Aug. 6, 1940. C. F. ROOT 2,210,258

SHEET FEEDING MECHANISM FOR PRINTING PRESSES

Filed Aug. 24, 1938 2 Sheets-Sheet 1

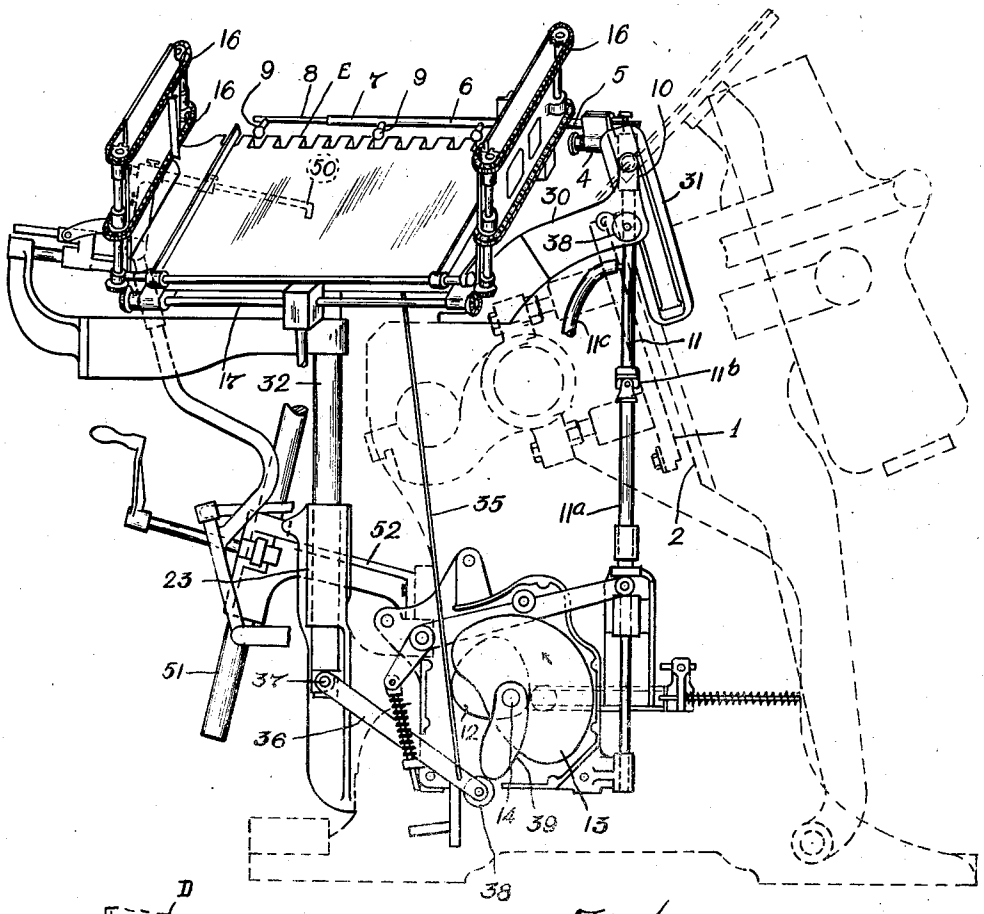


Fig. 1

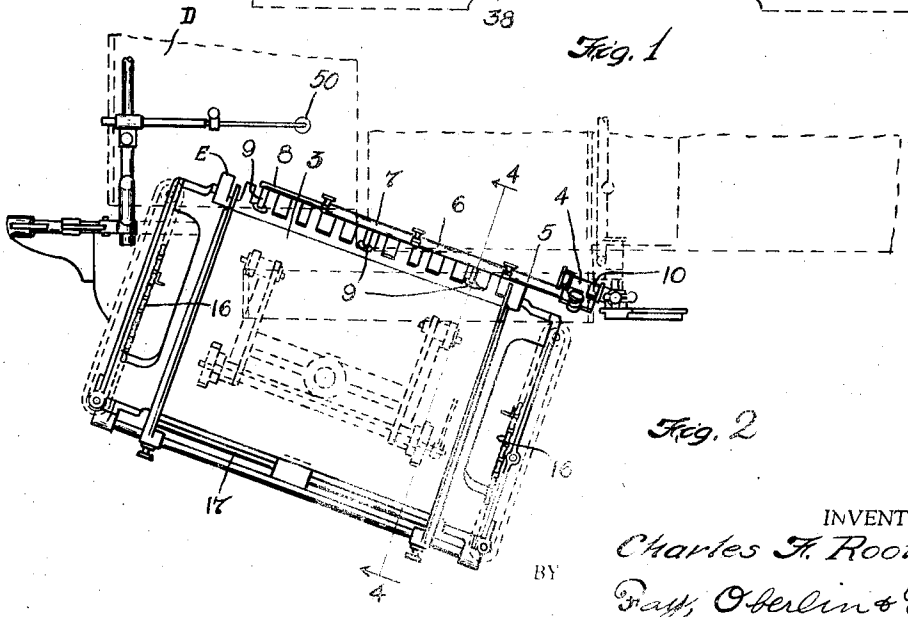


Fig. 2

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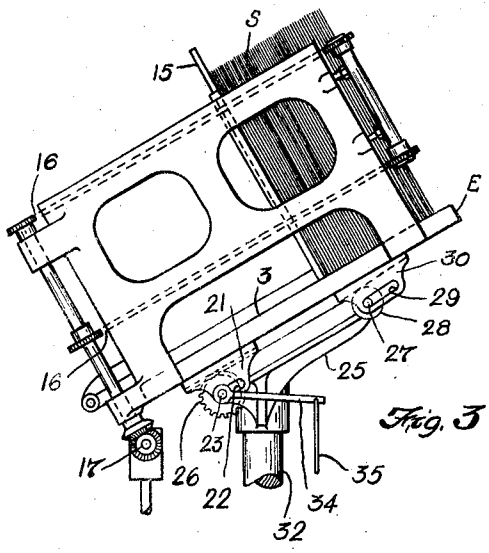


