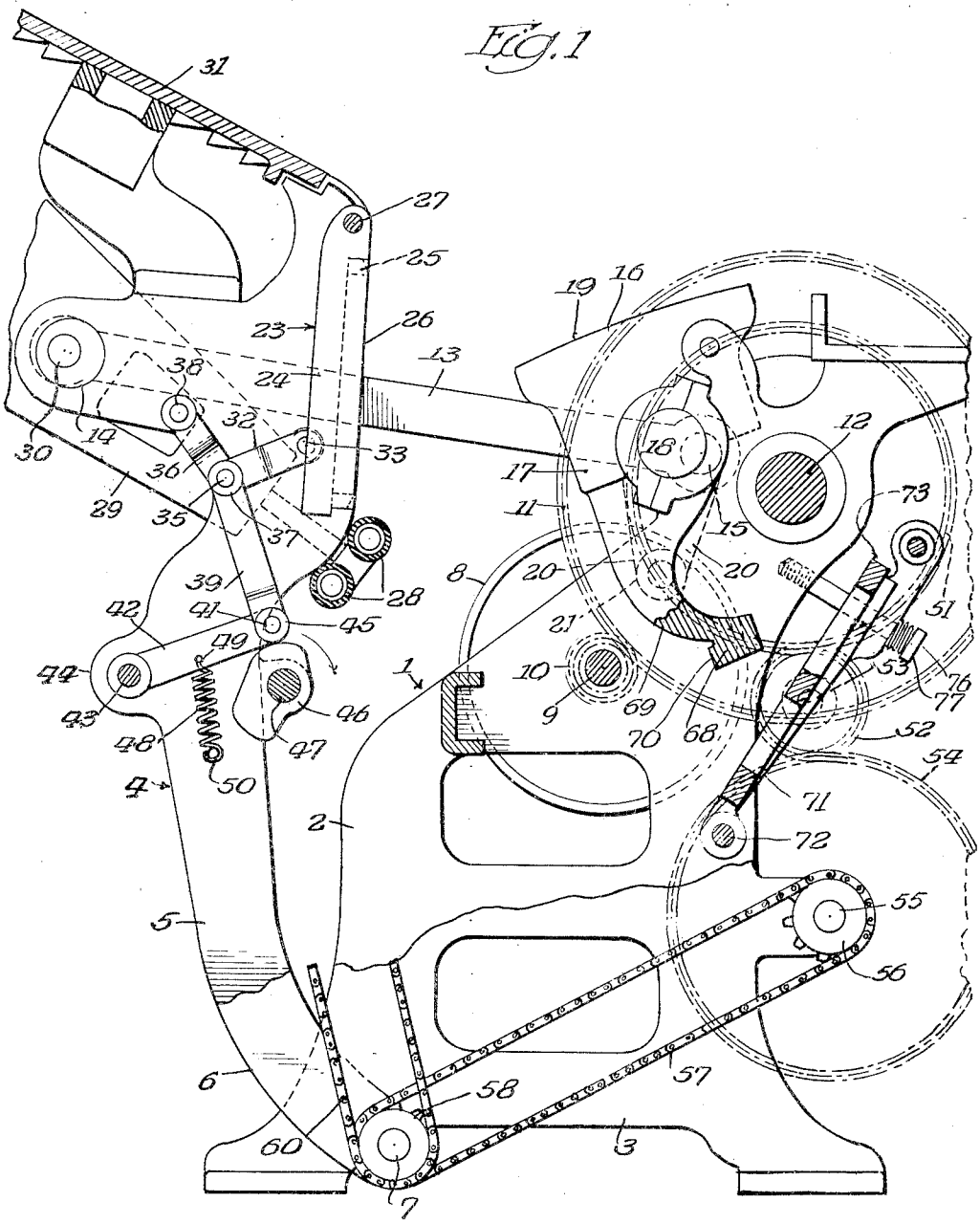
Feb. 14, 1950 C. F. ROOT 2,497,799

PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

Filed Aug. 2, 1946 4 Sheets-Sheet 1

Fig. 1



INVENTOR:
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PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

