No. 622,168. Patented Mar. 28, 1899.

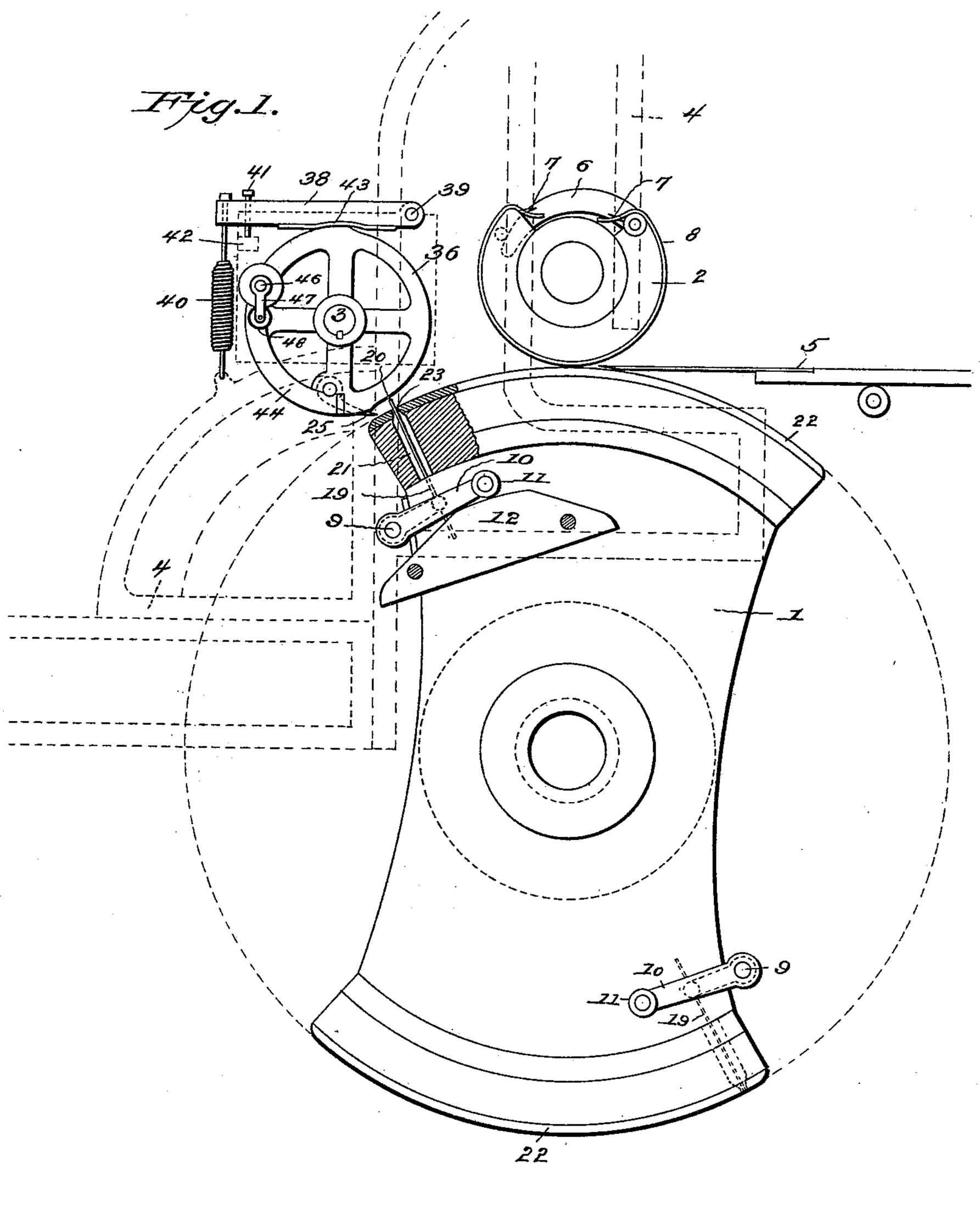
J. T. ROBERTSON.

PLATE PRINTING PRESS.

