

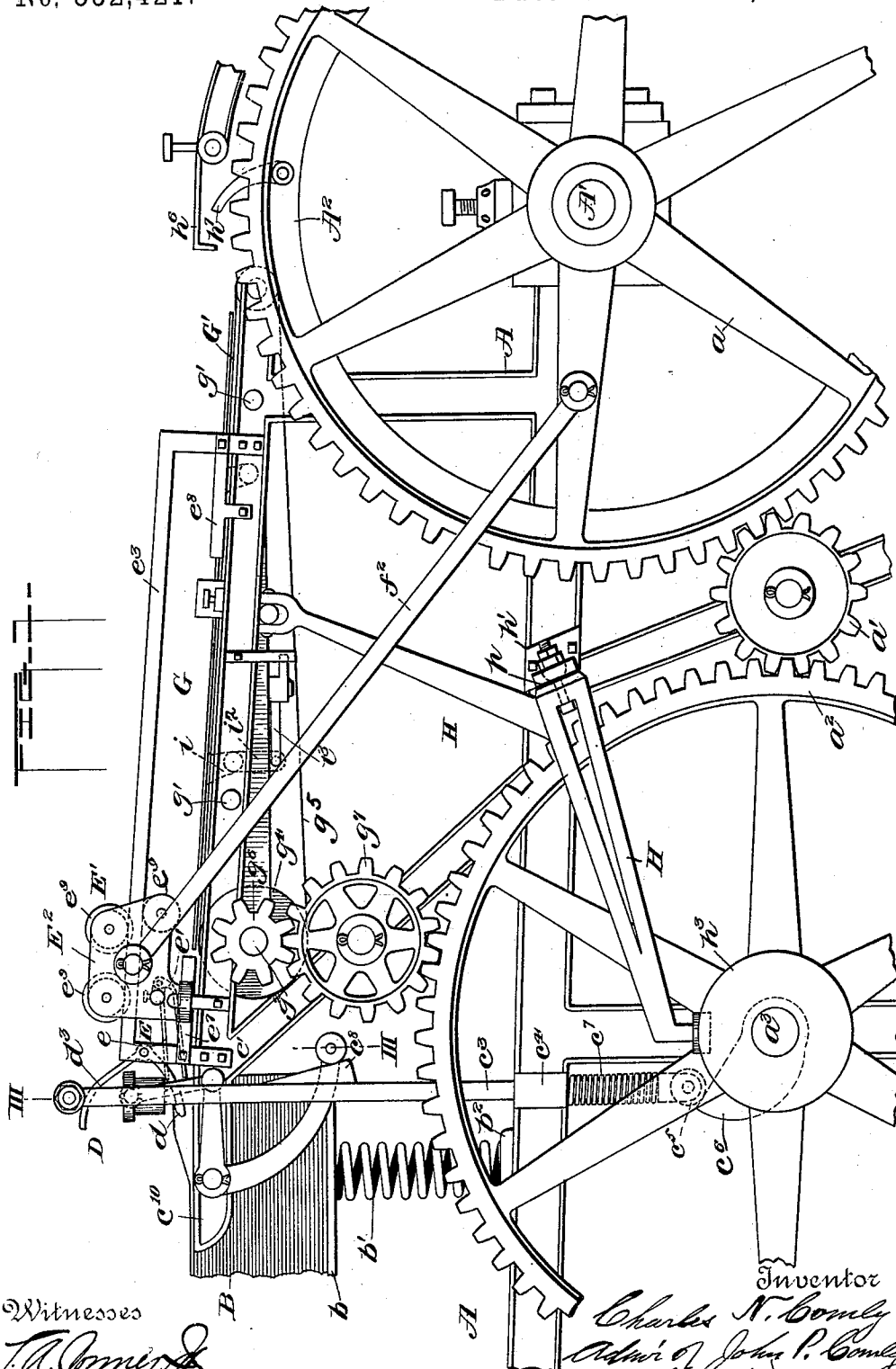
No Model.)

4 Sheets—Sheet 1.

J. P. COMLY, Dec'd.
C. N. COMLY, Administrator.
PAPER FEEDING MACHINE.

No. 552,421.

Patented Dec. 31, 1895.



Witnesses
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Chas. E. Riordan

Inventor
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By *Buttsworth & Dowd*
his Attorney.

