E. R. LINEBAUGH,

SHEET FEEDING MECHANISM FOR PRINTING PRESSES.

APPLICATION FILED MAR. 17, 1919.

1,319,716.

Patented Oct. 28, 1919.

3 SHEETS—SHEET 1.

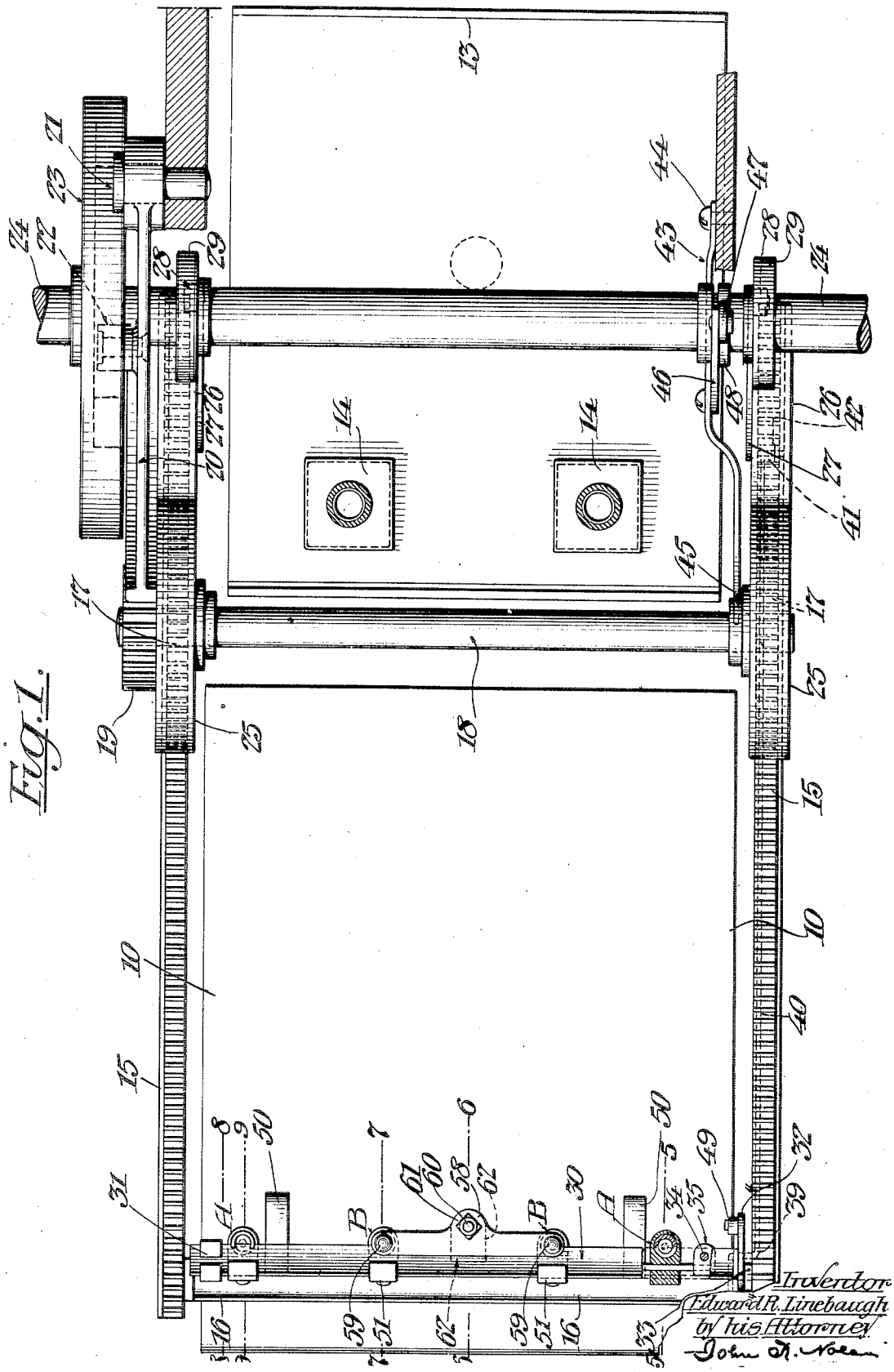


Fig. 1.

