

June 1, 1937.

M. H. HILL

2,082,396

PRINTING PRESS

Filed May 15, 1935

4 Sheets-Sheet 1

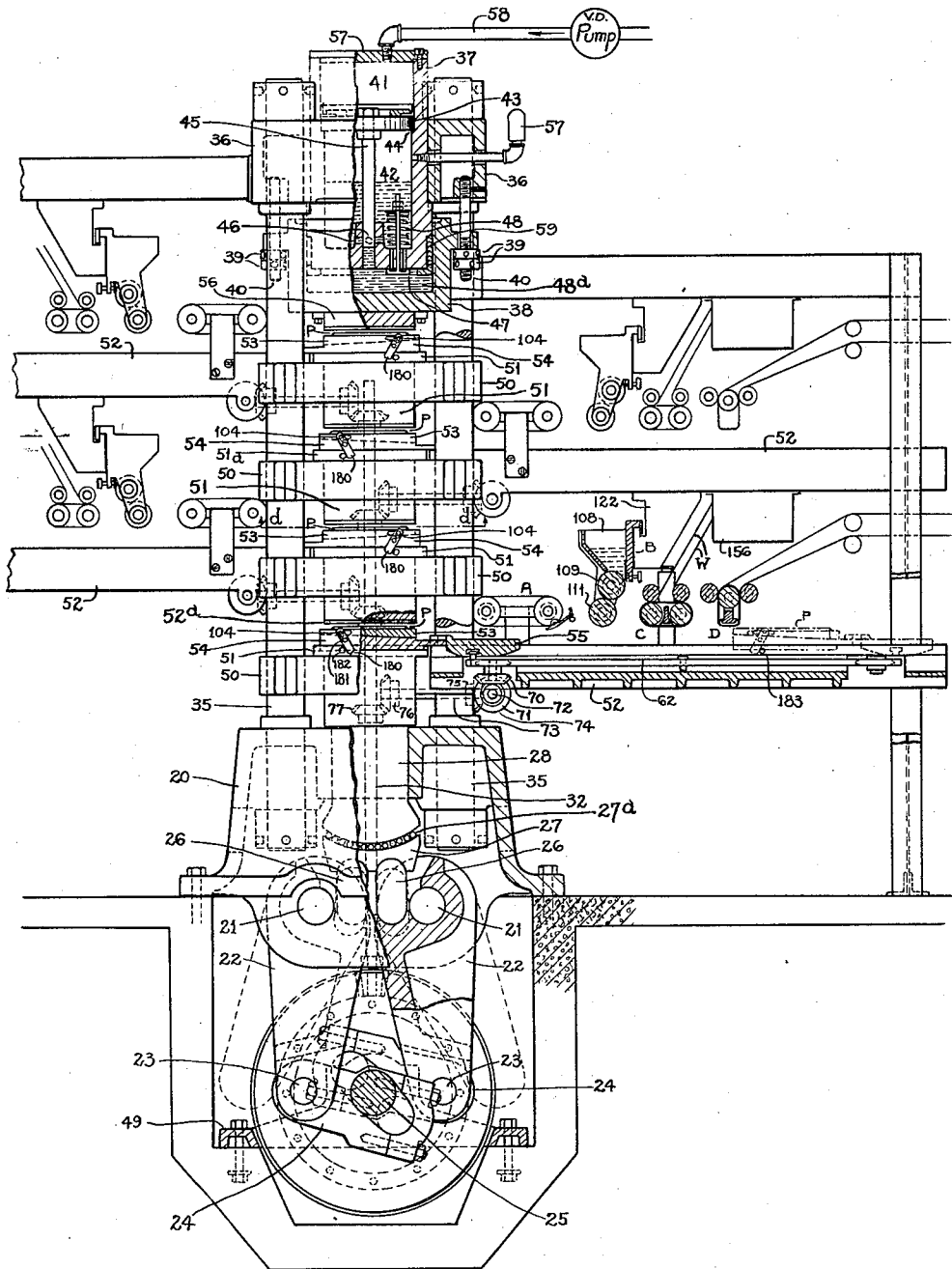


Fig. 1

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4 Sheets-Sheet 2

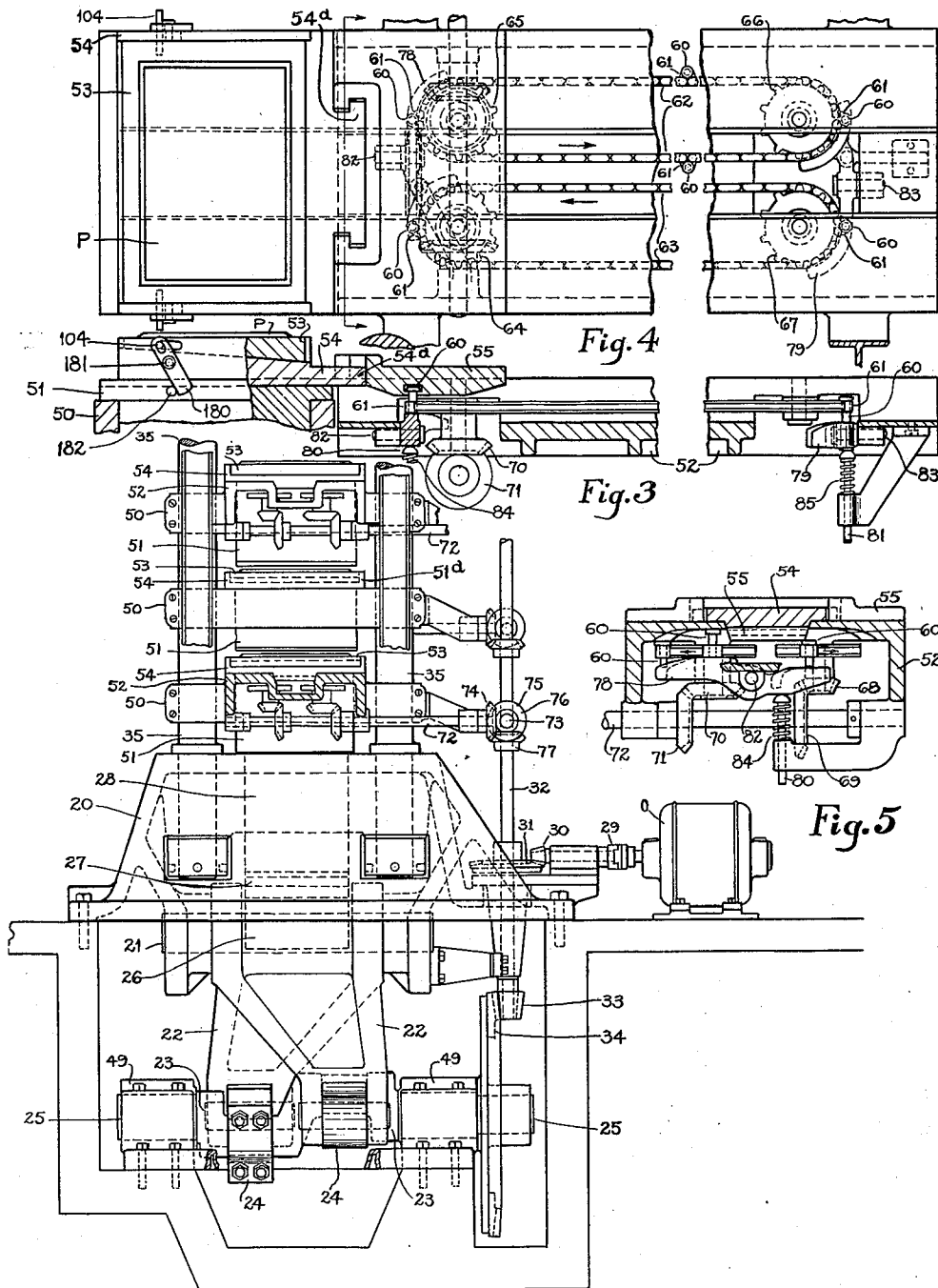


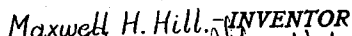
Fig. 2

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4 Sheets-Sheet 4