(Application filed Feb. 4, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

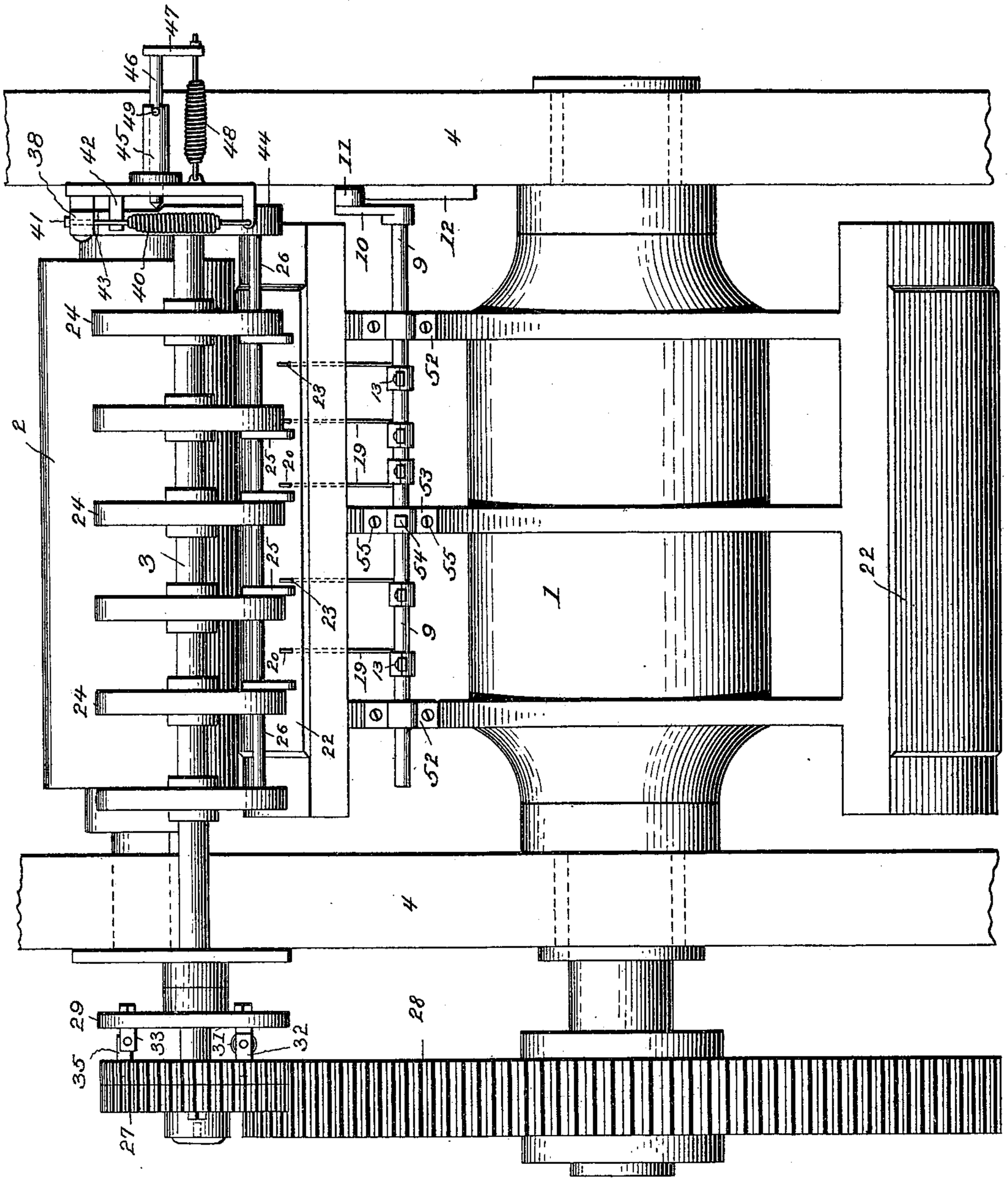

Fig. 2.

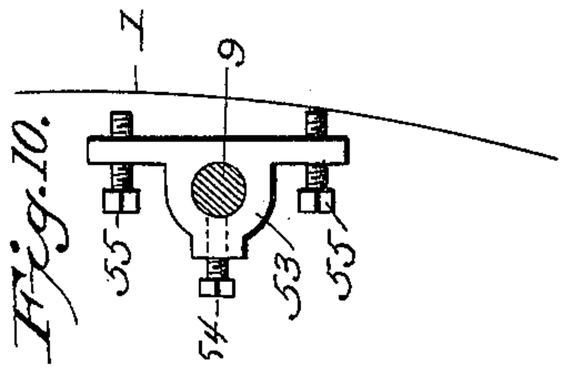

Fig. 10.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

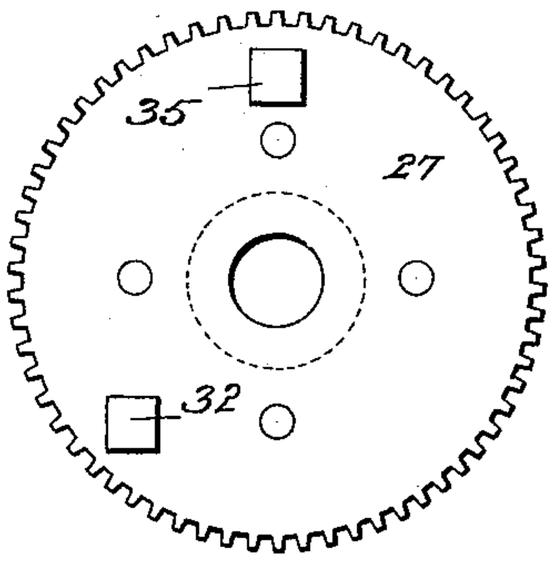


Fig. 4.

