

No. 799,349.

PATENTED SEPT. 12, 1905.

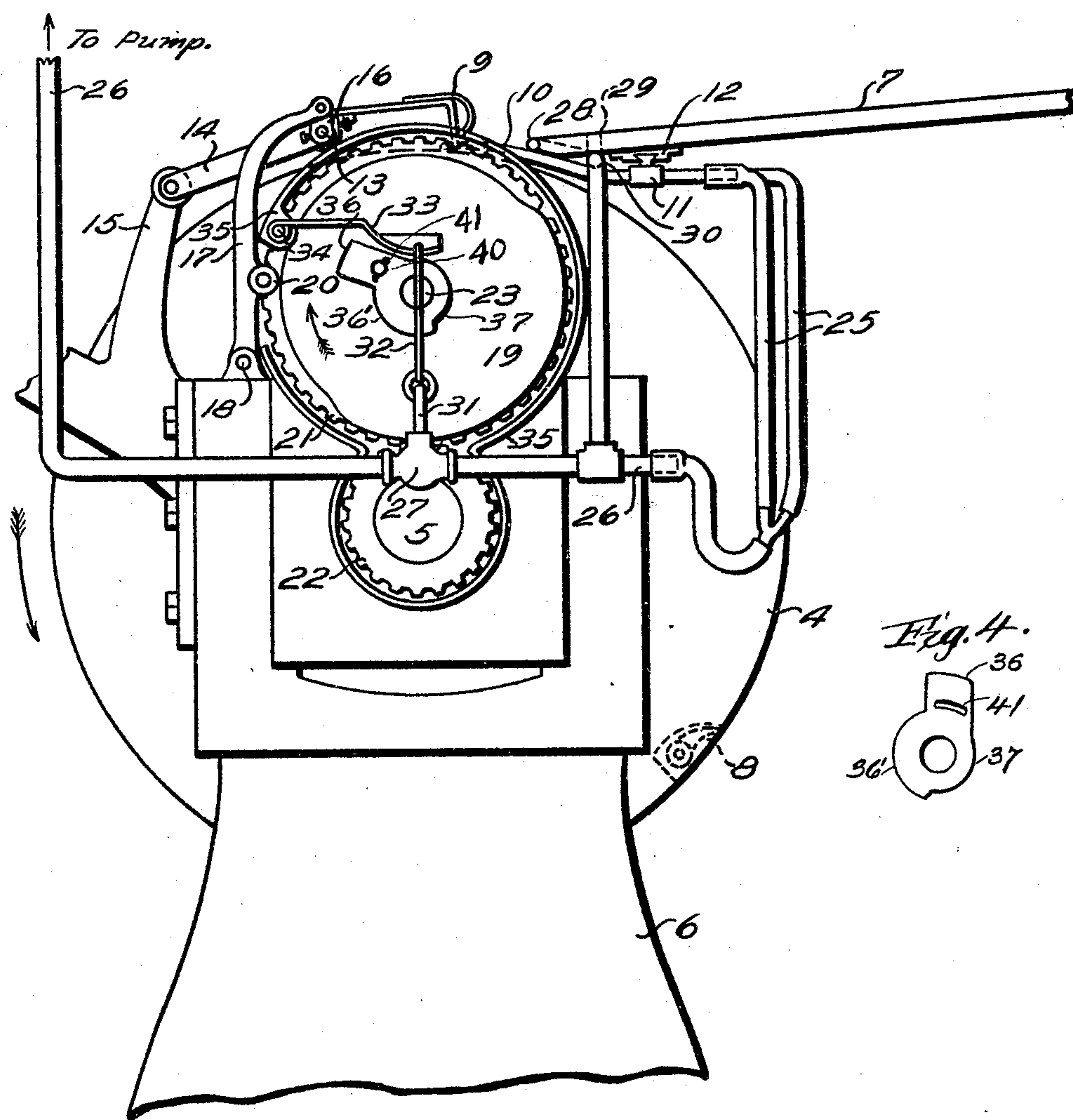
A. W. MASSEY.

VACUUM FEED CONTROLLING DEVICE FOR PRINTING PRESSES.

