No. 715,081. Patented Dec. 2, 1902.

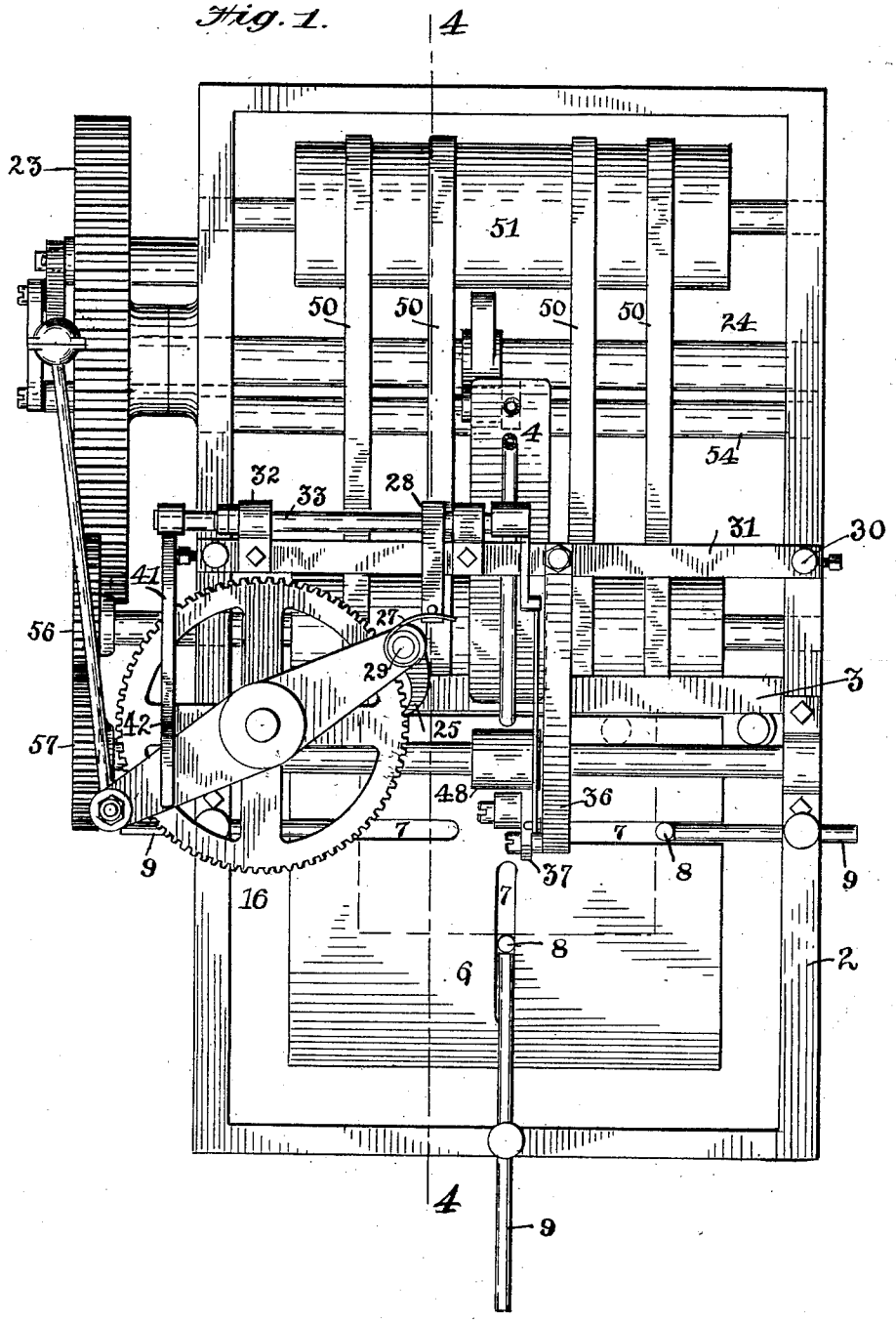
W. G. JOHNSTON.

AUTOMATIC FEED FOR PRINTING AND RULING MACHINES.

(Application filed Dec. 30, 1901.)

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.



