Feb. 14, 1950 C. F. ROOT 2,497,801

PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

Filed April 23, 1947 4 Sheets-Sheet 1

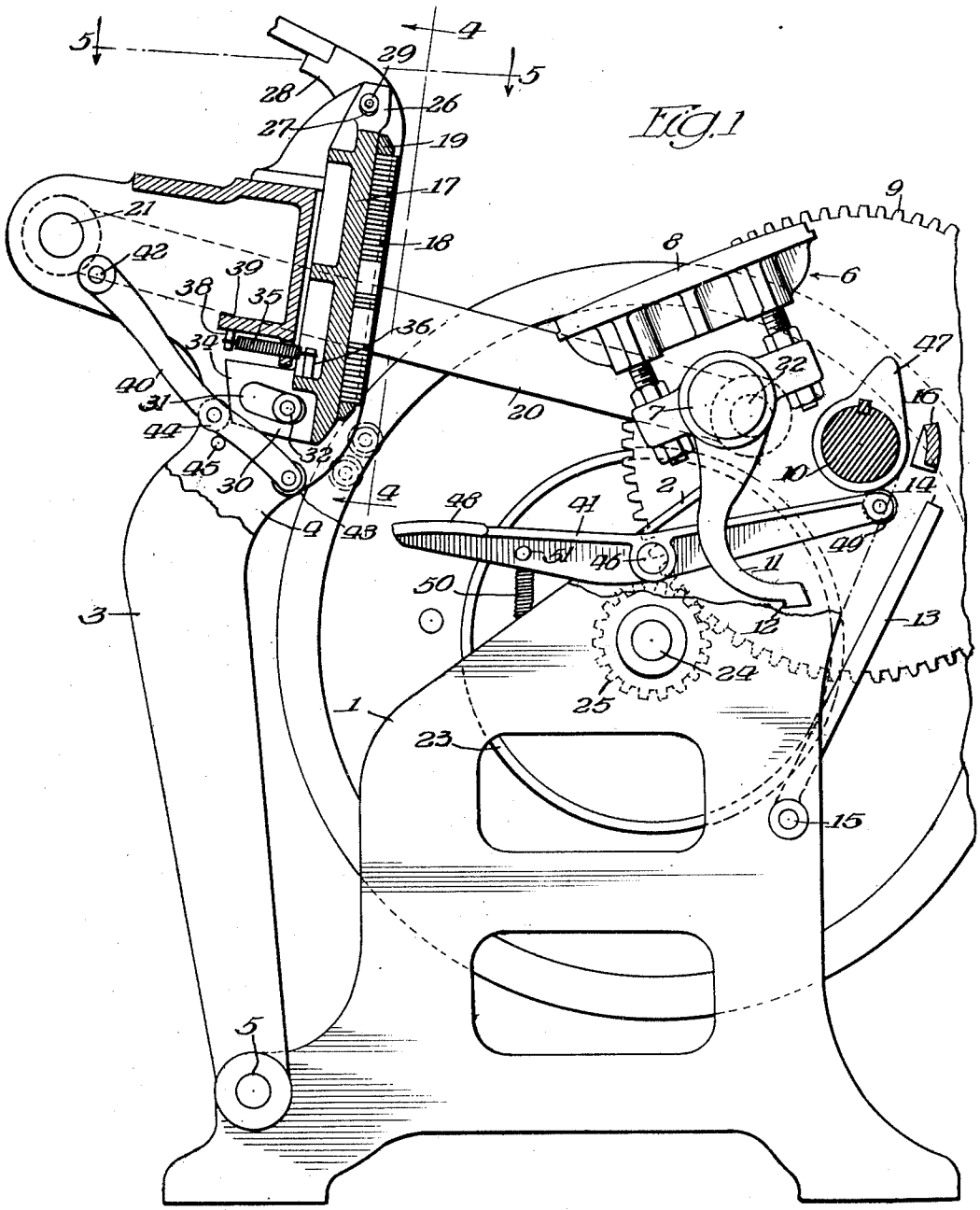


Fig. 1

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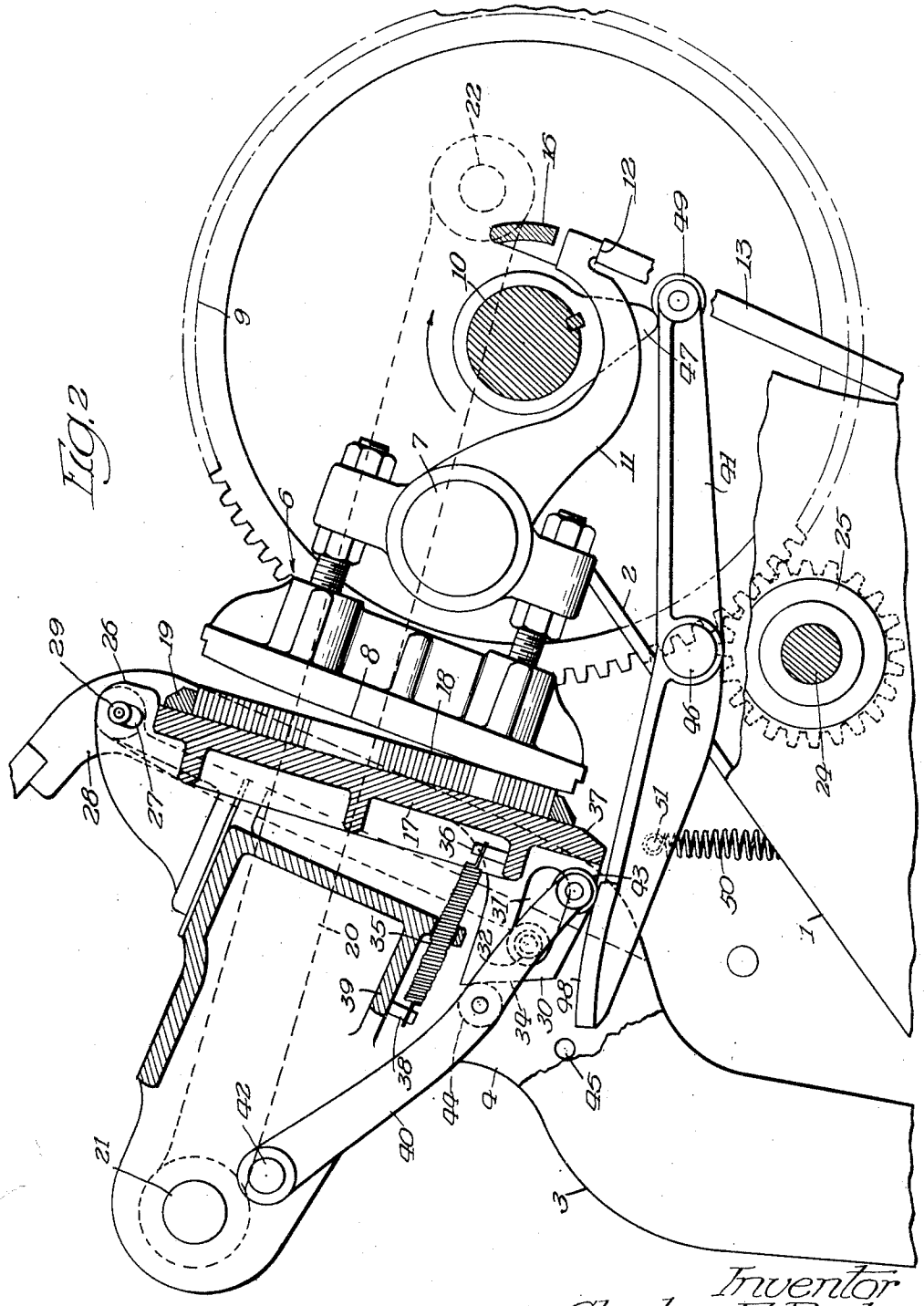


