No. 747,864. PATENTED DEC. 22, 1903.

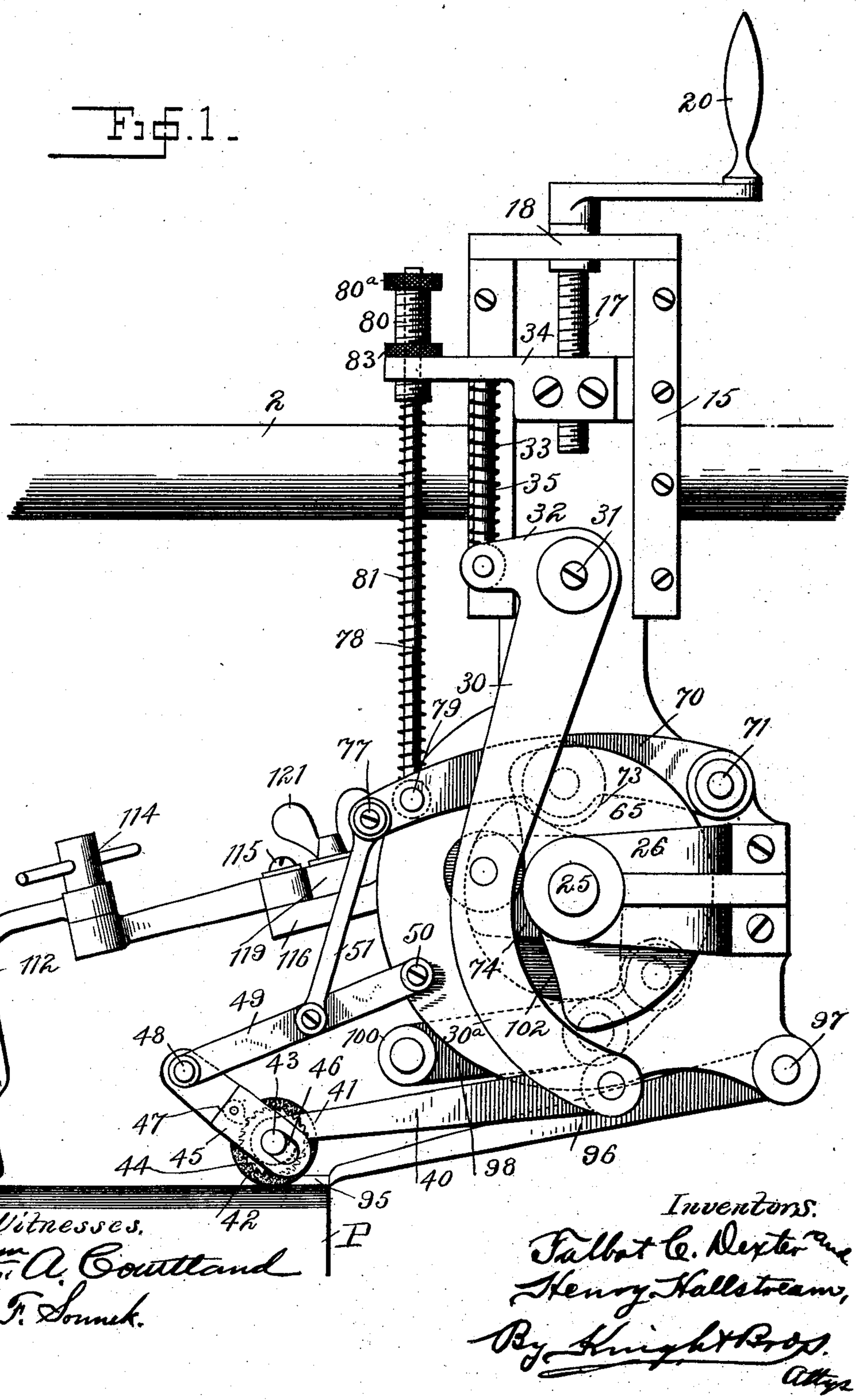
T. C. DEXTER & H. HALLSTREAM.

PAPER FEEDING MACHINE.

