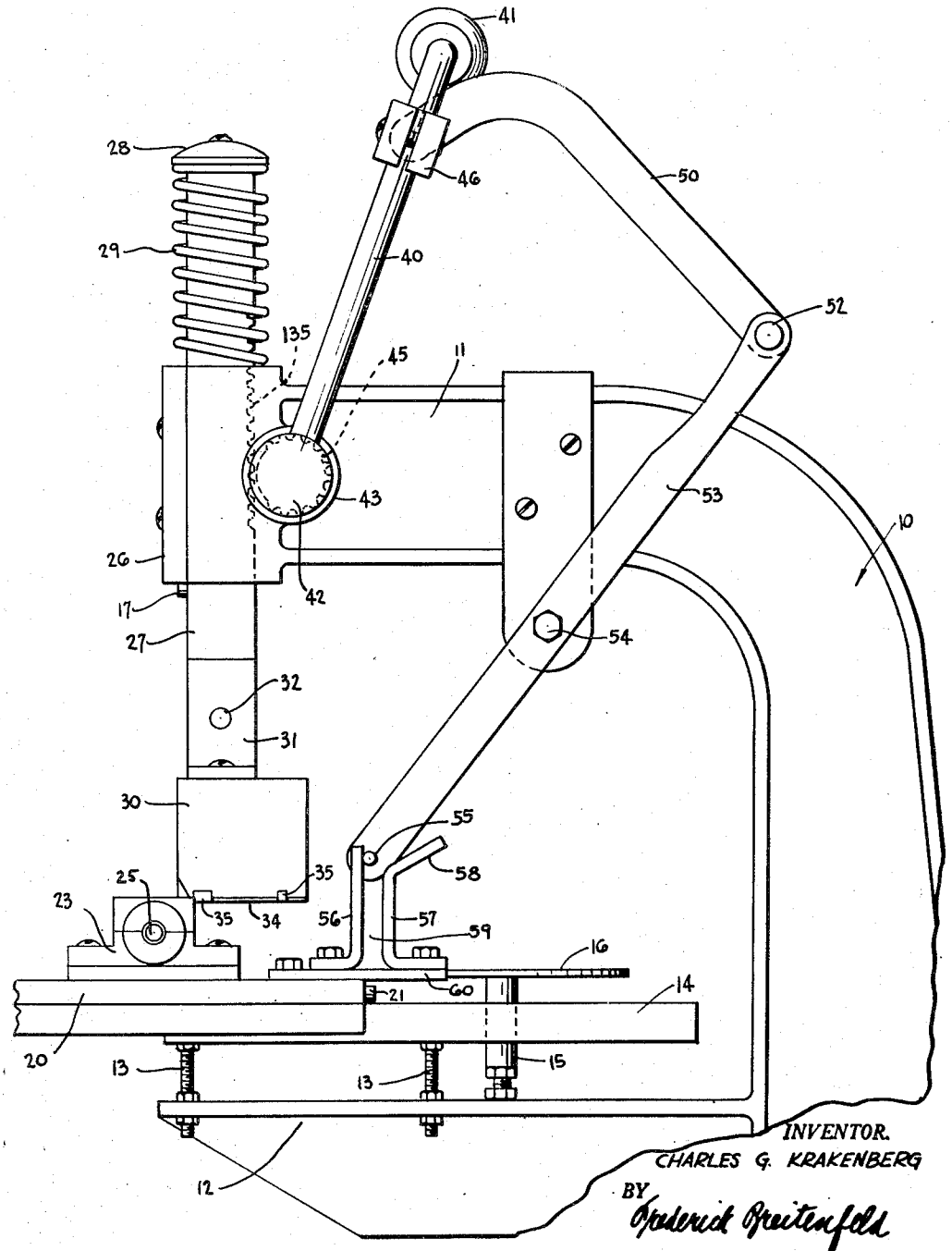
July 21, 1953 C. G. KRAKENBERG 2,645,996

PRINTING MACHINE

Filed Oct. 5, 1950 4 Sheets-Sheet 1

Fig. 1.