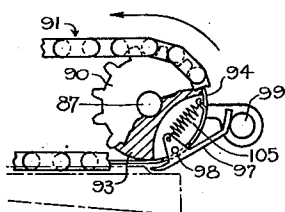


Fig. 20

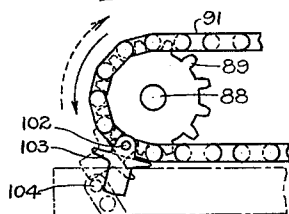


Fig. 21

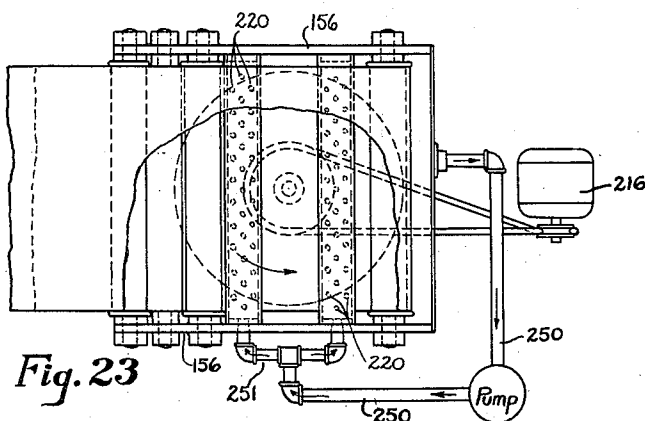


Fig. 23

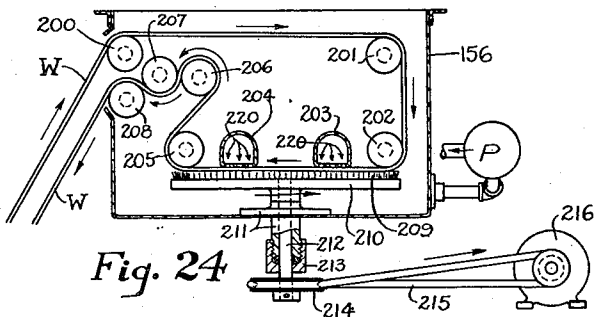


Fig. 24

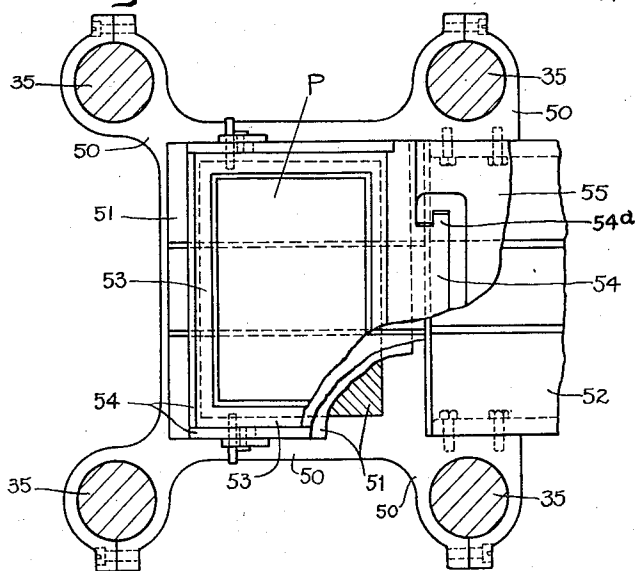


Fig. 22

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## UNITED STATES PATENT OFFICE

2,082,396

## PRINTING PRESS

Maxwell H. Hill, Rochester, N. Y.