APPLICATION FILED APR. 7, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



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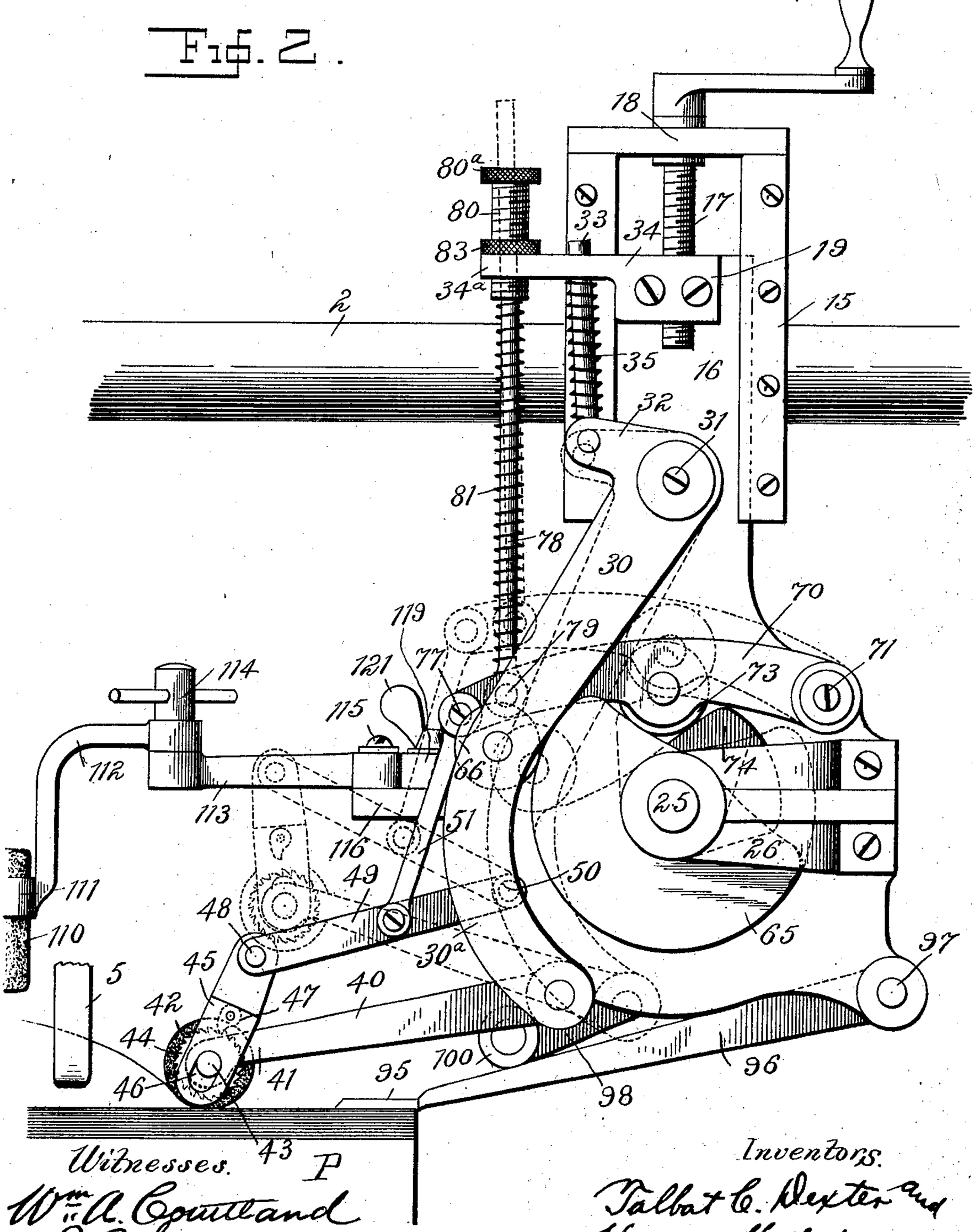
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



