

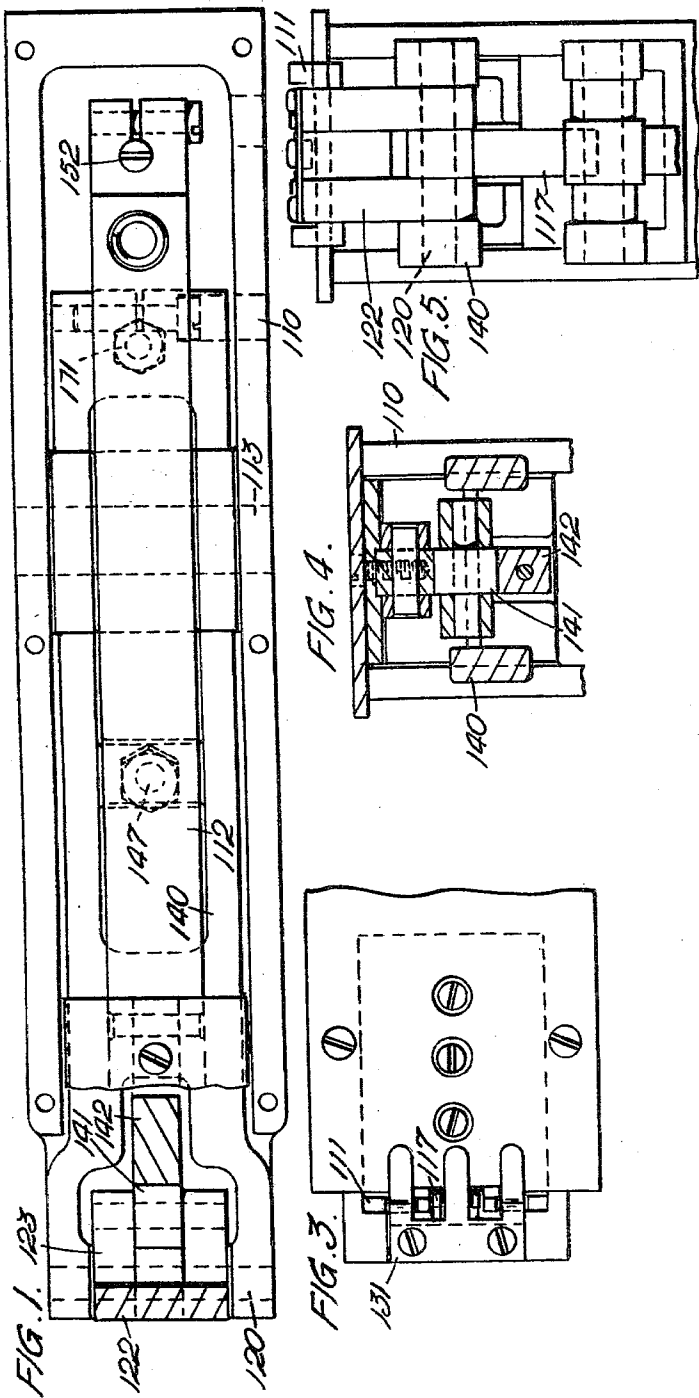
March 16, 1965

H. T. BACKHOUSE
SHEET FEEDING MACHINES

3,173,685

Filed April 25, 1962