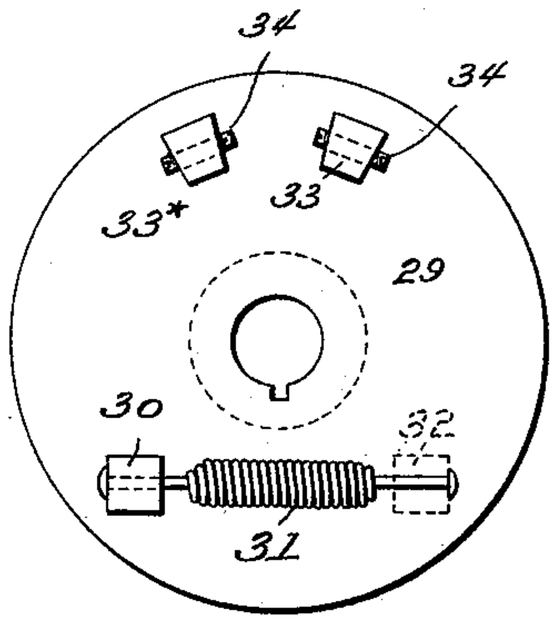


Fig. 5.

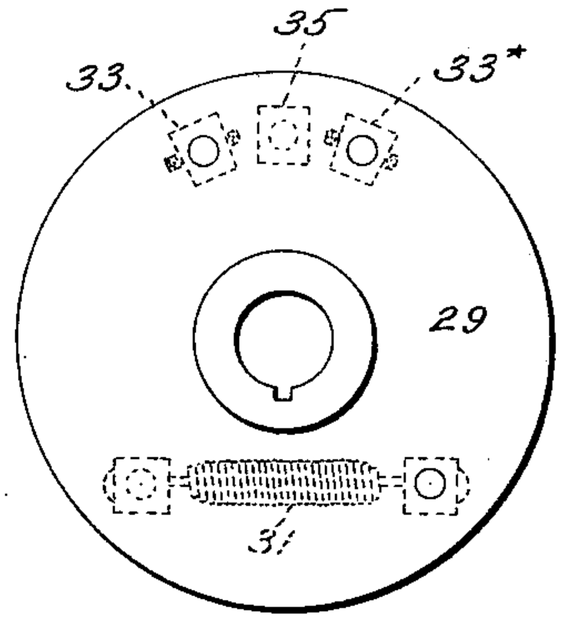


Fig. 6.

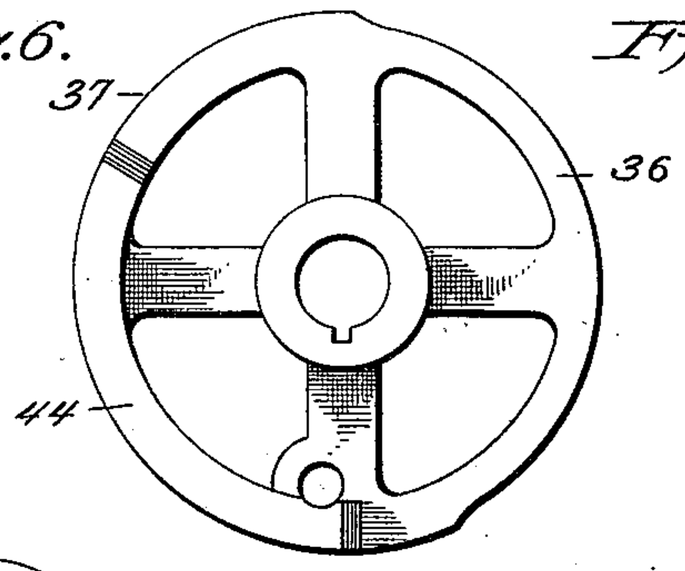
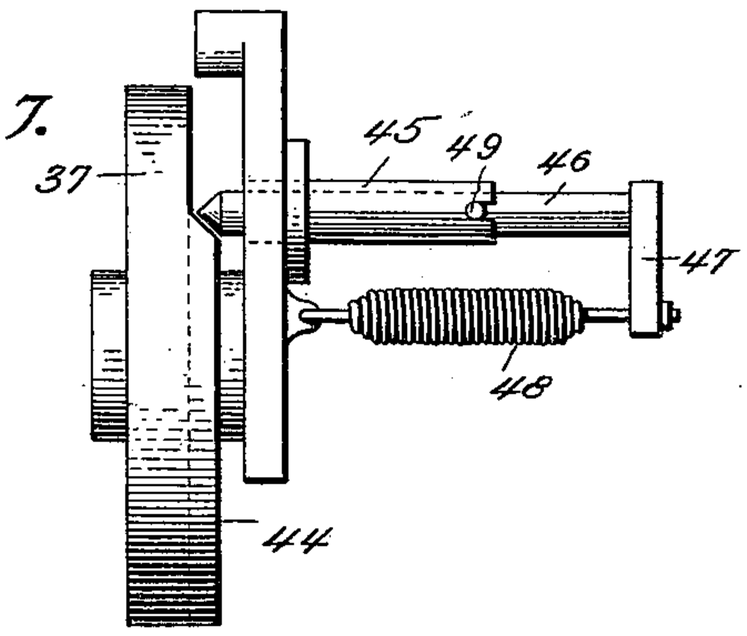