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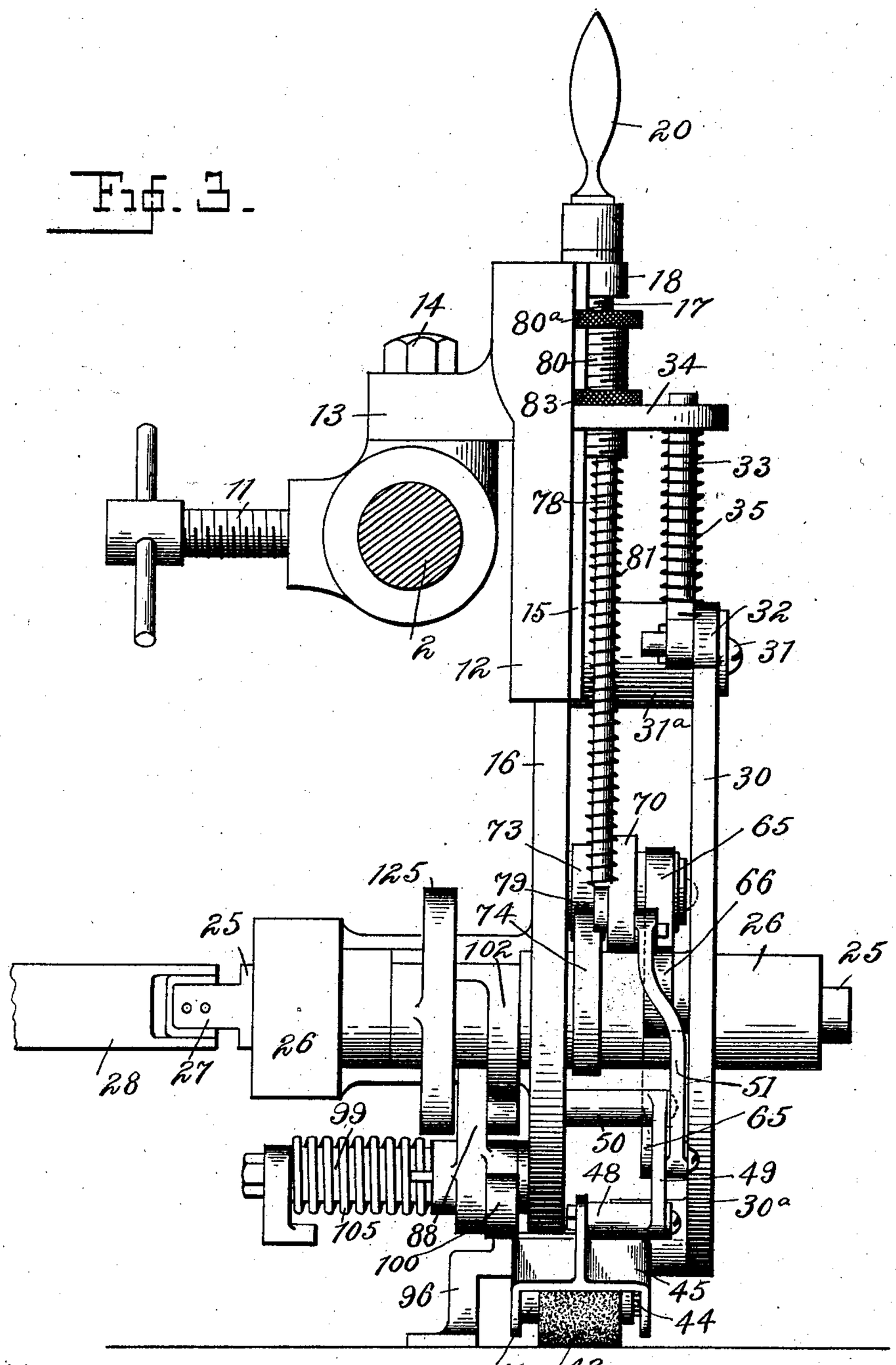
NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3.



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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 4.