Fig. 3

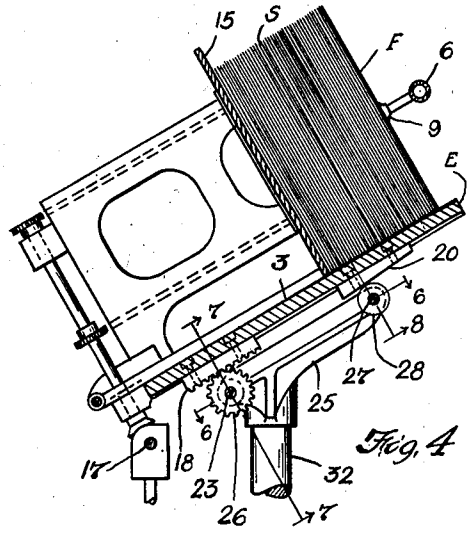


Fig. 4

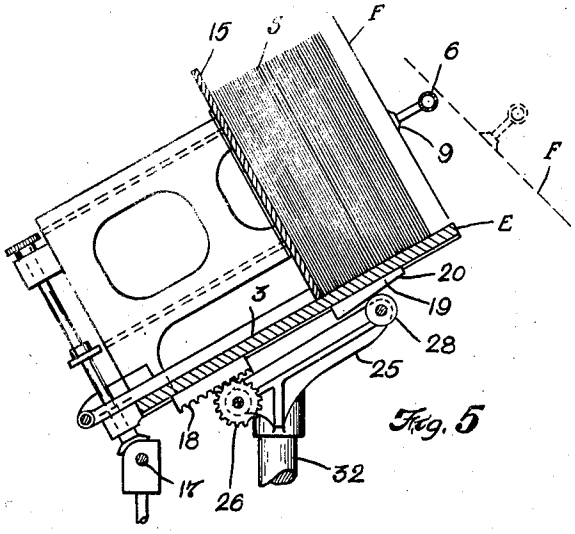


Fig. 5

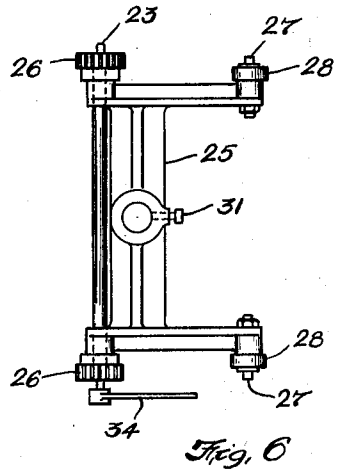


Fig. 6

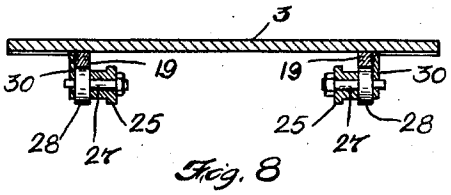


Fig. 8

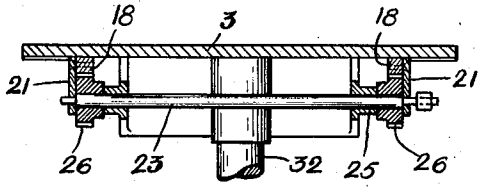


Fig. 7

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UNITED STATES PATENT OFFICE

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SHEET FEEDING MECHANISM FOR PRINTING PRESSES

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Application August 24, 1938, Serial No. 226,492

6 Claims. (Cl. 101—287)

This invention relates, as indicated, to sheet feeding mechanism for printing presses, but has reference more particularly to the feed tables of platen printing presses.

A primary object of the invention is to provide a feed table having predetermined movements imparted thereto for the purpose of faciliating the transfer of sheets from the table to the platen of the press.

A more specific object of the invention is to provide in a press of the character described means for retracting the feed table of the press, whereby to permit the lower edge of the sheet being transferred to clear the forward edge of said table.

It is noted that a feed table embodying this general mode of operation forms the subject matter and is broadly claimed in my prior Patent No. 1,841,632, dated January 19, 1932, although there shown in association with a different type of sheet transferring mechanism.

Another specific object of the invention is to provide in a press of the character described means for lowering the forward edge of the table relatively to the rear edge thereof incidental to the retraction of the table, whereby disengagement or separation of the grasped sheet from the stack of sheets is materially assisted and the lower edge of the grasped sheet is prevented from dragging on the portion of the table over which it passes while being removed.

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 set 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 side elevation of a platen printing press, with the outline of the press shown in dotted lines and the feed table and associated mechanism shown in solid lines;

Fig. 2 is a plan view of the feed table and associated sheet feeding mechanism;

Fig. 3 is a side elevation of the feed table;

Fig. 4 is a cross-sectional view of the feed table taken on the line 4—4 of Fig. 2 with the feed table in its advanced position;

Fig. 5 is a view similar to Fig. 4, but showing the feed table in retracted position;