Application May 15, 1935, Serial No. 21,612

11 Claims. (Cl. 101—316)

The present invention relates to a machine for printing, or more particularly to presses for producing printed sheets or impressions from engraved plates, or dies and it has for its general object to overcome many of the faults existing in machines now used for this purpose. In machines in which the impression is produced by means of a pressure roller applied to the back of the printed sheet, distortion of the paper is apt to result while in machines in which the engraved plates must be formed to fit the periphery of a drum a bending operation is entailed which is both costly and dangerous to the welfare of the plates with distortion of the printed sheet an accompanying fault. To overcome these and other objections it is my purpose to print from plates which are substantially flat, to print from one or more plates at the same time, to apply pressure over the whole surface of the plate or plates simultaneously, to prepare the surface of shiftable plates for printing by a simple motion thereof relative to accompanying sheet removing, cleaning and inking devices to maintain the timed relationship of the various movements and functions in a simple manner, and to observe economy in the use of power in order to produce with efficiency and economy.

A principal purpose in this invention is to provide means for producing and applying pressure of considerable magnitude for the printing operation, and as a further improvement to maintain opposing this force a resistant means with a readily adjustable means for varying the amount of resistance to the produced force, to meet the varying conditions encountered in using different classes of engraving, and variations in the texture of the printed sheets. My improvements are directed in part specifically toward the method of preparing the engraved plates for the printing operation, to which end I arrange for a simple movement thereof outwardly or transversely from the station where the printing is done and for return in like manner. During these combined movements the plate is stopped, cleaned, inked and a fresh sheet deposited thereon.

To these and other ends, the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings:

Fig. 1 is a view in elevation, partly broken away to more clearly show important parts.

Fig. 2 also in elevation, and partly in section

is a view taken at right angles to Fig. 1 the upper part being broken away and omitted.

Fig. 3 is a sectional view taken generally thru the center of Fig. 4 and showing to a somewhat larger scale the mechanism for moving the plates and associated parts.

Fig. 5 is an end view of Fig. 4, partly in section.

Fig. 6 is a plan view of a mechanism as arranged for removing the printed sheets from adherence to the plates.

Fig. 7 is an end view of Fig. 6. The plate and associated parts are shown in construction lines in Figs. 6 and 7 to show the relative position during this operation.

Fig. 8 is a sectional view on the line *a-a* of Fig. 6.

Fig. 9 is a plan view of a wiping mechanism.

Fig. 10 is an end view of Fig. 9.

Fig. 11 is an opposite end view of Fig. 9 showing means for feeding the wiping medium.

Fig. 12 is a sectional view on the line *b-b* of Fig. 9.

Fig. 13 is a fragmentary side view of Fig. 9 showing means for holding the mechanism in pressure contact with the plate for the wiping operation.

Fig. 14 is a plan view of the inking mechanism.

Fig. 15 is an end view of Fig. 14 partly broken away.

Fig. 16 is a plan view of a wiping mechanism forming a modification of that shown in Fig. 9.

Fig. 17 is an end view of Fig. 16 showing means for turning the rolls and advancing the belt and the wiping medium thereon.

Fig. 18 is a sectional view on the line *c-c* of Fig. 16.

Fig. 19 is an end view of Fig. 16 and a projection thereof;

Fig. 20 is an enlarged duplication of a portion of the showing of Fig. 7.

Fig. 21 is an enlarged duplication of another portion of the showing of Fig. 7.

Fig. 22 is an enlarged horizontal section taken just above one of the plate carriers showing the latter and adjacent parts partly broken away but otherwise in plan view.

Fig. 23 is an enlarged top view partly broken away of one of the washing units for the plate cleaning device, and

Fig. 24 is a vertical section taken substantially centrally through Fig. 23.

Similar reference numerals throughout the several views indicate the same parts.

### The power unit

Referring more particularly to the drawings and first describing the press mechanism, a base 20 Figs. 1 and 2 is formed on its lower side to provide journals for shafts 21—21 which serve as pivotal connections or wrist pins for levers 22—22. The lower ends of levers 22—22 are formed to receive pins 23—23 which serve to form a hinged connection for connecting links 24—24. The links 24—24 are constructed to encircle the offset portions or cranks of a crankshaft 25 which is rotatably mounted in a suitable bearing and support 49. The upper ends of levers 22—22 are provided with curved seats to receive the oval blocks 26—26 which constitute in effect a pair of links. These oval blocks at their upper ends fit into the dual curved under surface of a concavo-compensating saddle block 27. The upper surface of block 27 may be described as a portion of a reentrant cylindrical surface. Above block 27 is a sliding member 28 guided in a suitable opening in the base 20. The lower surface of member 28 is a complementary surface to that of the upper surface of compensating block 27 and a series of rollers 27<sup>a</sup> are interposed to minimize friction between these surfaces. A driving means such as a pulley or a motor shown at O, Fig. 2, turns the pinion and shaft 30 thru coupling 29 and with it the mating gear 31 fixed to vertical shaft 32. The shaft 32 carries at its lower end a pinion 33 which meshes with a gear 34 fixed to crankshaft 25. It will be seen that as the crankshaft 25 is rotated by means of the gear 34, pinion 33, shaft 32, and gears 31 and 30, that the levers 22—22 are caused to oscillate about the centers of shafts 21—21 the lower ends being alternately drawn together and thrust apart by the action of the crankshaft 25 and the connecting links 24—24 and by this motion a nearly vertical reciprocating motion is imparted to the oval blocks 26—26 and a vertical motion to the block 27 and member 28, a powerful upward thrust being imparted to these parts. The purpose of the compensating block 27 is to adjust itself about the curved under surface of the sliding member 28 in order to dispose the load uniformly upon the blocks 26—26 and the levers 22—22, thus compensating for any variation in the symmetrical construction of the parts between the sliding member 28 and the crankshaft 25 and/or variation arising from any slight difference in angularity of the connecting links 24—24.

### The platen resistance

Fixed in the base 20 are posts 35—35—35—35 which serve to support and hold at the top a yoke 36 in which is fixed a stationary ram 37. The lower part of ram 37 is adapted to fit into the bore of a cylinder 38. The cylinder 38 is mounted for limited movement thereon and its downward movement is restricted by lugs, integral therewith, which contact the adjustable nuts 39—39 threaded upon rods 40—40 fixed in yoke 36. The ram 37 is provided with an internal bore, which is divided into two chambers 41 and 42 by the piston head 43 which is slidably mounted therein and normally rests upon a shoulder or seat 44 formed in the inside bore of ram 37. A rod 45 is fixed in piston 43 and moves therewith. The lower end of rod 45 extends into a hole formed in the lower part of ram 37 and fits closely but movably therein.