Fig. 7.



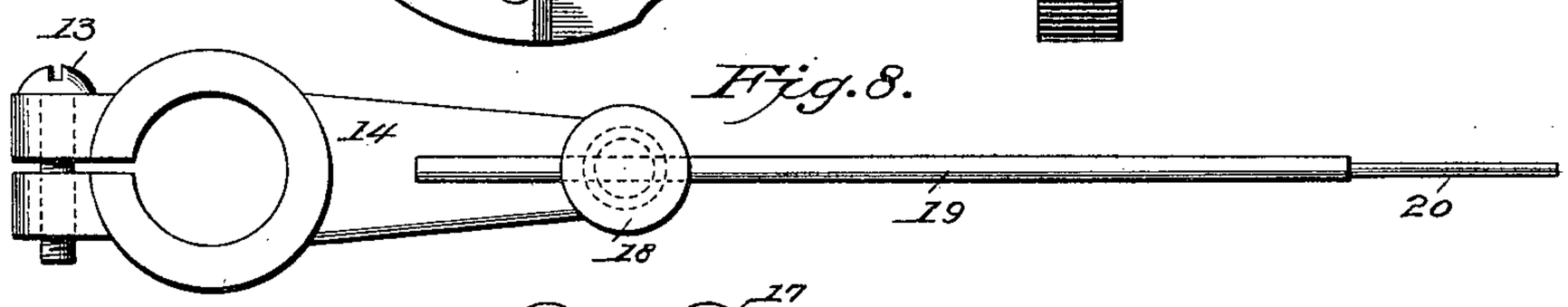


Fig. 8.

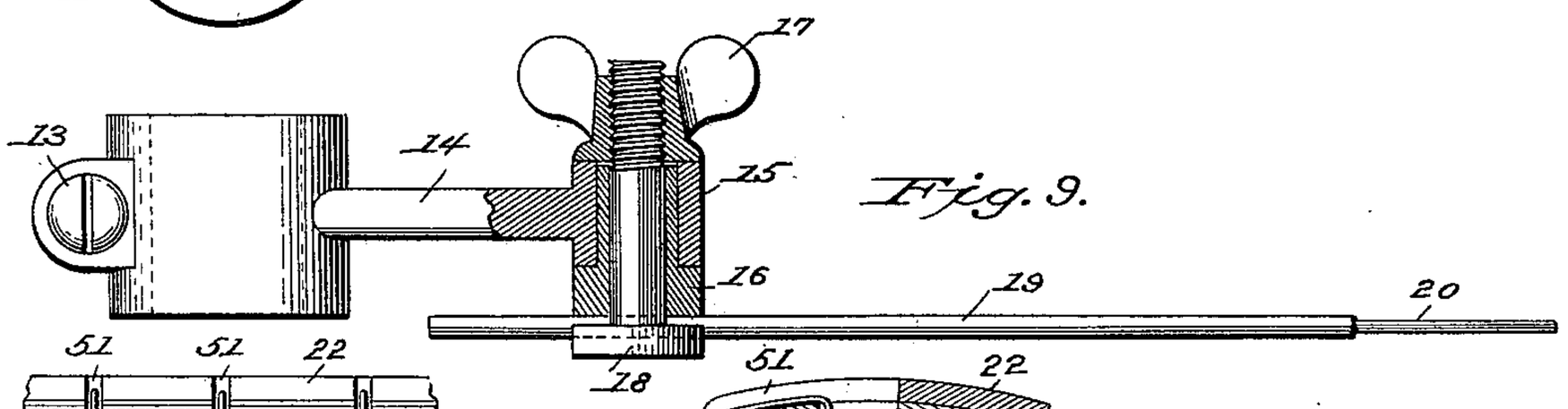


Fig. 9.