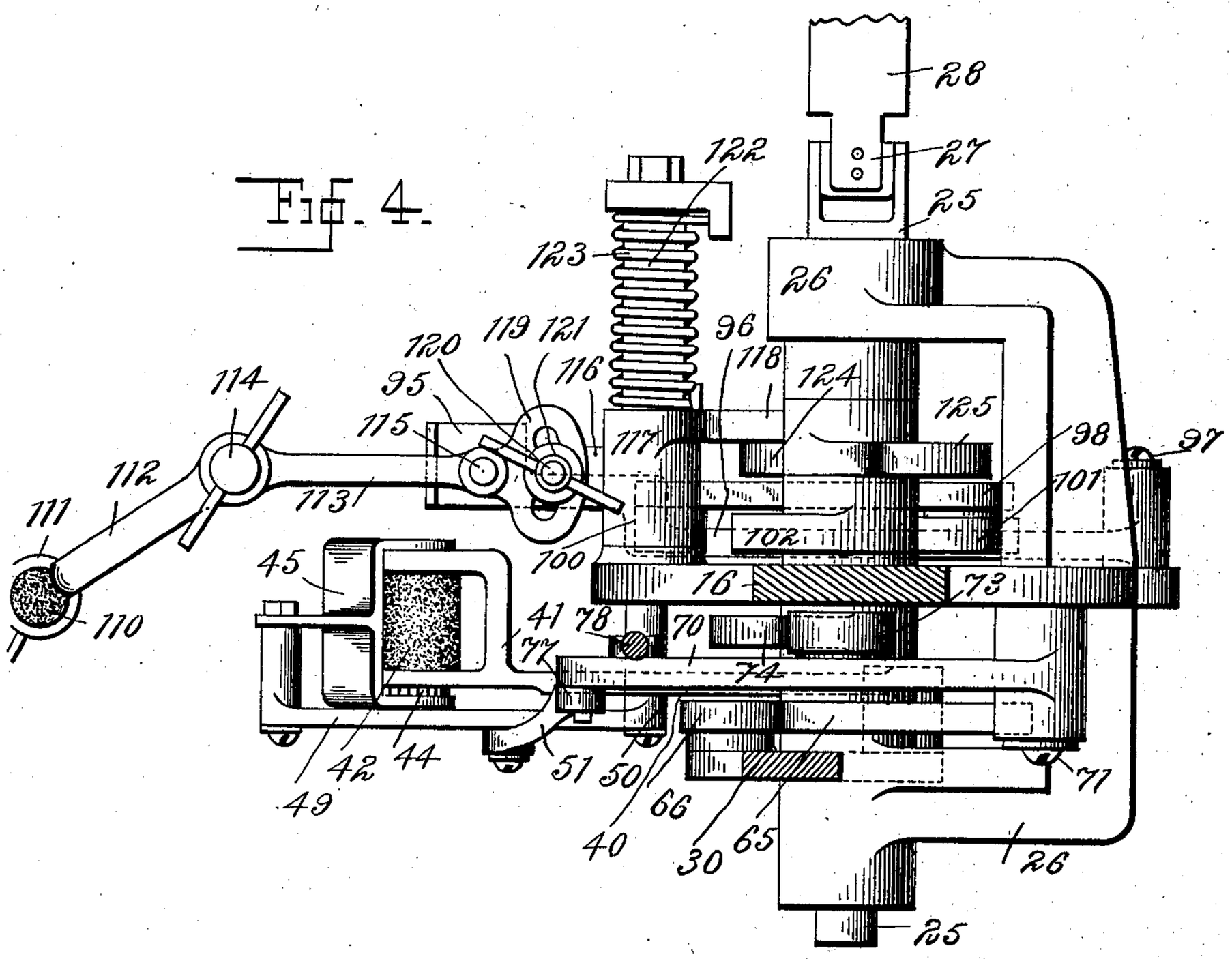
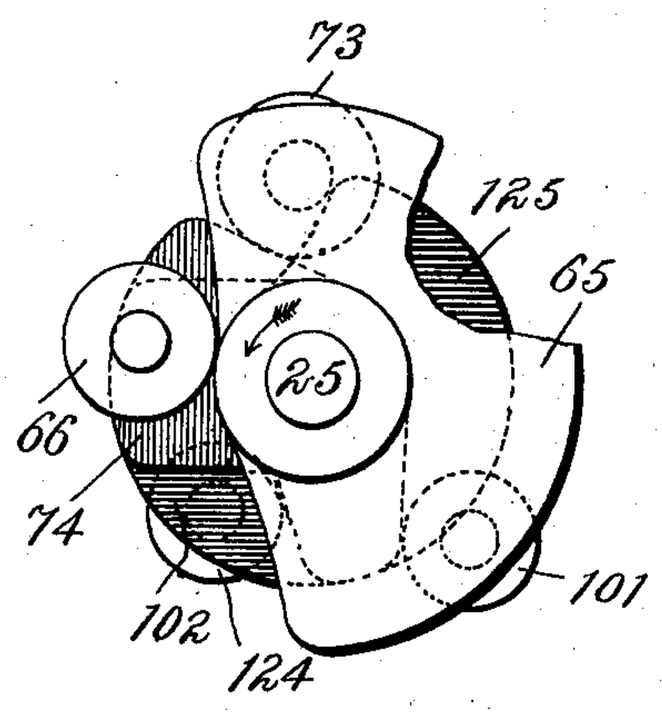