46—46 are ports through the inside raised portion of ram 37, and are normally closed or blocked by the end of rod 45. A check valve 47 is mounted in the lower part of ram 37 and adapted to admit the flow of liquid downwardly from chamber 42 of ram 37 into the space allowed in cylinder 38, but not in the opposite direction, it being held closed against counter movement of the liquid by a spring 48. A suitable liquid is supplied as shown by the horizontal shade lines, Fig. 1, which fills the space indicated at 48<sup>a</sup>, in cylinder 38, and extends somewhat up into the chamber 42 of ram 37. Preferably air is supplied to chamber 42 with sufficient pressure to act against the liquid in that chamber and cause the valve 47 to open and admit the flow to cylinder 38 to overcome frictional resistance and move the latter until the lugs on cylinder 38 contact the nuts 39—39 and hold cylinder 38 in what may be said to be its normal position, when valve will be closed by spring 48. Preferably air is similarly supplied to chamber 41 of ram 37, but at a greater pressure than that existing in chamber 42. This pressure acts against the top surface of piston 43 holding it against the seat 44 and with it the rod 45, holding it against counter movement which would be occasioned by the pressure in chamber 42 against the under side of piston 43 and keeping it in position to block the ports 46—46.

### The platen and plate supports

Mounted upon the posts 35, are suitable frames 50, Figs. 1, 2, and 22 which are adapted to receive the floating filler blocks 51 which depend therein. These filler blocks are slidably mounted therein and normally rest upon a rim or flange 51<sup>a</sup> formed at their tops which contact the frames 50. The top surface of blocks 51 are formed to constitute a continuation of the slide surface of beds 52, which extend outwardly therefrom, (Fig. 3). The bottom surfaces of blocks 51 are faced as indicated at 52<sup>a</sup>, with a suitable resilient material to contact the backs of the printed sheets, and which is known to be efficacious to those skilled in the art for this class of printing. The engraved plates P are mounted upon backing plates 53, the under surfaces of which are inclined, and fit against complementary inclined surfaces of carriers 54. Extensions of carriers 54 are T shaped, as indicated at 54<sup>a</sup>, see Fig. 4, to engage similar T shaped openings in carriages 55. These jointly constitute vertical guides so that independent vertical movement of carriers 54 is possible without breaking the connection or disturbing the carriages 55. Parts 54 and 55 are adapted to slide upon the beds 52 and carry with them the plates P and associated parts while the printed sheets are removed and the surfaces of the engraved plates are being inked, wiped and otherwise prepared for the next printing operation.

### The press operation

I may assume for my description of the actual press operation which will now be described, that the plates have been prepared for printing and have been returned to the positions as shown by full lines in Fig. 1. At this time the crankshaft has been revolved to the approximate position shown, the lower ends of levers 22—22 are being drawn together and impart an upward movement to member 28 as previously described. As sliding member 28 moves upward the lower filler

block 51 will be contacted and raised, and with it the carrier 54, backing plate 53, engraved plate P and associated parts. As this movement continues all the interposed moving parts between member 28 and the last resistance block 56 attached to cylinder 38 will have been brought into contact. It is apparent that further movement will be resisted by the pressure existing, and caused to exist, by any movement in cylinder 38.

Movement upwardly of cylinder 38 is opposed by the pressure of the liquid trapped in the cylinder, at 48<sup>a</sup> as aforementioned, by the stationary ram 37. This pressure applies also against the end area of the rod 45, tending to lift it and the piston 43 against the pressure existing in chamber 41. The upward movement of cylinder 38 will cause the pressure of the oil body 48 to rise sufficiently to lift rod 45 and open access to parts 46, allowing the liquid in 48<sup>a</sup> to escape into chamber 42 but still maintained under pressure in cylinder 38 due to the reaction of rod 45 and piston 43 under pressure from chamber 41.

This pressure period is utilized for the printing operation. When the continued rotation of crankshaft 25 permits the downward movement of the interposed parts, because of their own weight, it is apparent that rod 45 and piston 43 will immediately operate downward to close ports 46; the pressure in chamber 48<sup>a</sup> of cylinder 38 due to its upward movement against the resistance of rod 45 and piston 43 will immediately cease when the piston has contacted its seat 44, and the cylinder will be returned to its normal position by the lesser pressure of chamber 42 causing a flow of liquid thru valve 47.

To put it the other way around, the consequent lowering of cylinder 38 through its own weight, plus the pressure in chamber 42, plus the pressure in chamber 41, restores it to its initial position when the pressing down is relieved. Normal pressure in the chamber 48<sup>a</sup> of the cylinder is restored through passage of the liquid thereto through the ports 46 for a moment and then through valve 47 until the former balance is restored in 42. In the meantime, piston 43 is re-seating because of the pressure in 41, which expedites the previous functions and causes the stem 45 to close the ports 46 as the printing pressure on the end of the stem is relieved. It is probable that the normal leakage past piston 43 would bring the pressure in chamber 42 to equal that existing in chamber 41 if it were allowed to accumulate. To prevent this a relief valve 57 is placed to communicate with chamber 42 and prevent the pressure therein rising above a desired amount. It is further apparent that by varying the pressure supplied to chamber 41, a greater or less resistance to lifting will be imparted to rod 45 and piston 43 which will in turn cause a greater or less resistance to yielding movement of cylinder 38 under the stress of making the printing impression. I therefore have a cylinder arranged to resist movement in one direction by a controllable amount, which may be varied at will in a simple and easy manner. By this means the interposed parts between which the impressions on the printed sheets are made can be subjected to a controlled pressure. It may be further pointed out that by varying the position of the stop nuts 39—39 on the rods 40—40, the cylinder 38 may be made to move thru a greater or less distance. By this means the duration of pressure or time of pressing may be varied within desirable limits.