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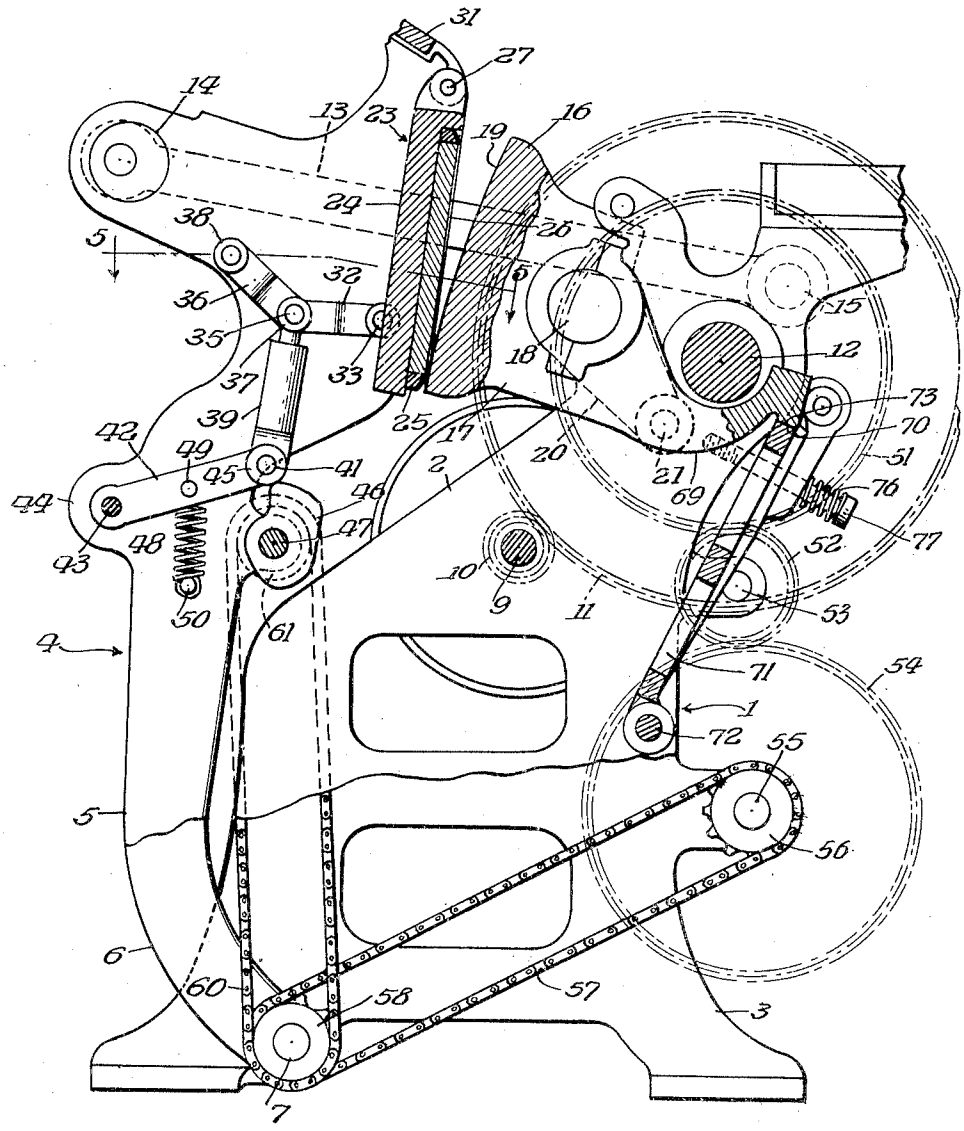
FIG. 2



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PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

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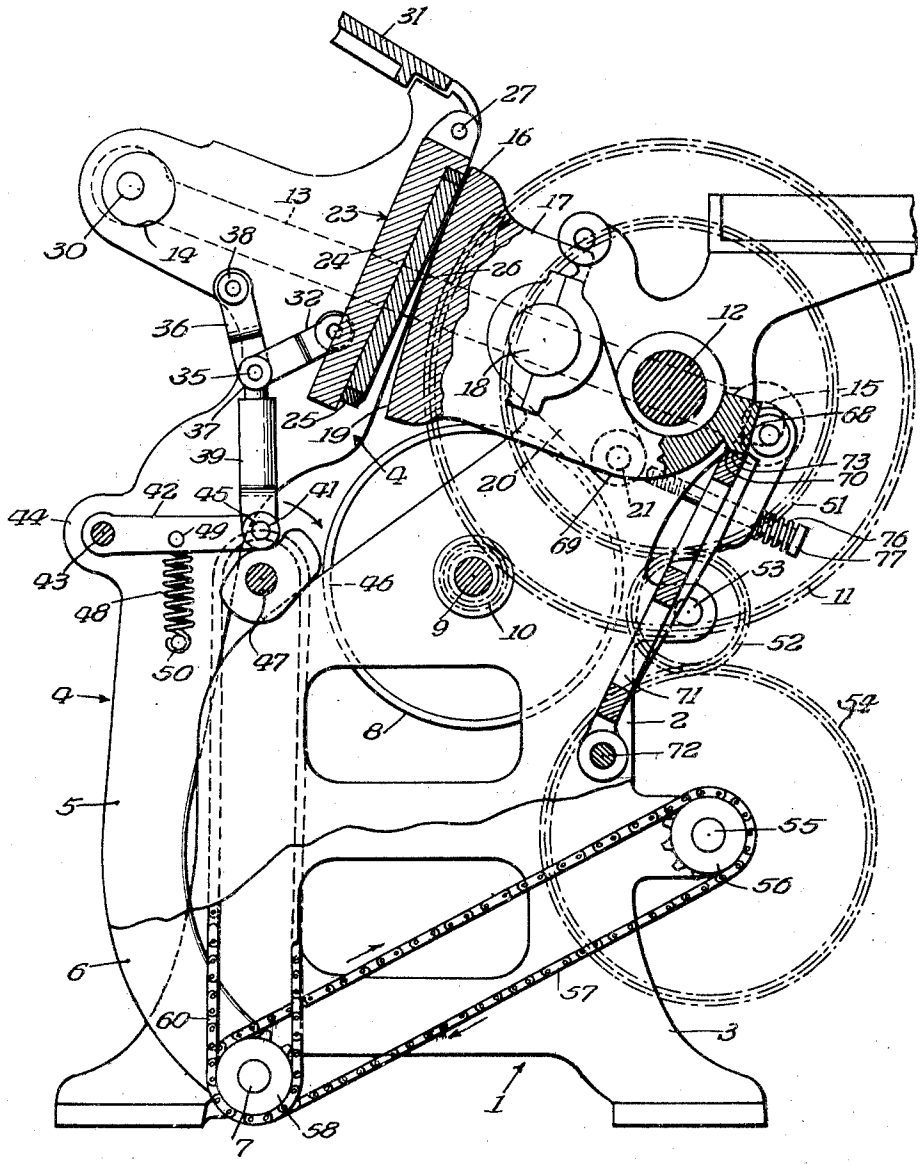
FIG. 3