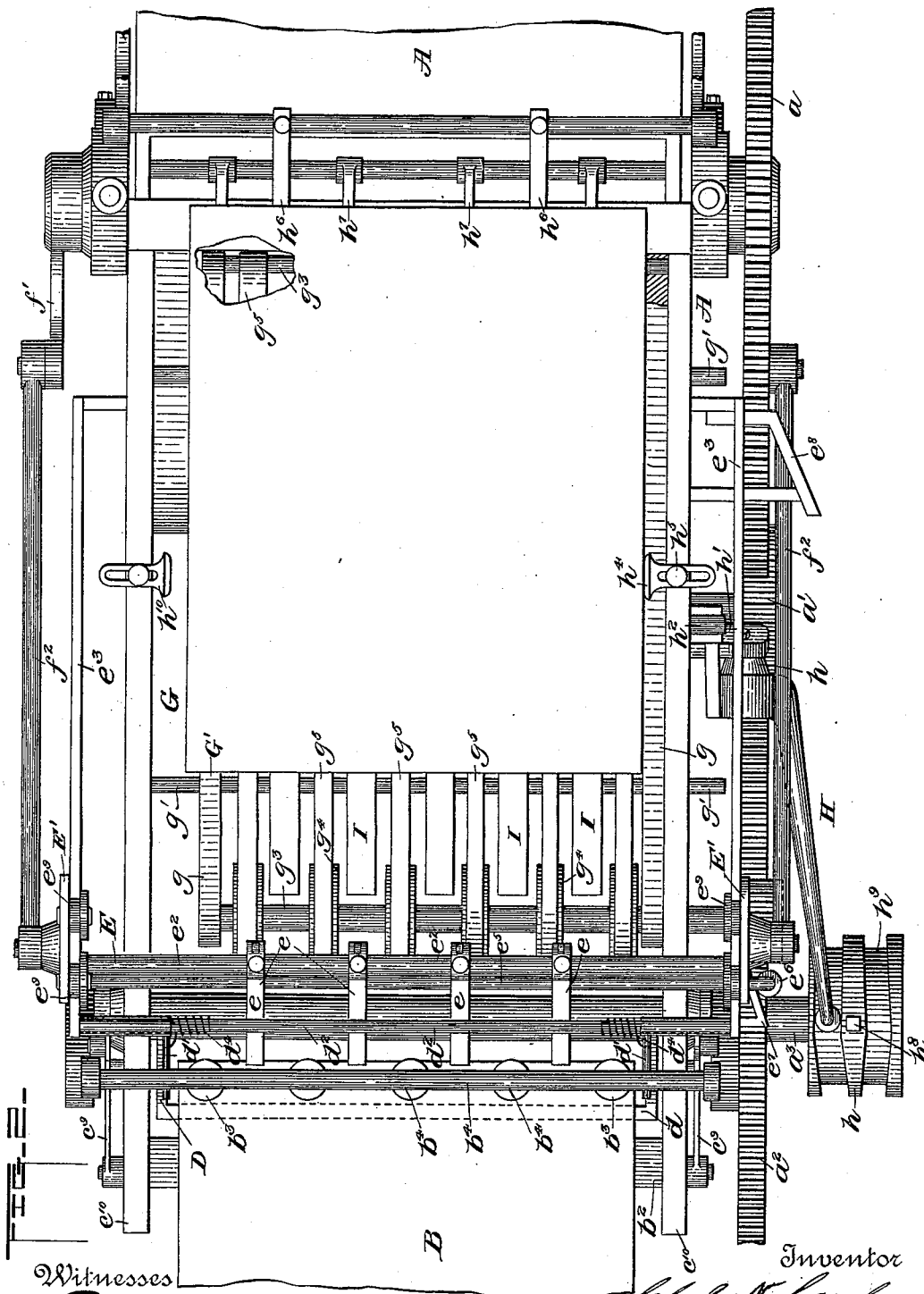
(No Model.)

4 Sheets—Sheet 2.

J. P. COMLY, Dec'd.
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PAPER FEEDING MACHINE.

No. 552,421.