Fig. 5.



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No. 747,864. Patented December 22, 1903.

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. 747,864, dated December 22, 1903.

Application filed April 7, 1902. Serial No. 101,778. (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.

Our invention relates to improvements in paper-feeding machines of the buckler type, in which the successive sheets of an adjustably-supported pile are first buckled at the corners to partially loosen the sheets and afterward fed off from the pile by suitable feeding-off mechanism.

In an application, Serial No. 101,777, filed by us on the 7th day of April, 1902, for improvements in paper-feeding machines we cover, broadly, 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 just before its inward movement the active surface of its frictional sheet-engaging pad will have imparted to it a forwardly-rotating movement with relation to the instrument. This forward rotation of the active surface of the frictional pad is the initial movement of the buckler for starting the buckling operation when the difficulty encountered is greatest, the second part of the buckling operation being the ordinary inward stroke of the buckling-finger.

Our present invention, which relates to an improvement on the same style of sheet-buckling mechanism for paper-feeding machines, as set forth in the said application, Serial No. 101,777, comprises a sheet-buckling instrument carrying a rotatable frictional sheet-engaging pad, an oscillating arm or yoke journaled upon the buckling instrument and having means for engaging the rotatable sheet-engaging pad, and operating and controlling means constructed and arranged to move the buckling instrument inwardly and outwardly with relation to the pile and to positively rotate the sheet-engaging pad during its entire inward motion while it is in engagement with the pile.

More specifically, our invention consists of a sheet-buckling finger having a soft rubber pad or roll journaled in its free end, an arm or yoke mounted to oscillate upon the free end of the buckling-finger and to move laterally with relation thereto, a ratchet-wheel secured to the journal of the rubber pad or roll, a pawl carried by the oscillating arm or yoke, a connection between said arm or yoke and a stationary part of the buckler-frame, and means for reciprocating and raising and lowering the buckling-finger to cause the rubber pad to rotate forwardly in engagement with the pile while the buckling-finger is moving inwardly upon the pile and to raise the buckling-finger from the pile and move it outwardly in raised position. When the buckling-finger is raised from the pile, the arm or yoke carrying the pawl is moved laterally upon the buckling-finger, so as to disengage the pawl from the ratchet of the rubber pad for the purpose of avoiding the rearward rotation of the roll and the engagement of the pawl with a new tooth of the ratchet upon the next succeeding stroke of the buckling instrument. By this automatic engagement and disengagement of the pad-rotating means with the pad the pad will always present a new surface in engagement with the sheet, which is desirable in securing the best results.

In order that our invention may be fully understood, we 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 rear elevation of one of a pair of our improved sheet-buckling mechanisms representing the parts in their initial position. Fig. 2 is a similar view representing two other positions of the operating parts. Fig. 3 is an inside edge elevation of the buckling mechanism as seen when looking from the center of the pile of sheets, the buckler-stop being omitted. Fig. 4 is a detail sectional plan view of the same. Fig. 5 is a detail view illustrating the relative initial positions of the several operating cams upon the cam-shaft.