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PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

Filed Aug. 2, 1946 4 Sheets-Sheet 4

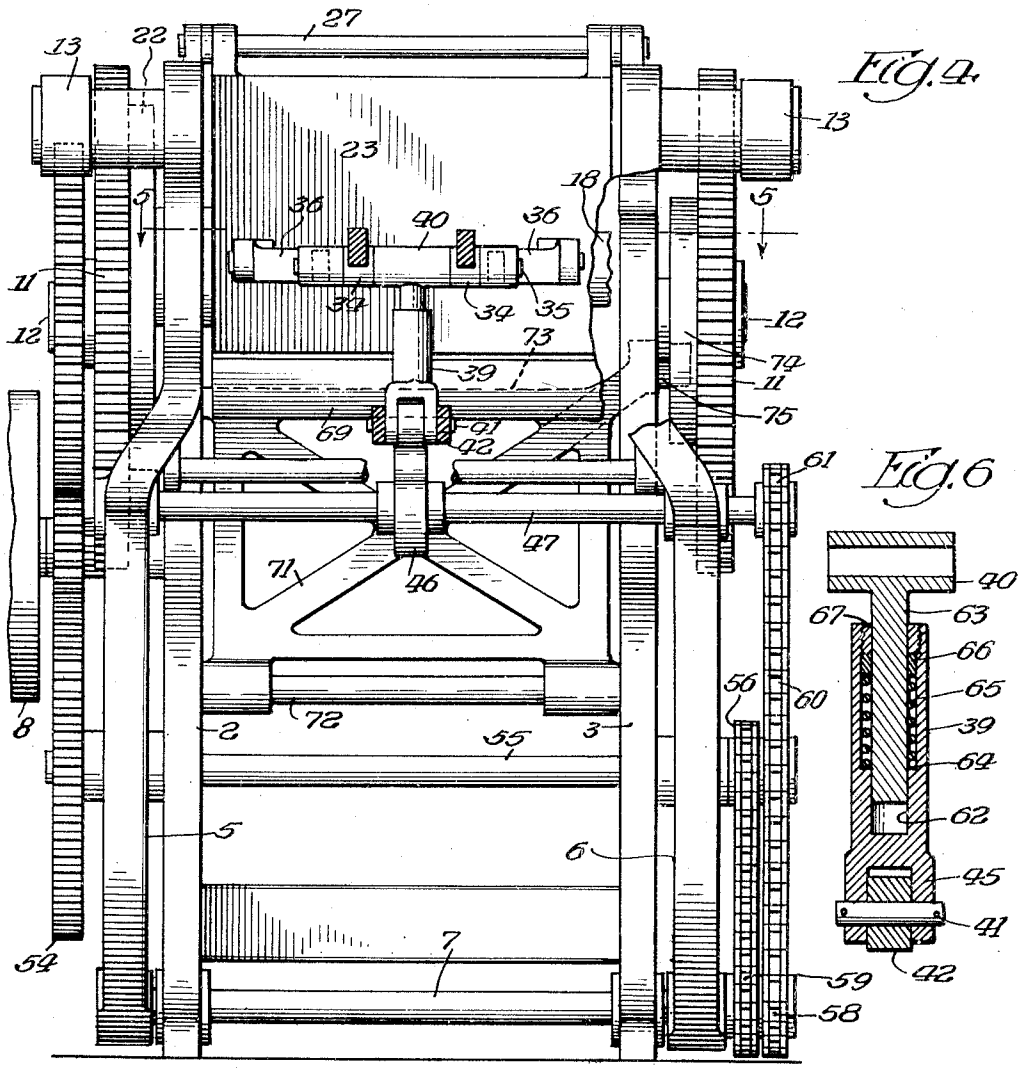

Fig. 4.

Fig. 6

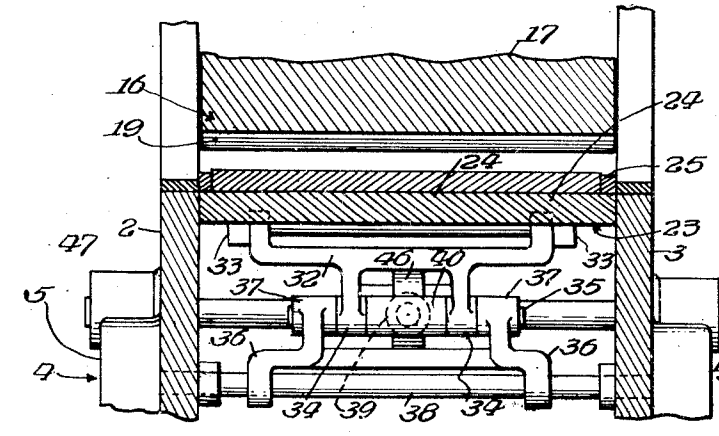

Fig. 5

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Patented Feb. 14, 1950 2,497,799

UNITED STATES PATENT OFFICE

2,497,799

PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

Charles F. Root, Cleveland, Ohio, assignor to Chandler and Price Company, Cleveland, Ohio, a corporation of Ohio

Application August 2, 1946, Serial No. 687,844

9 Claims. (Cl. 101—298)

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This invention relates in general to platen printing presses and more particularly to a press wherein the platen has a curved convex surface.