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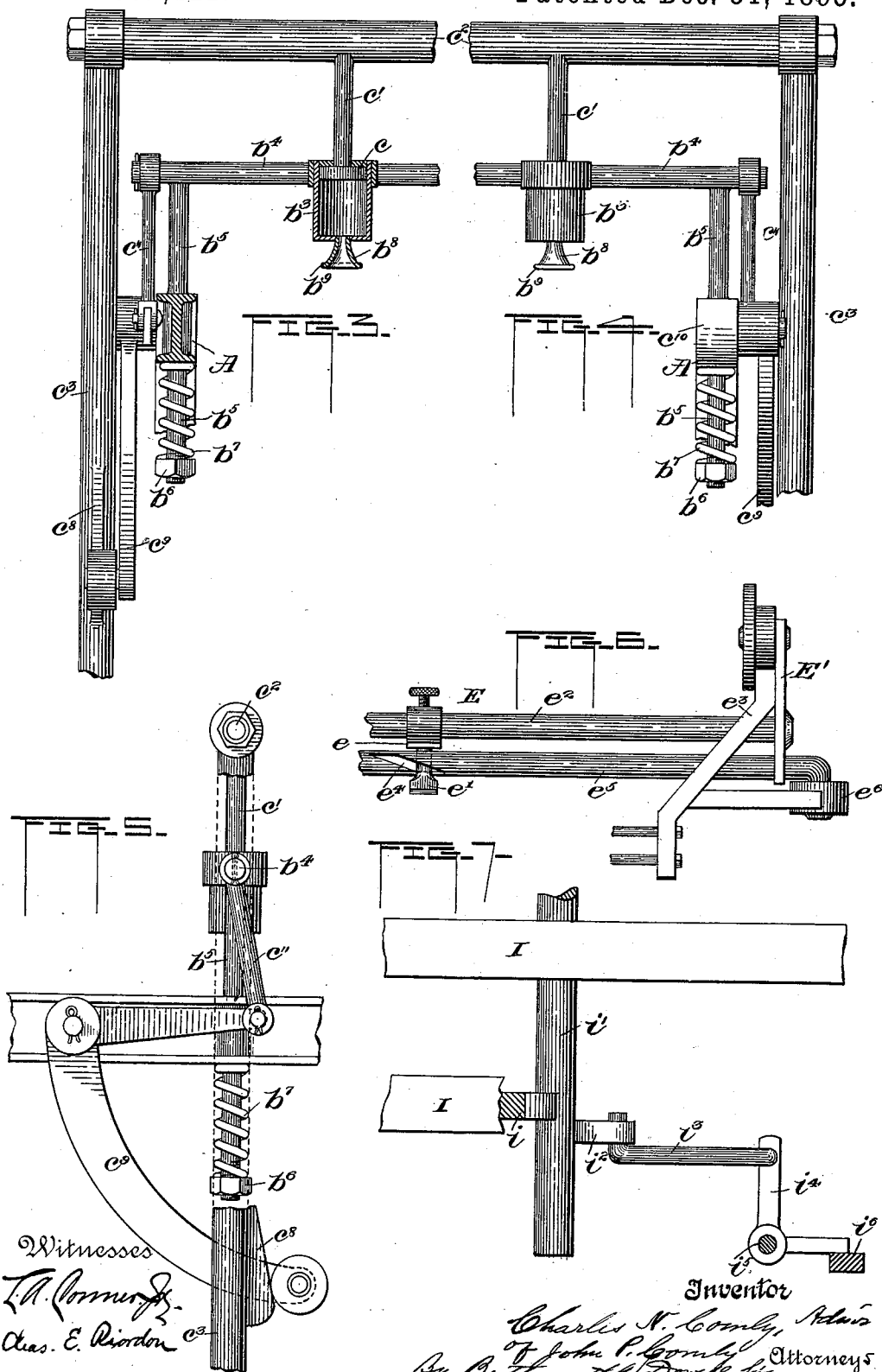
(No Model.)