Witnesses.
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Jno. F. Cross

Inventor,
William G. Johnston,
by Horace Pettit
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No. 715,081. Patented Dec. 2, 1902.

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AUTOMATIC FEED FOR PRINTING AND RULING MACHINES.

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(No Model.) 5 Sheets—Sheet 2.

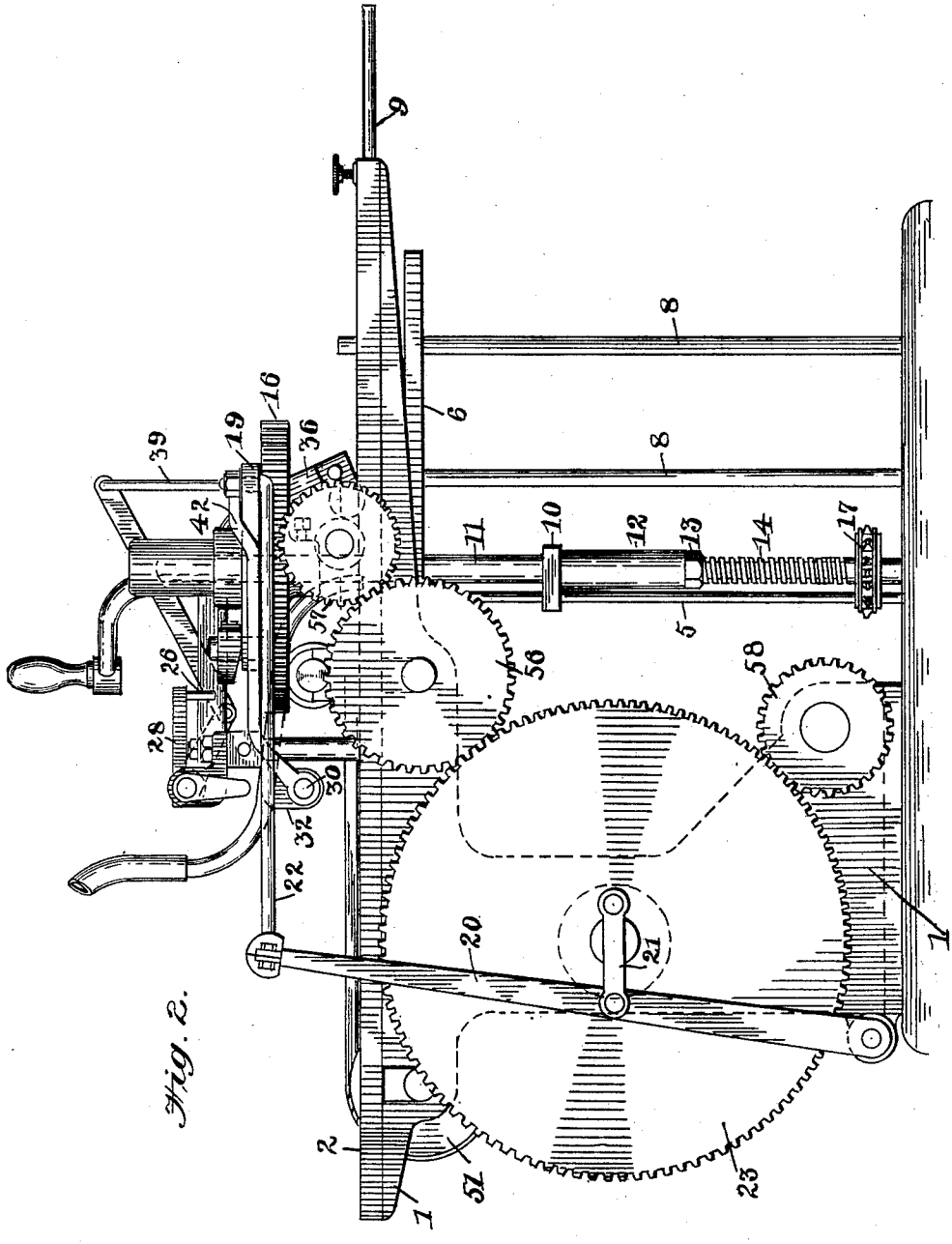


Fig. 2.