There have been many attempts in the past to design a practical job press wherein the platen has a curved printing surface, and the advantages of the curved platen press have long been recognized as clearly set forth, for example, in the Clark Patent No. 1,034,083. Perhaps the primary advantages of a curved platen over the well known type of press wherein both the platen and the type bed are flat, is the fact that less pressure is necessary between the platen and bed during the printing operation because of the progressive line contact therebetween. Furthermore, the printed sheet is stripped from the type form as it prints thus eliminating the stripping difficulties present in a flat platen press.

In my co-pending application, Serial No. 686,383 filed July 26, 1946, I have illustrated a form of curved platen press wherein the platen is pivoted adjacent one end thereof to an oscillating platen carrier, and I have so positioned the various pivotal points therein as to obtain what may be termed "pin point contact." The present form of curved platen press as disclosed herein is shown as being adapted for use on a printing press commonly known in the trade as a Gordon type, wherein the platen is mounted on a stationary frame and the type bed is carried by an oscillating frame. The platen is ordinarily mounted to rotate about a fixed axis so that it may assume a substantially horizontal position when the two frames are separated in order to receive a sheet for printing while the inking rollers are inking the type form. As the frame, on which the type bed is mounted, oscillates and moves toward the platen, the platen rotates downwardly to a printing position.

An early attempt was made to provide a Gordon type press with a curved platen as evidenced by the patent to Waters, No. 1,360,063, but there, the type bed remained rigidly connected to the oscillating frame and an attempt to obtain pin point contact between the type bed and the curved platen was made by rolling the platen against the bed during the printing operation and controlling this action by the use of pins on the platen received by holes on the edge of the bed. The present form of my invention contemplates the use of a pivoted type bed moving against a curved platen member held stationary during printing in such a way as to obtain pin point contact in a simple and efficient manner.

While I have explained fully and clearly in my

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above referred to co-pending application the meaning of the term "pin point contact," it may be briefly reiterated here in the following manner:

When any curved surface is caused to roll over a flat plane, if this rolling motion is accomplished from one end of the curved surface to the other without having any slippage between the two surfaces, the result will be perfect pin point contact at every point along the two surfaces from one end thereof to the other. This is the result which should be obtained or closely approximated with a curved platen press in order to obtain a perfect printing impression. When one end of a curved surface is pressed against a flat plane and is rolled thereon in such a way as to produce perfect pin point contact, the other end of the curved surface will travel a predetermined path, which will not be an arc of a true circle. This can be clearly illustrated by the use of a curved surface which has a very small radius. As this radius of curvature increases and the length of travel of the ends of the curved surface decreases, the path of travel thereof will approach an arc of a true circle. The underlying principle upon which this invention is based is the pivoting of the type bed to its carrier in such relation with the pivotal point of the oscillating frame that the relative movement between the curved platen and the type bed will be a perfect rolling action, thus obtaining perfect registry during the printing operation between the impression members.

It is, therefore, one of the principal objects of the present invention to provide a platen printing press wherein the platen member has a curved surface thereon of convex form and the type bed is pivotally mounted on the frame carried thereby.

Another object of the invention is to provide a platen printing press having a main stationary frame and an oscillating frame pivotally mounted thereon, wherein the platen has a curved surface and is mounted on the stationary frame and the type bed is pivotally mounted on the oscillating frame, and means are provided to obtain pin point contact between the platen and the type bed during the printing operation.

A further object is to provide a platen printing press of the curved platen type wherein the type bed is pivotally mounted to an oscillating frame and the pivotal points of the type bed and frame are so located with respect to each other and to the platen as to obtain pin point contact between the platen and type form during the printing operation.

Still another object is to provide a platen

printing press of the curved platen type having a pivotally mounted type bed thereon wherein suitable pressure equalizing means act in conjunction with the type bed to provide a substantially constant pressure between the platen and type bed during the printing operation.

Another and more specific object of the invention is to provide a platen printing press of the curved platen type having a pivotally mounted type bed thereon wherein suitable pressure equalizing means of a mechanical nature act in conjunction with the type bed to provide a substantially constant pressure between the platen and the type bed during the printing operation.

A still further object is to provide a curved platen printing press having a pivotally mounted type bed, wherein the platen is positively locked against movement during the impression period as the type bed rolls over the curved surface thereof.

Other objects and advantages of the invention will become apparent upon a reading of the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a side elevation of a printing press embodying the invention with parts broken away and shown in section for the sake of clarity;

Fig. 2 is a view similar to Fig. 1 showing the curved platen and type bed in the initial printing position;

Fig. 3 is a view similar to Fig. 2 showing the curved platen and type bed in the final printing position;

Fig. 4 is a rear elevation of the press;

Fig. 5 is a fragmentary horizontal section taken substantially along the plane of line 5—5 in Figs. 2 and 4; and

Fig. 6 is an enlarged detail of a portion of the pressure equalizing means.

Referring now more particularly to the drawings, the main stationary frame is generally indicated by the numeral 1 and is provided with spaced side members 2 and 3 of the conventional type employed in a Gordon press. The oscillating frame 4 has spaced side members 5 and 6 and is mounted for oscillation at its lower end on the shaft 7 extending between the sides 2 and 3 of the main frame. The manner of operation of the Gordon type job press is well known to those skilled in the art, and may be described only briefly here.