APPLICATION FILED NOV. 18, 1904.

2 SHEETS—SHEET 1.

*Fig. 1.*



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2 SHEETS—SHEET 2.

Fig. 2.

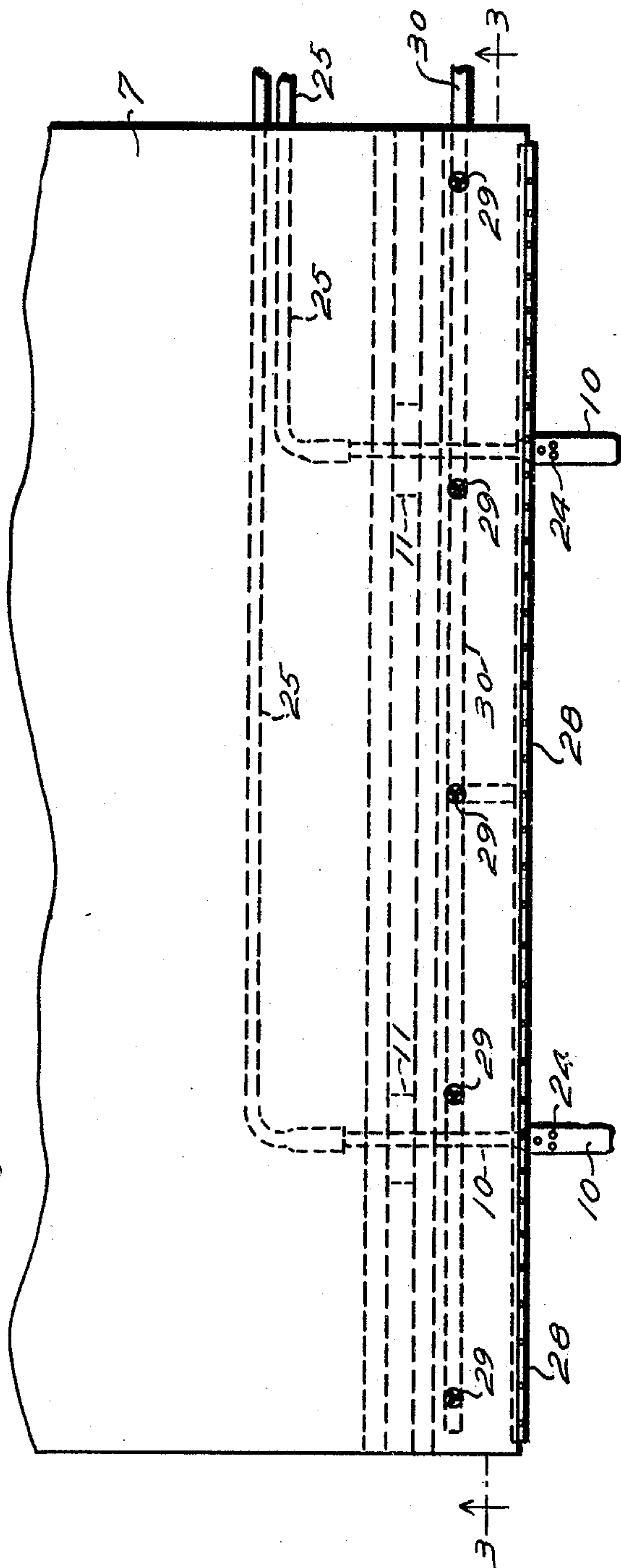
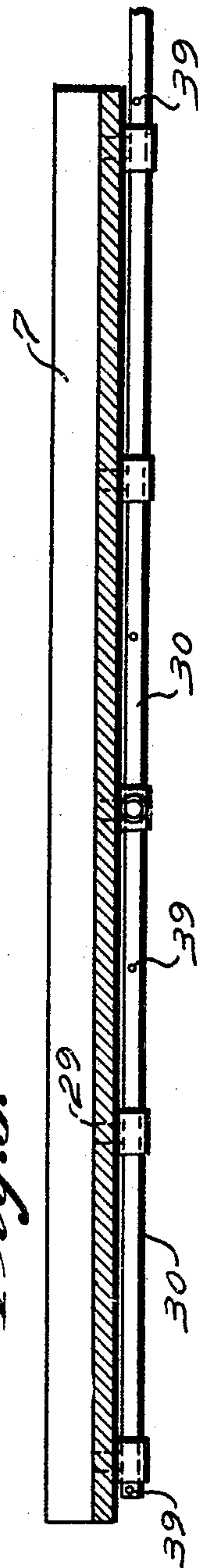


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## VACUUM FEED-CONTROLLING DEVICE FOR PRINTING-PRESSES.