4 Sheets—Sheet 3.

J. P. COMLY, Dec'd.
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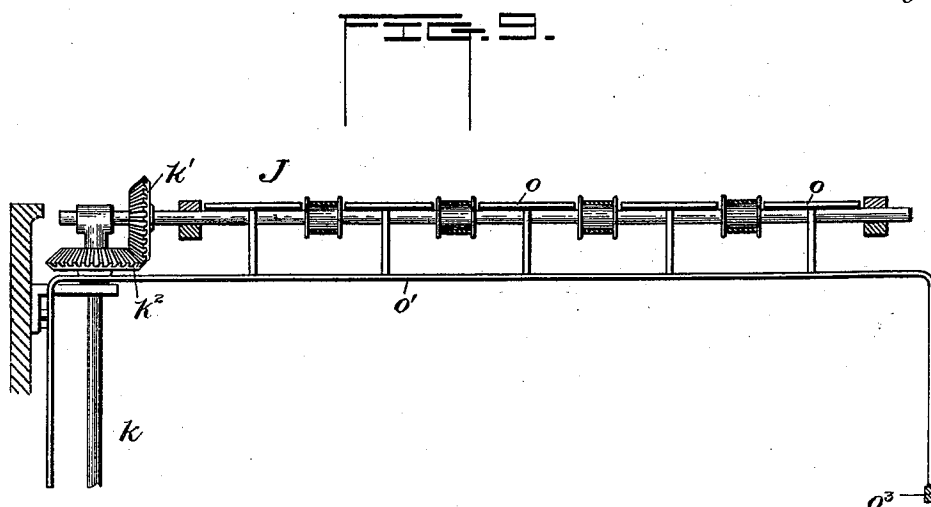
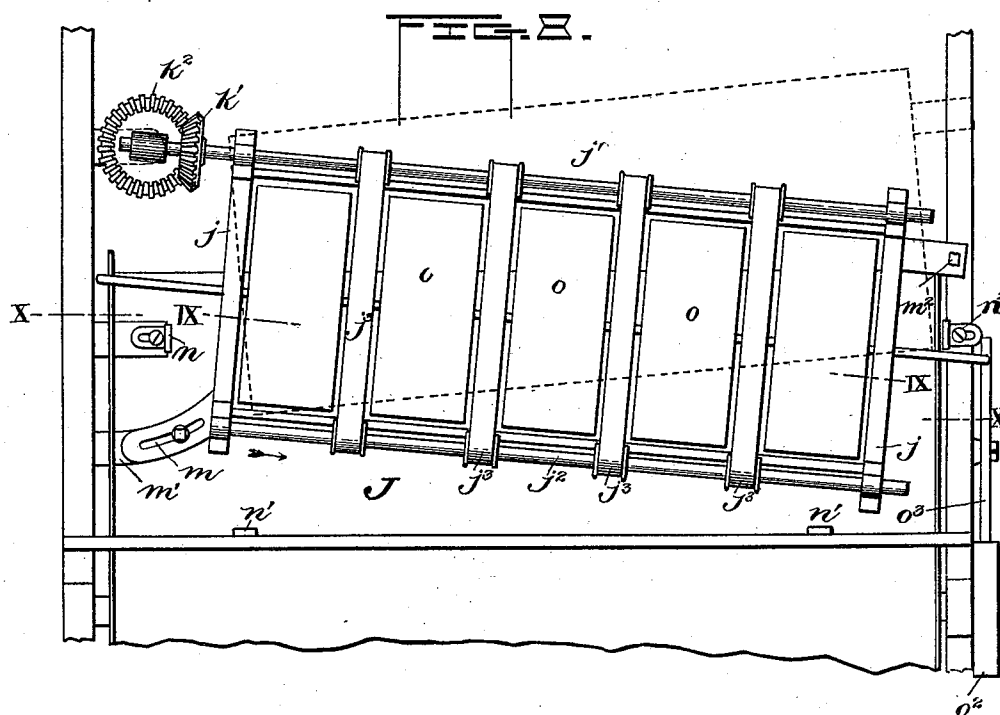
Patented Dec. 31, 1895.



4 Sheets—Sheet 4.

No. 552,421.

Patented Dec. 31, 1895.



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UNITED STATES PATENT OFFICE.

CHARLES N. COMLY, ADMINISTRATOR OF JOHN P. COMLY, DECEASED, OF
LEBANON, OHIO, ASSIGNOR OF ONE-FOURTH TO SAMUEL W. PROBASCO,
OF SAME PLACE.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 552,421, dated December 31, 1895.

Application filed December 18, 1894. Serial No. 532,194. (No model.)

To all whom it may concern:

Be it known that I, CHARLES N. COMLY, a citizen of the United States, residing at Lebanon, in the county of Warren and State of Ohio, administrator of the estate of JOHN P. COMLY, deceased, late of Lebanon, in the county of Warren and State of Ohio, do hereby declare the following to be a full, clear, and exact description of the invention of the said
10 JOHN P. COMLY of an Improvement in Automatic Feeding and Registering Machines, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a machine for automatically feeding and registering single
15 sheets of paper, but more particularly to registering and feeding sheets of paper to a printing-press.

The primary object of the invention, is to
20 provide means whereby a single sheet of paper may be taken from a pile and properly conveyed to the gages of a printing-press or other machine, to provide means for properly registering or aligning the sheet before leaving the feeding-machine, to provide means
25 whereby uniformity of the margins may be preserved when it is desired to print both sides of the sheet, and to provide means by which the different mechanisms may be operated from a single source of power.

A further object of the invention is to provide a simple, efficient and durable machine which may be used in connection with folding, ruling, envelope and other machines of
30 various designs.

With these and other objects in view the invention consists in the construction and combination of the several parts, as will be more fully hereinafter described, and then
40 more particularly defined in the claims at the end of the description.