Chamber 41 is closed by cover plate 57 at top. A supply pipe 58 is shown leading into chamber 41, by which air and any hydraulic liquid lost through packing 59 of cylinder 38 may be reintroduced into chamber 41 and thence by ordinary leakage past piston 43 into chamber 42 and cylinder 38. In other words, the amplitude of the yielding resistance is controlled by the hanger nuts 39 and the magnitude of the resistance is controlled by the pressure in chamber 41.

#### *The plate carriers*

Extending outwardly from posts 35 and frames 50 (Figs. 1 and 2) are slide beds 52, all of similar construction so only one need be described. The upper surface of bed 52 is formed to constitute a bearing surface or track having a depressed center in which a projection on carriage 55 and carriers 54 moving in conjunction therewith is adapted to fit and run. Substantially a continuation of this surface is also provided on the top surfaces of filler blocks 51 already referred to. Essentially the same surface serves as a slide bed for both carriage 55 and carrier, but the projection provided on the carriage fits somewhat further into this depressed part, as shown clearly in Figs. 3 and 5. A slot of T form extending across the projection on carriage 55 is adapted to receive the heads of pins 60, which are slidably mounted in a vertical direction in extra links 61 which form part of the chains 62, 63. The chains 62, 63 are carried on rotatable sprockets 64, 65, 66, 67 and driven therefrom by means of gears 68, 69, 70, 71, shaft 72 and gears 74, 75, and 76 on shaft 73 from gear 77 on vertical shaft 32. See Figs. 1 and 2. The chains 62 and 63 are directed so that the portions of same which travel in the depressed part of bed 52 move in opposite directions. To assist in analysis of this mechanism, directional arrows are shown in Fig. 4. The levers 78, 79 are movably mounted on studs 82, 83 fixed in the under side of bed 52 and are adapted to be swung about the centers thereof. The ends of levers 78, 79 terminate in arcuate cam surfaces adapted to contact the under ends of pins 60 to cause them to rise out of the chain links 61 in which they are carried and engage the cross T slot in carriage 55. It is apparent that the levers may be rocked periodically by any suitable means to cause the engagement of pins 60 with carriage 55. In the embodiment shown, the levers are actuated from the pins themselves to accomplish this purpose, the pins being so located in the chains that the periodical motion, as also the periodical dwell of carriage 55, carrier 54, plate P and associated parts moving therewith, is attained.

The spring pressed plungers 80 and 81 are located to urge the levers 78, 79 to swing about the studs 82, 83 in one direction due to the pressure of springs 84, 85. The gears 68, 69, 70, 71 are so proportioned that, when the chains are driven, 2 pins on the respective chains arrive approximately at the ends of their movements at the same time. As the pin on chain 63 approaches the end of its movement, as shown by directional arrow for chain 63, it will be prevented from rising out of the link in which it is carried by the flat portion of the under side of the projection on carrier 55. As it contacts the cam end of lever 78 it is apparent that the cam end of this lever under chain 63 will be depressed forcing up the opposite cam end under chain 62 against the influence of spring 84, and

will cause a pin in chain 62 to be forced up into position to engage the T slot in carriage 55. The pin in chain 63 cannot engage the T slot in moving across it as the heads of the pins are wider than the narrow portion of the T slot in carriage. A pin in chain 62 being thus engaged with carriage 55 will cause it to be gradually started, due to its circular motion, about sprocket 65 after which it will be drawn along with the chain 62 until it reaches the limit of its outward movement, when it will automatically disengage itself from the carriage by its circular motion about the sprocket 66. This part of the operation will leave the carriage standing at the end of its outward movement. In the embodiment shown a pin on chain 63 will also arrive at the limit of its outward movement at approximately the same time as the pin in chain 62 which is engaged with the carriage, but the approaching pin in chain 63 will not pick up the carriage because the lever 79 will not be depressed by the pin engaged with the carriage, it being held up out of operating position with lever 79. Thus a dwell may be caused to occur at the ends of the movement of the carriage and all parts moved therefrom by operative connection thereto. The next succeeding pin in chain 63 will be forced up into position to engage the T slot in carriage 55 because a pin in chain 62 will arrive at the end of its outward motion at approximately the same time as the next succeeding pin in chain 63, and will contact the cam portion of lever 79 extending under chain 62, causing it to be rotated into position to force the pin 63 up into position to engage the T slot in carriage 55 and cause its return movement to the position shown in Figs. 4 and 5, at which point it will disengage itself from the carriage by its circular motion about sprocket 64 and leave the carriage standing at the end of its inward movement. A dwell will here occur by the operation of the chains, the pins carried therein, and the operation of the cam levers before described. We therefore have a simple automatic means of moving the carriage, carrier, plate P, and associated parts along a slide, of starting them gradually, of stopping them gradually with a decreasing motion in the direction of their movement, and of leaving them standing at the ends of their movement for a desired dwell. The dwell occurring at one end of the movement may be utilized for the operation of pressing or printing. The dwell at the opposite end of the movement may be utilized for the purpose of feeding a fresh sheet onto the engraved plates for the next printing operation. The intermediate movement of these parts may be utilized for removing the printed sheet, inking the plate, and wiping the surfaces thereof. All parts pertinent to this outward and inward movement may be proportioned to obtain outward and inward movements of the same speeds, or they may be varied to obtain outward and inward movements of different speeds. In the mechanism illustrated, chain 62 may be driven at a speed one half that of chain 63, but it is apparent that a number of differing speeds is possible and this is noted merely to better explain the mechanism as shown. Only one slide bed and mechanism for preparing the engraved plates is shown in Fig. 1 with any degree of detail, but it will be understood that they are all of similar construction, as shown in Figs. 3, 4, and 5. Dot and dash lines in Fig. 1 show one mechanism at the end of its outward movement. It is within the contemplation of the invention

that, if no dwell is desired, as for instance at the outward limit of movement, the lever 79 may be actuated by means other than the pins 60 to cause immediate reversal of carriage 55 and parts moved therewith.