Fig. 6 is a plan view of the feed table supporting frame;

Fig. 7 is a cross-sectional view taken on the line 7—7 of Fig. 4, and Fig. 8 is a cross-sectional view taken on the line 8—8 of Fig. 4.

The press illustrated in the drawings, as previously indicated, is of the familiar platen or Gordon type and need not be further described than to note the oscillatorily mounted platen 1, on which the sheet requires to be placed preliminarily to being brought into contact with the form by the conjoint movement of such platen and of the opposite bed 2 which carries such form in a suitable chase (not shown).

Mechanism is provided for transferring successive sheets from a suitable table or support 3, adapted to hold a stack S of such sheets, on to the platen 1, when the latter is in the open or sheet receiving position, such mechanism being generally of the construction described in my prior patents, Re. No. 18,383, dated March 15, 1932, and No. 1,810,929, dated Jan. 19, 1932, to which reference should be had for a clearer understanding of this portion of the present improved sheet feeding mechanism.

Such sheet transferring mechanism proper includes, as shown in Fig. 2, a tubular member 4, to which is attached in parallel offset relation a tubular extension 5. A tubular extension 6 is telescopically adjustably held in tubular extension 5, and such extension 6 in turn supports successive telescopic extensions 7 and 8, such extensions respectively carrying the sucker tips 9, shown as three in number. The member 4 is oscillatorily mounted on a horizontally extending tubular arm 10, which is in effect a continuation of a rectangularly related tubular shaft 11 (Fig. 1). The shaft 11 is capable both of oscillation about and reciprocation longitudinally of its axis, the latter being substantially vertical and located at one side of the press. These movements are respectively derived from a carrying member 11a, in the form of a shaft generally aligned with supporting member 11 and connected therewith by a universal joint 11b, the requisite movements of member 11a being effected by cams 12 and 13, mounted on a transverse operating shaft 14, through suitable cam rollers, racks, levers etc., generally shown in Fig. 1, but which need not be described in detail since their net effect is described in the aforesaid patents. Suction is established in the sucker tips 9 at predetermined intervals, as by means of a vacuum pump (not shown) through the inter-

mediary of a flexible conduit 11c, which is connected with the shaft 11.