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by his Attorney
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3 SHEETS—SHEET 2.

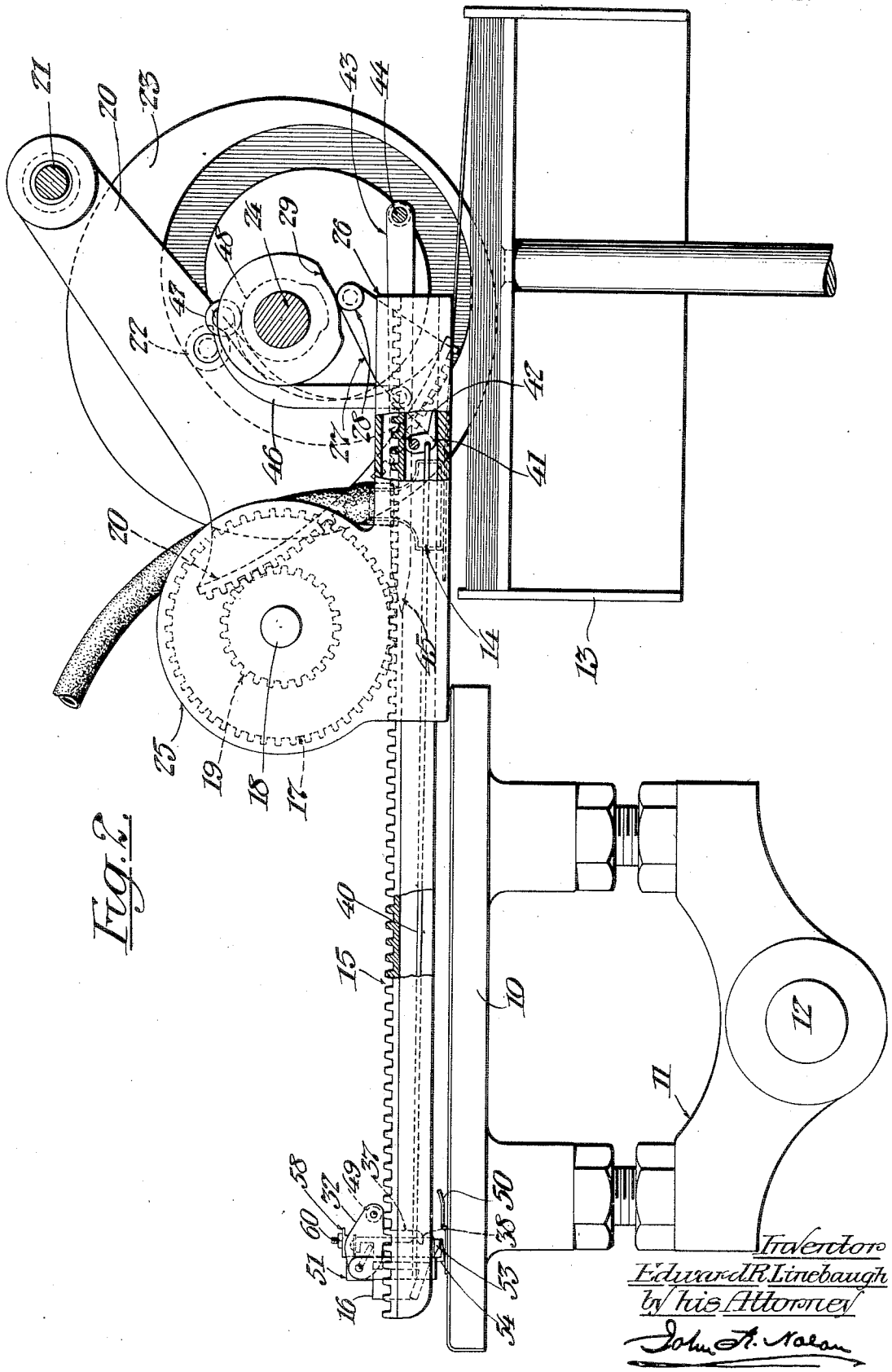



Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 9.