Fig. 2

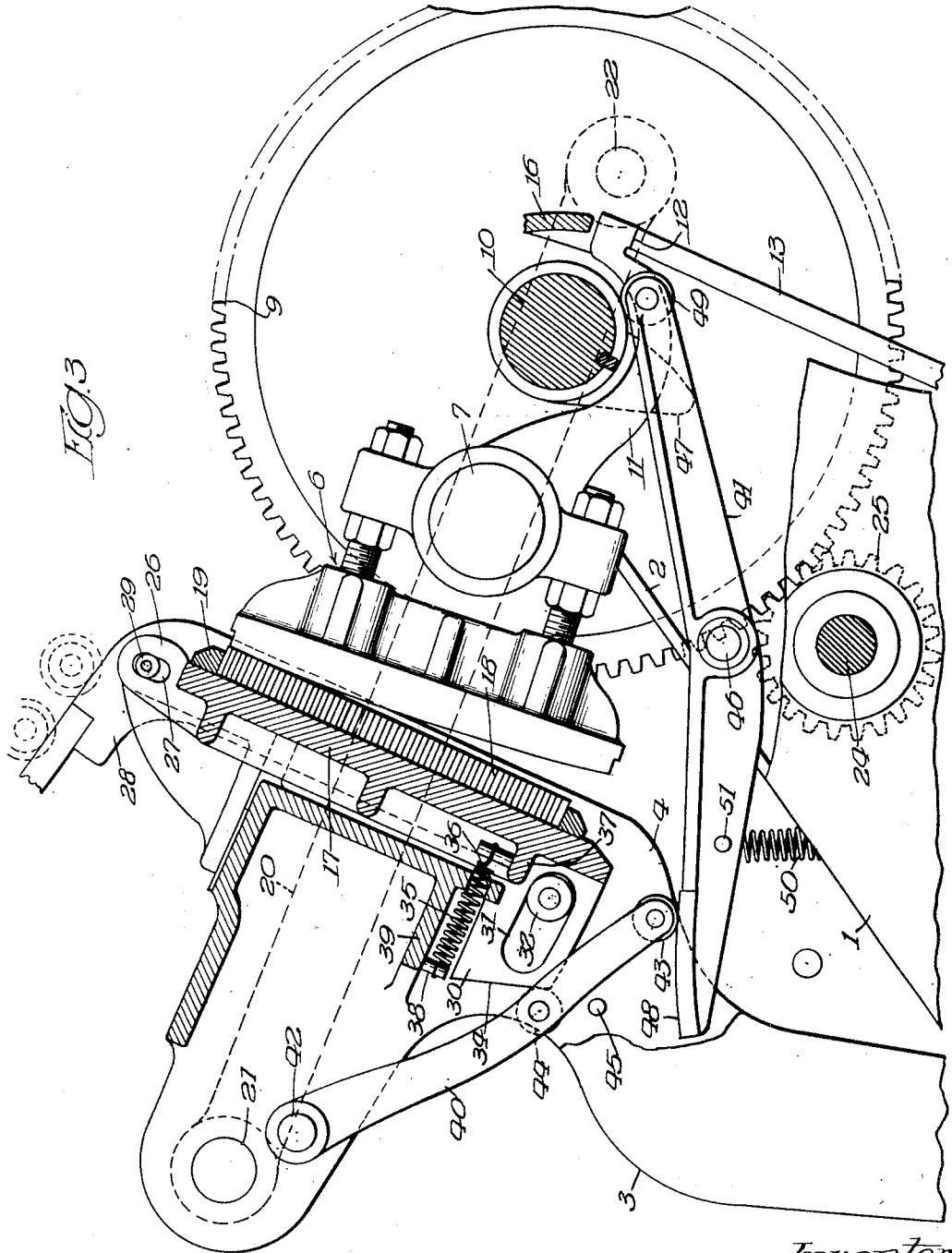
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PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

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FIG. 3



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PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