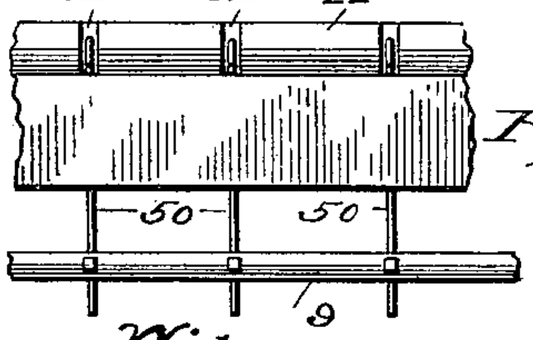


Fig. 12.

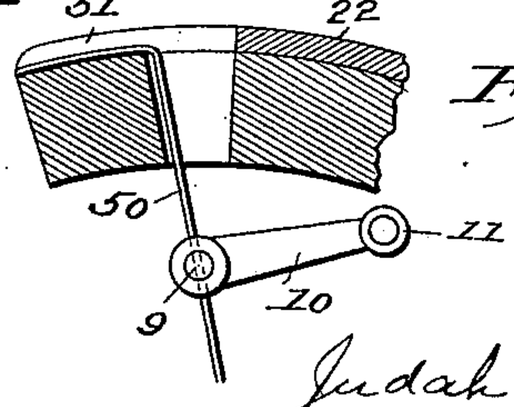


Fig. 11.

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UNITED STATES PATENT OFFICE.

JUDAH TOURO ROBERTSON, OF NEW YORK, N. Y.

PLATE-PRINTING PRESS.

SPECIFICATION forming part of Letters Patent No. 622,168, dated March 28, 1899.

Application filed February 4, 1898. Serial No. 669,086. (No model.)

To all whom it may concern:

Be it known that I, JUDAH TOURO ROBERTSON, a citizen of the United States, residing in the borough of Manhattan, in the city of New York, State of New York, have invented certain new and useful Improvements in Plate-Printing Presses, of which the following is a specification.

My invention relates to plate-printing presses, and has for its object to provide means for automatically lifting the front edge of the paper from the plate-carrier after it has received the impression into position to be seized by gripper-fingers carried by a gripper-carrier located to the rear of the impression-surface, said lifting mechanism being so arranged as to dispense with the necessity for projecting the front edge of the paper beyond the edge of the engraved plate.

A further object of my invention is to provide novel means for automatically checking the movement of the gripper-carrier a sufficient length of time to permit the paper to pass into the gripper-fingers carried thereby and at the same time to control the subsequent movement of said gripper-carrier in unison with that of the plate-carrier and impression-surface in order that any liability of the gripper-fingers pulling away from the paper may be obviated.

In the operation of rotary plate-printing presses heretofore it has been attempted to locate gripper-fingers on the impression-cylinder, which has been found to "chug" the paper to the impression-cylinder, causing the paper, on account of the sizing it contains, to stick to the impression-cylinder, and thus frequently fail to take up all the ink in the engraved lines, thus giving a pale and worthless impression. Furthermore, in attempting to use a gripper-cylinder to the rear of the impression-cylinder, which would obviate the defect above noted, it has been necessary to so feed the paper to the plate-cylinder that the front edge of said paper will project somewhat beyond the front edge of the engraved plate, which is usually beveled in order that said paper may pass into the upraised ends of the gripper-fingers on the gripper-cylinder, such method of feeding the paper presenting two serious defects, which it is the aim of my present invention to entirely overcome. The first and most serious defect is that as what is termed the "nose" of the impression-cylinder—that is to say, the front edge of the blanket carried thereby—comes in contact with the beveled edge of the engraved plate on the plate-cylinder the overlying front edge of the paper thereon is brushed by the fullness of the blanket and is liable to be dragged forward more or less before the impression-roll puts such a pressure on the paper as to keep it firm and in place, thus utterly destroying the utility of the press for registry-printing—that is to say, passing the paper more than once through the press—a process now almost essential in all forms of plate-printing. The second defect is the waste of paper due to the necessity for projecting the same beyond the front edge of the plate, such waste amounting to at least one square inch of paper for each inch in width of the sheet being printed, a very important item in the economy of plate-printing for bank-notes, bonds, &c., in which the paper used is of the most expensive character. Both of these defects are fully overcome by my novel mechanism for lifting the front edge of the paper off the body of the engraved plate into position to be gripped by the gripper-fingers, as the necessity for so feeding the paper to the press as to project its front edge beyond the edge of the plate is dispensed with, thereby not only preventing the brushing and pulling of the blanket on the impression-cylinder, but also permitting the impression to be imparted to the paper as close to its edge as may be desired.