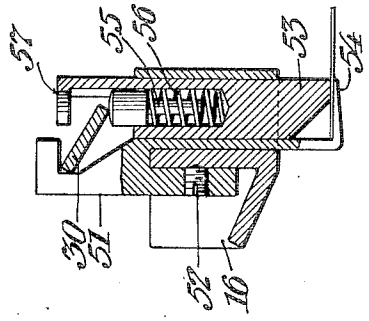



Fig. 8.

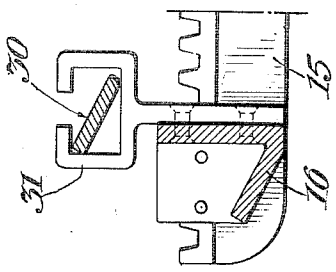



Fig. 7.

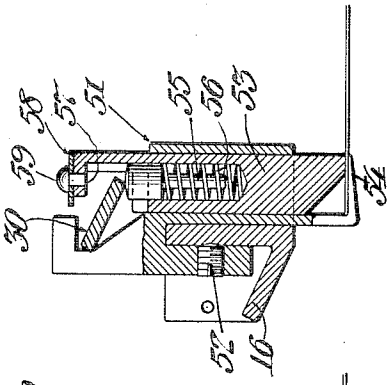



Fig. 6.

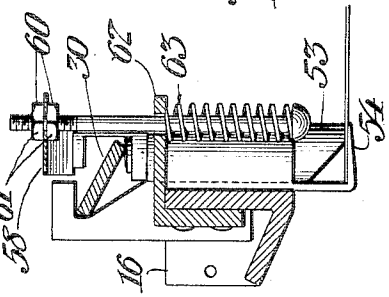



Fig. 5.

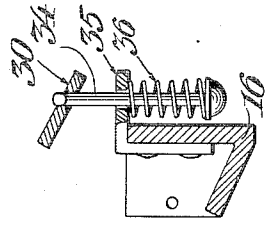



Fig. 4.