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Fig. 4

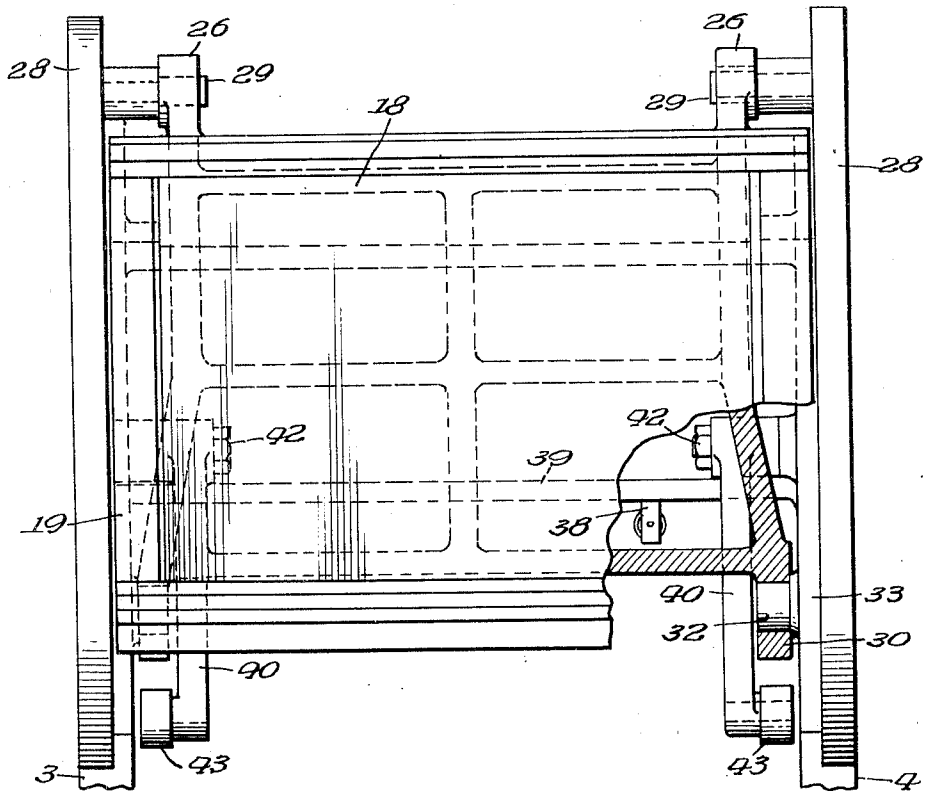
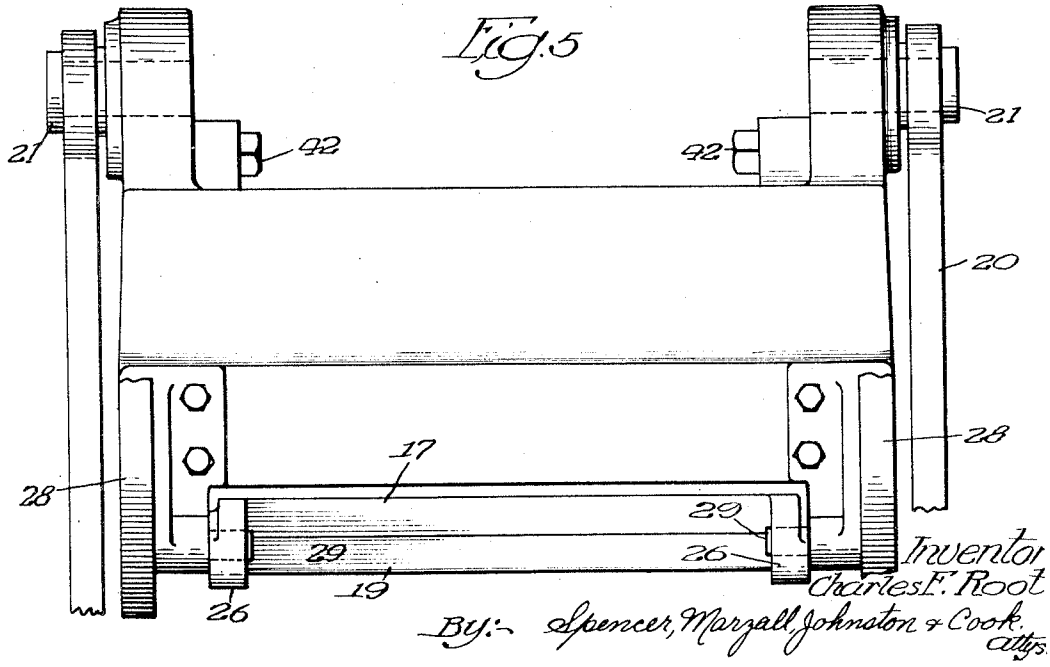


Fig. 5



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UNITED STATES PATENT OFFICE

2,497,801

PRINTING PRESS HAVING CURVED IMPRESSION SURFACE

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Application April 23, 1947, Serial No. 743,427

5 Claims. (Cl. 101—297)

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This invention relates in general to platen printing presses, and is particularly directed to a press of this character wherein the platen has a curved convex surface.

One of the principal objects of the present invention is to provide a platen printing press wherein the platen has a curved convex surface thereon and the type bed which carries the type form is floatingly mounted on its frame.