No. 799,349.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed November 18, 1904. Serial No. 233,275.

*To all whom it may concern:*

Be it known that I, ALFRED W. MASSEY, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vacuum Feed-Controlling Devices for Printing-Presses, of which the following is a specification.

The main object of my invention is to provide improved means for controlling the delivery of sheets of paper to printing-presses to insure perfect register of the impressions and to provide simple and efficient means for preventing the shifting of a sheet of paper on the feed-table of a press when said sheet is released by the guides before being gripped by the feeding mechanism. I accomplish these objects by the device shown in the accompanying drawings, in which—

Figure 1 is an end view of the cylinder and feed-table of a printing-press provided with feed-controlling mechanism constructed according to my invention, such parts of the machine as have no direct relation to the subject-matter of this invention being broken away or omitted. Fig. 2 is a top plan of a portion of the feed-table of the same device. Fig. 3 is a section on the line 3 3 of Fig. 2. Fig. 4 is an enlarged view of the cam which controls the suction apparatus.

In general terms the objects of this invention are accomplished by providing suction-apertures in the feed-platform or a corresponding support and by means of vacuum apparatus communicating with said apertures securing a sheet of paper against movement upon the platform during a certain interval of time preceding the gripping of the paper by the grippers of the press. This vacuum control is susceptible of much more accurate adjustment than can be accomplished by mechanical means and may be arranged to hold the paper until the exact instant at which the same is gripped by the grippers and then by reduced suction insure an even feed.

In the construction shown in the drawings the printing-press is provided with a platen-cylinder 4, which is journaled on a horizontal shaft 5 in the supporting-frame 6. The feed-platform 7 of the press is inclined slightly from a horizontal position and is disposed tangentially of the cylinder 4 near the upper part of the same. The cylinder 4 is provided

with the usual grippers (indicated at 8) and which are operated by the usual mechanism. (Not shown in the drawings.)

The advancing edge of the paper which is fed to the cylinder from the platform 7 is guided by a pair of guide-fingers 9, which may be of any usual form and which rest on feed-tongues 10, which serve as a continuation of the platform and support the edge of the paper at points close to the surface of the cylinder 4. The tongues 10 are mounted on blocks 11, which are slidable in grooved guides 12, secured to the lower side of the table 7. The guide-fingers 9 are mounted on a shaft 13 and are adjustable along said shaft into positions of alinement with the tongues 10. The shaft 13 is journaled in a pair of arms 14, which are pivotally connected to the parts 15 of the frame at opposite ends of the cylinder. The shaft 13 has rigid thereon an arm 16, which is connected to an arm 17, pivotally mounted at 18 on the frame. The lifting of the guide-fingers 9 is accomplished by means of a cam 19, which engages the roller 20 on the arm 17 during a certain part of each revolution of the cam. The cam 19 is connected by gears 21 and 22 with the shaft 5 and makes one revolution for each two revolutions of the cylinder 4. The cam 19 is journaled on a short shaft 23 at one end of the cylinder 4.

The guide-tongues 10 are hollow and are provided with perforations 24 near the points at which said tongues are engaged by the guide-fingers 9. The opposite ends of the tongues 10 are connected by means of flexible tubing 25 with a pipe 26, which leads to a vacuum-pump and is controlled by the valve 27. The pipe 26 is also connected with a pipe 28, extending along the edge of the platform 7, which is adjacent to the cylinder and substantially forming a part of said platform. The pipe 28 is perforated along its upper edge at points which come in contact with paper fed from said platform. The platform is also provided with a plurality of perforated suction-nozzles 29, which terminate flush with the upper surface of the platform 7 and are located rearward of the pipe 28. The nozzles 29 are connected together by means of a pipe 30, which also communicates with the pipe 26.