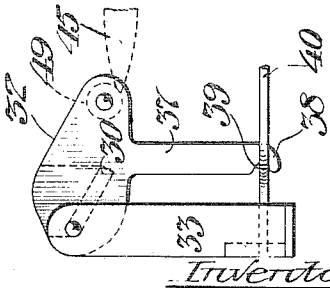
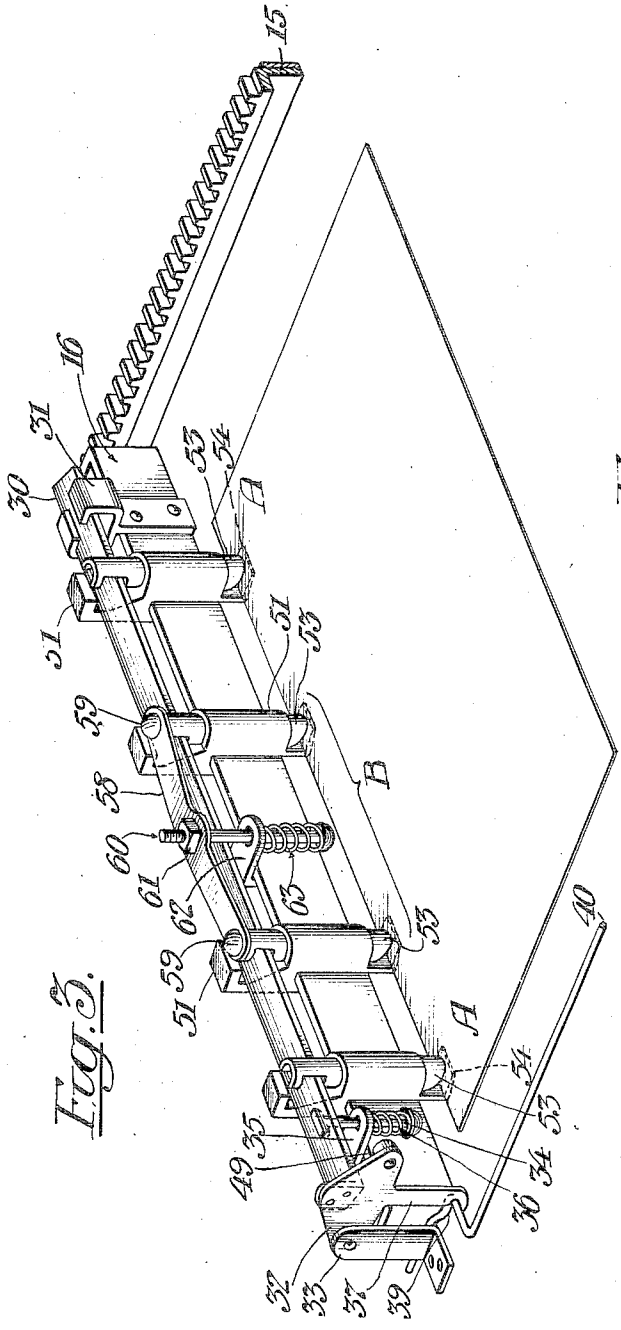



Fig. 3.




Inventor.

Edward R. Linebaugh

by his Attorney.

John R. Nolan

# UNITED STATES PATENT OFFICE.

EDWARD R. LINEBAUGH, OF BARBERTON, OHIO, ASSIGNOR TO THE DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## SHEET-FEEDING MECHANISM FOR PRINTING-PRESSES.

1,319,716. Specification of Letters Patent. Patented Oct. 28, 1919.

Application filed March 17, 1919. Serial No. 283,102.

*To all whom it may concern:*

Be it known that I, EDWARD R. LINEBAUGH, a citizen of the United States, and resident of Barberton, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Sheet-Feeding Mechanism for Printing-Presses, of which the following is a specification.

This invention relates to sheet feeding mechanism for Gordon printing presses and the like; and it has for its object to provide a simple and efficient construction and organization of gripper devices whereby is insured a reliable feeding of successive sheets of paper of different qualities and thicknesses.

In the form of embodiment of my invention herein illustrated the usual reciprocating gripping frame is provided at its forward portion with two end grippers and a pair of middle grippers, each of said grippers comprising complementary fixed and movable members. Compression springs are associated with the movable members of all the grippers and auxiliary spring devices are associated with the movable members of the middle grippers. Provision is had whereby the series of movable gripper members are temporarily raised and lowered as and when the gripper frame approaches and reaches the limit of its rearward stroke, whereby a suitably-disposed sheet is received by the grippers and securely clamped by the combined action of all the springs, preparatory to the feeding of the sheet upon the platen; and whereby when the gripper frame approaches the limit of its forward stroke, the pressure of the compression springs upon the movable grippers is released, while that of the auxiliary devices on the central grippers is maintained to insure the correct positioning of the sheet against the usual end stops of the platen. Means are provided whereby the pressure of the auxiliary spring devices can be nicely adjusted in order to vary the effective action of the grippers to meet the requirements of different qualities and thicknesses of paper.

The invention also comprises novel features of construction and combinations of parts which will be hereinafter described and claimed.

In the drawings—

Figure 1 is a plan view of a portion of a printing press embodying my invention.

Fig. 2 is a side elevation of the same.

Fig. 3 is a perspective of the forward end of the gripper frame including the grippers, showing a sheet as engaged by the latter.