Another object of the invention is to provide in a platen printing press having a stationary frame and an oscillating frame, a curved platen mounted on one of the frames and a type bed carrying a type form floatingly mounted on the other frame so that proper registry or pin point contact will be obtained between the type form and the curved surface of the platen during the printing operation.

A further object is to provide a printing press having a stationary frame and an oscillating frame with a curved platen on the stationary frame and a type bed floatingly mounted on the oscillating frame, wherein the floating mountings of the type bed are so positioned relative to each other and to the pivotal point of the oscillating frame as to produce proper registry or pin point contact between the type form and curved surface of the platen during the printing operation.

Still another object is to provide a platen printing press of the curved platen type having a floatingly mounted type bed thereon wherein a novel form of mechanism is adapted to be actuated to move the type bed to initial printing position and to thereafter uniformly resist movement of the type bed to its final printing position against the pressure exerted thereagainst by the curved platen during the printing operation.

A still further and more specific object of the invention is to provide a platen printing press of the curved platen type wherein the type bed is floatingly mounted thereon and novel mechanism is provided on both of the frames which are adapted to cooperate with each other during movement of the oscillating frame toward the stationary frame to move the type bed to its initial printing position. These cooperating means are then utilized to uniformly resist movement of the type bed to its final printing position due to pressure exerted thereagainst by the curved platen during the printing operation.

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

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Fig. 1 is a side elevational view of a platen printing press embodying the present invention with certain parts broken away and shown in section, the press being illustrated in its open position;

Fig. 2 is an enlarged fragmentary side elevational view of the press shown in Fig. 1 with parts thereof broken away and shown in section, wherein the type bed is shown in its initial printing position;

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

Fig. 4 is an elevational view of the type bed and type form carried thereby with parts broken away and shown in section and taken substantially along the plane of line 4—4 of Fig. 1; and

Fig. 5 is a top plan view of the oscillating frame and type bed taken substantially along the plane of line 5—5 of Fig. 1.

Platen printing presses, in general, are provided with two frame members, one of which is stationary and the other of which oscillates toward and away therefrom to perform the printing operation. Where the type bed is mounted on a stationary frame and the platen is mounted on the oscillating frame, the press has been commonly known as the Golding type. The other well known Gordon type of platen press has the type bed mounted on the oscillating frame and the platen mounted on the stationary frame.

There have been many attempts in the past to design a practical job press both of the Golding and Gordon types wherein the platen has a curved printing surface, and the advantages of such a curved platen press have long been recognized, as clearly set forth, for example, in the Clark Patent No. 1,034,083. For example, the press can be made of lighter material and thus more economically, due to the fact that less pressure is required between the platen and type form during the printing operation because of the progressive line, or pin point contact, therebetween. Another advantage is that the printed sheet will be stripped from the type form as it prints, thus eliminating the stripping difficulties present in a flat platen press.

The present invention, while broadly applicable to any type of job printing press, is disclosed and described herein for purposes of illustration as having particular application to a Gordon press wherein the type bed is mounted on the oscillating frame. In my copending application, Serial No. 687,844 filed August 2, 1946, I have illustrated a form of curved platen press wherein the type bed is pivoted adjacent one end thereof to the os-

cillating frame and there was provided a predetermined relationship between the pivotal point of the type bed and the pivotal point of the oscillating frame so that proper registry or pin point contact would be obtained between the type form and curved surface of the platen during the printing operation.

An early attempt was also made to provide a Gordon 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 pin point contact or proper registry between the type form and curved platen was allegedly obtained by rolling the platen against the form 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. As distinguished from the prior art and my above referred to copending application, the present form of invention provides a floating mounting for the type bed which permits movement thereof in a predetermined manner to obtain proper registry.

The term "pin point contact" as used herein is synonymous with proper registry and may be illustrated briefly by describing the action or movement between a plane and curved surface when one is rolled against the other in such a way that no slippage occurs between the two surfaces. If one of the surfaces remains stationary and the other is rolled thereagainst, regardless of which surface is caused to move, when there is no slippage, pin point contact will result. The one surface must climb upwardly or downwardly on the other surface to result in pin point contact or proper registry.