Referring to the accompanying drawings, Figure 1 is a side elevation of a portion of a rotary plate-printing press embodying a preferred form for carrying my invention into effect, one side of the frame being removed. Fig. 2 is a rear elevation of the same. Figs. 3, 4, 5, 6, and 7 are enlarged detail views of the mechanism for controlling the movement of the gripper-cylinder. Figs. 8 and 9 are enlarged detail views of my preferred form of lifting mechanism. Fig. 10 is a detail view of the mechanism for limiting the rotation of

the lifter-shaft. Figs. 11 and 12 are detail views of a portion of the plate-cylinder, illustrating a modified form of lifting mechanism.

Similar numerals of reference denote corresponding parts in the several views.

In the said drawings the reference-numeral 1 denotes a plate-cylinder adapted to carry two plates, above which is located an impression-cylinder 2 and to the rear of which is located a gripper-shaft 3 in immediate proximity to the plate-cylinder, all of said parts being supported in the press-frame 4 and so geared to a common actuating mechanism that the impression-cylinder and gripper-shaft rotate four times to one rotation of the plate-cylinder. A feeder-board 5, adapted to be mechanically reciprocated at the proper time, affords a means for accurately feeding the paper between the plate and impression cylinders. The impression-cylinder 2 is cut away longitudinally at 6 for a portion of its circumference and is provided with pins 7 or other suitable means for attaching thereto the blanket or blankets 8 employed in presses of this character.

For each plate carried by the cylinder 1 there is provided a paper-lifting mechanism as follows: Mounted in the body of the cylinder 1 is a rock-shaft 9, having fixed thereto at one end an arm 10, preferably carrying at its outer end a roller 11, that is adapted to contact with and ride over a cam-surface 12, fixed to the press-frame at one side. The bearings for said rock-shaft consist of the plates 52, bolted to the plate-cylinder 1, as shown in Fig. 2, while centrally of said rock-shaft is mounted a rocking bearing 53, keyed to said rock-shaft by means of the screw 54 and movable therewith, as shown in Fig. 10. Suitable adjusting-screws 55, passing through said bearing and adapted to contact with the plate-cylinder 1, serve to limit the rotation of said rock-shaft 9, for a purpose hereinafter to be described. Also fixed to said rock-shaft 9, but adjustable longitudinally thereon by means of the screw-bolts 13, are a series of arms 14, preferably five in number, each being formed at its outer end into a socket 15, adapted to receive a carrier 16, swiveled therein by means of a thumb-nut 17 and bolt 18 and carrying a pin-socket 19, having a pin 20 fixed therein, as shown in detail in Figs. 8 and 9. These sockets 19 and pins 20 project through apertures 21 in the bed of the plate-cylinder, said apertures being of somewhat larger diameter than the pin-sockets and pins for the major portion of their length to permit a limited lateral play to said pin-sockets and pins, but preferably tapering abruptly near the exterior surface of the bed, as shown in Fig. 1. The engraved plate 22 is mounted on the bed, so that one edge will overlie these apertures 21, and is correspondingly apertured at 23 to permit the passage therethrough of the pins 20, said apertures tapering from the under side to the outside of the plate, their outer ends being reduced, so as to just permit the free passage therethrough of the pins 20 and no more. It will be understood that when the roller 11 is not in contact with the cam-surface 12 the ends of the pins 20 will be flush with or slightly below the outer surface of plate 22.

The gripper-shaft 3 has fixed thereto a series of wheels 24, each carrying a gripper-finger 25, mounted on a rock-shaft 26, that is actuated by a suitable cam or other mechanism to automatically open and close the said gripper-fingers at the proper time. This form of mechanism, however, being old and well known, no further description or illustration of the same is deemed necessary. Also mounted on said gripper-shaft 3 at one end, but freely rotatable thereon, is a gear-wheel 27, that is geared with a power-wheel 28. In proximity to said wheel 27 is a wheel 29, fixed to the shaft 3 and provided with a projection 30, to which is fixed one end of a coiled spring 31, having its other end fixed to a similar projection 32 on the wheel 27, as clearly shown in Figs. 2, 3, 4, and 5. Also formed on said wheel 29 are two other projections 33 and 33*, provided with adjustable threaded stop-pins 34 therein, between which is adapted to play a projection 35 on the wheel 27. Preferably near the other end of the shaft 3 is fixed a wheel 36, having its periphery formed with a cam-surface 37 around a little more than one-half its circumference, against which is adapted to contact a brake-shoe 38, pivoted at one end at 39 to the press-frame and having attached at its other end a coiled spring 40, that is attached at its other end to the press-frame. A suitable adjustable stop-pin 41, contacting with a projection 42 on the press-frame, serves to limit the contact of the brake-shoe 38 to the cam-surface 37 only of said wheel 36, while, if desired, a leather or other suitable frictional contact-surface 43 may be attached to the under side of brake-shoe 38. The outer side of said wheel 36 is also provided with a cam-surface 44, extending around a portion of its diameter, while mounted in a guide 45 in the press-frame is a plunger 46, carrying an arm 47 at its outer end, to which is attached one end of a coiled spring 48, attached at its other end to the press-frame and serving to project the inner beveled end of said plunger 46 against the cam-surface 44 of the wheel 36, a pin 49 on said plunger serving to limit the inward movement of said plunger, so that it will not contact with the normal surface of said wheel 36, all as clearly shown in Figs. 2, 6, and 7.