The valve 27, which controls the vacuum-pipe 26, is operated by a stem 31, which is connected by means of a link 32 with an arm



33, which is pivoted at 34 to the gear-guard 35 or some other stationary part of the frame of the press. The valve 27 is arranged to normally assume its closed position under the weight of the arm 33 and its connections. The valve 27 is opened by means of a cam 37, which is secured to the shaft 23 and adjustable thereon relatively of the cam 19. The cam 37 lifts the arm 33, and thus holds the valve wide open while the part 36 of said cam is in contact with the arm 33. The part 36' of the cam 37 serves to hold the valve 27 in a partly-closed position. The cam 37 is so adjusted relatively of the cam 19 that the suction-valve 27 will open before the guide-fingers 9 are lifted from the tongues 10 and will remain wide open until the time when the sheet of paper is gripped by the grippers 8. The valve 27 then closes partly and remains partly closed until the cam moves out of contact with the arm 33. The length of time during which the valve 27 remains open depends upon the relative formation of the arm 33 and the cam 37, and the releasing of the valve 27 and consequent cessation of the suction occurs when the cam 37 has passed clear of the arm 33. It will be seen that the time of operation of the valve 27 may be adjusted by shifting the cam 37 around the shaft 23, it being preferred to have the reduction of the suction occur at the exact instant at which the grippers 7 seize the paper. To provide for such adjustment, the cam 37 is loose upon the shaft 23 and is secured against the face of the cam 19 by means of a bolt 40. The bolt 40 passes through an annular slot 41 in the cam 37, and said cam is secured in any desired position of adjustment by tightening the bolt 40, and thereby clamping the cam 37 against the face of the cam 19.

In order that the vacuum in the pipes 25 and 26 between the valve 27 and the suction-apertures may be instantly released when the valve 27 closes, the said pipes are provided with small apertures, as indicated at 39 in Fig. 3. These apertures are so located that they cannot at any time be covered by the paper fed into the machine and are of less capacity than the pipe 26.

The operation of the device shown is as follows: The operator places a stack of sheets of paper upon the feed-platform 7 and feeds the sheets one at a time into contact with the guide-fingers 9 and the usual side edge-guide. Then at a certain time before the lifting of the fingers 9 the cam 37 raises the arm 33, opening the valve 27, and holding the sheet of paper securely in a fixed position upon the feed-platform through the suction at the vacuum apertures in the table 7, the pipe 28, and the tongues 10. The guide-fingers 9 are then raised through the action of the cam 19, as hereinbefore described, and are held in such raised position until after the grippers 8 seize the sheet of paper and carry it around with

the cylinder 4. When the part 36 of the cam passes out of contact with the arm 33, the strong suction on the paper ceases and the suction is then only of sufficient intensity to insure that the paper lies flat against the platform and passes to the cylinder without permitting air-bubbles to form between said sheet and cylinder.

Through the constant contact of the guide-fingers 9 with the edges of the sheets of paper fed into the press such guide-fingers quickly become slightly grooved in alinement with the upper surface of the tongues 10. This grooving of the guide-fingers tends to lift the edge of the sheet when the fingers are raised, frequently shifting the sheet and causing imperfect register of impressions. When, however, the press is provided with suction apparatus constructed according to my invention, the lifting tendency is effectually counteracted by the suction at the apertures in the tongues 10, and the shifting of the paper is absolutely prevented by the numerous points at which it is held by suction to the feed-platform. The pipe 28 with its numerous perforations extending across the entire width of the paper causes the paper to fit snugly and flatly against the said pipe. The paper is thus properly started without irregularities in its surface, and the formation of air-bubbles between the surface of the paper and the platen-cylinder 4 is avoided, thus doing away with a frequent cause of imperfect impressions. Other features of the operation of the device shown will be readily understood from the drawings and the foregoing description. It will be readily seen that my invention is also applicable to embossing machinery, perforating-machines, automatic press-feeding machines, and numerous other devices wherein an accurate feeding of sheets of this material is desired. The most important use for this invention is in color-printing, where each sheet receives a plurality of separate impressions and where it is of the greatest importance that each impression register perfectly with the preceding impressions.