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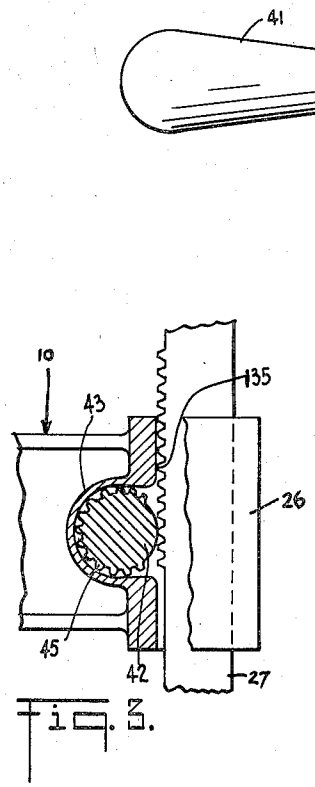



Fig. 3.




Fig. 2.

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PRINTING MACHINE

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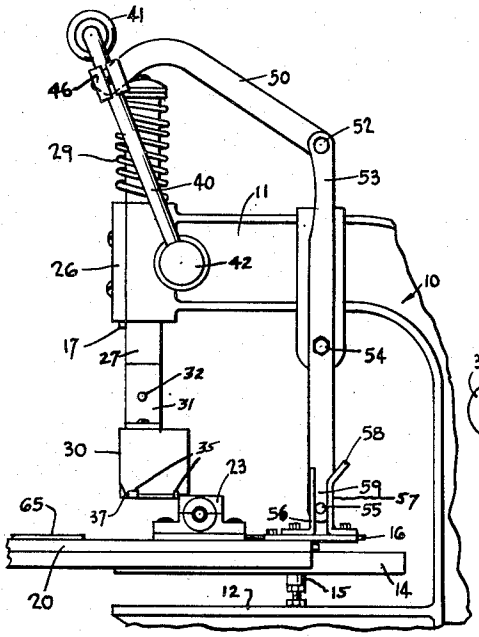


Fig. 10.

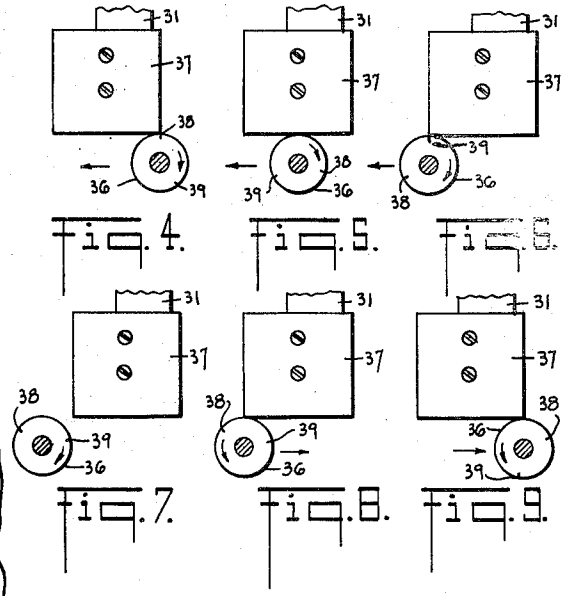


Fig. 4. Fig. 5. Fig. 6.



Fig. 7. Fig. 8. Fig. 9.

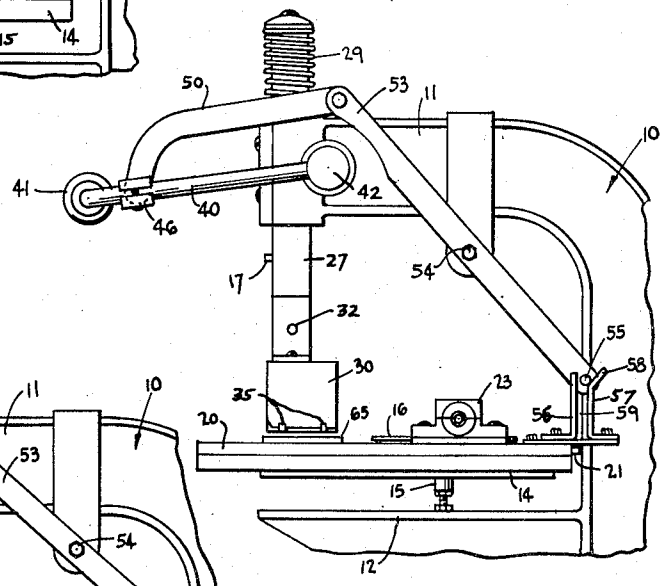


Fig. 11.

