

Aug. 6, 1957

H. T. BACKHOUSE
SHEET FEEDING MACHINES

2,801,849

Filed July 13, 1955

7 Sheets-Sheet 1

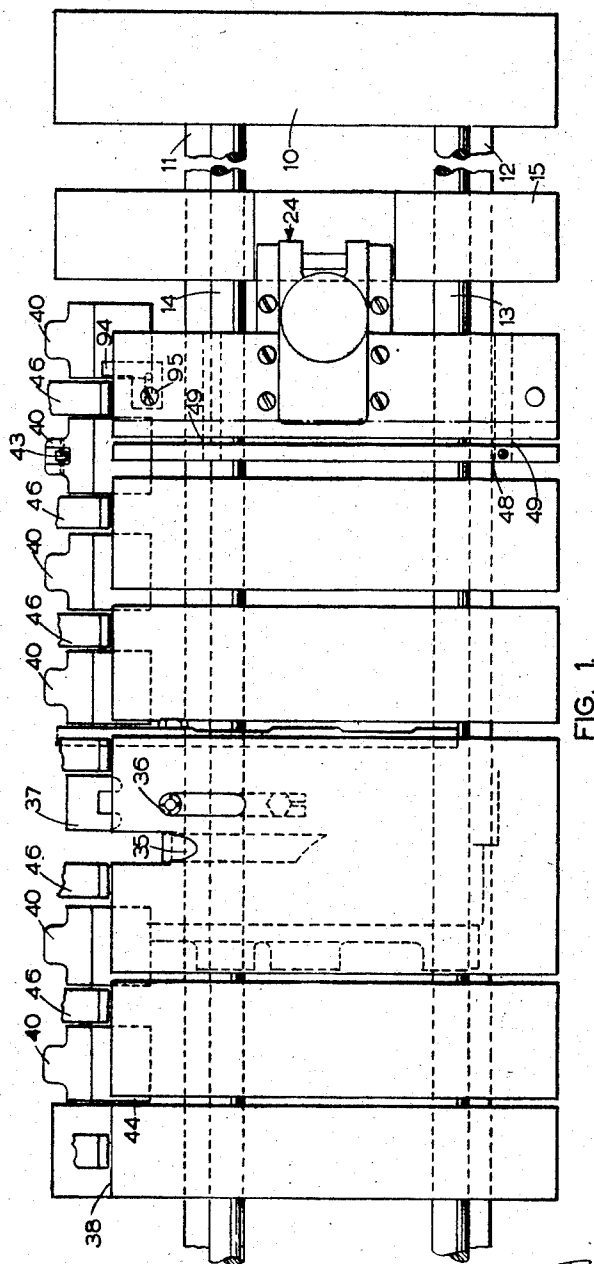


FIG. 1

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7 Sheets-Sheet 2