Suitable driving means such as an electric motor or the like (not shown) is adapted to drive the main pulley 8 mounted on the drive shaft 9 extending between the sides of the main frame. Pinions 10 are also mounted on the shaft 9 and mesh with and drive gears 11 keyed to the shaft 12. The shaft 12 extends between the sides of the main frame and has a gear 11 at each end thereof. A connecting arm 13 is provided at each side of the machine and each is pivotally mounted at one end 14 thereof to the oscillating frame 4 while the other end is mounted on a crank pin 15 located on the outer side of each gear 11. As the gears 11 rotate in a clockwise direction, as viewed in Fig. 1, the crank pins 15 carry with them the links 13 and the oscillating frame connected to the other end thereof whereby the frame 4 is caused to move and oscillate toward and away from the main frame 1.

Likewise, in the usual form of this type of press, a platen member 16, having a frame 17, is mounted for oscillation about a fixed axis 18. In the past the platen 16 has been of the usual flat type, but in accordance with my invention, I curve the surface of the platen substantially as indicated at 19, and the platen 16 and frame 17 may, if desired, be made integral as shown. Preferably this surface constitutes an arc of a circle, but I do not wish to be limited to such an arc inasmuch as any suitable curved surface, whether regular or irregular, may produce satisfactory printing results. The platen is caused to oscillate or rock about its axis 18 by means of an arm 20 which is provided at its outer end with a cam follower 21. A cam groove 22 of suitable configuration is provided on the inner side of one of the gears 11 within which the cam follower 21 is adapted to ride during rotation of the gears 11. As these gears rotate, the cam follower 21 is caused to move from the position shown in Fig. 1 to that shown in Figs 2 and 3 by means of cam groove 22. This operation takes place in timed relation with the movement of the oscillating frame so that as the two frames are separated, the platen will move to sheet receiving position, while the type bed is being inked, and will then return to printing position as the type bed oscillates toward it, all in accordance with conventional practice.

The type bed is indicated generally by the numeral 23 and constitutes the usual frame 24 and chase 25 within which the type, indicated at 26, is located. In the conventional type of press, the type bed is rigidly mounted onto the oscillating frame, but where a curved platen is provided as in the present invention, and where this platen remains rigidly locked in one position during the printing operation, I have mounted the type bed 23 so that it will swing about a pivotal point during the printing operation thereby assuming two extreme positions, one of which is the initial printing position and the other the final printing position. While the type bed may be pivoted at any suitable location, I have found it more practical to mount it for pivotal movement about a point adjacent its upper end such as indicated by the pivot pin 27.

Suitable mechanism is provided for permitting clockwise rotation of the type bed about its pivotal point 27 during the printing operation in order to maintain the type bed in the position it assumes at the end of the printing operation, and to then restore the bed to its original or initial printing position. The inking of the type form will take place before the type bed reaches its outermost position ready for its initial contact with the curved platen, at any desirable position between its two extremes. For purposes of illustration, the type bed is shown in Fig. 1 in position for inking, which position is an intermediate one between its two extremes. The inking mechanism may be of the usual and well known character commonly utilized in Gordon type presses and need not be described in detail here. It may be sufficient to state that the inking rollers 28 are mounted in the usual way to a carrier 29 pivotally mounted on the oscillating frame at 30. The circular rotating inking disc 31 is of the usual character and is located above the type bed so that the rollers 28 may receive ink from the disc during the printing operation. As the oscillating frame moves away from the main frame, suitable mechanism causes the inking rollers 28 to travel downwardly over the disc 31 and over the type form 26 to the position shown in Fig. 1. As the frame 4 starts to move toward the platen for the printing operation, the rollers 28 move upwardly over the type form 26 to the uppermost position.

As stated above, the main feature of the invention is the provision of the pivoted type bed

in combination with so locating the pivotal points of the oscillating frame and the type bed with respect to each other and with respect to the curved platen as to obtain pin point contact between the platen and bed from one end thereof to the other during the printing operation, thus simulating cylinder press operation on a platen press. Thus, the pivotal points 27 and 7 are so located in the present invention as to produce the desired pin point contact without the aid of any other mechanism such as that heretofore used for sliding the type bed or otherwise imparting additional movements to the bed or the platen. After the platen receives the sheet to be printed and the type form has been inked, the platen will assume its position as shown in Fig. 2 by being oscillated about its fixed axis 18. As the platen thus moves downwardly, the type bed moves toward it with the oscillating frame 4 until it reaches the initial printing position as shown in Fig. 2. During the printing operation the platen remains stationary, but the oscillating frame continues to move forwardly to its position shown in Fig. 3 (the front of the press being the right hand side as viewed in the figures). During this time, the type bed has been permitted to rotate about its pivotal point 27 in a clockwise direction in such a way that the path traveled by the upper end thereof will follow the path which it would follow if it were free to do so to obtain perfect pin point contact. It will be observed that to obtain perfect pin point contact, either the curved surfaces of the platen must "climb" upwardly on the flat surface of the type form, or the type form must "climb" upwardly on the curved surface on the platen. In the present instance, the type bed is the member which "climbs" upwardly on the curved platen by reason of the location of its pivotal point with relation to the pivotal point of the oscillating frame.