When this principle is applied to a platen printing press where the surface of the platen is curved, the moving surface will have to roll and climb against the other or stationary surface and the embodiment of the invention illustrated herein is designed to attain this result by novel mounting and control mechanism on the type bed. In the present instance, when the oscillating and stationary frames are separated, the curved platen is moved to a substantially horizontal position for the purpose of receiving a sheet to be printed. During this time, the type form is being inked. The oscillating frame will then move to carry the type form toward the platen, at which time the platen returns to its printing position and is securely locked in such position while the type form carried by the type bed rolls thereagainst during the printing operation.

Referring now more particularly to the drawings, the press in general is provided with a stationary frame having spaced side members 1 and 2 and an oscillating frame having the spaced side members 3 and 4. This oscillating frame is pivotally mounted on the stationary frame by means of the pivot pins 5 at each side thereof.

The platen is generally indicated by the numeral 6, is mounted on the stationary frame for a rocking or oscillating motion on the rock shaft 7 and is provided with a curved convex surface 8. The operation of a Gordon press is very well known to those skilled in the art and the details of such well known structure need not be specifically described or illustrated herein. It is sufficient to state that the large gear 9 on one side of the machine, which is mounted on and secured to the shaft 10, is provided with a cam track (not shown) which is engaged by a roller on the end of a rocker arm (also not shown) on the rock

shaft 7. The cam track is so arranged that rotation of the gear 9 will cause an oscillating movement of the rock shaft 7 and platen 6 carried thereby in order to move it to sheet receiving position as shown in Fig. 1 and to printing position as shown in Figs. 2 and 3.

The rock shaft 7 has a forwardly extending rocker extension 11 secured to or integral therewith which terminates in an end portion 12. In the printing position of the platen, the rocker extension 11 will be in a position as shown in Figs. 2 and 3 and is locked in this position against movement by means of the rocker lock 13. This rocker lock 13 is in the form of a gate extending between the sides of the stationary frame and is pivotally mounted thereon at 15 and has a flat upper surface 14 which is moved beneath the end 12 of the rocker extension 11. Suitable and well known means are provided for properly actuating the rocker lock 13 in timed relation with the oscillating movement of the platen so that it will lock the platen against movement during the printing operation and will be moved outwardly to permit the platen to be moved to sheet receiving position. A cross member 16 at the front of the press and extending between the sides of the stationary frame cooperates with the rocker lock 13 to prevent movement of the rocker extension 11 in either direction while printing is taking place.

The type bed as illustrated herein is indicated by the numeral 17 and is adapted to carry a type form 18 within the confines of a chase 19. Movement of the oscillating frame to carry the type bed toward the platen is accomplished by means of a link 20 located one on each side of the press, one end of each link being pivotally secured to the oscillating frame by means of the pins 21 and the forward end of one link being pivotally mounted at 22 to the gear 9. The opposite side of the machine, not illustrated herein, may be provided with a similar gear or may have what is known as a small head mounted on the opposite end of the shaft 10 to which the forward end of the other link 20 is pivotally mounted. It will thus be evident that rotation of the gear 9 and shaft 10 will produce a longitudinal reciprocation of the links 20 which will thus transmit an oscillating movement to the frame carrying the type bed.

The press may be driven by any suitable power means (not shown) which drives a pulley 23 on one side of the machine mounted on the shaft 24. A pinion 25 may also be secured to the shaft 24 to mesh with the gear 9 to thereby drive the gear and impart the necessary motion to the various parts of the press.

The type bed 17 is floatingly mounted on the frame which carries it by novel means which include upwardly extending ears 26 at each side of the type bed, each of which ears has a substantially vertically extending elongated slot 27 therein. The upper outer sides 28 of the oscillating frame carry inwardly extending pins or rollers 29 which are received within the slots 27 (see also Fig. 4).

The lower end of the type bed 17 is provided with a rearwardly extending ear 30 on each side thereof, each of which has an elongated arcuate slot 31 therein. Each slot 31 is adapted to receive a pin or roller 32 mounted on the stationary side members 33 of the oscillating frame. The upper and lower pin and slot connections 27, 29, 31 and 32, provide a floating mounting for the type bed 17 and are arranged in a predetermined manner with respect to each other and with re-

spect to the pivotal point 5 of the oscillating frame, so that proper registry will occur between the type form and curved platen during the printing operation.