From the above description the operation of my improved construction will be understood to be as follows: The paper to be printed is laid and registered by hand onto the feeder-board 5, the register being such that the front edge of the paper will project a little beyond the edge of the feeder-board. The plate-cylinder 1 and impression-cylinder 2 are so geared that during their rotation the nose or front edge of the blanket 8 will meet the front bev-

eled edge of each plate 22, so that the further rotation of the two will result in a firm and even pressure therebetween. Now the mechanism for reciprocating the feeder-board 5 is so arranged that said feeder-board will be moved forward into delivery position just after the plate and impression cylinders have come into firm and intimate contact, and the paper will thus be drawn into the press in exactly the position it is desired to go, thus insuring a perfect register for subsequent impressions where such may be desired. The pin-apertures 23 in the plate being located to the rear of the front beveled edge of said plate and as near to the engraved portion as may be desired, the front edge of the paper will overlie said apertures. Now during the further movement of the press as the plate approaches the gripper-wheels 24 the contact of roller 11 with cam 12 will rock the shaft 9, and consequently project the pins 20 through the apertures 23, the necessary lateral play being afforded to said pins through the swivel connection 15 16 and the enlarged diameter of the apertures 21 in the bed. This projection of the pins 20 will necessarily lift the front edge of the paper from the plate 22 into position to pass into the grippers 25, it being understood that the gripper-shaft 3 revolves in unison with the impression-cylinder 2, except as hereinafter described, and that the gripper-controlling mechanism will automatically open said grippers into position to receive the edge of the paper into them. It will be observed, however, that did the gripper-wheels 24 rotate absolutely in unison with the plate and impression cylinders there would be no opportunity for the edge of the paper to pass into the gripper-fingers, and to obviate this defect I have provided means for momentarily checking the rotation of the gripper-shaft 3 at the moment that the gripper-fingers reach the receiving position. Thus the power applied to the wheel 27, freely rotatable on the gripper-shaft 3, is normally imparted to said gripper-shaft through the spring 31, connecting said wheel 27 and the wheel 29, fixed to said shaft, it being understood that the tension of said spring is sufficiently strong to retain the stop 35 of the wheel 27 in contact with the stop-pin 34 of stop 33 of the wheel 29. (Shown in Fig. 4.) Now as the gripper-fingers 25 reach the receiving position (shown in Fig. 1) the plunger 46 comes into contact with the incline of the cam 44 on wheel 36, fixed to the gripper-shaft, as shown in Fig. 7, and the power required to overcome the tension of spring 48 and force out said plunger 46 overcomes the tension of the spring 31, thereby momentarily checking the rotation of the gripper-shaft 3 and its gripper-wheels 24, and thus permitting the front edge of the paper to pass into the gripper-fingers 25 in position to be grasped thereby. The length of this stoppage is limited by the distance between the stop 35 on wheel 27 and the stop-pin 34 of stop 33* on wheel 29, as indicated in Fig. 5, for when said parts contact the wheel 29 and gripper-shaft necessarily resume their rotation. At approximately the same moment, however, that the plunger 46 and cam-surface 44 contact the cam-surface 37 on the periphery of wheel 36 passes beneath and in frictional contact with the brake-shoe 38, the frictional resistance exerted thereby, through the tension of spring 40, being sufficient to counteract the tension of spring 31 after the plunger 46 has passed onto the cam-surface 44, and thus retain the wheels 27 and 29 in the same relative position to which they were brought by the action of the plunger 46, the gripper-shaft being again rotated at the same speed as the plate and impression cylinders. This carries the paper away from the plate and impression cylinders at the same rate of speed that it passes between the same and prevents any danger of the gripper-fingers pulling away from said paper. Now by the time the whole cam-surface 37 has passed beneath the brake-shoe 38 the paper has passed from between the plate and impression cylinders, so that the removal of said frictional resistance, which immediately results in a jumping forward of the gripper-shaft until the stop 35 on wheel 27 again contacts with the stop-pin 34 of stop 33 in Fig. 4, can no longer pull the gripper-fingers away from the paper.

