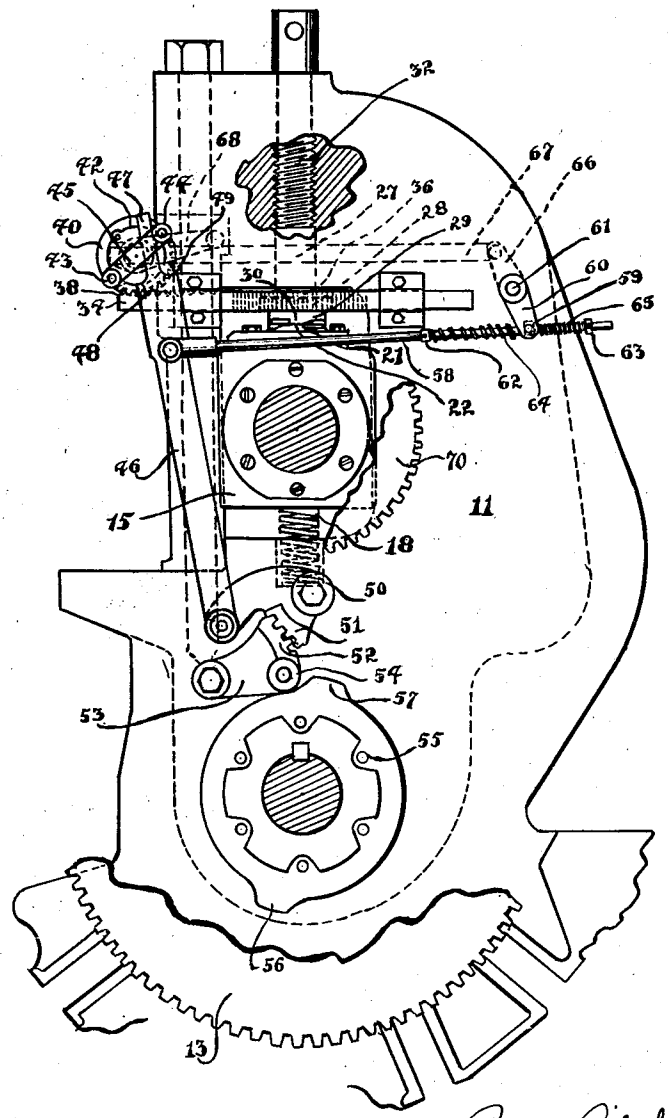
Jan. 20, 1931. P. AITCHISON 1,789,420

PRINTING MACHINE

Filed Jan. 19, 1929 4 Sheets-Sheet 1

Fig. 1.



Peter Aitchison
INVENTOR

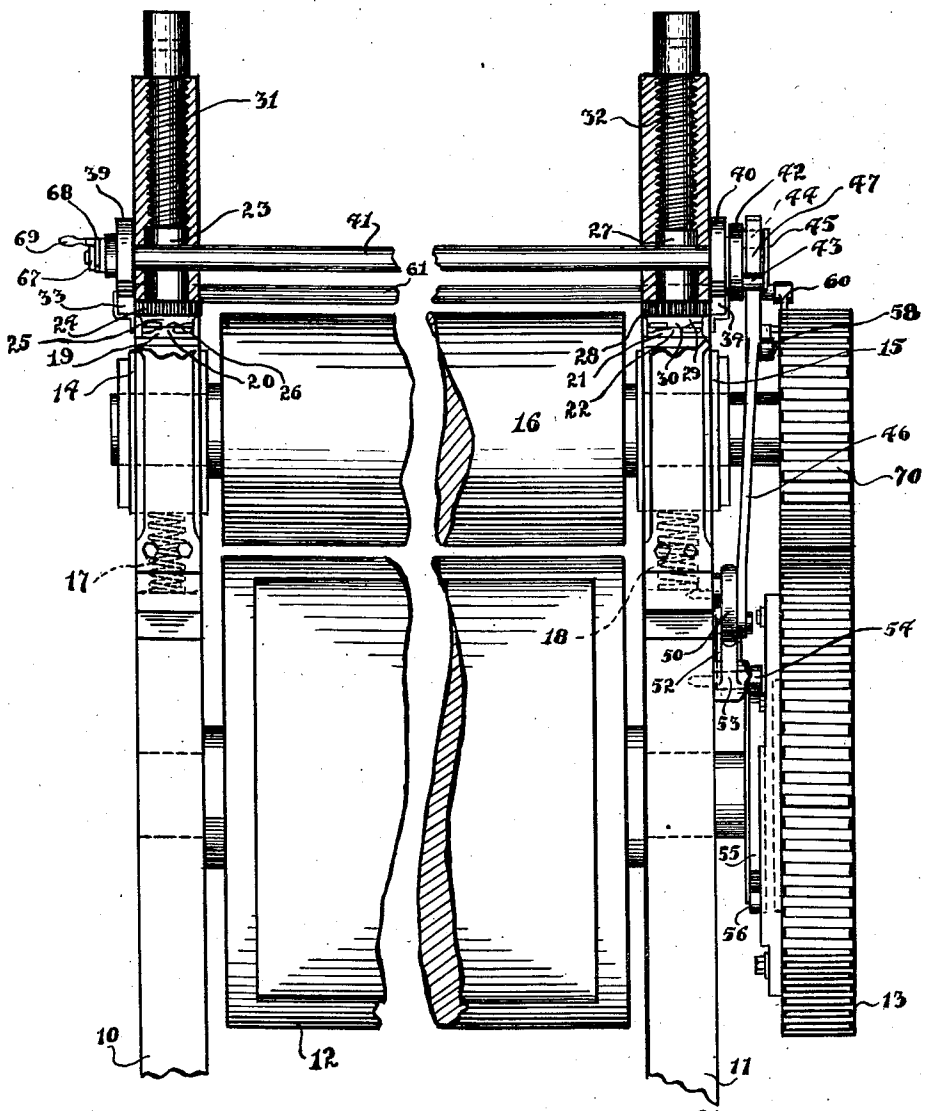
BY Frank P. Wentworth
ATTORNEY.