It will be evident that if the lower end of the type bed were free to oscillate about its pivotal point, no printing operation would take place until near the upper end thereof because of the lack of pressure forcing the type bed against the platen. It will also be clear that if rigid means were provided to produce a pressure between the type bed and the platen, such pressure would be gradually increased as the printing operation was completed because the line of contact therebetween approaches the pivotal point 27. It then becomes necessary to provide some equalizing means which will exert a sufficient pressure against the lower end of the type bed and yet which may be gradually relieved as the printing operation progresses so that a substantially constant pressure will be obtained throughout the entire operation. The pressure equalizing means must be such as to permit the type bed to swing about its pivotal axis during the printing operation. Either mechanical or other means may be used to accomplish this purpose such as the hydraulic means disclosed in my above referred to co-pending application. In the present instance, however, I have designed a novel mechanical means which will produce the same result. The specific pressure equalizing means disclosed herein comprises a toggle secured at one end to the oscillating frame and at its other end to the type bed. Movement of the toggle joint will cause the type bed to swing about its pivotal axis. The toggle may take any one of numerous specific forms and I have illustrated in Fig. 5 one of the preferred forms which it may take. One half of the toggle comprises spaced link members 32 which are secured at one end to the rear of the type bed 24 by means of pivot pins 33 and at the other ends 34 they may receive a toggle pin 35. The other half of the toggle comprises similar spaced link members 36 which are also mounted for rotation at one end 37 thereof to the toggle pin 35, while at their other ends they are pivotally mounted on a shaft 38. A link 39 is mounted at its upper end 40 on the toggle pin 35 between the inner ends 34 of the spaced link members 32. The lower end of the link 39 is pivotally connected at 41 to another link 42 which extends rearwardly and is pivotally connected at 43 to a boss 44 at the rear of the oscillating frame 4. At this point then, it will be evident that upward movement of the link 39 to its position shown in Fig. 2 will swing the type bed outwardly about its pivotal axis 27 to its initial printing position. Downward movement of the link 39 will cause the type bed to swing about its pivotal axis in a clockwise direction from the initial printing position of Fig. 2 to its extreme rearward position in the final printing position as shown in Fig. 3.

The movement of the arm 39 to swing the type bed about its pivotal axis is caused by the cam follower 45 following the contour of the cam 46 mounted on the shaft 47. Any suitable means such as a coiled tension spring 48 may be utilized to maintain the cam follower 45 against the edge of the cam 46. The spring 48 may be connected at its upper end to a pin 49 on the link 42, and at its other end to a pin 50 on the oscillating frame 4.

The shaft 47 with the cam 46 thereon is caused to rotate in timed relation with the movement of the oscillating frame 4 and with the printing operation. The means to produce this result may include, by way of illustration, a gear 51 keyed to the shaft 12 which is rotated by the main drive shaft through the pinion 10 and gear 11. An idler gear 52 is mounted for rotation on a stub shaft 53 and is driven by the gear 51. Another gear 54 keyed to the shaft 55 is also in mesh with the idler gear 52 and is driven thereby. A sprocket wheel 56 is also keyed to the shaft 55 and is adapted to engage a chain belt 57 which passes therearound and which drives a similar sprocket wheel 58 rotatably mounted on the shaft 7. A similar sprocket wheel 59 (see Fig. 4) is keyed to the sprocket wheel 58 for rotation on shaft 7 and meshes with a similar chain belt 60 to drive a sprocket wheel 61 mounted on the shaft 47. The cam 46 being also mounted on the shaft 47 will thus rotate in timed relation with the printing operation and the contour thereof will be such as to force the toggle upwardly to move the type bed to its extreme outer position at the beginning of the printing operation and to move the toggle downwardly and rotate the type bed rearwardly to assume its extreme innermost position at the end of the printing operation as shown in Fig. 3.

Thus a sufficient amount of pressure is exerted against the lower end of the type form so as to produce a printing impression between the type form and the paper carried by the curved platen. As the oscillating bed continues to move toward the platen from its position shown in Fig. 2 to its position shown in Fig. 3, the cam permits a downward movement of the link 39 and the toggle pin 35 to gradually rotate the type bed in a clockwise

direction. This gradual release of pressure against the type bed takes place during the printing operation and, while the release is a gradual one to maintain the pressure constant between the platen and the bed, it is of a comparatively short duration because of the short period of time necessary to accomplish the printing operation.

After the type bed is moved to its extreme inner position with respect to the oscillating frame 4 as shown in Fig. 3, the oscillating frame 4 will begin its movement away from the platen by reason of the fact that the connecting arms 13 are in their extreme forward position and at exactly dead center with respect to the shaft 12 at the end of the printing operation. There is a short dwell on the cam 46 at this point to maintain the type bed in the position assumed thereby at the end of the printing operation for a short period of time during the movement of the type bed away from the platen to prevent the type bed from retracing its step and producing a double impression. After the type bed has moved a predetermined distance away from the platen, the cam follower 45 will reach a suitable point on the cam 46 where the type bed will be moved forwardly a sufficient distance to be engaged by the inking rollers 28 as they move downwardly over the type bed as shown in Fig. 1. After the inking rollers have returned to their uppermost position and the oscillating frame moves forwardly then the cam 46 will rotate the type bed about its axis to its extreme forward position in readiness for its initial printing operation.