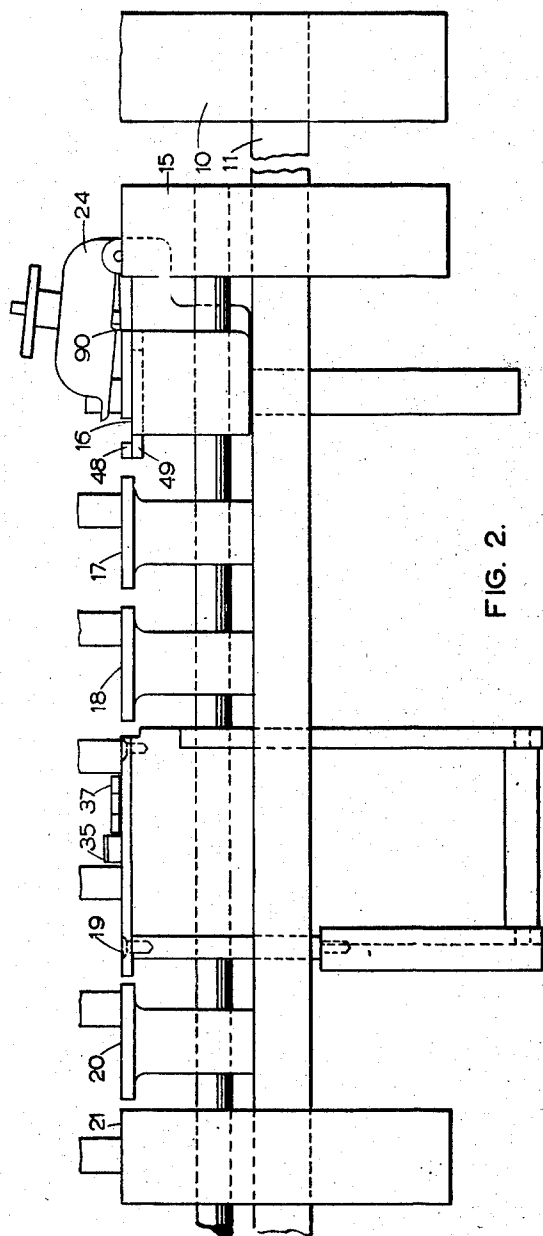


FIG. 2

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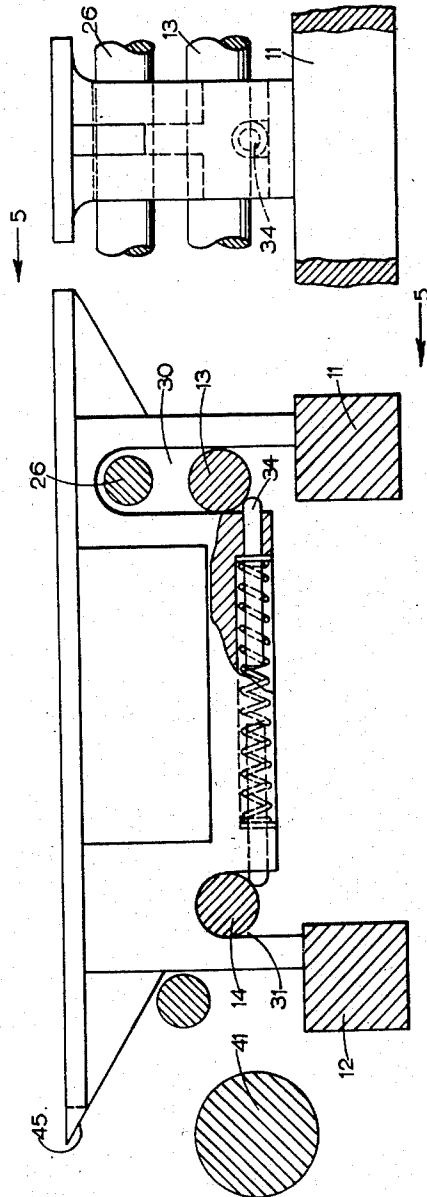
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7 Sheets-Sheet 3