#### Sheet removing mechanism

As the carriage 55 moves along bed 52, the carrier 54, backing plate 53, engraved plate P and associated parts move under and past the mechanism illustrated in Figs. 6, 7, and 8, and shown diagrammatically at A in Fig. 1. Referring to Figs. 6, 7, and 8, and additionally to Figs. 20 and 21, a suitable support 86 is formed with suitable bearing portions which serve to journal shafts 87, 88 rotatable therein. At one end of shafts 87, 88 are sprockets 89, 90 pinned or otherwise fastened thereto. A continuous chain 91 meshes with these sprockets so that companion movement of shafts 87, 88 is accomplished. The shafts 87, 88 have affixed to their central portions rolls 92, 93 suitably secured to rotate therewith. A series of flexible bands or belts 94 pass about these rolls and are perforated with a series of holes 95 adapted to admit projections 96 on drums 92, 93 to prevent slippage. Grippers 97 are pivotally mounted on pins 98 secured to the bands 94 and are urged by springs 105 in a direction to cause the finger end of grippers 97 to contact the bands 94, and the tail portions of these grippers to swing outwardly from same. In Figs. 6, 7, and 8, and more particularly in Fig. 20, the tail portions are shown in contact with a rod 99 extending across the mechanism and held at its ends by rigid extensions of the general support 86. The rod 99 serves to depress the tail portions of grippers 97 overcoming the springs 105 and thus causing the finger portion of the grippers to move out of contact with bands 94 leaving a space between. A bar 100 is similarly supported for similar purpose when the grippers have been moved to contact same, as shown by dotted lines at 101 in Fig. 8. Pendant from the chain 91 and pivotally connected thereto by a pin 102 is a lug 103. This lug is formed with arms extending outwardly therefrom and positioned to allow a certain angular movement about the pivotal connection 102 before contacting the chain 91 and arresting this movement. In the embodiment shown, the lug 103 is free to swing about the pin 102 impelled by gravity until one side projecting arm has contacted the chain 91 when it will be stopped. A certain desirable amount of movement is shown by its position in both full and dotted lines in Fig. 21. The operation is as follows:

When the outward movement of plate P and carrier parts on bed 52 has brought these parts to a position, as shown by dot and dash lines in Figs. 6 and 7, a projection such as the pin 104 on carrier mechanism contacts the lug 103 just as the edge of the printed sheet, which may extend somewhat over the edge of the engraved plate P, has entered between the finger of grippers 97 and the flexible bands 94. The contact between pin 104 and lug 103 will start movement of the chain 91, the sprockets 89, 90, the shafts 87, 88, the rolls 92, 93 and bands 94 which carry the grippers 97. This movement will carry the tail portions of grippers away from contact with the restraining rod 99 allowing the springs 105 to act and the sheet to be seized between the grippers 97 and the bands 94. The motion continued will cause the sheet to be drawn about

the drum 93 and onto the top side of the mechanism and flat portions of the bands 94, when the tails of grippers 97 will contact the bar 100, will be depressed by same and will leave the sheet free for removal by other means. It can be further seen that, by changing the relative position of driving pin 104 with respect to the carrier mechanism and by altering the position of grippers with respect to the lug 103, the grippers may be caused to move from the position shown by dotted lines 101 with the same described movement to a position as shown by the full lines at 97 in Figs. 8 and 20, and an essentially similar mechanism may be used in this manner for feeding a fresh sheet onto the surface of plates P. When the pin 104 has moved the lug 103 from the starting position shown in Fig. 7 to a position where the chain link from which it is pendant is caused to follow a circular path about sprocket 90, it is apparent that it will move out of contact with pin 104 and the movement imparted from that member will cease. As pin 104 moves beyond lug 103 the angular slack movement allowed by the projecting arms on lug will cause it to swing down to a position where it will again be contacted by pin 104 during its return movement and will restore the mechanism to the starting position shown, when it will again rise out of contact with pin 104 and then fall back in position to be moved during the next outward movement of carrier and pin 104.

When plate P and associated parts have attained the limit of outward movement, as shown by dot and dash lines in Fig. 1, a fresh sheet is to be deposited on the surface of plate P. For this purpose a mechanism essentially as shown in Figs. 6, 7, 8, with functions reversed as described, may be employed, or it is within the contemplation of the invention to employ any other suitable means of feeding same.

#### *Inking mechanism*

A preferred embodiment of inking mechanism for applying ink to the surface of plates P is shown in Figs. 14 and 15, and also diagrammatically at B, Fig. 1, and in outline elsewhere. A container 108 constructed to hold ink is provided with suitable journals for shafts 110, 120 which have affixed to their central portions rolls 109, 111, respectively. Roll 109 is located so as to be partly within the container 108 and is rotated by means of shaft 110 and coupling and shaft not shown. Roll 111 is located somewhat below, and ink carried from the container 108 by roll 109 is deposited thereon by contact and transference, and from thence to the surface of the plates P as they pass beneath in their described movement on beds 52. A flexible strip 112 is affixed to the container, and a series of operable screws 113 are located to bear against the outer side of this strip and by their adjustment to vary the aperture Y and thus allow a greater or less amount of ink to be withdrawn by the rotation of roll 109. 114, 115 are eccentric bushings rotatably mounted in suitable bearing portions of container 108 and fixed to an external yoke-shaped connecting piece 116, and adapted to be rotated in unison thereby. The inner bore of bushings 115 serve to journal shaft 110 rotatable therein. A fixed arcuate strip or segment 117 is adapted to be clamped by the jam screw 118 in arm 116 of the yoke and thus retain 114, 115 in any desired set position. Location of eccentric bushings 114, 115 is such that movement of piece 116 will vary the distance

between rollers 109, 110, and may also vary the aperture Y. Gears 118, 119, fixed to shafts 110, 120, are proportioned so that they will remain in mesh materially undisturbed by the adjustment of bushings 114, 115, and thus furnish an independent means of rotating rolls 109, 110, without dependence on frictional contact. A gibbed slide 121, is formed at top of container 108, from which slide the whole mechanism is dependent. The slide 122 is constructed to project out beyond the general limits of the machine to allow the inking mechanism to be moved out of its operating position for inspection or change. A coupling previously mentioned, not shown, provides means for disconnecting shaft 110 from the general drive of the machine when the mechanism is thus moved.