Referring to the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation, partly broken away, illustrating the machine as applied to a printing-press. Fig. 2 is a plan view. Fig. 3 is a fragmentary sectional elevation on the line III
45 III of Fig. 1 of the paper-lifting mechanism. Fig. 4 is a fragmentary rear elevation of the paper-lifting mechanism. Fig. 5 is a side ele-

vation of the mechanism illustrated in Figs. 3 and 4. Fig. 6 is a fragmentary view illustrating the means for operating the grippers which convey the sheet after it has been raised from the pile to the registering device. 55 Fig. 7 is a fragmentary plan view showing the mechanism for raising the sheet off the traveling belts after it has been properly registered. Fig. 8 is a plan view of a modified form of registering or sheet-aligning device, 60 and Fig. 9 is a sectional view on the line IX IX of Fig. 8.

In the drawings, A may designate a frame of any preferred construction provided with suitable bearings in which is journaled the 65 shaft A', to which the press-cylinder A² is secured. On the outer end of this shaft is the master gear-wheel a, which engages an intermediate spur-gear a', which in turn meshes with the gear a², the latter being secured to 70 the shaft a³, which extends transversely of the machine and is journaled in the frame A.

The paper B is placed upon a table b, beneath which is arranged a series of springs b', supported upon the seat b², the said seat 75 being secured to the frame in any approved manner. These springs tend to raise and keep the pile of paper in its proper position, so that a single sheet may be raised by the lifting mechanism. This mechanism may be of 80 any suitable construction; but it is preferable to employ a series of cylinders or exhausts b³, which are located at intervals transversely of the machine, and which are suitably supported upon the cross-rod b⁴, the latter having depending stems b⁵, which pass through 85 apertures in the frame A. The stems have nuts b⁶ on the ends thereof and spiral springs b⁷ surrounding said stems below the frame-beam, which normally press the stems downwardly, the tension of the springs being varied at will by simply turning the nuts. The cylinders b³ have each an open funnel-shaped mouthpiece b⁸, the bottom of which is covered with rubber b⁹ or other elastic substance 95 which may cause the sheet of paper to adhere to the surface of said mouthpiece.

Within the cylinder are arranged plungers c secured to the ends of rods c', which depend from a cross-rod c², the said cross-rod 100

being secured to the upper ends of the vertically-movable rods c^3 . These rods are arranged on opposite sides of the machine and pass through brackets c^4 arranged on a portion of the frame, and are provided on their lower ends with antifriction-rollers c^5 , which abut against the edge of the cams c^6 secured to the shaft a^3 , by which the rods are raised. The springs c^7 which surround the lower ends of the rods serve to keep the rollers in constant contact with the cams and to return the plungers of the exhausts after they have been raised. The rods c^3 , above the brackets c^4 , are provided with cams or cam-surfaces c^8 which contact with antifriction-rollers arranged on the lower ends of bell-crank levers c^9 , which are pivoted to projecting portions c^{10} of the frame, the said bell-crank levers being connected at their other ends with the cross-bar b^4 by the pitmen c^{11} . It will be seen by this construction that as the plungers are raised to cause a suction in the cylinders to lift the forward edge of a sheet of paper from the pile the cylinders will also be raised, but at a slower speed, and after a partial movement of the plungers, so that the edge of the sheet is not only lifted by the suction created in said cylinders, but is carried by the same a proper distance to be held in position to be conveyed to the registering device.

The sheet being raised from the pile of paper by the action of the exhausts, the rock-bar D by means of the leaf d , which now passes under the edge of the sheet, will hold the same in a raised position and prevent the sheet as it is withdrawn from disturbing the other sheets of the pile. This leaf d is secured to or formed integral with the angular levers d' , which are loosely mounted upon the stay-rod d^2 , the said bell-crank levers having the arms d^3 arranged in the path of movement of the cross-rod c^2 , which operates the plungers, and are retained in contact therewith by springs d^4 . The springs d^4 surround and have one of their ends secured to the stay-rod or brace d^2 and their other ends passed under the arms so as to normally raise the leaf d , while the downward movement of the cross-rod c^2 , caused by the recoil of the springs c^7 , will move the rock-bar on its pivot, throwing the leaf out of the path of the next sheet of paper after the one raised has been taken to the registering or aligning device.