Fig. 4 is an elevation of the actuating arm, and its adjuncts, for the presser bar.

Figs. 5, 6, 7, 8 and 9 are transverse vertical sections as on the correspondingly numbered lines, respectively, of Fig. 1.

Referring to the drawings, 10 designates a platen; 11 an oscillatory support therefor, and 12 a rock-shaft upon which the support is mounted, which shaft is intermittently actuated to effect the timely motion of the platen in respect to the usual reciprocating form-bed.

13 designates a paper feed box, and 14 suction boxes above the same adapted to raise each uppermost sheet successively from the pile of paper contained in the box and position the sheet for the engagement of its forward edge by the grippers of a reciprocating gripper frame, whereby the sheet is carried over and upon the platen.

The gripper frame comprises two parallel racks 15 connected at their forward ends by a cross-bar 16, which frame is reciprocable above and substantially parallel to the upper surface of the platen when the latter is in sheet-receiving position. Meshing with the racks 15 are spaced gear-wheels 17 fast on a transverse shaft 18 having its bearings in the respective sides of the machine frame. On this shaft is a gear-wheel 19 in mesh with a gear sector 20, the arm of which is mounted on a stud shaft 21 supported at one side of the machine frame. The sector arm bears a lateral roll 22 which runs in the cam race of a face cam 23 fast on a continuously driven shaft 24, which race is of such formation as to effect the oscillation of the sector and thereby insure constant back and forth motion of the gear-wheels 17 and the timely reciprocation of the racks of the gripper frame.

The gears 17 are confined in appropriate casings 25 having rearward basal extensions 26 within which the respective racks are mounted for longitudinal reciprocation. The casings are hung on the hubs of the gears 17 to have capacity for slight vertical oscillation; the extensions 26 being provided at their rear with upwardly and rearwardly extending arms 27 bearing suitably-

disposed rolls 28 which are held in operative contact with counterpart cams 29 fast on the shaft 24 by the weight of the gripper frame. The contour of the cams 29 is such that before the gripper frame commences its backward stroke the casings are slightly tilted to raise the forward end of the gripper frame and its grippers slightly above the platen; and thus enable them, in their back stroke, to clear the paper imposed on the platen.

The gripper actuating mechanism includes a suitably disposed vibratory presser bar 30 which is adapted in its periodic oscillation to control the operation of the grippers in order to effect the timely gripping and releasing of the paper. This bar 30 is supported at one end by a bracket 31 on the frame bar 16 and at the other end by a rock-arm 32 which is pivoted to a bracket 33 on the adjacent rack bar. The presser-bar has connected thereto, adjacent the arm 32, a pin 34 which depends through a perforated bracket 35 on said bar, and is provided with a compression spring 36 which, bearing against the under side of the bracket 35 and the headed lower end of the pin 34, tends to maintain the inner or acting edge of the presser-bar normally depressed. The arm 32 is provided with a depending extension 37 having a hook-like lower portion 38 for engagement by the forward hooked end 39 of a rod 40 which extends longitudinally of the adjacent rack. The opposite end of the rod is pivotally connected to a dog 41 which is pivotally supported on said rack. This dog is provided with a tail piece 42 which is adapted to bear upon the horizontal floor of the casing at certain intervals in the travel of the gripper frame and thus maintain the rod in a position with the rock-arm slightly retracted in opposition to the action of the spring 36. When in the rearward movement of the gripper frame, the dog escapes the floor of the casing said rod is released to free the presser bar from restraint, which condition is maintained until the dog, during the succeeding forward stroke of the gripper frame, again engages and rides upon the floor of the casing.