The link 39 is preferably constructed in the form of a yieldable member, the details of which are shown in Fig. 6. In this form of the member, the link 39 is in the form of a tubular member having a central opening 62 therein within which an arm 63 connected to the member 40 and is adapted to reciprocate when necessary. The opening 62 is enlarged to form an annular shoulder 64 against which one end of a coiled compression spring 65 is adapted to bear. The upper end of the spring 65 bears against a collar 66 secured to the arm 63 which, in turn, is limited in its upward movement by means of the collar 67 threadedly engaging the upper end of the tubular member 39. The spring 65 is sufficiently strong to permit the entire link to move as a unit during normal operation of the machine. The link is made yieldable, however, in the event that any undue or excessive pressure is exerted between the platen and type bed during the printing operation. Such excessive pressures may be caused, for example, by a plurality of sheets of paper being inadvertently fed onto the platen simultaneously, or the tympan packing may exceed its proper thickness. In any event, when such excessive pressure is present between the two members during the printing operation, the spring 65 will yield and permit a downward sliding movement of the arm 63 and its connecting portion 40 to the toggle arms with respect to member 39 to permit the type bed to move rearwardly a sufficient distance to compensate for such excessive pressure.

Previous attempts to utilize a curved platen in job presses have made it necessary to move or rotate the platen continuously during the printing impression. In the Gordon press, which has been illustrated herein as embodying the present invention, there is usually provided a rocker lock or gate which positively locks the platen against movement in its printing position.

The present form of my invention advantageously utilizes this rocker lock without change.

Referring further to the drawings, it will be noted that the platen frame 17 is provided with spaced locking arms 68 which extend forwardly of the press and have downwardly curved portions 69 to avoid conflict with the shaft 12, and which terminate in locking ledges 70. A rocker lock or gate 71 is pivotally mounted between the sides of the stationary frame at 72 and is provided with spaced upper locking ends 73 at each side thereof, a suitable cam 74 mounted on the shaft 12 adjacent one end thereof actuates the rocker lock 71 through the cam follower 75 mounted thereon in timed relation with the rotary motion of the platen about its fixed axis. A coiled compression spring 76 is supported by a stud 77 normally urging the rocker lock inwardly.

When the platen is in sheet receiving position, the locking arms 68 will be in their lowermost position and the rocker lock 71 will be in its forward position, as shown in Fig. 1, due to the action of the cam 74 against the cam follower 75. However, as soon as the platen is moved to printing position as shown in Fig. 2, the arms 68 will move therewith and the rocker lock 71 will immediately position its locking ends 73 beneath the ledges 70 in a wedging action to positively lock the platen against any movement during the impression period. It will be evident that when the contact between the type form and curved platen is above the center thereof, there will be a tendency for the platen to oscillate, but this locking means, being of a positive nature, will securely hold the platen rigid during printing.

In many instances the heavier types of printing presses are also used for cutting and creasing operations. That is, a cutting and/or creasing form is substituted for the type form, and it is intended and understood that any reference in the description and claims herein to a printing press, necessarily includes such a press when used either for printing or cutting and creasing.

From the foregoing description, it will be apparent that I have provided novel mechanism for producing pin point contact, or proper registry, in a curved platen press by pivoting the type bed to its carrier rather than pivoting the curved platen as disclosed, for example, in my above referred to co-pending application. The novel arrangement of the pivotal points, together with holding the curved platen rigid during printing, assures proper registry and a clear impression. Also, the embodiment of the invention in a conventional Gordon type press requires a minimum of alterations in the press, thereby providing for economical manufacture. It will be clear that certain changes may be made in the form, construction and arrangement of parts from that disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes come within the scope of the claims appended hereto.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A printing press comprising a main stationary frame, an oscillating frame pivotally mounted on said main frame, means for moving said oscillating frame toward and away from said main frame for a printing operation, a curved platen member mounted on one of said frames, a type bed member, means pivotally mounting said type

bed member adjacent its upper end to the other of said frames, means urging the lower end of said type bed member away from its frame while said main frame and oscillating frame are in non-printing position, means including said pivotal means to obtain line contact between the two members progressively from one end thereof to the other as the lower end of the type bed member is moved toward its frame during the printing operation, means to provide a substantially constant pressure between the two members during the printing operation, and means to retain said type bed member in the final printing position for a predetermined period of time during movement of said oscillating frame away from the main frame to prevent double impression.

2. A printing press comprising a main stationary frame, an oscillating frame pivotally mounted on said main frame, means for moving said oscillating frame toward and away from said main frame for a printing operation, a curved platen member mounted on said main frame, a type bed member, means pivotally mounting said type bed member adjacent its upper end to said oscillating frame, means urging the lower end of said type bed member away from its frame while said main frame and oscillating frame are in non-printing position, means including said pivotal means to obtain line contact between the two members progressively from one end thereof to the other as the lower end of the type bed member is moved toward its frame during the printing operation, means to provide a substantially constant pressure between the two members during the printing operation, and means to retain said type bed member in the final printing position for a predetermined period of time during movement of said oscillating frame away from the main frame to prevent double impression.

3. A printing press comprising a main stationary frame, an oscillating frame pivotally mounted on said main frame, means for moving said oscillating frame toward and away from said main frame for a printing operation, a curved platen member mounted on said main frame, a type bed member mounted on said oscillating frame, means pivotally mounting one of said members adjacent the upper end thereof to its frame, means urging the lower end of said pivoted member away from its frame while said main frame and oscillating frame are in non-printing position, means including said pivotal means to obtain line contact between the two members progressively from one end thereof to the other as the lower end of the pivoted member is moved toward its frame during the printing operation, means to provide a substantially constant pressure between the two members during the printing operation, and means to retain said type bed member in the final printing position for a predetermined period of time during movement of said oscillating frame away from the main frame to prevent double impression.