Witnesses.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 5 Sheets—Sheet 3.

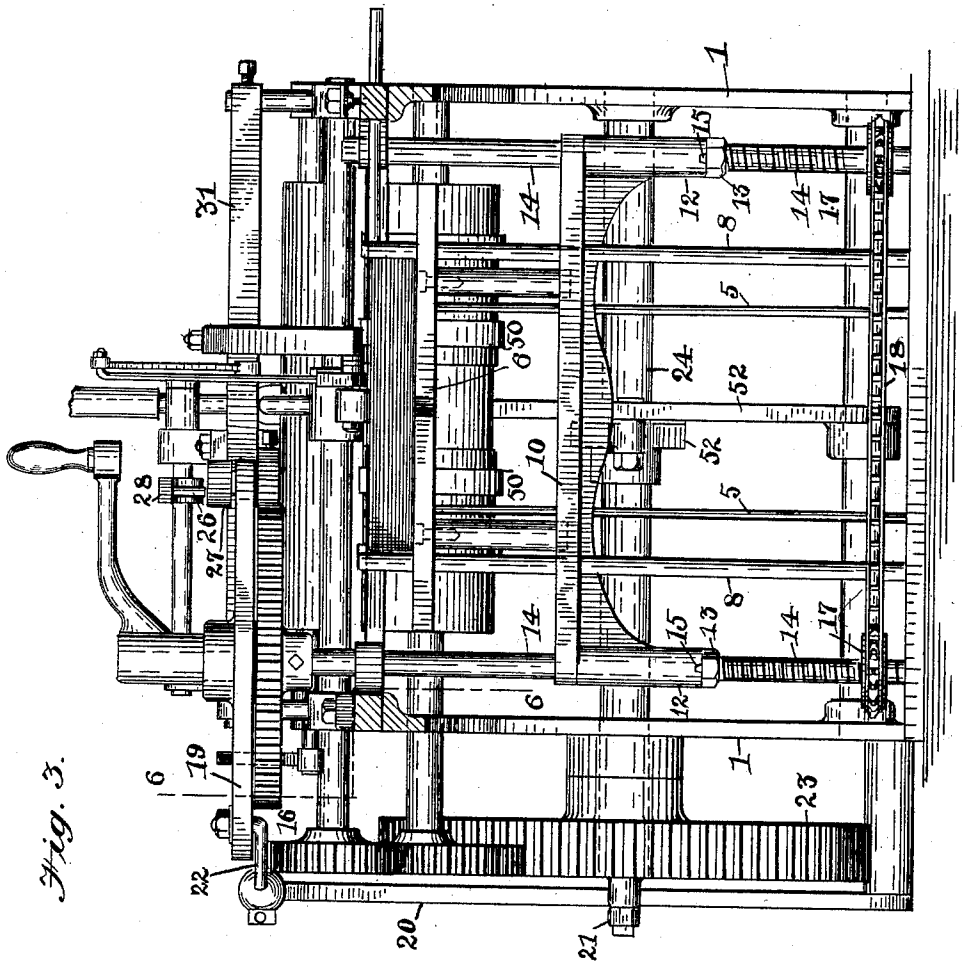


Fig. 3.

Witnesses.
Edw. W. Vaill Jr.
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(Application filed Dec. 30, 1901.)

(No Model.) 5 Sheets—Sheet 4.