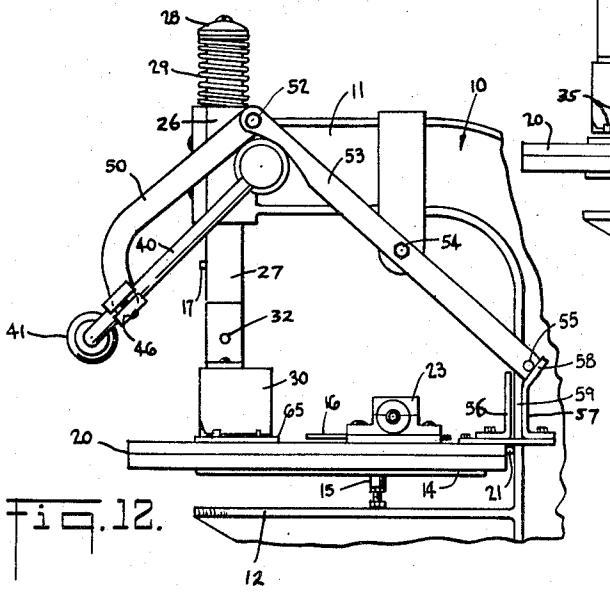


Fig. 12.

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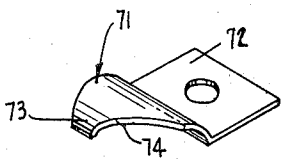



Fig. 17.




Fig. 13.

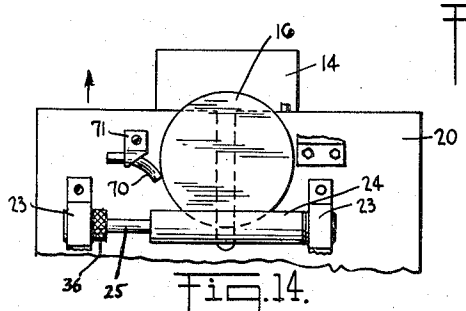



Fig. 14.

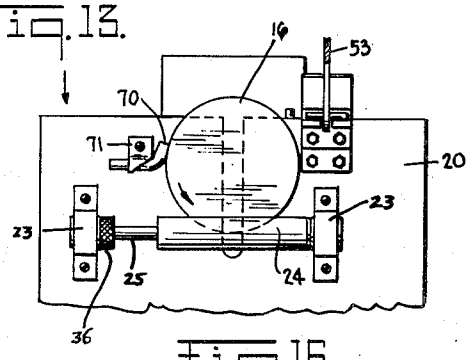



Fig. 16.

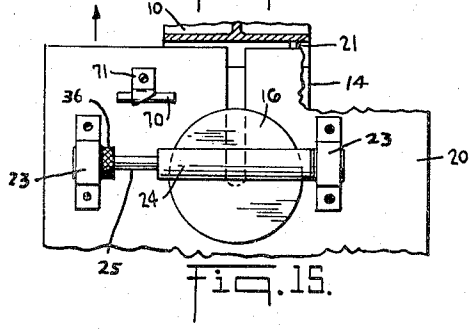



Fig. 15.

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Patented July 21, 1953 2,645,996

# UNITED STATES PATENT OFFICE

2,645,996

## PRINTING MACHINE

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Application October 5, 1950, Serial No. 188,498

5 Claims. (Cl. 101—319)

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My present invention relates generally to printing machines, and has particular reference to printing apparatus of relatively small size, suitable for hand operation if desired, and requiring no unusual skill on the part of the operator.

The apparatus is primarily intended for use in imprinting a name or other legend upon a so-called "personalized" checkbook, and is specially designed to permit this to be done in an expeditious manner upon the individual leaves of already-bound checkbooks. The invention is not restricted, however, to any specific purpose, and the improved printing apparatus is useful for a large variety of printing or equivalent operations, especially where they are simple and of relatively small magnitude and where it is desired to perform them quickly, inexpensively, and with a minimum of noise and maintenance attention.