A horizontally disposed bar 43, which is pivoted at its rear end to the supporting frame, as at 44, overhangs the sheet when the latter is under the control of the suction boxes; the free end of such bar extending slightly beyond the forward end of the sheet and being tapered to constitute a cam nose 45. (See Fig. 2.) This cam bar is provided with an upstanding member 46 bearing at its upper end a roll 47 in co-operative relation to a cam 48 fast on the shaft 24, which cam is appropriately shaped to effect the periodical raising and lowering of the bar 43 in order to shift its nose 45 into and out of the path of a laterally projecting stud or roll 49 on the rock-arm 32 of the gripper mechanism. When the roll is in engagement with the cam bar and the latter is raised as just described the grippers are opened to receive the forward edge of the sheet, and when the cam bar 43 is lowered such grippers automatically seize the sheet preparatory to drawing it forwardly over and imposing it upon the platen. A pair of spaced stops 50 located upon the platen, adjacent its forward end, receives the edge of the sheet as the latter is drawn outward, the grippers passing slightly beyond the stops and releasing the positioned sheet against the stops.

The parts above referred to, excepting the grippers, are of known construction and operation.

In the present instance four grippers are employed, viz: two end grippers (A) and a pair of intermediate grippers (B). Each of the grippers comprises a vertically bored housing 51 which is adjustably secured by a screw 52, or the like, to the cross-bar 16 of the gripper frame. Within the bore of the housing is a vertically movable gripper member 53 which co-acts with a fixed gripper member 54 constituted by the foot of the housing. The member 53 is formed with a vertical socket for the reception of a pin 55 and a compression spring 56, which latter, encircling the pin, bears against the bottom of the socket and the head of the pin. The upper portion of the movable gripper member extends somewhat above the head of the pin and is offset to afford a notch into which the lower or acting edge of the presser bar freely extends, directly over the head of the pin. Thus the presser bar, according to its angularity depresses the pin to insure the action of the spring on the movable gripper member, or releases the spring from pressure, or acts against the overhanging lip 57 of such member in a manner to lift the latter bodily from clamping position.

In addition to the internal spring 56 the movable gripper members of the central pair (B) are provided with an auxiliary spring construction which comprises, in its preferred form, a strip of flat spring metal 58, the ends of which bear resiliently upon the up-projecting portions of the movable gripper members and are secured thereto by rivets or studs 59. The strip is perforated intermediate its ends for the free passage of a vertical supporting bolt 60 to which the strip is clamped by means of a pair of nuts 61 screwed on the bolt. The bolt extends loosely through a guide bracket 62 on the bar 16, and is normally depressed by the action of a suitably-disposed compression spring 63 which bears at its respective ends against the bracket and the bolt head; the tendency and effect of said spring 63 being to draw down the body of the re-

silient strip, medially of its ends, and thus transmit through the latter a uniform yielding pressure upon the movable members 53 of the central grippers. By vertically adjusting the clamping nuts on the bolt the tension of the spring 63 can be nicely regulated in order to secure various effective actions of the resilient strip upon the associated grippers to meet the requirements of different qualities or thicknesses of paper.

Briefly the operation is as follows: As the gripper frame approaches the limit of its rearward stroke the roll 49 on the rock-arm 32 contacts with the nose of the cam bar 43 which has been properly positioned through its connection with the cam 48. The arm 32 and the presser bar are thus swung upward against the action of the spring 36 in a way to cause the acting edge of said bar to bear against the overhanging lips 57 of all the movable gripper members and thus bodily lift the latter to open the bite of the grippers for the reception of the end of the sheet supported by the suction boxes. This done the cam bar 43 is lowered, thus permitting the rock-arm and presser bar to resume their down position, in which case the acting edge of the bar bears upon the heads of the pins 55. Consequently the springs 56 being compressed act uniformly upon the movable gripper members to cause them to grip the paper; and at the same time the spring plate 58, exerting an additional clamping effect upon the two central grippers, insures a positive and reliable gripping of the sheet at its central portion. In the succeeding forward stroke of the gripper frame the sheet, thus firmly held, is drawn over upon the platen, and as said frame approaches the limit of its forward stroke the dog 41 engages and rides upon the floor of the casing, thus retracting the rod 40 and by its hooked forward end slightly rocking the arm 32 in a manner to raise the acting edge of the presser bar and thus relieve the pressure of the pins on the springs 56 of the entire series of grippers. Such upward movement of the presser bar, however, is not sufficient to cause it to contact with the lips 57 of the movable gripper members, and hence the two middle grippers are maintained under uniform pressure by the action of the spring plate 58 thereon. The pressure of the plate is so adjusted that the paper is positively drawn by the middle grippers into contact with the stops 50, and then such grippers, together with the end grippers, as they complete their forward stroke, escape from the positioned sheet. Thereupon the gripper frame is tilted and retracted for a repetition of the above described operation on a succeeding sheet of paper; and so on.

