Oct. 31, 1939. C. F. ROOT 2,177,787

SHEET DELIVERY MECHANISM

Filed July 6, 1938 2 Sheets-Sheet 1

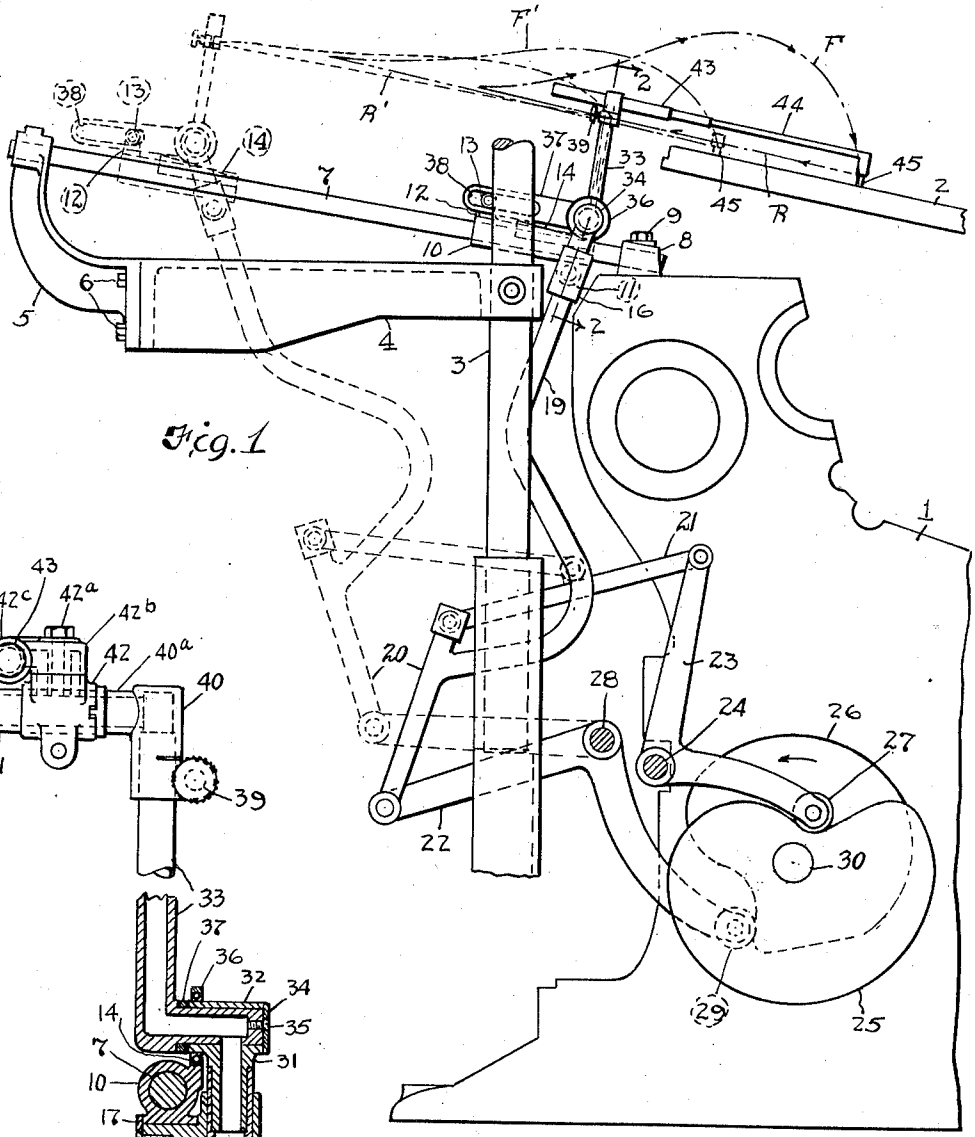


Fig. 1

Fig. 2

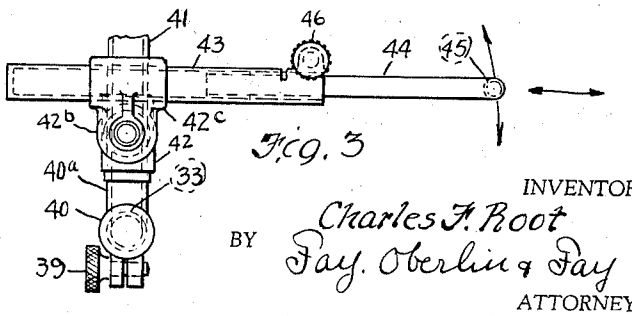


Fig. 3

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SHEET DELIVERY MECHANISM

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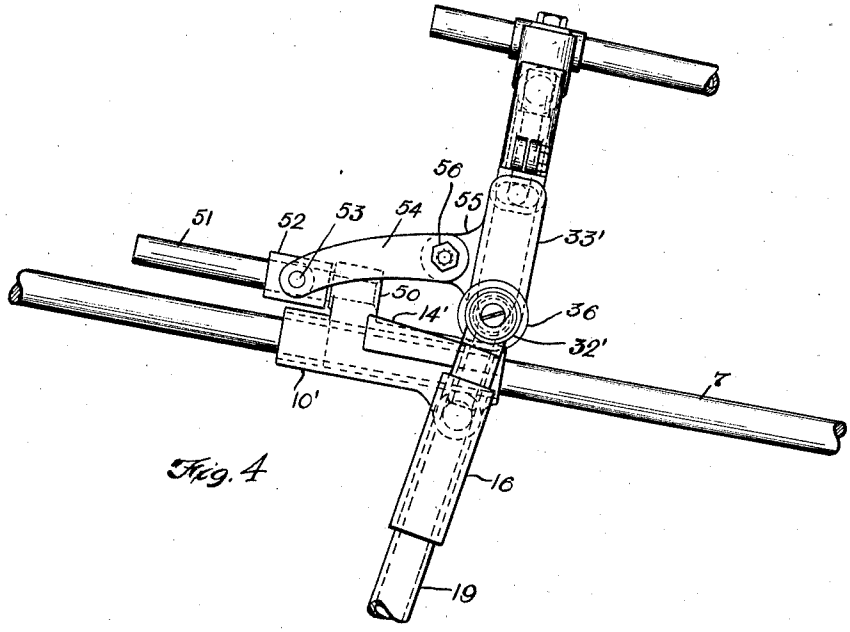


Fig. 4

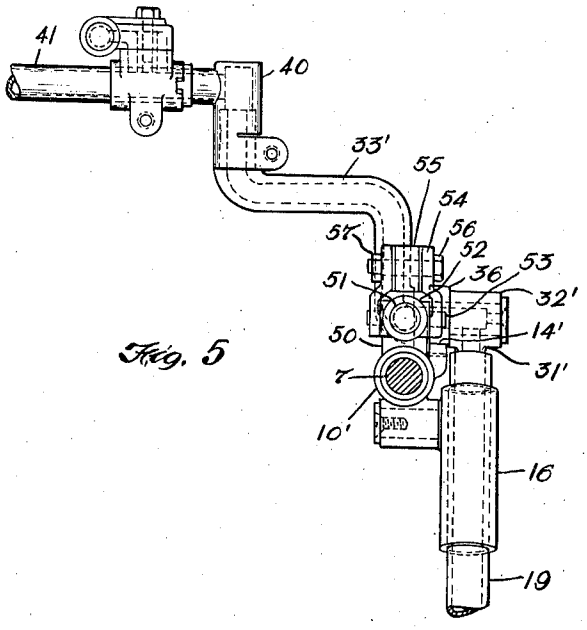


Fig. 5

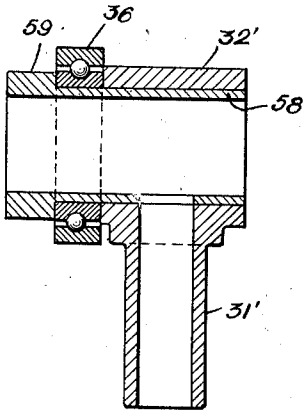


Fig. 6

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2,177,787

SHEET DELIVERY MECHANISM

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Application July 6, 1938, Serial No. 217,702

10 Claims. (Cl. 271—74)

This invention relates, as indicated, to sheet delivery mechanism, but has reference more particularly to improvements in mechanism for removing printed sheets from the platen of a printing press.