Jan. 20, 1931. P. AITCHISON 1,789,420

PRINTING MACHINE

Filed Jan. 19, 1929 4 Sheets-Sheet 2

Fig. 2.



Peter Aitchison
INVENTOR

BY Frank P. Westmath
his ATTORNEY.

Jan. 20, 1931. P. AITCHISON 1,789,420

PRINTING MACHINE

Filed Jan. 19, 1929 4 Sheets-Sheet 3

Fig. 3.

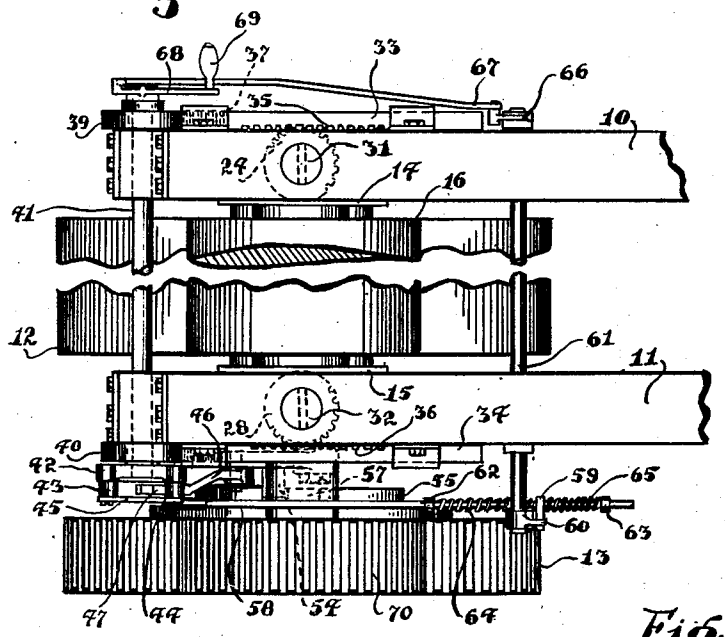


Fig. 4.

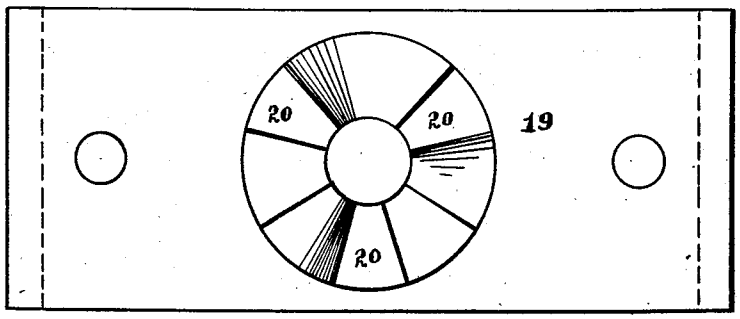
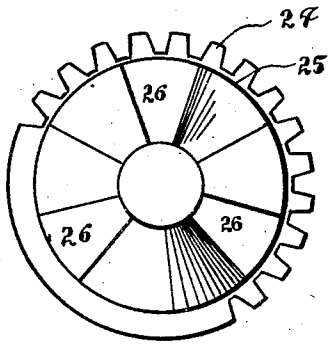


Fig. 5.



Peter Aitchison
INVENTOR

BY Frank P. Wentworth
his ATTORNEY.

Jan. 20, 1931. P. AITCHISON 1,789,420

PRINTING MACHINE

Filed Jan. 19, 1929 4 Sheets-Sheet 4

Fig. 7.