As the rock-lever D holds the sheets, the grippers E, comprising the jaws e and e' , which are pivotally connected together, grasp the forward edge of the sheet of paper to remove the same from the pile. The jaw e of each gripper is secured by a set-screw or otherwise to a cross-bar e^2 , which connects the frames or end pieces E' of the carriage E^2 arranged to travel back and forth upon the tracks e^3 , which are located above and secured to or formed integrally with the frame A. The lower jaw e' has its end passed through a cam-slot e^4 of the reciprocating rod e^5 , which has its ends mounted in the frames

of the carriage. This reciprocating rod has a roller e^6 journaled upon the end of said rod and arranged in the path of the cams e^7 and e^8 located at the rear and fore parts respectively of the frame and extending outwardly therefrom, whereby the grippers may be closed as the carriage moves rearward to grasp the sheet and opened when moving forward, so that the sheet may be taken from the pile to be properly registered. This carriage E^2 may be of any suitable construction, but it is preferable to use the frames E' , before referred to, on which are journaled the antifrictional rollers or wheels e^9 , which embrace the upper and under sides, respectively, of the tracks e^3 and serve to guide the carriage thereon, the said carriage being connected to the master-wheel a and the crank f' secured to the shaft A' on opposite sides of the machine by the pitmen f^2 , by which the said carriage is caused to move back and forth as the shaft A' rotates.

For registering or aligning the paper before being taken by the grippers of the press-cylinder there is provided a registering device G, comprising a table G' having the side beams $g g$, secured together by the bars $g' g'$, which are of sufficient length to permit said table to reciprocate transversely of the frame, through which the ends of bars $g' g'$ pass. The said table having the shafts $g^2 g^3$ journaled in the ends of the beams and provided with a series of grooved pulleys g^4 around which are endless belts g^5 , which tend to convey the sheet forward after the same has been dropped onto the table by the carriage E^2 . The shaft g^2 of the table is rotated by the gear g^6 , secured to the outer end of said shaft, which is in mesh with the spur-gear g^7 that in turn meshes with the gear a^2 , the face of the gear g^6 being of sufficient length to permit the table to reciprocate back and forth and yet be constantly rotated. This table is reciprocated by the angular rock-lever H, which has a knuckle-joint or other suitable connection h with a bracket h' extending outwardly from the frame A. The upper end of the rock-lever is pivotally secured to a stud h^2 which passes outwardly from the table G' through an aperture in the frame, and has its other end provided with a roller which enters a groove in the double-acting cam h^3 which is secured to the outer end of the shaft a^3 , so that as said shaft rotates the lever H will be rocked on its pivot, thereby moving the table according to the direction of the movement of said lever. In the position shown, the table and sheet have moved toward the gage h^4 which is secured to the frame and is adjustably held thereon by the set-screw h^5 , the sheet in the meantime being carried forward by the endless belts g^5 to the front gages h^6 , thereby placing the sheet in its proper position.

When the sheet arrives at the front and side gages and is properly registered, it is necessary that the sheet should become sta-

tionary, and to effect this plates I are arranged between the tapes provided with depending arms i , which are secured to or formed integrally with a shaft i' journaled in and reciprocating with the table G'. The shaft i' is provided with depending arms i^2 near the opposite ends of said shaft, which connect, by the pitmen i^3 , to the bell-crank levers i^4 pivoted to studs i^5 arranged on the table G', the outer end of said bell-crank levers being arranged to contact with the stops i^6 depending from the frame, as best shown in plan in Fig. 7. This mechanism is arranged on opposite sides of the machine, so that the sheets will be lifted off the endless tapes or belts g^5 whether the table moves to one side or to the other. At the time the sheets are lifted the gages h^6 are raised in any approved manner, and the grippers h^7 of the press-cylinder take the sheet to be printed in the usual and well-known manner.

The operation of the machine will be readily understood from the foregoing description. It will be seen when the sheets are arranged as shown, and the machine started, that as the plungers of the exhaust or cylinders b^3 are raised, as heretofore explained, the forward edge of the top sheet will be lifted, at which time the rock-bar D will be pressed upwardly by the springs d^4 to hold the sheet in this position. The carriage E² by its operating mechanism then moves rearwardly and causes the gripper E to grasp the edge of the paper which is withdrawn from the pile as the carriage moves forward till the roller e^6 contacts with the cam e^8 . This reciprocates the rod e^5 oppositely to the other movement, thereby opening the gripping-jaws e' , causing the sheet to be dropped upon the table G', which is now moving transversely of the machine to the side gage, as the endless belts g^5 carry the sheet forward to the front gages. The sheet is now lifted off the tapes by the plates I and their operating mechanism, and the front gages h^6 raised so that the grippers h^7 may take the sheet to be printed. After the sheet has been printed on one side it is sometimes desirable to print the same on the other side yet preserving uniformity of the margins. In this case the sheets of paper already printed are turned end for end and placed on the table b similar to the pile B. The cam h^3 , which is secured to the shaft a^3 by the set-screw h^8 , is moved so that the cam-groove h^9 will be engaged by the end of the rock-lever H, and as this groove is oppositely arranged to the other groove of said cam the table G' will consequently be reciprocated in the other direction or toward the side gage h^{10} , carrying the sheets in that direction. The operation of the machine, with the exception of the direction of movement of the table G', is the same as heretofore explained.