Ordinary printing presses, even those of relatively small size, are not suitable for the small-scale operations herein contemplated. They are mechanically of relatively complex character, they are noisy and heavy and occupy considerable space, and their maintenance and operation requires a relatively high degree of skill and training. It is a general object of the invention to provide an apparatus having none of these disadvantages, whose manufacture is relatively inexpensive, whose operation is simple, reliable and quiet, and which produces printing of good quality.

The improved machine consists, in brief, of a horizontal printing bed slidable back and forth in its own plane, a vertically reciprocating printing head, inking means, and mechanism controllable by a single motive force for causing the parts automatically to move through a predetermined cycle of cooperative actions. More particularly, the bed has a work-holding part that moves forwardly from beneath the printing head so as to come into a readily accessible position close to the operator between successive printings; the bed comes to a stop at a predetermined rearward position just prior to the final descending motion of the printing head onto the work beneath it; and during its forward and rearward movements, the bed carries an inking roller from a rearwardly positioned ink supply to the type to be inked and back again. In timed relation to this, the printing head comes to a halt in an elevated position to allow the inking roller to wipe forwardly and back across the type; it descends upon the work to be printed; then it rises again.

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The more particular objects of the invention reside in the provision of an improved inking system whereby a single roller is sufficient for the purpose; in the provision of a simplified means for periodically moving the inking supply disc to assure proper functioning; and in the provision of a specially designed relatively uncomplicated system of mechanical levers and parts for translating the applied motive force into the contemplated sequence of actions, reliably, quietly, and in proper timed relation.

I achieve these objectives, and such other objects and advantages as may hereinafter appear or be pointed out, by the construction illustrated in the appended drawings which show a preferred embodiment of the invention and in which:

Figure 1 is a side elevation of the improved printing press;

Figure 2 is a front elevation;

Figure 3 is a cross-sectional view taken substantially along line 3—3 of Fig. 2;

Figures 4 through 9 are diagrammatic views taken in the direction 4—4 of Fig. 2 and showing various related positions of the printing head with respect to the inking roller;

Figures 10 through 12 are reduced elevations similar to Fig. 1 and showing the relation between the printing head and work-holding bed at various stages in the operation of the handle lever;

Figure 13 is a partial view of the bed of the machine viewed along line 13—13 of Fig. 2;

Figures 14 through 16 are reduced views similar to Fig. 13 and showing the positional relationship of the inking roller and inking disc at various intervals in the back and forth movements of the printing bed; and

Figure 17 is a perspective view of a clamp for holding the resilient finger which turns the inking disc.

The supporting frame 10 is of simple design, and is preferably formed of an iron casting which is I-shaped in cross section. The frame is formed in the shape of a U with the open end disposed forwardly toward the operator (to the left as viewed in Fig. 1). The frame is provided with a pedestal (not shown) which supports the upper and lower arms 11 and 12 of the U-shaped part in parallel horizontal levels above the floor.

Adjustably supported from frame arm 12 by means of threaded bolts 13 (Figs. 1 and 2) is a horizontal guideway 14 which extends from front to rear of the machine. Also attached to arm 12 by means of an adjustable bolt is the ver-

tically arranged sleeve 15. The sleeve passes through an opening in guideway 14 and rotatably supports an inking disc 16 at an adjustable level above the guideway. The inking disc is provided with a depending spindle which seats in the sleeve 15 and is free to rotate therein.

A printing bed 20 is slidably mounted on guideway 14 and reciprocates in its own plane between forward and rear positions. A stop 21, of rubber or other suitable material, is carried by the bed for abutment with the wall of the frame 10 to limit rearward movement of the bed (Fig. 12). The bed is slotted centrally by channel 22 extending forwardly from its rear edge so that rearward movement of the bed beneath the inking disc 16 will not be impeded, the disc-supporting collar 15 riding into and out of channel 22 (Figs. 14–16).