As a result of the foregoing construction, oscillation of shaft 11 about its axis, at the same time, causes member 4 to swing through a corresponding arc, and reciprocation of said shaft causes said member to move vertically to a corresponding extent. The foremost sheet F of the stack, in being transferred to the platen, is thus carried through a generally arcuate path in a clockwise direction, as viewed in Fig. 2, such path at the same time curving downwardly so that the sheet, when finally brought to rest, will lie in contact with platen 1 and be accurately positioned thereon for printing. As the member 4 moves downwardly, it is guided in its movement by a guide member 31, which is pivotally attached to a bracket arm 30 of the press, and held in angularly adjusted position by a nut 33. This guide member, as described in the aforesaid patent, may be angularly adjusted so that the forward edge of the sheet as it is deposited on the platen will be brought more or less closely adjacent the forward edge of the platen.

Heretofore, it has been the practice, in thus transferring the sheet, to first slightly raise it in the plane it normally occupies at the front of the stack S, this in order that its lower edge might clear the corresponding edge of the table 3, and also in order to cause a desired sliding or stripping movement of the grasped sheet relatively to the subjacent sheet for the purpose of disengaging the grasped sheet from said subjacent sheet.

By the present improved construction, all necessity for such initial upward movement of the sheets is obviated. Instead thereof, the sheet, after being grasped by the sucker tips of the transfer member, is cleared of the table in a much more facile and efficient manner by retracting the feed table, before the forward and downward movement of the sheet transfer means is begun, and at the same time lowering the forward edge of the table relatively to the rear edge thereof. The feed table requires to be thus retracted only to an extent sufficient to permit the lower edge of the sheet, in its downward movement, to clear the forward edge of the feed table, and the forward edge of the table requires to be lowered in relation to the rear edge thereof only to an extent which materially assists in disengaging or separating the grasped sheet from the subjacent sheet of the stack and to prevent dragging of the grasped sheet on the portion of the table over which it passes while being thus removed.

The table 3 is disposed laterally of the frame of the press, as shown in Fig. 2, and is arranged to support the sheets on edge, i. e. in a position approximating the vertical, the lower edge of the sheet, i. e. the one whereon it thus rests on the table, being designed to occupy the more advanced position after the sheet has been transferred to the platen. The table is provided with an adjustable back stop 15, and means are also provided for automatically advancing such a stack as the stack of sheets is depleted, so that the foremost sheet of the stack will always occupy a relatively fixed position on the table and also with respect to the sheet transferring or feeding mechanism. Such means are substantially of the character shown in Johnson Patent No. 1,912,941, to which reference may be had for a full description of this feature, only the chains 16 and chain drive shaft 17 of such mechanism being shown in the present drawings.

Secured to the lower surface of the table 3 near the rear edge thereof are a pair of transversely spaced racks 18, and near the forward edge thereof a pair of similarly spaced blocks 19 having inclined lower surfaces 20. Secured to the outer surfaces of the racks 18 are plates 21 having elongated slots 22 (Fig. 3) which extend parallel with the table 3 and through which extend the reduced ends of a shaft 23, which is journalled in a supporting frame 25. The shaft 23 has keyed thereto adjacent its ends pinions 26 which are in mesh with the racks 18. The frame 25 also has journalled therein stub shafts 27, upon which are mounted rollers 28 which bear against the inclined surfaces 20 of the blocks 19. The ends of the shafts 27 extend into elongated slots 29 (Fig. 3) in plates 30 secured to the outer surfaces of the blocks 19, these slots being inclined with respect to the table 3.

The frame 25, which carries the pinions 26 and rollers 28, is removably secured, as by a screw or bolt 31, to the upper end of a post 32, which is adjustably mounted in a bracket 33 secured to the frame of the press.

