the combined tension and elevating and lowering rod of the buckling-finger. This rod 60 is formed with an eye 61 at its lower end, which is freely pivoted upon a pin 62, projecting from one face of the buckling-finger 35. The upper end of the rod 60 passes freely through a transverse opening 56<sup>a</sup>, formed in the guide-block 56. A spiral spring 65 surrounds the rod 60 and is confined at its upper end by the guide-block 56 and at its lower end by an adjustable milled nut 66, which is threaded upon the threaded lower portion of the rod 60.

67 is a clamp-nut for binding the adjusting-nut 66 upon the rod 60. By screwing nut 66 upwardly or downwardly upon the rod the tension of the spring 65 can be adjusted to afford the required degree of pressure upon the buckling-finger. The upper end of rod 60 is formed with a series of transversely-extending holes 60<sup>a</sup>, into any one of which may be inserted a cotter-pin 68 for limiting the downward movement of the rod 60 through the guide-block 56 and affording a means for lifting the rod 60 and the buckling-finger, to which it is attached.

70 is the holding-down foot or clamp, mounted upon the inner free end of an arm or lever 71, which is journaled at its rear end upon a pin or bolt 72, secured to the lower bracketed portion of the buckler-supporting frame.

75 is a lever also journaled upon the pin or bolt 72 and formed at its inner end with a

laterally-projecting lug 76, which rests just above the arm 71 of the pile-holding clamp 70.

77 is a tension-rod journaled at its lower end 78 to the arm or lever 75 and passing freely through an opening formed in the guide flange or bracket 79. A long spiral spring 80 surrounds the tension-rod 77 and is confined at its upper end by guide-bracket 79 and at its lower end by an adjustable collar 81, mounted upon the rod 77. This tension-rod 77 acts through the lever 75 upon the holding-down foot 70 under the control of the cam device, which will now be described.

85 is the controlling-cam of the holding-down foot or clamp. This cam 85 is approximately semicircular in form and is keyed upon the buckler-operating shaft 25 between its bearings 26.

86 is a lever journaled upon a pin or bolt 87 and carrying a freely-journaled antifric-tion-roller 88, which runs upon the periphery of the controlling-cam 85.

89 is a link journaled at its lower end to the arm or lever 75 and at its upper end to the free end of the lever 86. By this means it will be observed that as the cam 85 rotates the lever 75 will be intermittently raised and lowered for relieving the holding-down foot 70 of the pressure of the tension-rod 77 while the edge of the sheet is being buckled and for applying the pressure of said tension-rod after the sheet has been buckled and while the partially-separated sheet is being fed off from the pile.

90 is an arm or lever journaled at its rear end upon the pin or bolt 72 and formed at its forward end with a longitudinally-extending socket 91, in which is adjustably mounted the stem 93 of the buckler-stop 94. The stem of the buckler-stop is bent horizontally and vertically to bring the stop 94 over in front of the buckling-finger. A thumb-screw 95 is threaded into the wall of the socket 91 in position to engage the stem 93 to hold the buckler-stop 94 in the desired adjusted position with relation to the buckling-finger.

A tension-rod 96 is pivoted at 97 to the arm or lever 90 and passes up through the guide-bracket 98, a long spiral spring 99 being mounted upon the rod 96 and confined at its upper end by the guide-bracket 98 and at its lower end by the adjustable collar 100, which is mounted upon the rod 96. The tension-rod 96 holds the buckler-stop 94 into engagement with the pile of sheets during the first part of the inward or buckling movement of the buckling-finger.

To elevate the buckler-stop 94 from the pile at the proper moment, we provide a controlling-lever 105, which is freely journaled upon the pin or bolt 87 and carries an antifric-tion-roller 106, which travels upon the periphery of an approximately semicircular controlling-cam 107, keyed to the buckler-operating shaft 105, said controlling arm or lever 105



being connected with the arm 90 of the buckler-stop by means of a link 108, which is pivoted at its opposite ends to arm 90 and lever 105.

5 The operation of our improved sheet-buckling mechanism may be briefly described as follows: The initial position of the mechanism is illustrated in Fig. 1 of the drawings. The rotation of the driving-shaft 25 to the  
10 left of Fig. 1 drives the gears 30 and 50 to the right, causing the active end of the buckling-finger to be moved inwardly in engagement with the pile, the buckling-pad 40 being held against rotation by the engagement  
15 of the knife-blade 44, the rear pivoted end of the buckling-finger being moved in an arc of a circle, which causes it to move toward and away from the horizontal plane of the top of the pile to effect a slight forward rotation of  
20 the buckling-pad on the pile for increasing the buckling effect, and the guiding-block 56 also moving in the arc of a circle toward and away from the buckling-finger to first gradually increase the tension - spring 65 as the  
25 buckling-finger moves inwardly and then gradually release the tension of said spring and engage the cotter-pin 68 for elevating the buckling-finger. The movements of the parts are so timed that the buckling-finger will be-  
30 gin to move upwardly away from the pile immediately after the completion of its inward buckling stroke, and it is supported in elevated position, as indicated in dotted lines in Fig. 3 of the drawings, until the gears 30  
35 and 50 complete the revolution, when the parts are again brought into the position shown in Fig. 1. While the buckling-finger is accomplishing its inward buckling stroke the tension is held off of the holding-down  
40 foot or clamp 70; but the moment the buckling-finger reaches its extreme inward position the cam releases the tension device to apply pressure to the holding-down foot. The buckler-stop 40 remains in engagement  
45 with the pile under the action of its spring-tension device during the first half of its inward stroke and is raised away from the pile while the buckling-finger is still on its inward stroke to allow the buckle in the sheet to  
50 spread out over the rear edge of the sheet, the buckler-stop being again brought into engagement with the pile just prior to the commencement of another inward stroke of the buckling-finger.