4 Sheets-Sheet 1



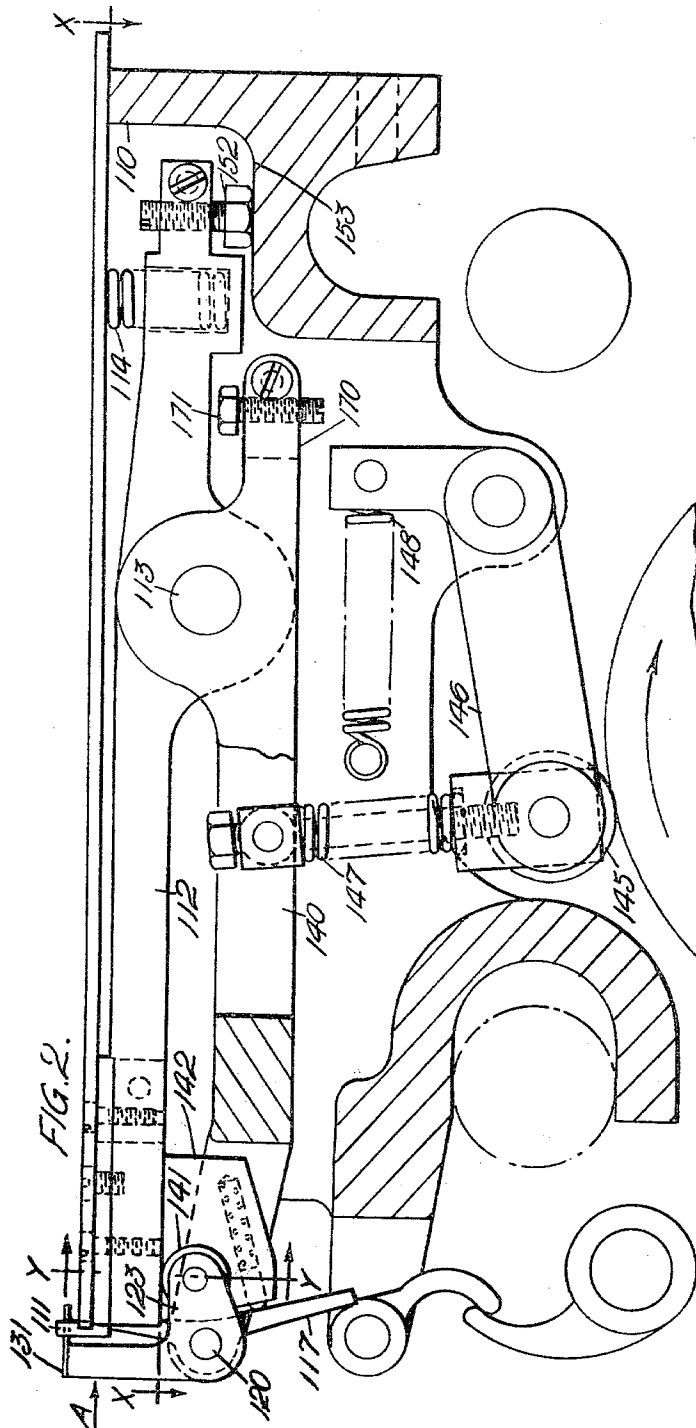
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4 Sheets-Sheet 2