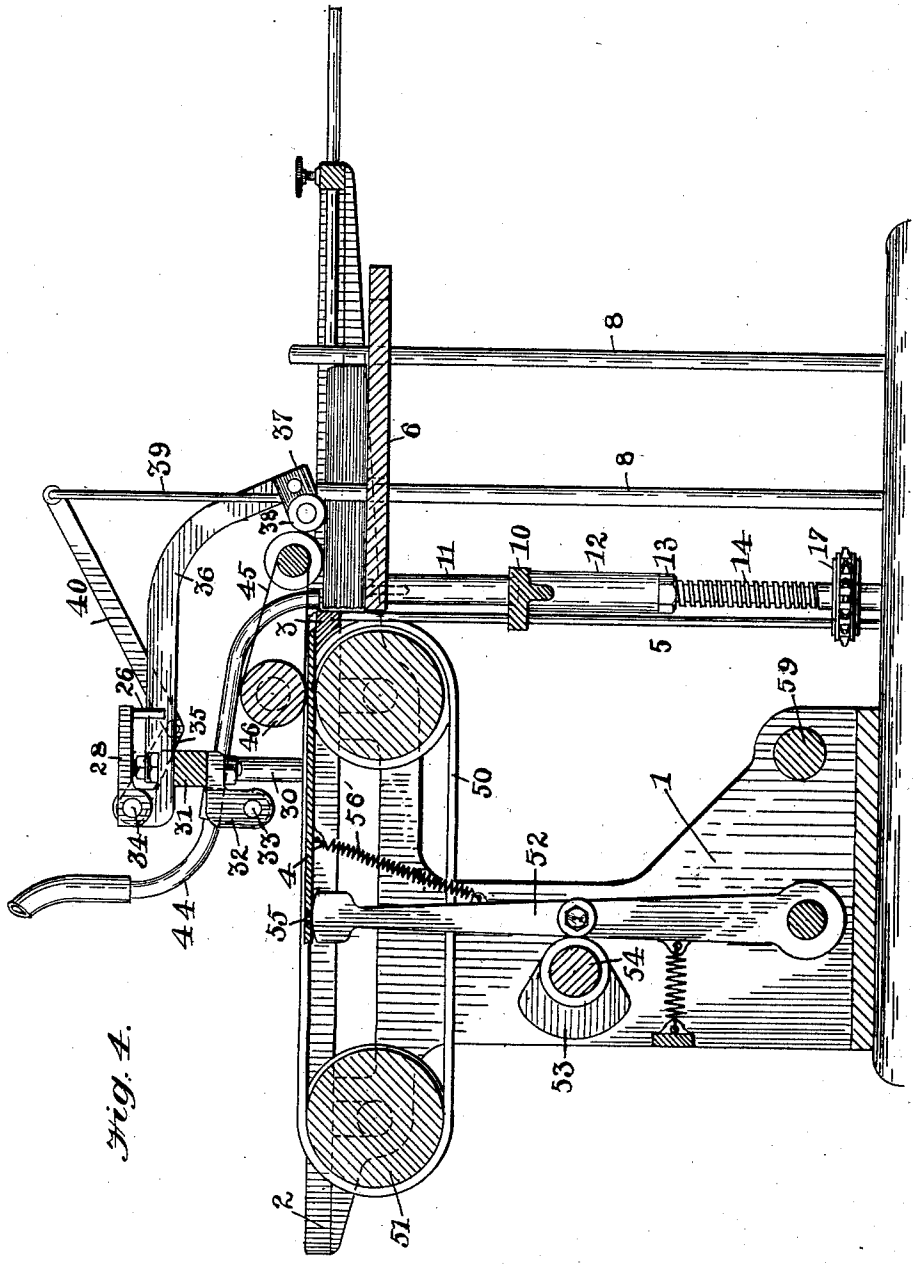


Fig. 4.

Witnesses.
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(Application filed Dec. 30, 1901.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 5.