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 our 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 mechanism are adjustably mounted upon this rear supporting-bar 2, so as to be capable of adjustment transversely of the pile.

In Fig. 2 of the drawings 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 our 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.

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 crank-handle 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 several cams, which operate the different parts of the sheet-separating mechanism. These cams will be referred to in connection with the said parts of the mechanism.

30 is the supporting and operating lever of the buckling-finger proper. This lever 30 is journaled at 31 upon a boss 31ª, projecting outwardly from the face of the buckler-supporting frame 16, and has a heel or lug 32 projecting from it adjacent to its journal, to which lug 32 is journaled a vertically-extending rod 33, which passes up through a guide-bracket 34, which is secured to the outer face of the nut 19 of the buckler-supporting frame. A spiral spring 35 surrounds the rod 33 and is confined between the bracket 34 and the lower end of the rod 33. The spring 35 tends to move the lower curved end 30ª of the lever 30 outwardly or to the right of Figs. 1 and 2.

40 is the buckling-finger proper, formed with a yoked forward end 41, in which is loosely journaled a soft-rubber sheet-engaging roll 42. The journals 43 of the roll 42 project a little beyond the yoke-arms of the buckling-finger. Keyed to one of the journals 43 inside of the buckling-finger yoked arm is a small ratchet-wheel 44.

The buckling-finger 40 is journaled loosely at its rear end upon a pin 55, mounted in the lower curved end 30ª of the lever 30.

An arm or yoke 45 is formed with slots 46 in its arms, which fit over the projecting journal ends 43 of the buckling-roll in such a manner that the yoke is capable of not only rotating upon said journals, but also of moving laterally upon the buckling-finger. The yoke 45 carries a rigid pawl 47, which is adapted to engage with the ratchet-wheel 44, and the upper end of the yoke 45 is pivoted at 48 to a link 49, which is in turn pivotally connected to the buckler-frame at 50. The link 49 has pivoted to it a link 51, which is connected at its upper end with the buckler-lifting and tension lever 70, which will presently be described.

Keyed to the operating-shaft 25 is the main cam 65, which is approximately semicircular in form. This cam 65 operates upon an antifriction-roller 66, journaled upon the buckler supporting and operating lever 30. By the rotation of cam 65 the buckling-finger 40 is moved inwardly and outwardly over the pile of sheets, means being provided, as presently described, for holding the buckling-finger in engagement with the pile during its inward stroke and elevating it from the pile during its outward stroke.

70 is a lever journaled upon a pin 71 on the buckler-supporting frame 16. The lever 70 carries an antifriction-roller 73, which operates upon the periphery of a cam 74, keyed

to the operating-shaft 25, and of approximately one-fourth of a circumference in extent.

The free end of lever 70 is connected with the buckling-finger through the links 51 and 49 and the yoke 45, the result of which connection is the raising and lowering of the buckling-finger by the cam 74 and the transmission to the buckling-finger of the spring-pressure from the tension device, which will now be described.

A rod 78 is journaled to the lever 70 upon a pin 79 adjacent to the free end of the lever 70 and extends upwardly from said pin 79 and passes freely through an externally-threaded elongated nut 80, which is threaded into a suitable opening formed in the lateral extension 34ª of bracket-arm 34. The nut 80 is formed with a milled head 80ª, by which it is operated. A spiral spring 81 surrounds the rod 78 and is confined between the enlarged lower end of said rod and the adjustable nut 80 at its upper end. By screwing the nut 80 downwardly or upwardly in its supporting-bracket 34ª the tension of spring 81 can be regulated. A clamp-nut 83 is threaded upon the elongated nut 80 and is adapted to engage the bracket-arm extension 34ª and secure the nut 80 in its adjusted position.

The spring 81 not only holds the buckler-elevating lever 70 into operative relation with the cam 74, but holds the buckling-finger down into operative engagement with the pile of sheets during its working strokes.