It will be seen that numerous details of the construction shown may be altered without departing from the spirit of my invention.

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

1. In a device of the class described, the combination of a feed-platform for supporting a plurality of sheets of paper; feed mechanism adapted to withdraw a sheet of paper from said platform; said platform having therein a plurality of perforations; suction apparatus communicating with said perforations and adapted to hold said sheet against shifting on said platform; a valve controlling the communication between said suction apparatus and perforations; and means controlled by said feeding mechanism for operating said valve, said means being adjustable



relatively of said feeding mechanism for regulating the relative operation of said valve and feed mechanism, substantially as described.

2. In a printing-press, the combination of a  
5 platen-cylinder; a feed-platform for supplying a sheet of paper to said cylinder; a gripping device for securing the sheet of paper to said cylinder; a guide near said platform for the edge of the sheet which is toward said cylinder, said guide being adapted to be withdrawn to permit the sheet to be engaged by said gripping device; a suction device near  
10 said guide adapted to engage the sheet and prevent the same from shifting through the withdrawal of said guide; a cam for controlling the withdrawal of said guide; a valve controlling said suction device; and a second cam for controlling the opening and closing of said valve, said cams being adjustable relatively of  
20 each other, substantially as described.

3. In a printing-press, the combination of a feed-platform for supporting a plurality of sheets of paper; feed mechanism adapted to withdraw a sheet of paper from said platform; said platform having therein a plurality of perforations; suction apparatus communicating with said perforations and adapted to hold said sheet against shifting on said platform; a valve controlling the communication between said suction apparatus and perforations; a cam for controlling the operation of said feed mechanism; and a second cam for controlling the opening and closing of said valve; said cams being adjustable relatively  
35 of each other, substantially as described.

4. In a device of the class described, the combination of hollow perforated tongues for supporting a sheet of paper; guide-fingers for one edge of the sheet, resting on said tongues  
40 and being adapted to be withdrawn upwardly therefrom; and suction apparatus communicating with said tongues and adapted to secure said sheet against lifting through the withdrawal of said fingers, substantially as described.  
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5. In a printing-press, the combination of a platen-cylinder; a feed-platform for guiding a sheet of paper to said cylinder; a gripping device for securing the paper to said cylinder;  
50 guide-tongues extending from said platform toward the cylinder; movable guide-fingers

resting on said tongues to guide the front edge of a sheet of paper before the same is engaged by said gripping device, said guide-fingers being adapted to be withdrawn to permit the  
55 sheet to be engaged by said gripping device; said tongues being hollow and perforated near said fingers; and suction apparatus communicating with said hollow tongues and adapted to draw the sheet into contact with said tongues  
60 and prevent the same from lifting when said fingers are withdrawn, substantially as described.

6. In a printing-press, the combination of a platen-cylinder; a feed-platform for guiding  
65 a sheet of paper to said cylinder; a gripping device for securing the paper to said cylinder; guide-tongues extending from said platform toward the cylinder; movable guide-fingers resting on said tongues to guide the front edge  
70 of a sheet of paper before the same is engaged by said gripping device, said guide-fingers being adapted to be withdrawn to permit the sheet to be engaged by said gripping devices; said platform and tongues being perforated;  
75 and suction apparatus communicating with the perforations in said tongues and platform and adapted through suction to secure the sheet against being lifted or shifted through the withdrawal of said fingers, substantially as described.  
80

7. In a device of the class described, the combination of a platform adapted to support a sheet of paper; feeding mechanism adapted to engage a sheet and withdraw the same from  
85 said platform; apparatus adapted through suction to prevent said sheet from shifting before being engaged by said feed mechanism; and means for controlling the intensity of such suction, said means being adapted to operate  
90 automatically to reduce said suction when said sheet is engaged by said feeding mechanism, to then maintain said reduced suction for a certain predetermined length of time, and then cut off said suction, substantially as described.  
95

Signed at Chicago this 11th day of November, 1904.

ALFRED W. MASSEY.

Witnesses:

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