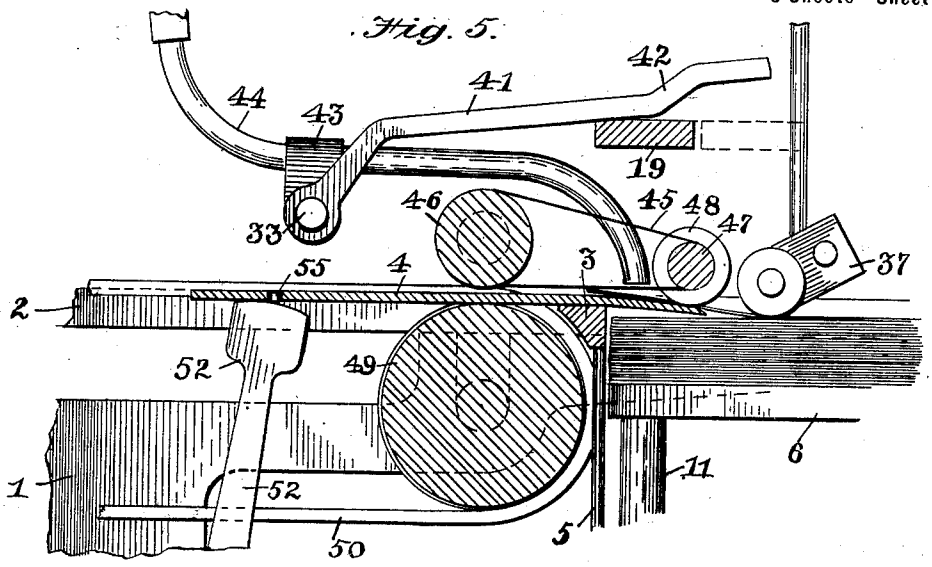
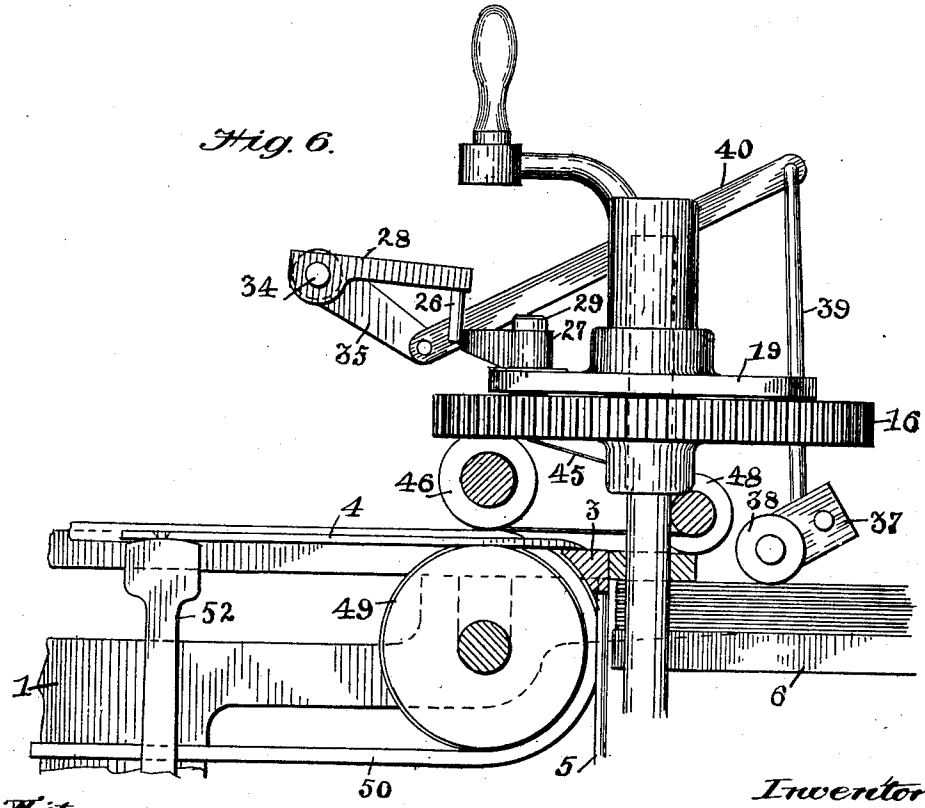


Fig. 6.



Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM G. JOHNSTON, OF WOODBURY, NEW JERSEY, ASSIGNOR TO THE STEEL MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

AUTOMATIC FEED FOR PRINTING AND RULING MACHINES.

SPECIFICATION forming part of Letters Patent No. 715,081, dated December 2, 1902.

Application filed December 30, 1901. Serial No. 87,672. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. JOHNSTON, a citizen of the United States, and a resident of Woodbury, State of New Jersey, have invented certain new and useful Improvements in Automatic Feeds for Printing and Ruling Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in automatic feeds for printing and ruling machines; and its objects are to provide efficient and reliable mechanism for automatically lifting and carrying to the press or other machine individual sheets to be operated upon and for automatically keeping the level of the bundle of sheets at a predetermined position, so that the lifting and feeding mechanism may operate constantly in connection therewith, together with other features to be hereinafter pointed out.