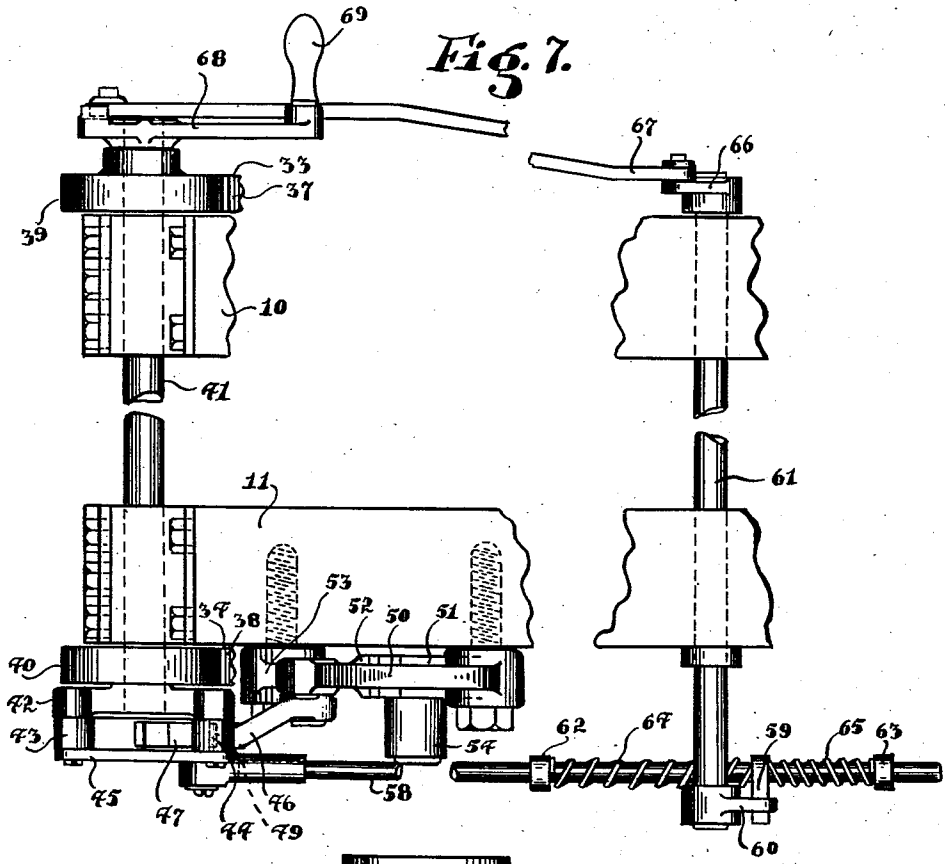
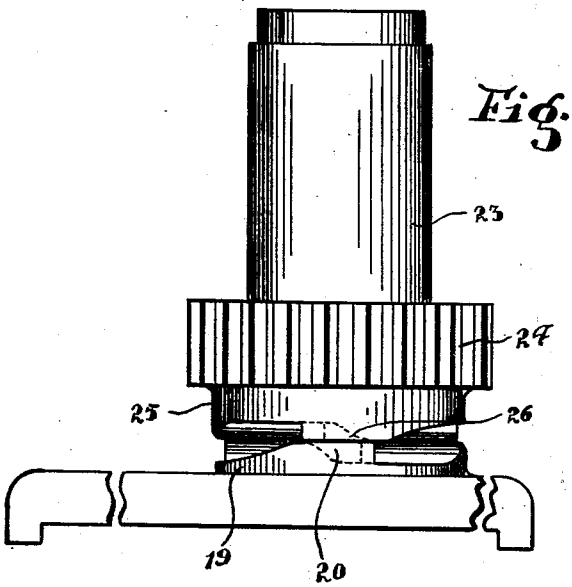


Fig. 6.



Peter Aitchison
INVENTOR

BY Grayson P. Wentworth
ATTORNEY.

Patented Jan. 20, 1931 1,789,420

UNITED STATES PATENT OFFICE

PETER AITCHISON, OF NEW ROCHELLE, NEW YORK, ASSIGNOR TO AMERICAN BANK NOTE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

PRINTING MACHINE

Application filed January 19, 1929. Serial No. 333,542.

The invention relates to printing machines, and more particularly to a throwoff mechanism for undersurface or steel plate printing machines.

Rotary steel plate printing machines present problems not present in any other type of rotary printing machine, due in part to the mechanical conditions necessary to the making of the imprint, and in part to the requirement for substantial uniformity and perfection in all impressions made. Such machines are used exclusively for the highest grade of printing, such as the production of paper currency, bonds, stocks and other negotiable instruments requiring a character of work minimizing the likelihood of successful counterfeiting. Such instruments are printed upon high grade, expensive paper, and it is therefore desirable to reduce the number of imperfect imprints as much as possible, not only because of the paper wastage, but because of the introduction of other complications arising from such wastage in the further procedure in completing the product.