#### *Plate wiping mechanism*

Figs. 9, 10, 11, 12, 23, and 24 show a type of wiping mechanism in which an endless belt 130 passes about rolls 131, 132 spaced apart sufficiently to permit having a shoe 133 which may be attached to or form a part of the general support 134. The support 134 may be described as a bar having suitable projections 144, 145 formed to provide journals for shafts 150, 151, which are affixed to or may form part of rolls 131, 132. The sectional view Fig. 12 shows the bar 134 widened at its lower face to form shoe 133. This shoe is faced with resilient means for backing up belt 130 and supporting same during the wiping operation when the mechanism is held in contact with the surface of plate P as it moves under and past the wiping mechanism by means of the driving means previously described and shown in Figs. 3, 4, 5. A wiping medium W is threaded under tension rollers 146, 147, and also around the outside surface of belt 130. It will be readily seen that when the rolls are turned by means of the ratchet and pawl mechanism shown in Fig. 11, the belt 130 will be caused to move by frictional contact therewith and will advance and carry said wiping means by frictional contact with same to carry the used or dirtied portion of wiping means W away from contact with plate P and present a fresh or clean portion thereof for the wiping operation. In Fig. 11, a ratchet wheel 152 is keyed or otherwise fastened to shaft 150 and moves therewith. A bell crank lever 154 is pivotally mounted on shaft 150 and carries on a short arm extension a pawl 153 which is adapted to engage the teeth of said ratchet and move same thru actuation of lever 154. A second pawl 155 is shown attached to an extension of the general support 134 and is adapted to engage said ratchet and to hold same from being turned due to reaction thru the mechanism from the wiping operation.

In the preferred embodiment as shown in Figs. 1, 23, and 24, the wiping medium is continuous or endless, and a part after being used for the wiping operation is introduced by its motion into a tank 156 which is constructed to contain a solvent for the ink and scrubbing means for conditioning the wiping medium W for continuous use, within the limits of the life of the material.

The detailed construction of washing tank 156 is illustrated in Figs. 23 and 24. The web W passes through a side opening in the container 156 in the direction of the arrows, successively, over supporting rolls 200, 201, 202, 205, 206 and 208 with the jockey roll 207 engaging it obversely

between the two last mentioned rolls thereby, in general, spreading the web in upper and lower reaches. Above or back of the lower reach are a plurality of sprayer tubes 203 and 204 having foraminous under faces 220. The pump P, through exterior piping 250 and a Siamese 251, draws the cleaning fluid or solvent from the tank in circulation and drives it through the sprays. At the same time, a disk brush 210 provided with bristles 209 rotates in a horizontal plane to engage and scrub the under (outer) face of the web in opposition to the spraying nozzles. This brush includes a shaft 212 supported in a bearing 211 on the bottom of the receptacle and projecting downwardly there-through with the provision of a suitable gland 213 to stuff it against leakage. The shaft terminates in a pulley 214 driven through a belt 215 from a preferably individual motor 216.

Figs. 16, 17, 18, 19 illustrate a modified form of wiping mechanism, it having the driving roll 159 located differently with regard to shoe 160 and by this constructional difference being of a generally narrower form. A wiping mechanism as thus shown may be used for a further or finish wiping of the surface of plate P. 136 is, in general, a bar or support having suitable bearings 161, 162 in which are rotatably mounted shafts 163, 164 integral with roll 159 and forming, in effect, extensions thereof. A belt 165 passes about this roll and over a shoe 160 which is attached to or may form part of the general support 136. Ratchet means for advancing roll 159 and with it belt 165 is shown in Fig. 17. A pawl 166 is carried by an extension on lever 167 and adapted to engage ratchet wheel 168 fixed to shaft 164 and move same through actuation of lever 167. A pawl 169 is operably attached to the mechanism and adapted to engage the teeth of ratchet 168 and hold same against reversal. Guide rolls 146, 147 (Figs. 9 and 10) and 170, 171 in Figs. 16 and 19 are preferably mounted in separate bearing pieces 172, 173, 174, 175 in order to be easily removable and provide simple means for threading the wiping means W and W' in their respective mechanisms. Adjustable wedges 176, 177, 178 and 179 are provided to space the guide rolls in order to properly accommodate the belts 130, 165 and wiping mediums W, W'. Fig. 13 is a fragmentary view of a supporting and oscillating means common to both types of wiping mechanisms described, in which a supporting member 129 is formed to provide a guide suited to receive the slide extensions of supports 134 or 136. The upper portion of support 129 is hollow to receive a spring pressed plunger 137 and spring 138. Plunger 137 carries at its lower end a roller 139 adapted to contact the said slide extensions and hold the wiping mechanisms in contact with plates P under pressure from springs 138. An adjustable crank head 140 rotatably mounted on a support such as bracket 141 is caused to rotate, means not shown, and imparts an oscillating motion to the wiping mechanisms through a connecting rod 142 having operable connection therewith. An adjusting nut, having a center bearing hole which acts as a guide for the upper end of plunger rod 137, is shown at 143. This nut may be adjusted to vary the tension of spring 138 on plunger 137 in contact with bar 134 through roller 139 and thus adjust the desired pressure of the wiping mechanisms against plate P.