The upper surface of bed 20, at its forward end, is a work holding part as indicated by the illustrative checkbook 65 shown thereon in Figs. 10–12. Rearwardly of this part are a pair of bearings 23 between which is journaled an inking roller 24. This roller is mounted to rotate freely above the level of the bed 20 and about its horizontal axis shaft 25.

The forward end of frame arm 11 terminates in a vertical bearing 26 adapted to receive a suitably shaped upward extension 27 of a printing head 30. The upper end of the extension has an enlarged head 28. A spring 29 is held in compression between this head and the bearing 26, and constantly urges the extension 27 together with the printing head 30 into an elevated position above the printing bed, this position being reached when stop pin 17 abuts the bearing 26.

The printing head 30 is connected to its extension 27 by brackets 31 and 33 having aligned openings in which there is a pin 32 (Fig. 2). The printing head 30 may be swung about this pin 32 so that its under surface 34, which is provided with grooves or other means for the reception of channel strip type holders or the like, may be swung into a forwardly facing position to facilitate the insertion or removal of type. Such type is diagrammatically represented in the present drawings and is designated by the reference numeral 35.

The mechanism for simultaneously reciprocating the printing head vertically and the bed horizontally comprises a system of levers motivated by a single member 40. Member 40 is a lever arm one end of which is horizontally arranged and provided with an operating handle 41. The other end is bent downwardly and terminates in a horizontal shaft 42. This shaft is journalled in extension 43 of bearing 26, and the end of shaft 42 which is housed in the bearing 43 is provided with pinion-like gear teeth 45 on a portion of its periphery. These teeth are adapted to mesh with rack teeth 135 formed on the printing head extensions 27 (Fig. 3).

A split clamp 46 is fastened near the bend in lever arm 40 and is adjustable lengthwise of the vertical part of the arm. A link 50 is connected at one end to clamp 46 by pivot 51. The opposite end of the link 50 is pivoted at 52 at one end of a second lever 53. Lever 53 is centrally pivoted at 54 to the frame 10. The lowermost end of lever 53 carries a cross pin 55 which rides in a vertical channel 59 provided between elements 56 and 57 (Fig. 1). These elements are carried by bracket member 60 which is secured to the rear of the printng bed 20.



Each of the elements 56 and 57 is centrally slotted as shown at 61 in Fig. 13, to permit the lever 53 to ride in the slots 61 while pin 55 rides in channel 59. The upper end of element 57 is bent rearwardly to diverge from the vertical for a reason presently to be explained.

The mode of operation is as follows: An operator stands in front of the press and places the work on the work holding part of the bed. If, for example, a checkbook 65 is to be imprinted, it is positioned as shown in Fig. 10 and the cover is turned back by the operator to expose the uppermost check. If desired, the cover may be retained in turned back position by a suitable holder (not shown). With his left hand the operator now pulls handle 41 downwardly, which turns lever 40 and shaft 42. At the beginning of this movement the untoothed portion of the shaft 42 is opposite rack teeth 135 so that the printing head remains stationary.

The movement of lever 40 counterclockwise (as viewed in Fig. 1) swing links 50 and lever 53 so as to move the pin 55 in the same angular direction. This pin slides downwardly in channel 59, exerting pressure against element 57 to move the bed 20 rearwardly, until the parts presently occupy the positions shown in Fig. 10. During this movement the roller 24 rides rearwardly across the type 35 while the printing head 30 remains stationary.

At approximately the position of operating lever 40 shown in Fig. 10 the pinion teeth 45 and the rack teeth 135 come into meshing relation, and further turning of the lever 40 moves the printing head downwardly, compressing spring 29, while the bed 20 continues to move to the rear.

The pin 55 now rises in channel 59 until the parts occupy the positions shown in Fig. 11. During this part of the movement of the bed, the roller 24 has been carried over the disc 16 to replenish its ink supply and the stop 21 has struck the frame 10 limiting further rearward motion of the bed 20. The printing head 30 is now positioned only slightly above the checkbook 65 and is ready for application of printing pressure thereto.

Further downward movement of handle 41 moves the printing head into printing contact with the work 65 while pin 55 slides ineffectively up element 58, so that no further horizontal pressure is transferred from the pin 55 to the work bed 20 and the latter thus remains stationary during the printing operation.