95 is the holding-down foot or clamp, mounted upon the inner free end of an arm or lever 96, which is journaled upon a pin 97, supported in the buckler-frame.

98 is an arm or lever journaled upon a pin 99, extending from the buckler-frame. The arm 98 carries at one end an antifriction-roller 100, which is adapted to be intermittently forced down into engagement with the arm 96 of the holding-clamp 95. Journaled upon the other end of the lever 98 is an antifriction-roller 101, which travels upon the periphery of a cam 102, keyed to the cam-shaft 25. This cam 102 is approximately one-third of a circumference in extent.

Mounted upon an extension of the pin 99 is a tension-spring 105 of usual construction, which spring is arranged to move lever 98 upon its journal, so as to cause antifriction-roller 101 to closely follow the controlling-cam 102 and to throw the antifriction-roller 100 into engagement with the arm 96 of the holding-clamp for applying the tension of spring 105 to the clamp when the lever 98 is released by the cam. The tension of spring 105 is thrown upon the holding-down foot or clamp 95 to securely clamp the pile immediately after the edge of the top sheet has been buckled from beneath the foot and while the separated sheet is being fed off from the pile by the feed mechanism.

110 is the buckler stop or foot, consisting of a block of rubber mounted in the socket 111, formed in the lower end of a bent arm 112, which is mounted upon the outer end of an arm or lever 113 by means of a vertical screw-bolt 114. The arm 113 is pivoted at 115 to a rock-arm 116, formed integral with a sleeve 117 and an oppositely-projecting arm 118. The rear end of arm 113 is formed with a laterally-extending slotted yoke 119, through the slot of which projects a bolt 120, extending up from arm 116. A nut 121, threaded on the bolt 120, clamps arm 116 in the desired adjusted position.

The joints between arms 112 and 113 and 113 and 116 allow the adjustment of buckler-stop 110 horizontally into any position with relation to the buckling-finger.

The sleeve 117 is freely journaled upon a pin 122, extending from the buckler-frame, and an adjustable tension-spring 123 is also mounted upon pin 122 and engages the sleeve 117 to throw stop 110 into engagement with the pile. The arm 118 carries an antifriction-roller 124, which runs upon the periphery of a controlling-cam 125, keyed to shaft 25. The rotation of the cam 125 causes the elevation of the buckler-stop 110 at the proper moment at the completion of each buckling operation to allow the sheets to be fed from the pile by the feeding-off devices.

Any suitable feeding devices may be employed for feeding the separated sheets from the pile. It will be clear that two of the improved sheet-buckling separating mechanisms are to be used on each feeding-machine, one arranged at each of the rear corners of the pile of sheets.

The operation of our improved sheet-buckling mechanism may be briefly described, as follows: It will be clear that the pressure of the springs 81 of the two buckling mechanisms is exerted upon the buckling-pads through the medium of the lever 70, links 51 and 49, and yokes 45. The buckling-fingers and buckler-stops descend into engagement with the pile simultaneously, and at the commencement of the buckling operation the holding-down clamps 95 are resting by gravity upon the pile. The buckling-fingers engage the pile in the position shown in Fig. 1 of the drawings. The cams 65, operating upon levers 30, force the buckling-fingers inwardly on the pile, and as the yokes 45 are anchored by the links 49 they will immediately start to rotate upon the forward ends of the buckling-fingers, and as the stationary pawls 47 engage ratchet-wheels 44 the buckler-rolls 42 will be positively rotated in the buckling-fingers, and as the movement of their active lower surfaces is inwardly over the pile it will be clear that the buckling action upon the sheet will be due to the combined inward motion of the buckling-fingers and inward rotation of the buckling-pads. When the buckling-fingers have reached the limit of their inward stroke, they are raised by the levers 70 and cams 74, the extreme inner lowered position and inner raised position

being indicated in Fig. 2 of the drawings. When the buckling-fingers are raised, the slots 46 in yokes 45 allow the yokes to move vertically upon the buckling-fingers to disengage the pawls 47 from ratchets 44, the outward movement of the buckling-fingers in raised position being effected while these parts are disengaged, as described. When the buckling-fingers are again lowered into engagement with the pile for another inward stroke, the pawls 47 will again be moved into engagement with the ratchet-wheels 44 by the downward pressure of springs 81, and as the buckling-rolls were not rotated upon the return or outward movement of the buckling-fingers it will be clear that the pawl will engage a new tooth of the ratchet. By this means the buckling-rolls are always rotated in one direction only, thereby insuring the presentation of a new surface to the pile for each buckling stroke.