4. A printing press comprising a main stationary frame, an oscillating frame pivotally mounted on said main frame, means for moving said oscillating frame toward and away from said main frame for a printing operation, a platen carrier rockably mounted on said stationary frame, a curved platen mounted on said carrier, means for moving said carrier and platen to sheet receiving and to printing position, a type bed member, means pivotally mounting said type

bed member adjacent its upper end to said oscillating frame, means urging the lower end of said type bed member away from its frame while said main frame and oscillating frame are in non-printing position, means including said pivotal means to obtain line contact between the two members progressively from one end thereof to the other as the lower end of the type bed member is moved toward its frame during the printing operation, means to provide a substantially constant pressure between the two members during the printing operation, and means to retain said type bed member in the final printing position for a predetermined period of time during movement of said oscillating frame away from the main frame to prevent double impression.

5. A printing press comprising a main stationary frame, an oscillating frame pivotally mounted on said main frame, means for moving said oscillating frame toward and away from said main frame for a printing operation, a platen carrier rockably mounted on said stationary frame, a curved platen mounted on said carrier, means for moving said carrier and platen to sheet receiving and to printing positions, means for holding said carrier and platen stationary in the printing position during the printing operation, a type bed member, means pivotally mounting said type bed member adjacent its upper end to said oscillating frame, means urging the lower end of said type bed member away from its frame while said main frame and oscillating frame are in non-printing position, means including said pivotal means to obtain line contact between the two members progressively from one end thereof to the other as the lower end of the type bed member is moved toward its frame during the printing operation, means to provide a substantially constant pressure between the two members during the printing operation, and means to retain said type bed member in the final printing position for a predetermined period of time during movement of said oscillating frame away from the main frame to prevent double impression.

6. A printing press comprising a main stationary frame, an oscillating frame pivotally mounted on said main frame, means for moving said oscillating frame toward and away from said main frame for a printing operation, a curved platen member mounted on one of said frames, a type bed member, means pivotally mounting said type bed member adjacent its upper end to the other of said frames, toggle means connected between said type bed member and its frame, means for actuating said toggle means for urging the lower end of said type bed member away from its frame while said main frame and oscillating frame are in non-printing position, means including said pivotal means to obtain line contact between the two members progressively from one end thereof to the other as the lower end of the type bed member is moved toward its frame during the printing operation, said toggle actuating means also acting to provide a substantially constant pressure between the two members progressively from one end thereof to the other as the lower end of the type bed member is moved toward its frame during the printing operation, said toggle actuating means also acting to provide a substantially constant pressure between the two members during the printing operation, and means to retain said type bed member in the final printing position for a predetermined period

of time during movement of said oscillating frame away from the main frame to prevent double impression.

7. A printing press comprising a main stationary frame, an oscillating frame pivotally mounted on said main frame, means for moving said oscillating frame toward and away from said main frame for a printing operation, a curved platen member mounted on said main frame, a type bed member, means pivotally mounting said type bed member adjacent its upper end to said oscillating frame, toggle means connected between said type bed member and its frame, means for actuating said toggle means for urging the lower end of said type bed member away from its frame while said main frame and oscillating frame are in non-printing position, means including said pivotal means to obtain line contact between the two members progressively from one end thereof to the other as the lower end of the type bed member is moved toward its frame during the printing operation, said toggle actuating means also acting to provide a substantially constant pressure between the two members during the printing operation, and means to retain said type bed member in the final printing position for a predetermined period of time during movement of said oscillating frame away from the main frame to prevent double impression.

8. A platen printing press comprising a stationary frame, an oscillating frame pivotally mounted on said stationary frame, means for moving said oscillating frame toward and away from said stationary frame for a printing operation, a curved platen on one of said frames, a type bed on the other of said frames adapted to have a type form mounted thereon, cooperating means on said type bed and its frame for floatingly mounting said type bed on its frame for rocking movement within a limited range during printing, whereby line contact is obtained between the type form and platen during printing, means urging the lower end of said type bed away from its frame while said stationary frame and oscillating frame are in non-printing position, means to provide a substantially constant pressure between the type form and curved platen from the point of initial contact to the point of final contact therebetween during the printing operation, and means to retain said type bed in the final printing position for a predetermined period of time during movement of the oscillating frame away from said stationary frame to prevent double impression.

9. A platen printing press comprising a stationary frame, a second frame movably mounted on said stationary frame, means for moving said second frame toward and away from said stationary frame for a printing operation, a curved platen on one of said frames, a type bed on the other of said frames adapted to have a type form mounted thereon, cooperating means on said type bed and its frame for floatingly mounting said type bed on its frame for rocking movement within a limited range during printing, whereby line contact is obtained between the type form and platen during printing, means urging the lower end of said type bed away from its frame while said stationary frame and second frame are in non-printing position, means to provide a substantially constant pressure between the type form and curved platen from the point of initial contact to the point of final contact therebetween during the printing operation, and means to retain said type bed in the final printing position for a predetermined period of time during movement of the second frame away from said stationary frame to prevent double impression.

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