In general the nature of the invention consists in providing a movable table adapted to keep the surface of the pile of paper or other material substantially in one plane by means of screw-shafts and a spring-operated pawl-and-ratchet device, which operates as the sheets are successively withdrawn from the pile, and also consists in providing pneumatic means for separating and raising the individual sheets, thereby allowing a spring guide-plate to be inserted between the same and the pile, the latter at the same time pressing the sheet against the feed-roll, whereby it is delivered to the carrying-bands.

For a full and complete disclosure of this invention reference may be had to the following description and to the accompanying drawings, in which—

Figure 1 is a plan view of the complete mechanism. Fig. 2 is a side elevation; Fig. 3, an end elevation, the end bar and frame being removed; Fig. 4, a sectional view taken substantially upon the line 4 4 of Fig. 1; Fig. 5, a sectional view taken substantially upon the same line, but showing only the suction-tube and cam-arm portion of the feeding mechanism; and Fig. 6 is a sectional view taken substantially upon the line 6 6 of Fig. 3, showing only the gear and ratchet upon the screw-shaft and the pawl-actuating device, the latter being in its operative or engaged position.

In the drawings, 1 indicates suitable supporting-plates, which are surmounted by a rectangular frame 2, which incloses practically all the operative parts of the machine. Near the middle of this frame a transverse bar 3 is provided, which supports and holds from lateral movement the front end of the spring guide-plate 4 and also retains the upper ends of the table guide-rods 5 in position. The adjustable table consists of a plate 6, having slots 7 for the reception of the adjustable guide-rods 8, the upper ends of the latter being retained in position by means of longitudinally-adjustable rods 9. This arrangement of rods adapts the table to receive different sizes of sheets and to hold the same in position.

Below the supporting-table is a horizontal transverse supporting-bar 10, which is connected with the table by means of vertical posts 11. At each end of the supporting-bar 10 are the hollow cylindrical sleeves 12, the lower ends of which carry the threaded nuts 13, adapted to engage the screw rods or shafts 14. Said nuts are kept from turning by means of lugs 15 thereon, which engage corresponding recesses in the cylindrical sleeves. Upon turning the screw-threaded shafts 14 in either direction the bar 10 will be raised or lowered and also the table 6, which is supported therefrom.

Upon the upper end of one of the screw-shafts is secured a toothed wheel 16, which when engaged by an oscillating pawl is rotated and turns said screw-shafts. Upon the lower end of the screw-threaded shafts are secured sprocket-wheels 17, which are connected by a sprocket-chain 18, which adapts said screw-shafts to turn in unison. Above the toothed wheel upon the screw-shaft is mounted the oscillating bar 19, having oppositely-extending arms. The outer end of this bar is connected with some moving part of the mechanism, whereby it is oscillated through a certain arc. In this instance such movement is given by means of the lever 20 and the links 21 and 22 by the rotation of the main gear-wheel 23. However, it is evident

that the same movement may be imparted by connection to a moving part of the printing or ruling machine. The gear-wheel 23 is mounted upon the driving-shaft 24, which may be driven in any suitable manner, as by a pulley upon the end opposite to that of the gear or by a gear 58 on the driving-shaft 59.

Upon the inner end of the bar 19 is mounted the pawl 25, which is moved by the spring 27, mounted upon the upper end of the pin 29, by coming in contact with the pin 26 upon the end of the arm 28. It will be noticed that when said pin 26 is in its lowered position, as shown in Fig. 6, the spring will be pressed so as to rotate the pawl in a clockwise direction to engage the same with the teeth of the wheel. It is evident that this will occur only at the end of the stroke of the oscillating arm, the pawl remaining in engagement with the teeth until the end of the next stroke.