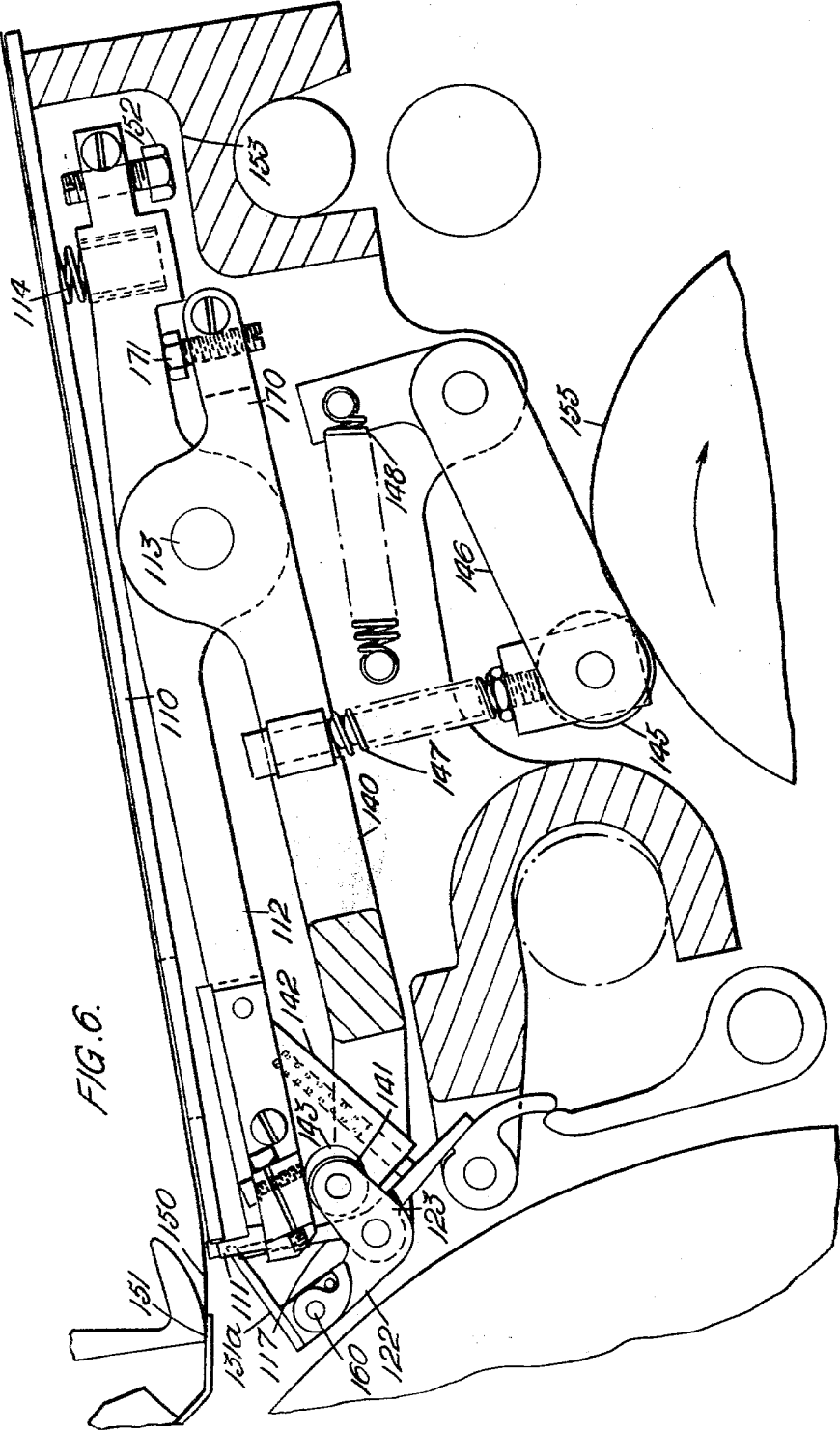
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4 Sheets-Sheet 3



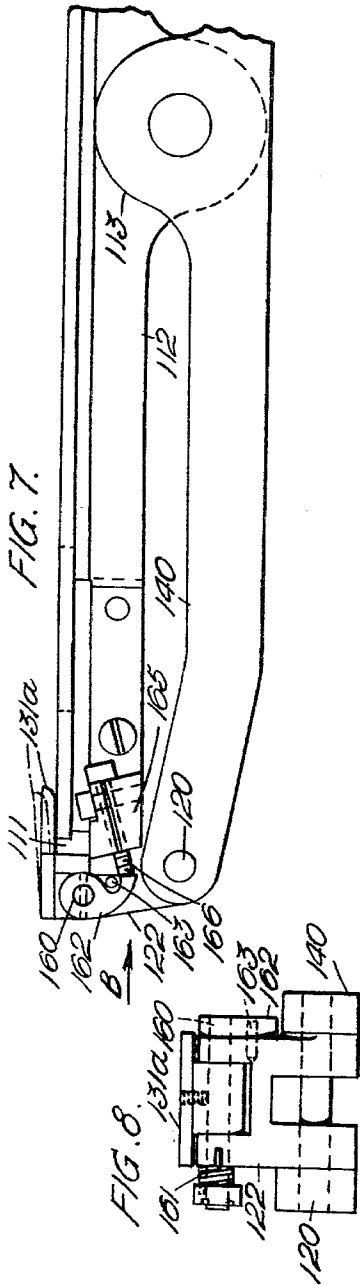
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4 Sheets-Sheet 4