It is to be understood that I do not limit my invention to the exact details of construction herein disclosed, as the same may be modified within the principle of my invention and the scope of the appended claims.

I claim—

1. The combination, in a printing press having a platen, forward paper stops on said platen, and a reciprocating gripper frame, of a gripper on said frame comprising complementary fixed and movable gripping members, a plurality of springs for exerting pressure independently of each other upon the movable member, a vibratory presser bar loosely connected with said movable member, means for actuating said bar to raise said movable member temporarily when the gripper frame approaches the end of its rearward stroke, and means for actuating said bar to relieve the movable gripper member from the pressure of one of said springs when the gripper frame approaches the end of its forward stroke, the other spring remaining in action upon said movable member.

2. The combination, in a printing press having a platen, forward paper stops on said platen, and a reciprocating gripper frame, of end grippers and a pair of middle grippers on said frame, each of said grippers comprising complementary fixed and movable members, compression springs associated with the movable members of the respective grippers, auxiliary spring means associated with the middle grippers, a vibratory presser bar loosely connected with the movable members of the respective grippers, means for actuating said bar to raise said movable members temporarily when the gripper frame approaches the end of its rearward stroke, and means for actuating said bar to relieve the movable gripper members from the pressure of said compression springs when the gripper frame approaches the end of its forward stroke, the auxiliary spring means remaining in action upon said movable members.

3. The combination, in a printing press having a platen, forward paper stops on said platen, and a reciprocating gripper frame, of paper grippers on said frame comprising complementary fixed and movable gripping members, compression springs associated with the movable members of the respective grippers, a vibratory presser bar loosely connected with said movable members, means for maintaining said bar in a normal position wherein it acts to compress the springs, means for actuating said bar to cause it to raise and then to lower the said movable members when the gripper frame is at the end of its rearward stroke, and means for actuating said bar to release the pressure from the springs when said frame approaches the end of its forward stroke.

4. The combination, in a printing press having a platen, forward paper stops on said platen, and a reciprocating gripper frame, of a pair of paper grippers on said frame comprising complementary fixed and movable gripping members, a resilient plate connecting the said members, a vertically-movable support for said plate, a spring acting to maintain said support yieldingly depressed, a vibratory presser bar loosely connected with said movable members, and means for actuating said bar to cause it temporarily to raise said grippers against the action of said spring and plate.

5. The combination, in a printing press having a platen, forward paper stops on said platen, and a reciprocating gripper frame, of a pair of grippers on said frame comprising complementary fixed and movable gripping members, compression springs associated with the movable members of the respective grippers, a vibratory presser bar loosely connected with said movable members, means for maintaining said bar in a normal position wherein it acts to compress the springs and thus hold said movable members yieldingly depressed, an auxiliary depressing means comprising a resilient plate connecting the said movable members, a vertically movable support adjustably connected to the body of said plate, and a spring acting to maintain said support yieldingly depressed, means for actuating said presser bar to raise and then to lower the said movable gripper members when the gripper frame is at the end of its rearward stroke, and means for actuating said bar to release the pressure of the compression springs when the said gripper frame approaches the end of its forward stroke.

Signed at Barberton, in the county of Summit and State of Ohio this 11th day of March, A. D. 1919.

EDWARD R. LINEBAUGH.