55 It will be clear to those skilled in the art that we propose to arrange two of our improved buckling mechanisms above the rear corners of the pile of sheets, the operating mechanisms being so timed as to cause the  
60 bucklers to operate simultaneously. After each sheet is buckled it is fed off from the pile by any suitable feeding-off devices, the pile being held firmly intact by the holding-down clamps 70.

65 We desire to claim, broadly, a sheet-buckling mechanism having a buckling-finger mounted upon a rotating support and a tension and

elevating device connected with the buckling-finger and engaging a rotating controlling-support. We also desire to claim the exact  
70 construction of our buckling mechanism as illustrated and above described. We also desire to claim, broadly, a sheet-buckling mechanism having a suitable tension device and  
75 controlling and operating means for imparting to the buckling-finger a gradually-increasing pressure during the initial part of its buckling stroke.

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

1. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger, a rotatable support  
85 on which said buckling-finger is pivotally mounted, a second rotatable support, and a suitable connection between the buckling-finger and said second rotatable support, substantially as set forth.

2. In a paper-feeding machine, the combination of a support for a pile of sheets, with  
90 a sheet-buckling finger, a rotatable support upon which said buckling-finger is journaled, a rod pivotally connected to said buckling-finger, a rotatable guide-block through which  
95 said rod extends, and means for limiting the movement of said rod with relation to said guide-block, substantially as set forth.

3. In a paper-feeding machine, the combination of a support for a pile of sheets, with  
100 a sheet-buckling finger, a rotatable support upon which said buckling-finger is journaled, a second rotatable support carrying a guiding and controlling block, a rod passing freely  
105 through an opening in said guiding and controlling block and pivotally connected to the buckling-finger, and means for limiting the movement of said rod through said block, substantially as set forth.

4. In a paper-feeding machine, the combination of a support for a pile of sheets, with  
110 a sheet-buckling finger, a rotatable support upon which said buckling-finger is journaled, a second rotatable support, a guiding and controlling block freely journaled upon said  
115 second rotatable support, a rod passing freely through an opening in said guiding and controlling block and pivotally connected to said buckling-finger, and a pin projecting through  
120 said rod and adapted to engage said block to limit the movement of the rod through the block, substantially as set forth.

5. In a paper-feeding machine, the combination of a support for a pile of sheets, with  
125 a sheet-buckling finger, a rotatable support upon which said buckling-finger is journaled, a second rotatable support, a guiding and controlling block extending laterally from  
130 and freely journaled upon said second rotatable support, a tension-rod passing freely through an opening in said guiding and controlling block and pivotally connected to the buckling-finger, and a tension-spring mounted upon said rod and confined between said guid-



ing and controlling block and a nut or collar upon the rod, substantially as set forth.

6. In a paper-feeding machine, the combination of a support for a pile of sheets, a buckler-operating shaft, a gear rotatably mounted upon said shaft, a second gear meshing with and driven by the gear of the operating-shaft, a sheet-buckling finger pivotally mounted upon said second gear, a tension device engaging said buckling-finger, and means for raising and lowering the buckling-finger, substantially as set forth.

7. In a paper-feeding machine, the combination of a support for a pile of sheets, with a buckler-operating shaft, a driving-gear rigidly mounted upon said operating-shaft, two freely-journaled driven gears meshing with and driven by said driving-gear, a sheet-buckling finger journaled upon one of said driven gears, a guiding and controlling block journaled upon the other of said driven gears, and a tension and lifting rod pivotally connected to the buckling-finger and having sliding connection with the guiding and controlling block, substantially as set forth.

8. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger adapted to reciprocate inwardly and outwardly with relation to the pile, means for raising and lowering said buckling-finger, and a tension device suitably connected with said buckling-finger and adapted to impart a light pressure at the start of the buckling operation and gradually increase the pressure during the initial part of the buckling movement, substantially as set forth.

9. In a paper-feeding machine, the combi-

nation of a support for a pile of sheets, with a sheet-buckling finger adapted to reciprocate inwardly and outwardly with relation to the pile, means for raising and lowering said buckling-finger, and a tension device suitably connected with said buckling-finger and adapted to impart a light pressure at the start of the buckling operation, then gradually increase the pressure during the initial part of the buckling movement, and finally decrease the pressure during the remainder of the buckling movement, substantially as set forth.

10. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling instrument, including a rotatable support upon which the buckling instrument is pivotally mounted, a combined tension and lifting device connected with the buckling instrument, a second rotatable support engaging and controlling said combined tension and lifting device, a pile-holding foot or clamp, a buckler-stop adapted to engage the pile in front of the buckling-finger, and means for operating and controlling the buckler-stop adapted to move it into engagement with the pile just prior to the start of the buckling movement and elevate it from the pile after the buckling instrument has partially completed its buckling movement and before the buckling movement is completed, substantially as set forth.

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