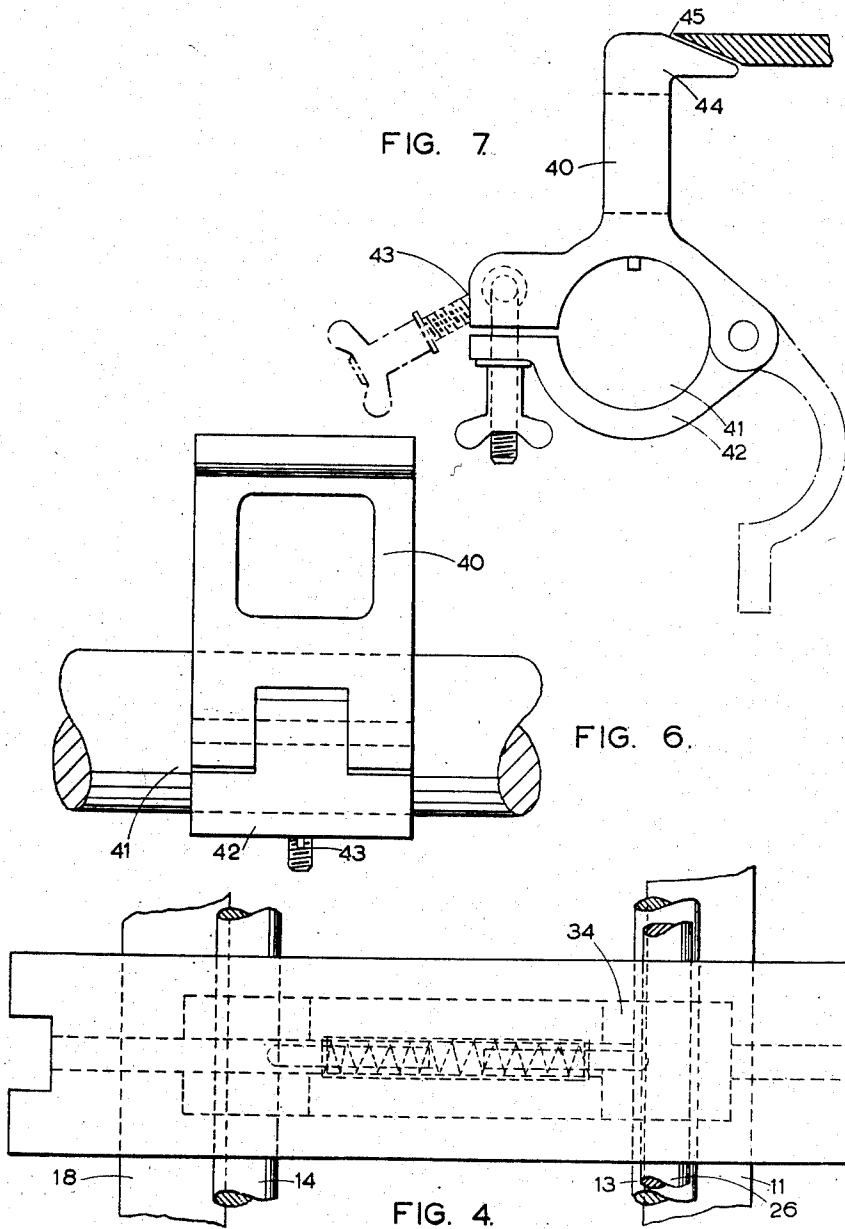
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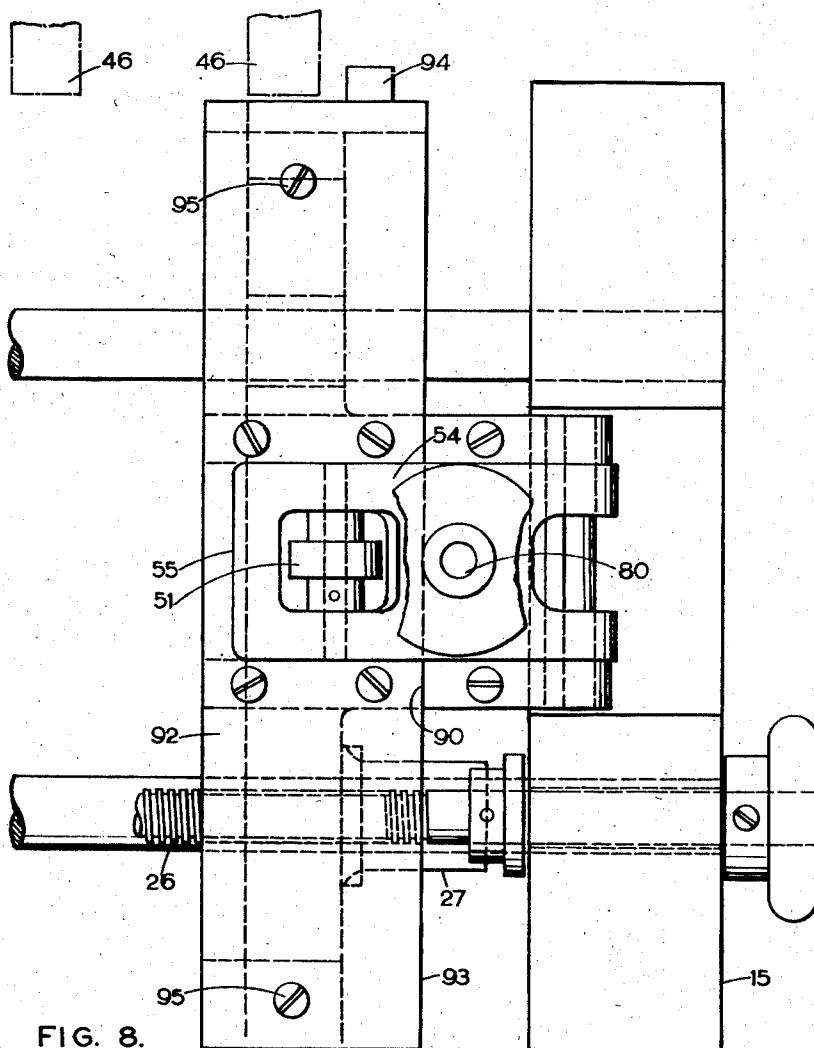
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Filed July 13, 1955