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SHEET FEEDING MACHINES

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Filed Apr. 25, 1962, Ser. No. 190,142

Claims priority, application Great Britain, Apr. 28, 1961,
15,533/61

1 Claim. (Cl. 271—60)

The invention relates to sheet feeding machines of the kind in which sheets are fed in succession (e.g. as a continuous stream of partly overlapping sheets) over a feed-table where registration of the front edge of each sheet in turn is obtained by engagement of the edge against one or more front lays which are then removed to enable the registered sheet to be removed to a printing or other machine operating on individual sheets. Side registration of the sheets may also be effected while on the feed table.

The invention provides a machine of the above kind embodying front lay mechanism comprising a front lay supported for up and down movements between a raised operative position in which it projects above the feed table for engagement by an oncoming sheet and a lowered inoperative position in which it lies clear of the removal path of the front edge of the sheet and having a smoother blade projecting rearwardly from the lay over the top of the table for the purpose of holding down the front edge of a sheet at or immediately before the front lay, the blade being carried by, or integral with, an upwardly extending arm of a bell-crank lever of which the fulcrum is on a part which is given an up and down movement and its other arm extends rearwardly into co-operative engagement with a member which precludes or limits up and down rocking movement of this arm, whereby as the fulcrum is moved downwardly the bell-crank lever is rocked to move the smoother blade forwardly clear of the lay face and as the fulcrum is moved upwardly the lever is rocked to move the blade rearwardly to its position over the top of the table characterised in that the fulcrum of the bell-crank lever is carried on a part which is given a preliminary downward movement ahead of the lay whereby the smoother blade is moved forwardly, or begins its forward movement, before the lay begins its downward movement.

It is preferred that the member with which the rearwardly extending arm of the bell-crank makes co-operative engagement, moves up and down with the lay.

In one form of the machine the part aforesaid which carries the fulcrum of the bell-crank has a lost-motion connection to the lay whereby after the preliminary downward movement aforesaid, the part effects the downward movement of the lay.

A specific construction of a section of a feed table embodying a front lay and smoother according to the invention and some modifications thereof will now be described with reference to the accompanying drawings in which:

FIGURE 1 is a sectional plan view on the line X—X in FIGURE 2, of the table section,

FIGURE 2 is a side view of the table section,

FIGURE 3 is a plan view of the left-hand portion of FIGURE 2,

FIGURE 4 is a sectional view on the line Y—Y in FIGURE 2, the view being in the direction "A,"

FIGURE 5 is a front view of the section, also in the direction "A,"

FIGURE 6 is a view corresponding to FIGURE 2 but showing the parts in a different operating position, some modifications, and some parts of an associated printing machine,

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FIGURE 7 is a view showing a portion of FIGURE 6 with the parts in the position of FIGURE 2, and

FIGURE 8 is a view in the direction "B" of the parts shown in FIGURE 7.

The section, 110, of the feed table has a front lay, 111, carried on a fore and aft lever 112 which is mounted for rocking movement on a transverse spindle 113. A spring 114 urges the lever 112 in the clockwise direction in FIGURES 2, 6 and 7 and tends to move the lay upwardly into the operative position shown in FIGURE 2 in which it projects above the table. There is also a no-sheet detector finger 117.