It will be understood that immediately after the paper has been grasped by the gripper-fingers 25 the further rotation of the plate-cylinder 1 will cause the roller 11 to ride down the rear incline of cam-surface 12, thus rotating shaft 9 in its bearings 52 and withdrawing pins 20 flush with or a little beneath the surface of plate 22, this rotation of shaft 9 being adjustably limited by the contact of one of the screws 55 with the plate-cylinder 1.

In Figs. 11 and 12 I have illustrated a modified form of lifting mechanism for the paper, the same consisting of a series of angular fingers 50, mounted in the rock-shaft 9, said fingers adapted to move in grooves or kerfs 51, formed in the bed and plate 22, as shown, it being understood that as with this construction the arm 10 must move in a direction opposite to that shown in the other figures in order to lift the paper the cam 12 must be reversed or placed with its operative face downward in order to accomplish the desired result.

I desire it to be understood that I do not broadly claim the application to a cylinder of a mechanism for lifting therefrom a sheet of paper, but specifically limit such portion of my invention to its application to a plate-printing press in such manner that the paper may be contacted with and lifted from the surface of the engraved plate itself, thus dispensing with the necessity for the paper projecting beyond the edge of said plate.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a plate-printing press, the combina-

tion of the plate-carrier, impression-surface, independent gripper-carrier, and mechanism adapted to be projected through the plate for lifting the printed sheet therefrom into operative engagement with the grippers mounted on said gripper-carrier, substantially as set forth.

2. In a plate-printing press, the combination of the plate-carrier, impression-surface, independent gripper-carrier, and mechanism adapted to be projected through the plate for lifting the printed sheet therefrom into operative engagement with the gripper-carrier, said mechanism consisting of a series of pins moving through apertures in the plate-carrier and plate, and means for projecting said pins through said plate and for withdrawing said pins flush with or beneath said plate, substantially as set forth.

3. In a plate-printing press, the combination with the plate-carrier, an impression-surface, and an independent rotary gripper-carrier, of mechanism adapted to be projected through the plate for lifting the printed sheet therefrom, and mechanism for checking the rotation of the gripper-carrier in position to receive the sheet into operative engagement with said gripper-carrier, substantially as set forth.

4. In a plate-printing press, the combination with the plate-carrier, an impression-surface, and an independent rotary gripper-carrier, of mechanism adapted to be projected through the plate for lifting the printed sheet therefrom, and friction mechanism for checking the rotation of the gripper-carrier in position to receive the sheet into operative engagement with said gripper-carrier, substantially as set forth.

5. In a rotary plate-printing press, the combination with the plate-cylinder, the impression-cylinder, and an independent rotary gripper-carrier, of means for feeding the sheet to be printed between the plate and impression cylinders after the printing contact between said cylinders has been established, and means for lifting the front edge of said sheet from the plate after receiving its impression into operative engagement with the gripper-carrier, substantially as set forth.

6. In a rotary plate-printing press, the combination with the plate-cylinder, the impression-cylinder, and an independent rotary gripper-carrier, of means for feeding the sheet to be printed between the plate and impression cylinders after the printing contact between said cylinders has been established, a series of pins adapted to be projected through apertures in the body of the engraved plate, and means for projecting and withdrawing said pins whereby the sheet, after receiving its impression, will be lifted into engagement with the gripper-carrier, substantially as set forth.

7. In a rotary plate-printing press, the combination with the plate-cylinder, the impression-cylinder, and an independent rotary gripper-carrier, of means for feeding the sheet to be printed between the plate and impression cylinders after the printing contact between said cylinders has been established, means for lifting the front edge of said sheet from the plate after receiving its impression, and mechanism for checking the rotation of the gripper-carrier in position to receive the lifted edge of said sheet into operative engagement with said gripper-carrier, substantially as set forth.

8. In a rotary plate-printing press, the combination with the plate-cylinder, the impression-cylinder, and an independent rotary gripper-carrier, of means for feeding the sheet to be printed between the plate and impression cylinders after the printing contact between said cylinders has been established, means for lifting the front edge of the sheet from the plate after receiving its impression, and friction mechanism for checking the rotation of the gripper-carrier in position to receive the lifted edge of said sheet into operative engagement with said gripper-carrier, substantially as set forth.

9. In a rotary plate-printing press, the combination with the plate-cylinder, the impression-cylinder, and an independent rotary gripper-carrier, of means for feeding the sheet to be printed between the plate and impression cylinders after the printing contact between said cylinders has been established, a series of pins passing through apertures in the body of the engraved plate, means for projecting and withdrawing said pins whereby the sheet, after receiving its impression, will be lifted, and friction mechanism for checking the rotation of the gripper-carrier in position to receive the lifted sheet into operative engagement with said gripper-carrier, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JUDAH TOURO ROBERTSON.

Witnesses:
L. B. GREGORY,
T. K. JOHNSON.