7 Sheets-Sheet 5



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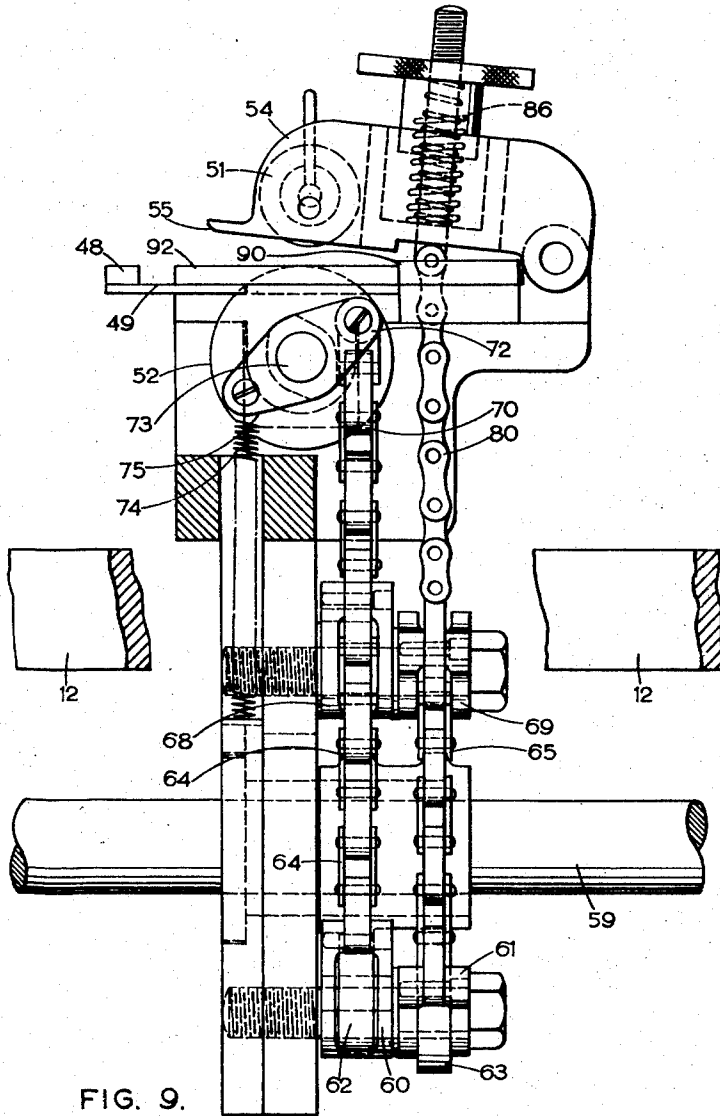
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Filed July 13, 1955