The operator now raises or permits the handle 41 to rise under urgency of the spring 29, causing the parts and levers to reverse their directions of movement. As lever 40 turns clockwise from its position in Fig. 12 to its position in Fig. 11, pin 55 rides down the flange 58 so that the bed remains stationary while the printing head is elevated. As the lever 40 continues to turn to its position of Fig. 10, the printing head continues to rise and the pin 55 rides into and downwardly in channel 59, moving the bed 20 forwardly and again passing the roller 24 over the inking disc 16. When the parts have reached the positions shown in Fig. 10 the teeth of the pinion 45 disengage the rack teeth 135 and further elevation of the printing head is halted by the pin stop 17 while the handle 40 continues to move toward its starting position of Fig. 1. The pin 55, however, rises in channel 59 and continues to move the bed forward so that the roller 24 wipes forwardly across the face of the

stationary printing head 30. By this time the checkbook 65 has moved forwardly from under the printing head 30 into an accessible position where the operator may turn back the printed uppermost check so that the second check is uncovered for printing thereon.

The procedure is then repeated until all of the checks or other items have been imprinted, the operator merely lowering and raising the handle with his left hand while he turns the checks with his right hand each time his left hand nears the top of its stroke and the printing bed moves forwardly.

It will be observed from the foregoing that the single inking roller 24 rides over the type 35 twice during each printing operation, once on the forward movement of the bed and once on the rearward movement. This insures the spread of a uniform layer of ink on the type. In order to prevent the second pass from wiping off the ink deposited by the first pass it is necessary to prevent the same portions of the roller from contacting identical type surfaces on the forward and backward strokes. For this purpose a wheel 36 preferably having a knurled periphery is mounted on the roller shaft 25 near one end thereof, and a friction member 37 is mounted at one end of the printing head 30 for rolling contact with the wheel 36. Member 37 may be formed of plastic, wood or other suitable material for frictionally and noiselessly engaging and turning the wheel 36.

Figures 4–9 diagrammatically illustrate the coaction of the friction member 37 with the wheel 36 and roller 24. In Figure 4 the bed 20 is moving forwardly (to the left in this figure). Wheel 36 makes contact with the friction member at point 38 in its periphery, and the wheel and roller begin to turn clockwise as shown in Fig. 5. The wheel disengages the friction member at peripheral point 39, as shown in Fig. 6. However, through inertia the wheel 36 continues to turn as the bed continues to move forwardly, so that the points 38 and 39 have moved to the locations shown in Fig. 7 by the time the bed reverses and starts back. Figures 8 and 9 show clearly that peripheral points of the wheel, different from those marked 38 and 39, first engage and last disengage the friction member 37 during this rearward motion, and therefore as the roller turns counterclockwise a different area of its surface is presented to the type 35.

A noiseless and equally simple means is also employed for turning the disc 16 as the roller passes back and forth over it between printing operations. As best seen in Figures 13 and 17, a finger 70 of resilient material, such as rubber or the like, is adjustably clamped to the rear of the bed 20 by bracket 71. The bracket is formed with a flat securing flange 72 and a semi-cylindrical finger-retaining socket 73. Part 73 is cut away at an angle as indicated at 74 so that the finger 70 is free to flex partially out of the clamp in one direction but not in the other. The clamp is so positioned on bed 20 as to hold one end of finger 70 in position to strike the periphery of inking disc 16 as the bed moves back and forth. As the bed moves to the rear (upwardly in the direction of the arrows in Figures 14 and 15), the disc 16 strikes the finger 70 very lightly and deflects it partially out of the clamp opening 74. This permits the roller 24 to wipe across disc 16 and take up ink without the disc being turned by contact with the resilient finger 70. However, on the return stroke of the bed (downwardly in Fig. 16), the disc 16 squeezes the finger 70 into the small space between the end of the clamp and the periphery of the disc 16. As a result, the finger 70 imparts a rotative kick to the disc 16, advancing it a small angular increment as indicated by the clockwise arrow in Fig. 16. Consequently, new surface areas of the roller 24 and disc 16 contact each other on the return stroke, resulting in an even transfer of ink from the disc to the roller as the apparatus continues to function.