A primary object of the invention is to provide mechanism of the character described which shall be effective to move the sucker tips in a predetermined path to and from the platen of the press.

Another object of the invention is to secure a movement of the aforesaid character without elevation of the rods upon which the carriage mounting the delivery sucker tip assembly slides and without the use of a larger number of operating elements for this purpose than has heretofore been provided in presses having sheet delivery mechanism.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims; the annexed drawings and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings—

Fig. 1 is a fragmentary side elevation of a platen press having incorporated therewith the sheet delivery mechanism of the present invention;

Fig. 2 is a fragmentary view, partly in elevation and partly in section, taken on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary plan view of the sucker tube assembly;

Fig. 4 is a side elevational view of a modified form of the invention;

Fig. 5 is a front elevation of the mechanism shown in Fig. 4; and

Fig. 6 is a vertical cross-sectional view of the suction post bearing shown in Figs. 4 and 5.

Referring more particularly to the drawings, there is shown the frame 1 of a platen press, provided with the usual oscillating platen 2. Secured to the feed table post 3 of the press is a bracket consisting of a relatively flat portion 4 and a curved portion 5, the latter being secured to the flat portion by means of bolts 6. The portion 5 of the bracket has an opening at its upper end for the reception of one end of a track in the form of a rod 7, the other end of this rod being secured in a boss 8 secured to the frame 1 of the press, as by a bolt 9. The rod 7 is inclined downwardly towards the frame of the press and forms a guide for the sheet delivery mechanism proper, to be now described.

Slidably mounted on the rod 7 is a carriage or sleeve 10, which has formed integrally therewith adjacent its forward end a depending cylindrical bearing portion 11, and adjacent its rear end an upstanding ear 12, providing a support for a roller 13. The sleeve 10 is further formed to provide a roller track 14, which is inclined to the axis of the sleeve.

Supported for oscillating movement within the bearing portion 11 of the sleeve 10 is a stub shaft 15, formed at one end with a cylindrical portion 16, the axis of which is at right angles to that of the shaft 15. The shaft 15 is secured against axial movement by means of a plate or disk 17 bearing against one end of the bearing portion 11 and secured to the shaft 15 by means of a screw 18.

Slidably mounted within the cylindrical portion 16 of the shaft 15 is a tubular lever 19, having a portion 20, to the ends of which are pivotally secured a link 21 and a bell-crank lever 22. The link 21 has pivotally secured to its other end a bell-crank lever 23, pivoted as at 24 to the frame 1 of the press or to the housing (not shown), for cams 25 and 26. One arm of the lever 23 carries a cam roller 27, which bears against the periphery of the cam 25. The bell-crank lever 22 is pivoted as at 28 to the frame 1 of the press or to the housing upon which the lever 23 is mounted and one arm of the lever 22 carries a cam roller 29, which bears against the periphery of the cam 26. The cams 25 and 26 are keyed to a shaft 30, which is driven by the press operating mechanism in synchronism with the oscillation of the platen 2.

The lever 19 has rigidly secured to its upper end a hollow member 31 having a horizontally disposed portion 32, which forms a bearing for a tubular L-shaped post 33, the interior of which communicates with the interior of the lever 19. The post 33 is secured against axial movement relatively to the bearing 32 by means of a disk 34, which bears against the outer end of the bearing 32 and is secured to the post 33, as by a screw 35. The bearing 32 has mounted thereon a freely revoluble roller 36, which is adapted to roll on the track 14. Rigidly secured to and extending rearwardly from the horizontal portion of the post 33, adjacent the roller 36 is a member 37 having an elongated slot 38 in the rear portion thereof, forming a trackway for the roller 13.