As previously described, backing plate 53 is provided with an inclined under surface (see Figs. 1, 3 and 22). This surface fits against a complementary inclined surface on carrier 54. A pin or projection fixed in backing plate 53, such as pin 104, projects through a clearance slot in the side flanges of carrier 54 and engages a slot in lever 180. Lever 180 is pivotally mounted on a pin or stud 181 fixed in carrier. It is apparent that as lever 180 is rotated within the limits of its movement, or the confines of slot in carrier flange, it will impart a reciprocating motion to backing plate and thus cause it to rise up or recede against the inclined surface on which it rides. A pin or lug 182 on filler block 51 is located to contact the lower or free end of lever 180 as the carrier and associated parts near the end of their inward movement to cause same to rotate about pin 181 and cause the backing plate 53 and plate P to rise on the said inclined surface. A similar pin or lug is located in bed 52, as shown at 183 in Fig. 1, and contacts the end of lever 180 at or near the limit of its outward movement causing it to swing about its center pin 181 and by this motion transmitted through pin 104 to cause the backing plate 53 and plate P to recede by its motion against said inclined surface. Thus, I have a mechanism adapted to alter the position of the plates P at or near the limits of their outward and inward movements, to cause same to contact the mechanisms for preparing the plates for the printing operation during movement in one direction, and to move the plates away from contact with said mechanisms during the opposite movement. In general, it may be said that, while I have described my invention in connection with specific structures and in connection with specific uses for such structures, it is to be understood that the invention in some of its aspects is capable of various further modifications and uses and that the structures may be modified without departing from the intent of the invention or the scope of the appended claims and that this application is intended to cover any adaptations or embodiments following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which it pertains, and as may be applied to the essential features hereinbefore set forth and as fall within the scope of the invention or the limits of the appended claims.

I claim as my invention:

1. In a printing press, the combination with a platen and a form carrier movable toward and from the same with a reciprocatory motion, of means for operating the carrier embodying a guide therefor, a pair of rock arms, a saddle block self-adjustable to the carrier under stress to establish a single line of pressure against the carrier, a pair of articulated pressure transmitting members connecting the rock arms and the saddle block, and rotatable eccentric means for rocking the arms with great mechanical advantage against the resistance of the saddle.

2. In a printing press, the combination with a platen and a form carrier movable toward and from the same with a reciprocatory motion, of means for operating the carrier embodying a guide therefor, a pair of rock arms, a saddle block having a complementary concavo-convex surface conformation with that of

the carrier, anti-friction rolls interposed between said surfaces to render the saddle block self-adjustable to the carrier under stress and to establish a single line of pressure against the carrier, a pair of articulated pressure transmitting members connecting the rock arms and the saddle block, a crank shaft, and links connecting the cranks thereof to the rock arms.

3. In a printing press, the combination with a yielding platen, a reciprocatory form carrier movable toward and from the same and means for operating the carrier with definite amplitude of movement into cooperation with the platen with great mechanical advantage, of regulatable hydraulic means for producing variable resistance in the said yielding action of the platen.

4. In a printing press, the combination with a plurality of reciprocatable platen and form carrier couples arranged in series to communicate printing pressure through one to the other and means having definite amplitude of movement for transmitting such pressure to the series with great mechanical advantage, of regulatable hydraulic means for supplying variable resistance through the whole series to such printing pressure.

5. In a printing press, the combination with a yielding platen, a reciprocatory form carrier movable toward and from the same and means for operating the carrier into cooperation with the platen with great mechanical advantage, of regulatable hydraulic means for producing variable resistance in the said yielding action of the platen, said means embodying a cylinder and a hollow ram therein, a pressure valve controlling communication between the two, and a variable air resistance device opposed to the movement of the valve.

6. In a printing press, the combination with a yielding platen, a reciprocatory form carrier movable toward and from the same and means for operating the carrier into cooperation with the platen with great mechanical advantage, of regulatable hydraulic means for producing variable resistance in the said yielding action of the platen, said means embodying a movable cylinder, a fixed ram therein and an adjustable reactionary support for the cylinder determining its initial position.

7. In a printing press, the combination with a yielding platen, a reciprocatory form carrier movable toward and from the same and means for operating the carrier into cooperation with the platen with great mechanical advantage, of regulatable hydraulic means for producing variable resistance in the said yielding action of the platen, said means embodying a yoke having supporting and guiding rods, a movable cylinder having lugs cooperating with the rods, means adjustable on the rods upon which the lugs nor-

mally and initially rest, and a ram within the cylinder fixed with relation to the yoke.

8. In a printing press, the combination with a yielding platen, a reciprocatory form carrier movable toward and from the same and means for operating the carrier into cooperation with the platen with great mechanical advantage, of regulatable hydraulic means for producing variable resistance in the said yielding action of the platen, said means embodying a movable cylinder, a fixed hollow ram within the same, ports providing hydraulic communication between the two, a piston within the ram having a stem acting as a valve controlling the ports and opened by pressure in the cylinder, and regulatable means retarding the movement of the piston on the opening of the valve.

9. In a printing press, the combination with a yielding platen, a reciprocatory form carrier movable toward and from the same and means for operating the carrier into cooperation with the platen with great mechanical advantage, of regulatable hydraulic means for producing variable resistance in the said yielding action of the platen, said means embodying a movable cylinder, a fixed hollow ram within the same, ports providing hydraulic communication between the two, a piston within the ram having a stem acting as a valve controlling the ports and opened by pressure in the cylinder, and a regulatable source of compressed air in communication with the ram behind the piston.

10. In a printing press, the combination with a yielding platen, a reciprocatory form carrier movable toward and from the same and means for operating the carrier into cooperation with the platen with great mechanical advantage, of regulatable hydraulic means for producing variable resistance in the said yielding action of the platen, said means embodying a movable cylinder, a fixed hollow ram within the same, ports providing hydraulic communication between the two, a piston within the ram having a stem acting as a valve controlling the ports and opened by pressure in the cylinder, a regulatable source of compressed air in communication with the ram behind the piston, and a relief valve leading from the chamber formed in the ram on the other side of the piston.

11. In a printing press, the combination with a main frame provided with vertical standards, a plurality of cross frames on the standards having vertical guides, filler blocks movable in the guides, plate carriers supported on the filler blocks, the latter being fitted with platens opposing the printing pressure from plates on adjacent filler blocks, and means for compressing together as a series the filler blocks with their platens and the plate carriers with their platens.

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