These floating mountings may have a different relationship from that shown if the pivotal point 5 of the oscillating frame is changed or moved to a different location. The slots 31 and pins 32 permit the type bed 17 to move between initial and final printing positions and the upper slots 27 and pins 29 permit a slight upward movement of the type bed so that it may climb along the curved surface 8 of the platen 6. The amount of movement, the direction thereof, and the amount of climb may vary depending upon the relative positions between the type bed and curved platen. This relative position will be determined by the location of the pivotal point 5. Thus it will be clear that if the pivotal point 5 is moved to a different location on the stationary frame, changes would have to be made in the location and general direction of the slots 27 and 31. These positions, however, can be easily determined and worked out for any particular location of the pivotal point 5.

Each of the ears 30 is provided at its rear side or edge with a cam surface 34 which cooperates with certain actuating mechanism presently to be described to control the movement of the type bed 17 to initial and final printing positions.

The type bed 17 is normally maintained in its retracted or final printing position by means of coiled tension springs 35 which are secured at their forward ends to pins 36 extending upwardly from horizontal ribs 37 across the back of the type bed, and at their rear ends to similar pins 38 extending downwardly from a rib or cross member 39 on the oscillating frame. In this position of the type bed, the pins 32 will be located at the forward ends of the slots 31. In moving the type bed to its initial printing position, the pins 32 will traverse the slots 31 so that they will then be located at the rear of such slots as shown in Fig. 2.

Fig. 1 shows the open position of the press where the platen is in sheet receiving position and the type form 18 is being inked by suitable inking rollers (not shown). The inking rollers will be moved upwardly to the usual inking fountain (also not shown) during the printing operation.

Novel cooperating means in the form of pivotally mounted arms and levers are secured to both the stationary and oscillating frames. These means will act together in proper timed relation to move the type bed to its initial printing position, and to resist and control the movement thereof to its final printing position, to which it is moved by pressure of the curved surface of the platen thereagainst.

The arms on the oscillating frame are indicated by the numeral 40. One of these arms is located at each side of the frame and on the inner side thereof. The cooperative lever arms 41 are mounted on the stationary frame in such a way that they may cooperate with and actuate the arms 40 during operation of the press.

The arms 40 are pivotally secured at one end thereof by means of pivot pins 42 at each side of the oscillating frame and each carries a roller 43 at its forward end. An intermediate roller 44 is positioned on each arm 40 between the ends thereof and is adapted to bear against and cooperate with the cam surface 34 at the rear of each ear 30. A suitably located pin 45 limits the downward movement of the arm 40 during the period of time that the two frames are separated and while the type form is being inked.

Each lever 41 is pivotally mounted between its ends on the stationary frame by means of pivot pins 46 and a rocking movement of each lever is caused to occur at the proper time by means of rotating cams 47 keyed to the shaft 10. The rear end of each lever 41 has a slightly arcuate cam surface 48 thereon adapted to cooperate with the rollers 43 on the forward ends of the arms 40, and rollers 49 at the forward ends of each lever 41 remain in contact with the cams 47 for actuation of the levers. Coiled tension springs 50 secured at one end to the stationary frame and at their other ends to pins 51 on the levers 41 normally maintain and urge the rollers 49 in contact with the cams 47.

The mechanism above described will act to move the type bed 17 to its initial printing position as the oscillating frame moves toward the platen after the platen has been rocked to its printing position and locked therein. This position of the various parts is illustrated in Fig. 2 where it will be seen that as the oscillating frame moves forwardly, the rollers 43 on the arms 40 will contact the cam surfaces 48 on the rear of levers 41. At the proper time the enlargement on the cams 47 will cause a rotation or rocking movement of the levers 41 in a clockwise direction, thus moving the rear ends 48 thereof upwardly, carrying the rollers 43 and the arms 40 therewith. Upward movement of the arms 40 will cause a forward and outward movement of the type bed 17 by reason of the rollers 44 bearing against the cam surfaces 34 on the ears 30. The position of the type bed and the arms 40 and levers 41 at the beginning of the printing operation will then be as shown in Fig. 2, where the type bed 17 has been moved forwardly and the pins 32 will be located at the rear ends of the slots 31.