Secured to the upper end of the post 33, as by a clamp screw 39, is a socket 40, to the horizontal portion 43a of which is secured a hollow delivery bar 41. Secured to the bar 41, at spaced points therealong are clamp fittings 42, and secured to these fittings, as by screws 42a, are fittings 42b having tubular portions 42c. Mounted within the portions 42c of the fittings 42b are tubular arms 43 having arms 44 telescopically mounted therein, and provided at their forward ends with the usual sucker tips 45. The arms 44 are clamped in adjusted position by means of clamp screws 46. The arms 44, being adjustable axially of the arms 43, the position of the sucker tips with respect to the front and rear edges of the platen may be varied Moreover, since the fittings 42b may be adjusted angularly about axes normal to the axis of the bar 41, the sucker tips may be adjusted arcuately with respect to the side edges of the platen. These adjustments are indicated by the arrows in Fig. 3

The cams 25 and 26, as noted in Fig. 1, rotate continuously in a counter-clockwise direction. As the cam 25 rotates, it imparts a counter-clockwise movement to the lever 23, and thus, through the link 21, moves the lever 19 rearwardly from the solid line position. This in turn causes the carriage or sleeve 18 to be slid rearwardly along the rod 7 from the solid to the dotted line position. In the course of this movement, the roller 36 rides up on the inclined track 14. This serves two purposes. It causes sufficient axial movement of the lever 19 to move the cam roller 29 away from the periphery of the cam 26, so that this cam is ineffective during the rearward movement of the lever 19. It also elevates the lever 19 sufficiently so that the sucker tips 45 move rearwardly in a straight line R, which, as shown in Fig. 1, is included at a slight angle to the plane of the upper surface of the platen 2 in the upper or delivery position of the latter. This insures that the printed sheet to be delivered to the delivery table will be lifted from the platen at the initiation of the delivery stroke.

During the aforesaid rearward stroke, the roller 13 rides in the slot 38, so that the post 33 is maintained substantially at right angles to the rod 7 during the entire stroke.

The lever 19 is moved forwardly by means of springs (not shown) which act on the levers 22 and 23, the cam 25 being relieved, as shown to permit the lever 19 to return to the solid line position of Fig. 1. The cam 26 is so shaped that during the forward stroke of the lever 19 the latter is at first moved axially upwardly, bringing the roller 36 away from the track 14, and causing the post 33 to tilt rearwardly, the roller 13 acting as a fulcrum during such tilting. This tilt is increased as the lever approaches a position intermediate the dotted and solid line portions of Fig. 1, and thereafter the post is tilted forwardly, finally assuming the solid line position of Fig. 1. As a result of this aforesaid tilting movement, the sucker tips 45 move in the curved path F, the tips at first rising in a gently sloping upward curve to a point above the rear portion of the platen and then downwardly towards the platen in a somewhat more abrupt curve.

With the arms 44 in their fully retracted position of adjustments, the sucker tips 45, as shown in Fig. 1, take a path indicated by the reference characters R' and F', the portion F' of this path being somewhat flatter than the path F, but in other respects generally similar to the latter.

It is thus seen that a desired path of movement is imparted to the sucker tips without the necessity of lifting relatively heavy portions of the press, such as the rod 7, and without a larger number of operating elements for this purpose than has heretofore been provided in presses having sheet delivery mechanism.

In that form of the invention shown in Figs. 4, 5 and 6, the carriage 10' has formed thereon, in addition to the inclined track 14', a lug or ear 50, to which is secured a short rod or bar 51, which is disposed above and parallel with the rod 7. Slidably mounted on this rod is a sleeve 52 having pins 53 at its opposite sides. Pivotally secured to these pins are levers 54, the forward end of which are rigidly clamped to a lug or ear 55 formed on the suction post 33' as by means of a bolt 56 and nut 57. The lower horizontal portion of the post 33' is journaled in the bushing 58, which is rigidly secured within the bearing portion 32' of the member 31', which corresponds with the member 31 in the previously described form of the invention. In this case, the roller 36, as shown in Fig. 6, is held in position between the end flange 59 of the bushing and the bearing portion 32' of the member 31'.