Instead of providing a registering device, as G, there may be used in some instances, such as

shown in Figs. 8 and 9. Here the table J is arranged to be placed at different angles, so that the sheet instead of being carried bodily to one side of the machine to be aligned or registered is made to travel obliquely by the belts j^3 to the respective side and front gages. This table has the side beams j , in which are journaled the pulley-shafts j' j^2 , having the tapes j^3 passing around said pulleys. The shaft j' is pivotally mounted on the end of an upright shaft k and has a miter-gear k' in mesh with a similar gear k^2 near the upper end of the upright shaft, by which the shaft j' is rotated. The table is supported on the frame in any suitable manner, and for this purpose there may be provided an arc m extending outwardly from one of the beams of said table which is adapted to be secured to a bracket m' on the frame when the table is shifted to vary the angle of the same. From the other beam of the table extends a projection provided with a set-screw m^2 , which engages the frame according to the position of the table, and further serves to support said table upon the frame. In the position shown in full lines the sheet of paper will travel toward the side gage n and front gages n' n' , while if the table should be shifted to the position shown by dotted lines the paper would then travel toward the side gage n^2 and front gages n' n' . By this arrangement the sheet may be properly registered or aligned and printed on both sides of the sheet, still retaining uniformity of the margins. The sheet of paper may be conveyed to the table by mechanism such as described in the other figures, and the sheet may be raised off the traveling belts by the plates o , which are connected to a vertically-movable rod o' . This rod is operated by the cam o^2 secured to the cylinder-shaft and the rock-lever o^3 pivoted to the frame, or the said rod may be operated in any other approved manner. The paper in this case is taken from the plates o in the manner heretofore described.

The atmospheric exhausts and pistons may be secured to their respective cross-rods in such manner as to be capable of being moved transversely thereof in order that they may be massed to lift sheets of paper of greater weight, and may be so constructed that two or more can be used in accordance with the size of sheet to be raised. Instead of the exhausts raising and lowering, the pile of paper may be caused to raise and lower by means of cams.

Other means than the pneumatic devices shown may be employed for separating the sheet of paper from the pile, and instead of rock-lever H for reciprocating the registering-table a bell-crank lever having one of its arms in the path of movement of a vibrating or other movable lever may be employed. Other changes of a substantially like character may be made, if so desired, without departing from the spirit of the invention.

Having thus fully described the invention, what is claimed as new, and desired to be secured by Letters Patent of the United States, is—

1. In a feeding machine, the combination with means for separating sheets of paper from a pile, of a registering table; said table being arranged to convey the paper to a side gage located on either side of the machine and to simultaneously advance the sheet to front gages, mechanism for conveying the separated sheets to said registering table, means for changing the direction of movement of the paper to either side of the machine, together with mechanism carried by the table for raising and holding the sheet stationary after being registered, whereby the sheets may be properly aligned and printed on both sides while preserving uniformity of the margins, substantially as described.

2. In a feeding machine, the combination with means for forwarding sheets of paper from a pile, of a reciprocating table which receives said sheets and carries the same to a side gage, mechanism carried by said table for simultaneously and continuously advancing the sheet to front gages, together with means for giving movement to said table, substantially as described.

3. In a feeding machine, the combination with means for separating sheets of paper from a pile, of a registering table, mechanism for conveying the paper to said registering table; said table being arranged to convey the paper to a side gage located on either side of the machine, means carried by the table for simultaneously and continuously advancing the sheet to front gages, together with means for changing the direction of movement of the paper to either side of the machine, whereby the sheets may be printed on both sides while preserving uniformity of the margins, substantially as described.

4. In a feeding machine, the combination with a frame, and means mounted thereon for raising the edge of a sheet of paper, of a carriage comprising two end-pieces located on opposite sides of the machine and suitably connected together by braces; said carriage extending transversely of the frame and arranged to travel back and forth thereon, grippers mounted on said carriage adapted to grasp the raised sheets, a rod slidingly held in the frames and engaging one member of each gripper to raise or lower the same, cams arranged on the frame at the rear and fore parts thereof and in the path of travel of said carriage for operating the grippers, together with means for moving the carriage, substantially as described.