With the above conditions in mind, I have provided a printing machine embodying therein a throwoff mechanism which will not only assure the separation of the members of the printing couple when it is desired to interrupt the operation of the machine, but which will permit the development of a desired pressure relation between these members and the restoration of this pressure relation following the actuation of the throwoff mechanism for the purpose of restoring the members of the printing couple to their co-operating printing relation.

With a throwoff mechanism embodying the invention, the quantity of movement of the impression cylinder or D-roll, upon which the throwoff mechanism acts, will be substantially constant at all times, and adjustment in the machine for determining the pressure relation between the members of the printing couple will not, in any way, disturb the operative relation or functioning of the parts of the throwoff mechanism.

The power utilized for operating the machine is used to actuate the throwoff mechanism, thus ensuring the application of sufficient power to develop that pressure relation between the members of the printing couple necessary to secure a required quality of work. Hence, in a machine embodying the invention, the throwoff mechanism is not only required to effect the separation and bringing together of the members of the printing couple, but to develop and maintain that pressure relation between said members of the printing couple for which the machine is set, when said members are brought together.

The control of the throwoff mechanism is manually operative to establish a relation of parts which will cause the power actuation of the said mechanism only following the completion of, or prior to, the making of the impression by the members of the printing couple, irrespective of the moment of hand actuation of said control mechanism.

The mechanisms used for imparting movement to the impression cylinder or D-roll, away from the plate cylinder, are so constructed and arranged as to not only ensure a properly timed movement of said cylinder, but to permit the convenient adjustment of these mechanisms in a manner to develop therethrough the desired pressure relation between the members of the printing couple. These mechanisms may be so constructed as to minimize wear thereon, since such wear can result only as a result of the actuation of the parts of the throwoff mechanism alone, and not only is their operative effect not modified by wear upon other parts of the machine, but they may be constructed to withstand wear without regard to such other parts.

The invention consists primarily in a printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of complementary cam members operative upon said bearing blocks respectively, one of said cam members being

rotatable about an axis perpendicular to the axis of said impression cylinder or D-roll, means whereby power is applied to said cam members, and manually operative means controlling the application of power thereto; and in such other novel features of construction and combination of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a side view of a printing machine embodying the invention, with portions thereof broken away;

Fig. 2 is an elevation from the left of Fig. 1, or from the feed side of the machine, said view being laterally condensed;

Fig. 3 is a plan view;

Figs. 4, 5 and 6 are detail views of one set of complementary cams through which the position of the impression cylinder or D-roll is controlled; and

Fig. 7 is a detail view in plan of the manual throwoff control and power applying mechanism upon an enlarged scale.

Like numerals refer to like parts throughout the several views.

In the embodiment of the invention shown in the drawings, the upper portion of the side frames of the machine are shown at 10 and 11. Mounted between said side frames is a plate cylinder 12, receiving its power from a main gear 13. Above said plate cylinder, in each of the side frames 10 and 11, are suitable guide openings in which are mounted bearing blocks 14 and 15 for the arbors of the impression cylinder or D-roll 16. Acting upon said bearing blocks with a normal tendency to move them away from the plate cylinder 12, are resilient members, the springs 17 and 18. While the machine is operating, the springs 17 and 18 are under tension, their sole function being to effect the separation of the plate cylinder and the impression cylinder or D-roll, when the throwoff mechanism is so actuated as to permit them to function.

Carried by and movable with the bearing block 14 is a cam plate 19, the risers 20 of which are presented upwardly of the bearing block. Preferably there are three of such risers in order to secure an effective application and distribution of the necessary force to develop the desired pressure relation between the members 12 and 16 of the printing couple. The bearing block 15 is provided with a similar cam plate 21 having similar risers 22.

Rotatably and slidably mounted in the side frame 10 is a stud 23, carrying, toward the free end thereof, a gear wheel 24 and a cam plate 25 having risers 26 thereon corresponding in number and arrangement with the cam plate 19 and its risers 20. One of these cam plates is complementary to the other. Mounted in the other side frame 11 is a similar stud 27, carrying a similar gear wheel 28 and cam plate 29 with its risers 30, this cam plate being complementary to the cam plate 21.

It will be noted that the studs 23 and 27, and the cam carried thereby, are rotatable about an axis perpendicular to the axis of the impression cylinder or D-roll 16.

The pressure relation of the members of the printing couple, while developed by the co-operating complementary cam plates, is determined by the action of the adjusting screws 31 and 32 mounted respectively in the side frames 10 and 11 and bearing respectively against the studs 23 and 27. By this construction, the bearing blocks 14 and 15 may be independently and accurately adjusted, while the machine is operating, to develop the desired pressure relation between the impression cylinder and the plates upon the plate cylinder to secure the desired uniformly accurate imprint, the springs 17 and 18 yielding during such adjustment. It will be noted, that this adjustment, while accomplished by means of the adjusting screws 31 and 32, is through the complementary cam plates 19 and 25, and 21 and 29 so that this adjustment does not in any way disturb or modify the action of the throwoff mechanism.