Beneath the lever 112 there is a second lever 140 which is pivoted on the spindle 113. This lever is forked at the left-hand end (FIGURES 1, 2, 6 and 7) and extending between the arms of the fork there is a pivot pin 120 which serves as the fulcrum of a bell-crank lever of which one arm, 122, extends upwardly on the side of the lays remote from the table and the other arm, 123, extends rearwardly beneath the table. The arm 123 is forked and carries a roller 141. The roller is secured within a notch 143 in a lug 142 dependent from the lever 112. Accordingly if the lever 140 is rocked to lower the pin 120 relative to the notch 143 in the lug 142, the bell-crank lever 122, 123, is rocked about its pivot pin 120 in the direction to move the upward arm, 122, away from the lay in the forwarding direction (i.e. to the left from the position shown in FIGURE 2 to that shown in FIGURE 6). Attached to the top of the arm 122 there is a smoother plate or blade 131 or 131a which moves with the arm from the position shown in FIGURES 2 and 3 in which it lies over the table and the edge of a sheet lying against the lay, forwardly (i.e. to the left) away from the lay and downwardly. FIGURE 6 shows the smoother plate 131a at the limit of this movement and also shows the front lay withdrawn below the table to permit a sheet 150 to be withdrawn by the grippers 151 of a printing machine.

To effect such movements of the lever 140 and the bell-crank lever 122, 123, there is a cam-follower roller 145 which runs on a cam 155 slidable, for adjustment, along a driving shaft. This roller is carried on a bell-crank lever 146 which has a resilient thrust and non-resilient tie connection 147 to the lever 140. A return spring 148 acts on the lever 146 to maintain the roller on the shaft and so to effect return movements of the lever 140.

The lever 140 has a tail 170 with an adjustable screw 171. This screw is so set that when the lever 140 has been rocked sufficiently to move the plate 131 or 131a clear of the lay, the screw comes into contact with lever 112 and further rocking movement of lever 140 is accompanied by rocking movement of lever 112 which lowers the lay beneath the board. Return movement of lever 112, which is effected by spring 114, is limited by an adjustable screw 152 which engages a ledge 153 on the table section 110.

The principal modification embodied in FIGURES 6—8 is that the smoother plate 131a is pivotally attached to the arm 122 at 160. A spring 161 urges rotation of the plate about its pivot in the anti-clockwise direction in FIGURES 6 and 7. An arm 162 fixed to the plate 131a engages a stop pin 163 to limit this rotation to the position of the plate shown in chain lines in FIGURE 7. In this position the plate is raised from the table a sufficient distance to accommodate a sheet of substantial thickness (e.g. card). Fixed to the lever 112 there is a block 165 in which is mounted an adjustable stop screw 166. This screw, when suitably adjusted, is engageable by the lower end of arm 162 when the parts are in the position shown in FIGURE 7 and rocks the plate 131a clockwise to re-

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duce the separation thereof from the table, to suit a thin sheet as shown in full lines.

It is an important feature of the construction described above that the smoother begins its forward and downward movement before the lays begin to move and while the sheet is still held in register by the lays.

I claim:

In a sheet feeding machine of the kind having a feed table and front lay mechanism which comprises a front lay and means for moving the lay upwardly and downwardly between an upper operative position in which it projects above the feed table for engagement by a front edge of a sheet advancing over the table and a lower inoperative position in which it lies clear of the front edge of the sheet, and a smoother blade projecting rearwardly from the lay, when the lay is in its operative position, over the top of the table and operative to hold down the front edge of a sheet adjacent the front lay; two levers one below the other beneath the table and lying in the direction of feed of the sheets, the upper lever carrying the front lay at the forward end of the upper lever, a bell-crank pivoted to the lower lever at the forward end thereof and having an upwardly extending arm carrying

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the blade aforesaid at its upper end and a rearwardly extending arm of which the free, rear, end engages in a notch in the upper lever, means for rocking the lower lever to impart an up and down movement to the pivot of the bell-crank and, the rear end of the rearwardly extending arm thereof being held in the notch, a forward and backward movement of the upper end of the upwardly extending arm thereof and the blade held thereby to move the blade forward clear of the lay face and back to its rearwardly projecting position aforesaid and a lost motion connection between the lower and upper levers whereby continued movement of the lower lever after the blade has been moved forwardly rocks the upper lever to lower the lay.

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