5. In a feeding machine, the combination with a support, of a carriage comprising two end-pieces located on opposite sides of said support and suitably connected together by braces and adapted to travel back and forth on said support, grippers comprising two members mounted on the carriage, a rod slid-

ingly held in the frames and engaging one member of each gripper to raise or lower the same, together with means for operating the rod, substantially as described.

6. In a feeding machine, the combination, with a frame and a track arranged on each side thereof, of a carriage adapted to grasp the edge and convey a raised sheet of paper forward; said carriage comprising end-pieces suitably connected together by rods and provided with anti-frictional rollers embracing the upper and the under sides of said tracks, grippers comprising two members mounted on said carriage adapted to grasp the forward edge of a raised sheet, a rod slidingly held in the end-pieces and engaging one member of each gripper to raise or lower the same, together with means for operating the rod, substantially as described.

7. In a feeding machine, the combination with mechanism for raising sheets of paper from a pile, of a rock-bar for holding the sheet raised, springs for causing the rock-bar to engage the under side of the raised sheets; said rock-bar being arranged in the path of movement of the sheet-lifting mechanism so as to be lowered by and simultaneously with said mechanism to permit a sheet to be raised by the sheet-lifting mechanism after the preceding sheet has been carried forward and separated from the pile, substantially as described.

8. In a feeding machine, the combination with vertically movable mechanism for raising sheets of paper from a pile, of a rock-bar for holding the sheet raised, means for causing the rock-bar to engage the under side of the raised sheets; said rock-bar being arranged in the path of movement of the sheet-lifting mechanism, so as to be lowered by and simultaneously with said mechanism to permit a sheet to be raised by the sheet-lifting mechanism after the preceding sheet has been carried forward and separated from the pile, substantially as described.

9. In a feeding machine, the combination with means for forwarding sheets of paper toward a front gage, of a table reciprocating transversely to the path of movement of said sheets to simultaneously carry said sheets to front and to side gages, and means carried by said table for raising and holding the sheet stationary, substantially as described.

10. In a feeding machine, the combination with means for forwarding sheets of paper toward a front gage, of a table reciprocating transversely to the path of movement of said sheets to carry said sheets to a side gage, a right and left cam, together with means connected to the table and operated by said cam so as to move said table either to one side or to the other at the proper time with respect to the forward movement of the sheets, whereby the said sheets may be printed on both sides while preserving uniformity of the margins, substantially as described.

11. In a feeding and registering machine,

the combination with means for forwarding the sheets toward front gages, of a transversely reciprocating table for conveying the sheet to a side gage, means for reciprocating said table together with mechanism carried by said table for raising the sheet and holding the same stationary after the same has been registered, substantially as described.

12. The combination with a frame, of a series of open-ended cylinders arranged transversely thereof, pistons working in said cylinders, means for operating the pistons, together with means for simultaneously raising the cylinders at a slower speed than the movement of the pistons, substantially as described.

13. In a feeding machine, a pneumatic sheet lifting device comprising a series of open-ended cylinders, pistons working in said cylinders, a cross-rod secured to the stems of the pistons, a second cross-rod secured to the cylinders, and means for vertically moving the two cross-rods, whereby the pistons and cylinders may be simultaneously raised but at different speeds, substantially as and for the purpose described.

14. In a machine of the character described, a registering device comprising a transversely reciprocating table mounted upon a suitable frame, the said table having a series of belts traveling transversely to the movement of the table, means for giving movement to the belts,

and means for reciprocating the table, substantially as described.

15. In a feeding and registering machine, the combination with means for conveying a sheet of paper forward, of a reciprocating table adapted to receive the sheet, traveling belts arranged on the table for conveying the sheet to a front gage, together with means for reciprocating the table to convey the sheets to a side gage, substantially as described.

16. In a feeding and registering machine, the combination with the transversely reciprocating table, of plates carried thereby and reciprocating with said table, together with means for raising said plates, substantially as described.

17. In a feeding and registering machine, the combination with a reciprocating table mounted upon a suitable frame, of a rock-shaft journaled in the table and carrying plates for raising a sheet of paper when placed upon the table, a bell-crank lever pivoted to said table and connected to the rock-shaft, together with means for operating the bell-crank lever, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES N. COMLY,
Administrator of John P. Comly, deceased.

Witnesses:

S. A. CHAMBERLIN,
S. W. PROBASCO.