The necessary power is applied to the cam plates 25 and 29 through slidable racks 33 and 34 mounted upon the side frames 10 and 11 respectively, which racks each have one set of teeth 35 or 36 enmeshed respectively with the gears 24 or 28, and another set of teeth 37 or 38 enmeshed respectively with rack segments 39 or 40 carried by a shaft 41 extending transversely of the machine and mounted in the side frames 10 and 11.

It will be noted that the rack teeth 35 and 36 extend entirely across the rack bars 33 and 34 so as to permit movement of the gears 24 and 28 across said rack bars by the adjusting screws 31 and 32 when adjusting the bearing blocks 14 and 15 to develop the desired pressure relation of the cylinders 12 and 16.

Carried by the shaft 41, at one end thereof, is a disk 42 having spaced impact studs 43 and 44 connected by a bridge plate 45. One of these studs as 43 is used to impart sufficient rotary movement to the shaft 41 to disengage the risers 30 from the risers 22, and the risers 26 from the risers 20, to permit the springs 17 and 18 to function, while the other stud 44 is used to so rotate the shaft 41 as to engage said risers 30 with the risers 22, and said risers 26 with the risers 20 respectively and force the bearing blocks 14 and 15 toward the plate cylinder 12 to an extent to so position the impression cylinder or D-roll 16 as to develop that pressure for which the machine is set by

means of the adjusting screws 31 and 32. The bridge plate 45 is a mere guide.

Power is applied to the studs 43 and 44 by means of a reciprocatory arm 46 having a guide stem 47, positioned between the studs 43 and 44 and held in this position by the plate 45. Adjacent said stem 47 are two shoulders 48 and 49 adapted to be selectively engaged with the studs 43 and 44 according to whether it is desired to separate the members of the printing couple or to bring them together.

This arm 46 is pivoted upon a rocking lever or crank 50, pivoted upon one of the side frames of the machine, as 11, and provided with a segmental rack 51 engaged by a segmental rack 52, carried by an oscillatory plate 53, also pivoted upon the side frame 11. Carried by the plate 53 is an antifriction roller 54 positioned in the path of movement of a cam 55 carried by and rotatable with the main gear 13 of the machine, which in turn rotates with the plate cylinder 12.

In the embodiment of the invention shown, the cylinder 12 is adapted to have two plates mounted thereon. Consequently, the cam 55 has two risers 56 and 57 which are so located as to engage the roller 54 at points in the rotation of said cylinder 12, following the making of an impression.

With the construction of the cam 55, and of the means for transmitting power therefrom to the arm 46 shown in the drawings, it will be noted that reciprocatory movement is imparted to said arm twice during each revolution of the cylinder 12, and that under normal working conditions, these reciprocations have no operative effect upon the throwoff mechanism. In fact, the operative effect of said arm 46 is determined solely by the position in which it may be set, the construction heretofore described, however, being such that the timing in the actuation of the throwoff mechanism by said arm is controlled by the actuation of the cam 55 and not by the actuation of the controlling or setting mechanism.

The arm 46 has pivotally connected therewith a rod 58, passing through an opening in an offset portion 59 pivoted to a crank 60 carried by a shaft 61. Said rod 58 has collars 62 and 63 thereon upon opposite sides of the offset portion 59, and between said offset portion and said collars respectively are springs 64 and 65 so as to permit the reciprocation of said rod 58 in either direction through spring tension which will not only permit ease of movement of the parts, but avoid any nicety of adjustment of the manually operative control means and the studs 43 and 44 and the arm 46.

Carried by the shaft 61 upon the other side of the machine, is a crank arm 66 which is connected by a link 67 with a crank 68, idly mounted upon the shaft 41. This crank 68 is provided with a diametrically opposite crank handle 69. This arrangement is merely for the purpose of bringing the manual control closely adjacent the feeder so that in case of a failure to feed a sheet, the throwoff mechanism may be actuated.

By the construction herein described, the cam plates 19, 25, 21 and 29 may be made of metal selected merely by reason of its durability and strength, which metal may be case hardened to increase its wearing properties. Furthermore, by this construction, the impression cylinder or D-roll gear 70 may be secured to an arbor of said cylinder, ordinary bushings being used where required throughout the machine, including the bushings for the arbors of the impression cylinder or D-roll.

The operation of the herein described printing machine is substantially as follows:—

Under normal working conditions, the impression cylinder or D-roll 16 is maintained in a position where it successively engages the plates upon the plate cylinder 12, which plates are spaced apart a distance sufficient to permit the actuation of the wiping and polishing cloths between impressions.