Rigidly secured to one end of the shaft 23 is a lever 34, to which in turn is pivotally secured a second lever 35. The lever 35 extends downwardly, as shown in Fig. 1, and is pivotally connected to a lever 36, which is pivoted as at 37 to the post 32 of the feed table support. The lever 37 carries at its free end a roller 38 which is in engagement with a cam 39 mounted on the shaft 14.

With the cam 39 in the position shown in Fig. 1, the feed table 3 occupies its advanced or normal position, as shown in Figs. 3 and 4. In this position of the table, the shafts 21 and 27 are at the rear of their respective slots 22 and 29, and the foremost sheet F of the stack S is in a position to be seized by the sucker tips 9, suction having been created in such tips at or about this time, as by a vacuum pump communicating with such tips through a flexible conduit 40, which is connected to the hollow shaft 11.

As the cam 39 is rotated in the direction indicated by the arrow in Fig. 1, the cam permits the lever 36 to rise, and the table 3, as a result, moves rearwardly by its own weight to the position shown in Fig. 5, this movement being of course controlled by the pinions 26. As a result of this movement of the feed table, the forward edge E of the table is moved rearwardly to such an extent that when the sucker tips subsequently carry the sheet F downwardly, as shown in dotted lines in Fig. 5, the lower edge of such sheet will clear the forward edge E of the table.

At the same time that the table is thus moved rearwardly, the inclined surfaces 20 of the blocks 19 move rearwardly over the rollers 28, and due to the fact that these surfaces are inclined, the forward edge E of the table is lowered with respect to the rear edge thereof. The result, in effect, is to impart to the table and thus to the stack supported thereon a slight downward tilting movement, at the same time that the table and stack are retracted, thus insuring disengagement or separation of the sheet F from the next sheet in the stack, and preventing dragging of the lower edge of such sheet on the portion of the table over which it passes while being thus removed.

As the sucker tips return for the next sheet, after depositing the sheet F on the platen, the table is returned to its initial or forward position, as shown in Figs. 3 and 4.

The printed sheets are delivered from the platen to a delivery table D, as by means of recip-

rocatorily mounted sucker tips **50**, which are actuated by delivery mechanism which forms no part of the present invention, and so need not be here described other than to state that such tips **50** move in synchronism with the movement of the sucker tips of the sheet delivery mechanism. The delivery table is supported as by a post **51** secured to a bracket **52** mounted on the frame of the press.

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.

I therefore particularly point out and distinctly claim as my invention:

1. In a press of the character described, the combination of a table for supporting a stack of sheets on edge, means for transferring the foremost sheet of said stack to the platen of said press, the initial portion of the sheet-transfer movement being downward and away from the stack, and means actuated in synchronism with the sheet transfer means for lowering the forward edge of the table relatively to the rear edge and for simultaneously retracting the table, whereby the table is moved clear of the lower edge of the foremost sheet and the lower edge of the sheet clears the forward edge of the table.

2. In a press of the character described, a table for supporting a stack of sheets on edge, and means for reciprocating said table and at the same time moving the forward edge of the table vertically with respect to the rear edge thereof.

3. In a press of the character described, a table for supporting a stack of sheets on edge, rack and gear means for reciprocating said table and cam and roller means for moving the forward edge of the table vertically with respect to the rear edge thereof as the table is reciprocated.

4. In mechanism of the character described, the combination of a reciprocable table for sheets; a member carrying a sheet engaging and moving finger adapted in one position to present such finger in operative relation to the foremost sheet on such table, said member having an oscillatory movement about a substantially vertical axis; means adapted to oscillate said member; and other means adapted to advance and retract said table and lower the forward edge thereof relatively to the rear edge thereof, all in proper synchronism with the oscillation of said member.

5. In mechanism of the character described, the combination of a table for sheets; a member carrying a sheet engaging and moving finger adapted in one position to present such finger in operative relation to the foremost sheet on such table, said member also having an oscillatory movement about a substantially vertical axis; means adapted to oscillate said member; and other means adapted to lower the forward edge of said table relatively to the rear edge thereof in proper synchronism with the oscillation of said member.

6. In a press of the character described, the combination of a table for supporting a stack of sheets on edge, means for reciprocating said table, means for transferring the foremost sheet of such stack to the platen of such press, means operated in synchronism with said sheet-transfer means for retracting said table, and means operative to lower the forward edge of said table as the latter is retracted to facilitate the removal of such sheet therefrom.

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