In this form of the invention, the action of the various elements is substantially the same as in the first form of the invention which has been described. The portion of the post 33' from which the lug 55 extends and the levers 54 form, in effect, a bell-crank lever. On rearward movement of the lever 19, the sleeve 52 slides rearwardly on the rod 51. On the forward movement of the lever 19, the lever is lifted, resulting in tilting of the aforesaid bell-crank lever about the pins 53, simultaneously with the forward sliding movement of the sleeve 52.

Due to the manner in which the levers 54 are clamped to the lug 55 an adjustment between the arms of the bell-crank lever is provided, which is of value in making adjustment of the sucker tips relatively to the platen or in modifying the path of movement of the sucker tips within certain limits.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

1. In a platen press, a track rigidly supported thereon, a carriage reciprocable on said track, and means for reciprocating said carriage, said means including a lever slidable relatively to the carriage as the latter is reciprocated, and suction means supported by said lever.

2. In a platen press, a track rigidly supported thereon, a carriage reciprocable on said track, a stub shaft journalled in said carriage and provided with a cylindrical sleeve immovable with respect to said shaft, and means for reciprocating said carriage, said means comprising a tubular lever slidable in the cylindrical portion of said sleeve, and cams and levers for oscillating said tubular lever.

3. In a platen press, a track rigidly supported thereon, a sleeve slidably mounted on said track, suction means, and means for imparting movement to said suction means, including a tubular lever oscillatable in a plane parallel with the axis of said sleeve, and means for oscillating said lever, said lever supporting said suction means.

4. In a platen press, a track rigidly supported thereon, a sleeve slidably mounted on said track

and having a trackway lying in a plane inclined to the axis of said sleeve, a lever for imparting reciprocal movement to said sleeve and roller means associated with said lever and adapted to ride on said inclined trackway during movement of the sleeve, whereby to impart axial movement to said lever.

5. In a platen press, a track rigidly supported thereon, a carriage slidably mounted on said track, a stub shaft journalled in said carriage, means for reciprocating said carriage, said means comprising a tubular lever slidable relatively to said stub shaft, suction means, and means pivotally movable in relation to said lever for supporting said suction means.

6. In a platen press, a track, a carriage slidably mounted on said track, a stub shaft journalled in said carriage, a tubular lever slidable relatively to said stub shaft, a suction post angularly movable relatively to said lever, and means for tilting said post rearwardly upon forward movement of said lever.

7. In a platen press, an oscillatable platen, a track substantially parallel with said platen when the latter is in the sheet-delivery position, a carriage reciprocable on said track, and means for reciprocating said carriage, said means including a lever slidable relative to the carriage as the latter is reciprocated, and suction means supported by said lever.

8. In a platen press, an oscillatable platen, a track substantially parallel with said platen when the latter is in the sheet-delivery position, a carriage reciprocable on said track, means for reciprocating said carriage, said means including a lever oscillatable in a plane spaced laterally of said carriage, a suction post carried by said lever, suction means carried by said post, and means constraining said post against appreciable tilting movement on rearward movement of said carriage.

9. In a platen press, an oscillatable platen, a lever, suction means supported by said lever, means for oscillating said lever whereby to move said suction means to and from said platen, and means constraining said suction means to move away from the platen in a substantially straight line slightly inclined to the platen when the latter is in the sheet receiving position, and to move toward the platen in a continuously curving path.

10. In a platen press, a track, a carriage slidably mounted on said track, a stub shaft journalled in said carriage, a lever slidable transversely of said stub-shaft, a suction means carried by said lever, and means for tilting said suction means rearwardly as said lever moves forwardly toward the platen of said press.

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