It will be noted that in this position of the various parts, the oscillating frame has not completed its forward movement. That is, the pivotal points 22 at the forward ends of the links 20 are still above dead center, and the printing operation will not be completed until the dead center is reached, as shown in Fig. 3. During the movement of the pivotal point 22 from its position as shown in Fig. 2 to its dead center position shown in Fig. 3, the printing operation will take place. During this time, the enlargement on cams 47 will permit the levers 41 to rock in a counter-clockwise direction, thus also permitting a downward movement of the arms 40. Pressure of the platen 6 against the type form 18 at the beginning of the printing operation will tend to urge the type bed 17 rearwardly, but such movement will be resisted by the rollers 44 on the arms 40 against the cam surfaces 34 on the ears 30. The movement of the arms 40 downwardly, which will permit rearward movement of the type bed, is controlled by the rollers 43 against the cam surfaces 48 of the levers 41, which are, in turn, controlled by the cams 47. It will be clear that if the type bed 17 were freely movable, there would not be sufficient pressure built up between the type form and platen to cause printing to take place. Therefore, this resistance set up by the cooperating arms and levers 40 and 41 will create a sufficient pressure for printing.

On the other hand, the type bed must be allowed to move and to roll over the curved surface 8 of the platen in such a way as to prevent

any slippage therebetween and obtain proper registry or pin point contact. The direction and amount of movement of the type bed 17 is controlled by the floating mountings consisting of the pin and slot connections 27, 29, 31 and 32. The relationship between these mountings and the pivotal point 5 of the oscillating frame has been explained above as being such that proper registry will result. It will be noted in Figs. 2 and 3 that as the type bed 17 moves rearwardly to its final printing position, the pins or rollers 32 will be caused to traverse the slots 31 and be positioned at the forward ends thereof. The amount of climb necessary for proper registry is permitted by the slots 27 which results in a relative movement between these slots and the pins 29. It will be noted in Fig. 3 that the pins 29 are positioned slightly below the upper ends of the slots 27.

From the foregoing description it will be apparent that novel mechanism in the form of cooperating parts on the oscillating and stationary frames as well as the floating mounting of the type bed have been provided for producing pin point contact, or proper registry, in a curved platen press. The novel arrangement of the pin and slot connections, forming the floating mounting of the type bed, together with holding the curved platen rigid during the printing operation assures proper registry and a clear impression. Furthermore, 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 those disclosed herein without departing from the spirit of the invention or sacrificing any of the attendant advantages hereof, provided, however, that such changes fall 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 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 platen carrier oscillatably mounted on said stationary frame, a curved platen on said carrier, means for oscillating said carrier and platen to sheet receiving and to printing positions, means for holding said carrier and platen against movement during the printing operation, a type bed on said oscillating frame adapted to have a type form mounted thereon, upper and lower guideways on said type bed, upper and lower guide members on said oscillating frame cooperating with said guideways for guidingly and 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.

2. 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 platen carrier oscillatably mounted on said stationary frame, a curved platen on said carrier, means for oscillating said carrier and platen to sheet receiving and to printing positions, means for holding said carrier and platen against movement during the printing operation, a type bed on said oscillating frame adapted to have a type form mounted thereon, upper slotted members on said type bed, lower guiding surfaces on said type bed, upper and lower guide members on said oscillating frame cooperating with said upper slots and said lower guiding surfaces for guidingly and 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.

3. 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 platen carrier oscillatably mounted on said stationary frame, a curved platen on said carrier, means for oscillating said carrier and platen to sheet receiving and to printing positions, means for holding said carrier and platen against movement during the printing operation, a type bed on said oscillating frame 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 including cam means positioned rearwardly of said type bed 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.

4. 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 platen carrier oscillatably mounted on said stationary frame, a curved platen on said

carrier, means for oscillating said carrier and platen to sheet receiving and to printing positions, means for holding said carrier and platen against movement during the printing operation, a type bed on said oscillating frame 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 including cam means positioned rearwardly of said type bed and other cam means on said stationary frame cooperating for 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.

5. 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 platen carrier oscillatably mounted on said stationary frame, a curved platen on said carrier, means for oscillating said carrier and platen to sheet receiving and to printing positions, means for holding said carrier and platen against movement during the printing operation, a type bed on said second frame 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 including cam means positioned rearwardly of said type bed 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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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
796,707	Clark	Aug. 8, 1905
857,721	Clark	June 25, 1907
1,034,083	Clark	July 30, 1912
1,289,273	Rout	Dec. 31, 1918
1,360,063	Waters	Nov. 23, 1920
1,474,142	Caplinger	Nov. 13, 1923
2,015,994	Eaton	Oct. 1, 1935