With undersurface engraved or intaglio plates it is necessary, to ensure the effective picking up of the ink throughout every portion of the design upon the plate, that considerable pressure be developed as a result of the engagement of the impression cylinder or D-roll blanket therewith, and that the impression cylinder or D-roll be adjusted with great nicety in relation to the plate cylinder, notwithstanding the use of a yieldable blanket upon the impression cylinder or D-roll. If it be found that an improper pressure condition exists, whether the pressure be excessive or inadequate, the adjusting screws 31 or 32 or either of them may be actuated to move the bearing blocks 14 and 15 toward or from the plate cylinder 12, while trial impressions are being made, until the proper pressure conditions, at every point of the width of the plate, are secured. The springs 17 and 18 permit movement of said bearing blocks toward the plate cylinder, and move them away from the plate cylinder, according to the direction in which the adjusting screws 31 and 32 are turned. Such adjustment is never very great. When the proper pressure relation has been established, the operation of the press is that of the ordinary steel plate or undersurface printing machine.

During each rotation of the plate cylinder 12, the risers 56 and 57 upon the cam 55 oscillate the plate 53, and through the gear segments 51 and 52, oscillate the lever 50 and thus raise and lower the arm 46. The movements of this arm, however, have no effect, so

long as it is so positioned that the shoulder 48 or 49 thereof will not engage one of the studs 43 or 44, or so long as the studs are not so positioned as to be engaged by said shoulders. This position of the arm 46 is maintained by the spring rod 58, shaft 61, cranks 59 and 66, link 67 and crank 68.

While the machine is operating to make impressions, the risers 20 will be engaged with the risers 26, and the risers 22 will be engaged with the risers 30, the set screws 31 and 32 taking up the thrust upon the cooperating cam plates through the studs 23 and 27 respectively.

Assuming that the parts are in the position shown in Fig. 1, which position is that of the parts immediately following or immediately before the making of an impression, and that the operator, prior to the completion of this impression, desires, for some reason, such as the failure to properly position a sheet upon the feed shelf, to separate the members of the printing couple and thus prevent offsetting upon the blanket of the impression cylinder or D-roll 16, it is merely necessary to impart about a half turn to the crank 68 by means of the hand crank 69 at any time prior to the engagement of the riser 56 with the roller 54. The turning of the crank 68 forces the link 67 to the right, Fig. 1, thus rocking the shaft 61 through the crank arm 66 and moving the crank 60 to the left so that the rod 58 is moved through the tension of the spring 64 to impart oscillatory movement to the arm 46 about its pivot upon the lever 50. The spring 64 permits the extension 47 to be thrust against the stud 43, irrespective of the position of the arm 46, and causes said extension to follow said stud upon the next upward movement of the arm 46 by the riser 56 of the cam 55. The arm 46, however, has no oscillatory movement by the lever 50 until the riser 56 engages the wheel 54.

The spring 64 permits movement of the hand crank 69 notwithstanding that at the moment, the arm 46 may be in its elevated position and that the side of this arm, below the stem 47, may be in engagement with the stud 43, and thereafter completes the setting of the arm 46, when the parts are so positioned as to permit the shoulder 48 to pass below said stud 43.

With the continued rotation of the cam 55, and prior to the engagement of the impression cylinder or D-roll with a succeeding plate upon the plate cylinder, the riser 56 engages the roller 54, raises the plate 53, and, through the gears 51 and 52 and lever 50, raises the arm 46. The shoulder 48 being engaged with the stud 43, this movement of the arm 46 results in the turning of the shaft 41 and of both gears 39 and 40 carried thereby. The turning of these gears imparts movement to the slides 33 and 34, which movement in turn rotates the gears 24 and 28, thus imparting movement to the cam plates 25 and 29 in relation to the cam plates 19 and 20 carried by the bearing blocks 14 and 15 respectively. This movement of the cam plates 25 and 29 causes the risers 26 and 30 to pass out of engaging relation with the risers 20 and 22 upon the cam plates 19 and 20 and thus permits the springs 17 and 18 to raise said bearing blocks 14 and 15 to an extent determined by the height of said risers.

It will be noted that the studs 23 and 27 permit the free rotation of the gears 24 and 28 and the cam plates carried thereby, and that this functioning of said cam plates does not in any way disturb the adjustments of the throwoff mechanism secured by means of the screws 31 and 32.

While the stud 44, when the machine is in operation, is out of the range of movement of the shoulder 49 upon the arm 46, the rotation of the disk 42 carrying these studs will bring said stud 44 into the range of movement of said shoulder, although the stem 47 and rod 58 cause the shoulder to be positioned to one side of the stud where it cannot operatively engage same. Consequently, after the throwoff mechanism has once been actuated to separate the members of the printing couple, the continued rotation of the plate cylinder 12 and of the cam 55 will have no operative effect to bring the members of the printing couple again into operative relation unless the manual control for the throwoff mechanism is actuated to establish a relation of parts which will accomplish this result.