Our present invention is subject to the broad claims in our above-named application, Serial No. 101,777, and our claims herein are limited to the particular form of mechanism which is above described for carrying out the broad idea of the said application.

Having thus described our invention, the following is what we claim as new therein and 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 frictional sheet-engaging pad rotatably mounted upon said buckling-finger, a device journaled upon said buckling-finger and adapted to engage said sheet-engaging pad and to cause it to rotate, and means for operating the buckling-finger, substantially as set forth.

2. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger, a frictional sheet-engaging pad rotatably mounted upon the buckling-finger, a device journaled upon said buckling-finger to engage said pad and rotate it, said device being movable laterally on the buckling-finger into and out of engagement with said pad and means for operating the buckling-finger, substantially as set forth.

3. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger, a frictional sheet-engaging pad rotatably mounted upon said buckling-finger, a pad-rotating device journaled upon the buckling-finger and movable laterally thereon, a connection anchoring said pad-rotating device to a stationary point, and means for operating the buckling-finger, substantially as set forth.

4. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger, a frictional sheet-engaging pad rotatably mounted upon said buckling-finger, a pad-rotating device journaled upon said buckling-finger and movable laterally thereon, means connected with said pad-rotating device for raising and lowering said buckling-finger, and means for moving said buckling-finger inwardly and outwardly with relation to the pile, substantially as set forth.

5. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger, a frictional sheet-engaging pad rotatably mounted upon said finger, a yoke journaled upon said buckling-finger adjacent to said pad and movable laterally on said buckling-finger, means carried by said yoke for engaging and rotating said pad, means connected with said yoke for raising and lowering said buckling-finger, and means for moving said buckling-finger inwardly and outwardly with relation to the pile, substantially as set forth.

6. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger, a frictional sheet-engaging pad rotatably mounted upon said finger, a ratchet upon said pad, a yoke journaled upon said buckling-finger adjacent to said pad, a pawl or lug carried by said yoke and adapted to engage said ratchet, means for raising and lowering said buckling-finger, a connection between said yoke and a stationary point, and means for moving said buckling-finger inwardly and outwardly with relation to the pile, substantially as set forth.

7. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger, a frictional sheet-engaging pad rotatably mounted upon said finger, a yoke journaled upon the buckling-finger, a ratchet carried by said pad, a pawl or lug mounted upon said yoke and adapted to engage said ratchet, a link connecting said yoke with a stationary point, means connected with said link for raising and lowering said buckling-finger, and means for moving said buckling-finger inwardly and outwardly with relation to the pile, 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, a sheet-engaging pad rotatably mounted upon said finger, a pad-rotating device journaled upon said buckling-finger, a spring tension device connected with said pad-rotating device, and means for operating said buckling-finger, substantially as set forth.

9. In a paper-feeding machine, the combination of a support for a pile of sheets, with a sheet-buckling finger, a frictional sheet-engaging pad rotatably mounted upon said finger, a pad-rotating yoke journaled upon said buckling-finger, a link connecting said yoke with a stationary point, a lever connected with said link, a spring tension device engaging said lever, and controlling and operating means adapted to reciprocate said buckling-finger and to raise and lower said lever, substantially as set forth.

10. In a paper-feeding machine, the combination of a support for a pile of sheets, a pile-holding clamp, and means for operating said

clamp, with a sheet-buckling finger, a sheet-engaging pad rotatably mounted upon said finger, a pad-rotating yoke journaled upon said finger and connected with a stationary point, a combined raising and lowering and tension device connected with pad-rotating device, and means for moving said buckling-finger inwardly and outwardly with relation to the pile, as set forth.

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