The means for raising and lowering the pin 26 into and out of the path of the spring 27 is arranged as follows: Upright posts 30 are provided at each side of the machine upon the rectangular frame, to which posts is adjustably secured the cross-bar 31. This cross-bar carries suitable bearings 32, which support two transverse horizontal shafts 33 and 34. The upper of these shafts carries the above-mentioned arm 28 at one end and at its opposite end the crank-arm 35. A curved arm 36, fixed to the cross-bar 31, serves as a support for the pivoted block 37, which carries at its lower end the roller 38. Rigidly fixed to the pivoted block 37 is a rod or lever 39, which extends upwardly a sufficient distance to give considerable motion to its upper end when the block and roller 38 are moved a slight distance. The upper end of the lever 39 is connected with the crank-arm 35 by the link 40. It will now be noticed that when the surface of the pile of paper articles being operated upon becomes slightly lowered or otherwise changed in relation to the table the roller will also be moved, and through its connection with the arm 28 will lower the pin 26 into the path of the spring 27. The pawl is thereby thrown into engagement with the teeth of the wheel 16, which through the oscillating movement of the arm 19 rotates said wheel a sufficient amount to raise the table 6 to a higher position, thereby disengaging the pin 26 from further contact with the spring 27.

In regard to the pneumatic separating and lifting device and its coöperating spring guide-plate special attention is called to Fig. 5, the parts of which are particularly described as follows: Upon the outer end of the shaft 33, above mentioned, is fixed a cam-arm 41, which rests upon the upper surface of the oscillating arm 19. By means of the offset and inclined portion 42 of said arm 41 the same is raised and lowered according to the stroke of the oscillating arm 19. Upon the inner end of said shaft 33 is fixed the block 43, which carries the tube 44 and adapts the latter to be rotated about the axis of the shaft 33. One end of this tube 44 is curved downwardly to within a short distance of the surface of the upper sheet of the pile being operated upon. The opposite end of said tube is connected with any suitable vacuum device or exhausting apparatus, whereby a suction or partial vacuum is maintained in said tube. When the arm 41 is in its lowered position, the end of the tube 44 is in close proximity to the upper sheet, and as the end is raised said sheet is drawn upwardly, owing to the suction of the tube, until said sheet comes in contact with the cords 45, carried by the roller 46 and the shaft 47. These cords arrest further movement of the sheet and cause the latter to be disengaged from the end of the tube. Just before the sheet is disengaged from the end of the tube a reciprocating plate 4 is moved forward and comes beneath the raised sheet. In its continued forward movement said plate 4 is forced beneath the roll 48 and the shaft 47, and thereby presses the sheet against said roll. This roll 48 turns in a clockwise direction, and so forces the sheet forward over the plate 4 and beneath the cords 45 until the roll 46 is reached. Directly beneath the roll 46 is a grooved roll 49, over which run several flexible carrying-bands 50, a similar roll 51 being provided at the outer end of the machine. The bands 50 bear against the lower side of the roll 46, so that when the sheet has reached the same it is caught and forced forward upon the bands, and thereby carried to the end of the machine and to the printing and ruling mechanism. The guide-plate 4 is reciprocated by means of a suitable lever 52, pivoted at the lower part of the machine and operated by means of a cam 53 upon the cam-shaft 54, the cam-shaft in this instance being the main gear-shaft 24. The guide-plate 4 is withdrawn from beneath the roll 48 immediately after the sheet has passed said roll and has engaged the carrying-bands 50.

In order to hold the guide-plate 4 in position, it runs in a shallow groove in the roll 49, while its outer end is supported upon the end of the lever 52 and retained in position thereon by means of the pin 55, which is retained loosely in a recess in the plate 4 by the spring 56′.

Suitable gears 56 and 57 are provided for rotating the rolls 49 and 48, respectively.

Minor changes in detail and arrangement of parts which would be self-suggestive to one skilled in the art may be made without departing from the spirit of my invention. For example, the machine may readily be arranged so that the pile may be made to move horizontally and the sheets fed upwardly or downwardly in a vertical direction. I do not wish to be limited to the exact details of construction herein set forth; but,

What I do claim as my invention, and desire to protect by Letters Patent, is—

1. An automatic feed mechanism, comprising in combination, a suitable supporting-table, a suction-tube for successively separating individual sheets of material to be operated upon, a reciprocating spring-plate adapted to be inserted between said sheet and the pile of sheets, traveling bands or cords placed above said plate and adjacent to said tube to withdraw the sheet from the end of the suction-tube and to carry the same to the end of the delivering means, and means for delivering said sheet to a printing or similar machine, substantially as described.