When it is desired to bring the impression cylinder or the D-roll into the printing relation with the plates upon the plate cylinder, it is merely necessary to reverse the movement of the hand crank 69 to bring it to the position shown in Fig. 1. This exerts a pull upon the link 67 imparting a reverse movement to the shaft 61 and to the cranks carried thereby, and through the tensioning of the spring 65, moves the arm 46 to the position shown in Fig. 1, where the shoulder 49 is positioned below the stud 44, so that upon the engagement of the riser 56 or 57 upon the cam 55 with the roller 54, the resultant up-thrust of the arm 46 will impart a reverse rotary movement to the disk 42, the shaft 41 and the gears 39 and 40 carried thereby. Such movement of said gears will move the rack bars 33 and 34 to the right into the position shown in Fig. 1, thus engaging the risers 26 and 30 of the cam plates 25 and 29 with the risers 20 and 22 of the cam plates 19 and 21 and forcing the bearing blocks 14 and 15 toward the plate cylinder 12 to a position which will develop the desired pressure, determined by the setting of the screws 31 and 32, upon the engagement of the blanket of the impression cylinder of D-roll with plates

upon said cylinder 12. The spring 65 has the same operative effect as the spring 64 in securing a timely oscillatory movement of the arm 46, irrespective of the moment of actuation of the hand crank 69.

The springs 17 and 18 maintain a proper position of the co-operating cam plates and the gears 24 and 28 notwithstanding that the studs 23 and 27 are slidably mounted in relation to the frame of the machine.

The pivoted offset portion 59 of the crank 60 permits the link 58 to rock with the reciprocations and oscillations of the arm 46.

It will be noted that the quantity of movement of the bearing blocks 14 and 15 is determined entirely by the height of the risers upon the cam plates 19, 25, 21 and 29, and that the quantity of this movement is not affected by the adjustment secured by means of the screws 31 and 32. It will also be noted that the only wear occurring upon said cam plates is due to the actuation of the throwoff mechanism, and, aside from the wear resisting properties of these plates due to case hardening, that this wear is negligible.

The screws 31 and 32 may be used to take up wear upon the bearings of the members of the printing couple, this however being a mere incident to the development of the necessary pressure relation between said members.

It is not my intention to limit the invention to the precise details of construction and combination of parts herein shown and described, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of complementary cam members operative upon said bearing blocks respectively, one of said cam members being rotatable about an axis perpendicular to the axis of said impression cylinder or D-roll, means whereby power is applied to said cam members, and manually operative means controlling the application of power thereto.

2. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of complementary cam members operative upon said bearing blocks respectively, one of said cam members being rotatable about an axis perpendicular to the axis of said impression cylinder or D-roll, adjusting screws acting upon said cam members respectively and operative to adjust the pressure relation between said plate cylinder and said impression cylinder or D-roll, means whereby power is applied to said cam members, and manually operative means controlling the application of power thereto.

3. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably mounted adjacent to and co-operating with said other cam plates respectively, said complementary cam plates being rotatable about an axis perpendicular to the axis of said impression cylinder or D-roll, means whereby power is applied to said rotatable cam plates, and manually operative means controlling the application of power thereto.

4. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably and slidably mounted adjacent to and co-operating with said other cam plates respectively, said complementary cam plates being rotatable about an axis perpendicular to the axis of said impression cylinder or D-roll, adjusting screws acting upon said complementary cam plates respectively and operative to adjust the pressure relation between said plate cylinder and said impression cylinder or D-roll, means whereby power is applied to said rotatable cam plates, and manually operative means controlling the application of power thereto.

5. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably mounted adjacent to and co-operating with said other cam plates respectively, gears carried by said complementary cam plates respectively, sliding racks enmeshed with said gears, means whereby said racks may be actuated, means for applying power to said last named means,

and manually operative means controlling the application of such power.

6. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably and slidably mounted adjacent to and co-operating with said other cam plates respectively, adjusting screws acting upon said complementary cam plates respectively and operative to adjust the pressure relation between said plate cylinder and said impression cylinder or D-roll, gears carried by said complementary cam plates respectively, sliding racks enmeshed with said gears, means whereby said racks may be actuated, means for applying power to said last named means, and manually operative means controlling the application of such power.

7. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably mounted adjacent to and co-operating with said other cam plates respectively, gears carried by said complementary cam plates respectively, sliding racks enmeshed with said gears, a shaft, gears carried thereby enmeshed with said sliding racks respectively, spaced studs carried by and movable with said shaft, a shouldered arm adapted to be selectively engaged with said studs to determine the direction of movement of said shaft, means rotatable with said plate cylinder, whereby said arm is reciprocated, and manually operative means whereby said arm may be so positioned as to engage either of said studs.

8. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably and slidably mounted adjacent to and co-operating with said other cam plates respectively, adjusting screws acting upon said complementary cam plates respectively and operative to adjust the pressure relation between said plate cylinder and said impression cylinder or D-roll, gears carried by said complementary cam plates respectively, sliding racks enmeshed with said gears, a shaft, gears carried thereby enmeshed with said sliding racks respectively, spaced studs carried by and movable with said shaft, a shouldered arm adapted to be selectively engaged with said studs to determine the direction of movement of said shaft, means rotatable with said plate cylinder, whereby said arm is reciprocated, and manually operative means whereby said arm may be so positioned as to engage either of said studs.

9. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably mounted adjacent to and co-operating with said other cam plates respectively, gears carried by said complementary cam plates respectively, sliding racks enmeshed with said gears, a shaft, gears carried thereby enmeshed with said sliding racks respectively, spaced studs carried by and movable with said shaft, a shouldered arm adapted to be selectively engaged with said studs to determine the direction of movement of said shaft, means rotatable with said plate cylinder, whereby said arm is reciprocated, a shaft having a plurality of cranks thereon, a crank mounted adjacent said shaft carrying said gears, a hand crank for actuating same, a link connecting one of the cranks of said crank shaft with said manually operative crank, a rod pivotally and slidably mounted in the other crank of said crank shaft and pivotally connected with said arm, collars upon said rod, and springs between said collars respectively and said crank arm.

10. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably mounted adjacent to and co-operating with said other cam plates respectively, gears carried by said complementary cam plates respectively, sliding racks enmeshed with said gears, a shaft, gears carried thereby enmeshed with said sliding racks respectively, spaced studs carried by and movable with said shaft, a shouldered arm adapted to be selectively engaged with said studs to determine the direction of movement of said shaft, a rocking lever piv-

oted to said shouldered arm, a rack upon said lever, an oscillatory plate, a rack thereon enmeshed with the rack upon said lever, a cam plate carried by and rotatable with said plate cylinder and operative upon said rocking plate, whereby said arm is reciprocated as a result of the rotation of said plate cylinder, and manually operative means whereby said arm may be so positioned as to engage either of said studs.

11. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably mounted adjacent to and co-operating with said other cam plates respectively, adjusting screws acting upon said complementary cam plates respectively and operative to adjust the pressure relation betwen said plate cylinder and said impression cylinder or D-roll, gears carried by said complementary cam plates respectively, sliding racks enmeshed with said gears, a shaft, gears carried thereby enmeshed with said sliding racks respectively, spaced studs carried by and movable with said shaft, a shouldered arm adapted to be selectively engaged with said studs to determine the direction of movement of said shaft, a rocking lever pivoted to said shouldered arm, a rack upon said lever, an oscillatory plate, a rack thereon enmeshed with the rack upon said lever, a cam plate carried by and rotatable with said plate cylinder and operative upon said rocking plate, whereby said arm is reciprocated as a result of the rotation of said plate cylinder, and manually operative means whereby said arm may be so positioned as to engage either of said studs.

12. A printing machine embodying therein the combination with a plate cylinder, an impression cylinder or D-roll, bearing blocks therefor movable toward and from said plate cylinder, and resilient members acting upon said bearing blocks with a normal tendency to impart movement thereto away from said plate cylinder, of cam plates carried by and movable with said blocks respectively, complementary cam plates rotatably mounted adjacent to and co-operating with said other cam plates respectively, adjusting screws acting upon said complementary cam plates respectively and operative to adjust the pressure relation between said plate cylinder and said impression cylinder or D-roll, gears carried by said complementary cam plates respectively, sliding racks enmeshed with said gears, a shaft, gears carried thereby enmeshed with said sliding racks respectively, spaced studs carried by and movable with said shaft, a shouldered arm adapted to be selectively engaged with, and having a guide stem extending between, said studs, to determine the direction of movement of said shaft, a rocking lever pivoted to said shouldered arm, a rack upon said lever, an oscillatory plate, a rack thereon enmeshed with the rack upon said lever, a cam plate carried by and rotatable with said plate cylinder and operative upon said rocking plate, whereby said arm is reciprocated as a result of the rotation of said plate cylinder, a shaft having a plurality of cranks thereon, a crank mounted adjacent said shaft carrying said gears, a hand crank for actuating same, a link connecting one of the cranks of said crank shaft with said manually operative crank, a rod pivotally and slidably mounted in the other crank of said crank shaft and pivotally connected with said arm, collars upon said rod, and springs between said collars respectively and said crank arm.

In witness whereof I have hereunto affixed my signature, this 11th day of January, 1929.

PETER AITCHISON.