It will be observed that the printing machine embodies a simple, low cost construction utilizing a relatively small number of parts. The operation is effected by movement of a single operating member which, if manually actuated, can be moved with one hand leaving the other free to manipulate the matter to be printed. Operation of the machine makes the work accessible to the operator for turning leaves without danger, since the forward stroke of the work holding bed toward the operator moves the work well out of line with the printing head. Before each printing impression is made the type is inked twice and the ink transferring roller is twice supplied with ink from the ink reservoir. This is accomplished uniformly and noiselessly and by use of only a single inking roller and without any danger of wiping ink back from the type onto the roller.

In general it will be understood that modifications may be made in the form and details of the described embodiment of the invention, by those skilled in the art, without necessarily departing from the spirit and scope of the invention as expressed in the appended claims.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. A printing press comprising a horizontal slidable bed having a work holding part, a printing head above said bed, a frame for supporting said bed and head, a bearing on said frame, an extension on the printing head slidably carried in said bearing to permit reciprocation of the printing head in a vertical direction, a rack on said extension, a spring acting upon said extension to lift the printing head, a handle lever pivoted to the frame and carrying a pinion in engagement with said rack for moving the printing head toward and away from the work bed, and a system of levers connecting said handle lever to said work bed for simultaneously moving the work holding part of the bed toward the printing head as the latter moves downwardly and away from the printing head as the latter moves upwardly under urgency of said spring, said lever system including a lever pivoted on a horizontal axis and extending downward from said axis toward said bed, a pair of spaced upstanding elements on said bed defining a vertical channel between them, and a pin at the lower end of said downwardly extending lever and positioned within said channel, the rear one of said upstanding elements having its upper end directed angularly away from the other, whereby swinging movements of said pin-carrying lever are translated by said pin into horizontally directed pressure upon said bed except at the end of rearward movement of said bed at which time said pin engages said angularly directed upper end of the rear one of said spaced elements.

2. A printing press comprising a frame, a horizontal slidable work bed carried on the frame, a printing head above the bed, a bearing on said

frame, said printing head being vertically slidable in said bearing, a handle lever pivoted to the frame, means for moving the printing head up and down in response to swinging of said handle lever, a system of levers connecting said handle lever to said work bed for simultaneously moving the work bed forwardly and rearwardly as the printing head moves downwardly and upwardly, said system of levers including one which is pivoted on a horizontal axis and extends downward from said axis toward said work bed, an upstanding member on said bed having a channel therein defined by spaced vertical walls the rear one of which is directed angularly away from the other at its upper end, and a pin riding in said channel and connected to said downwardly extending lever, whereby turning of said handle lever causes coaction of said pin with the walls of said channel to move the work bed horizontally except while the pin engages the angularly directed end of said rear wall.

3. In a printing press, a printing bed movable back and forth in its own plane and carrying an inking roller whose axis of rotation is parallel to the bed, a rotatable inking disc parallel to the bed and adapted to engage the roller for feeding ink thereto, said disc having an uninterrupted peripheral edge, a flexible member adapted to engage said edge frictionally and carried by the bed in a position to strike the periphery of said disc during each lap of travel of the bed and before and after rolling contact of the disc with the roller, and means to prevent flexing of said member to the same extent in opposite directions, whereby said disc is rotated by frictional contact with said flexible member to a greater degree upon movement of the bed in one direction than in the other.



4. In a printing press, a printing bed movable back and forth in its own plane and carrying an inking roller whose axis of rotation is parallel to the bed, a rotatable inking disc parallel to the bed and adapted to engage the roller for feeding ink thereto, said disc having an uninterrupted peripheral edge, and means carried by said bed and adapted to engage the periphery of said disc frictionally for advancing said disc through a slight angular increment between inking operations, said last named means comprises a flexible finger secured at one end to said bed with its opposite end free to encounter and engage frictionally with the periphery of said disc.

5. A printing press constructed as set forth in claim 1 wherein a portion of said pinion has teeth omitted so as to interrupt the driving engagement between said pinion and rack and thereby discontinue vertical movement of the printing head, said toothless region of the pinion being so located on the pinion that said discontinuance of vertical movement of the printing head occurs as the work bed approaches and retreats from its forward position.

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