2. An automatic feed mechanism comprising in combination, a suitable supporting-table, a suction-tube for successively separating individual sheets of material to be operated upon, a reciprocating spring-plate adapted to be inserted between said sheet and the pile of said sheets, traveling bands or cords for withdrawing the sheet from the end of the suction-tube, a stationary roller beneath which the reciprocating plate is adapted to be forced to grip the separated sheet and give the same a forward movement and means for delivering said sheets to a printing or similar machine, substantially as described.

3. An automatic feed mechanism comprising in combination, a suitable supporting-table, a suction-tube for successively separating individual sheets of material to be operated upon, a reciprocating spring-plate adapted to be inserted between said sheets and the pile of sheets, a stationary roller beneath which the reciprocating plate is adapted to be forced to grip the separated sheet and to give the same a forward movement, traveling bands or cords for withdrawing the sheet from the end of the suction-tube, a second roll over which said bands run, a pair of grooved rolls and longitudinal carrying-bands connecting said rolls and contacting with the second roll above mentioned, substantially as described.

4. An automatic feed mechanism, comprising in combination, a suitable supporting-table, a suction-tube for successively separating individual sheets of material to be operated upon, a reciprocating spring-plate adapted to be inserted between said sheets and the pile of sheets, a cam for operating said reciprocating plate, a stationary roller beneath which the reciprocating plate is adapted to be forced to grip the separated sheet and to give the same a forward movement, a shaft supporting said roller, a second roller, cords or bands running over said second roller and said shaft, a pair of grooved rolls and longitudinal carrying-bands connecting said rolls and contacting with the second roller above mentioned, substantially as described.

5. An automatic feed mechanism, comprising in combination, pneumatic means for successively separating individual sheets of material to be operated upon, means for delivering said sheets to a printing or similar machine, an adjustable table adapted to be moved toward the separating means, a movable roller in contact with the surface of the pile of sheets, a movable stop, connections between said stop and said roller, screw-shafts carrying and adapted to change the position of said table, a reciprocating part, a ratchet-wheel mounted upon one of said screw-shafts, connections between said screw-shafts, a pawl carried by said reciprocating part, a spring carried by said pawl, adapted to throw into operation said ratchet-wheel and screw-shafts and to be controlled by said stop, substantially as described.

6. An automatic feed mechanism, comprising in combination pneumatic means for successively separating individual sheets of material to be operated upon, means for delivering said sheets to a printing or similar machine, an adjustable table adapted to be moved toward said separating means, a movable roller in contact with the surface of the pile of sheets, a movable stop, connections between said stop and said roller, screw-shafts carrying said table, an oscillating bar, a pawl carried by said oscillating bar, a spring adapted to move said pawl, a ratchet-wheel upon one of said screw-shafts, the arrangement being such that when the stop is moved into the path of the spring the pawl will engage the ratchet-wheel at the end of one stroke of the bar and thereby communicate motion to the adjustable table through the screw-shafts, substantially as described.

7. An automatic feed mechanism, comprising in combination, a suitable supporting-table, a suction-tube for successively separating individual sheets of the material to be operated upon, a reciprocating spring-plate adapted to be inserted between said sheet and the pile of sheets, a stationary roll beneath which said plate is adapted to be forced, bands for withdrawing the sheet from the end of the suction-tube and for carrying the same to the delivering means, a shaft upon which said suction-tube is mounted, a cam-arm for oscillating said shaft and tube for raising and lowering the open end of the latter, an oscillating ratchet-bar coöperating with said cam-arm and means for delivering the sheets to a printing or similar machine, substantially as described.

In witness whereof I have hereunto set my hand this 26th day of December, A. D. 1901.

WILLIAM G. JOHNSTON.

Witnesses:
JNO. T. CROSS,
ARTHUR E. NITZSCHE.