7 Sheets-Sheet 6



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7 Sheets-Sheet 7

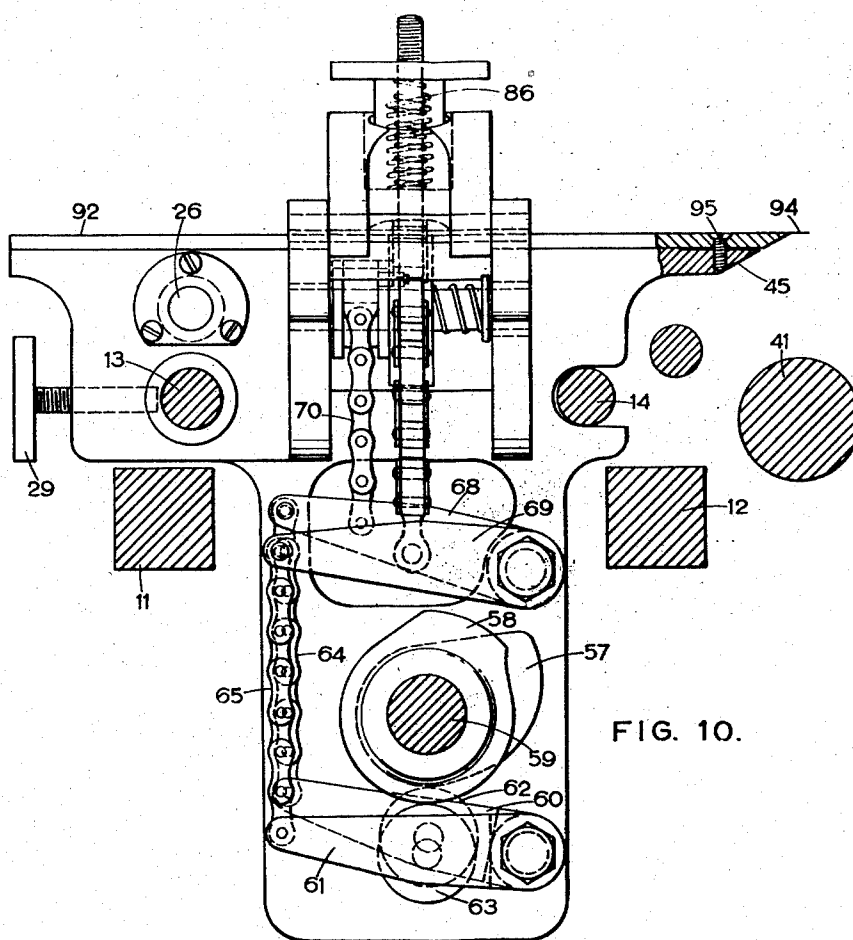


FIG. 10.

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SHEET FEEDING MACHINES

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Application July 13, 1955, Serial No. 521,824

13 Claims. (Cl. 271—59)

The invention relates to sheet feeding machines of the kind having a feed plate on to which a succession of individual sheets are fed and registered by being moved sideways up to a side-lay or stop adjacent to the side of the plate, before being taken into a printing or other machine operating on individual sheets. Such machines usually also include one or more front lays against which the front edges of the sheets are registered. The sheets may be fed on to the plate by hand or by a conveyor (e. g. a tape conveyor) to which they are supplied for example by means of a machine of the kind described in Patent No. 2,108,702.

It is frequently desirable that the side-lay and its associated mechanism for drawing the sheets up to the lay shall be adjustable in position to permit registration of sheets of different width or in different lateral positions and the object of the invention is to provide a simple and effective construction by which such adjustments can be made.

The invention provides a sheet feeding machine of the above kind which is characterised by the feature that the feed plate is divided in its width into sections of which an outer one carrying the side-lay and its operating mechanism is laterally adjustable, and one or more of the inner ones can be removed or replaced to accommodate such lateral adjustment of the outer section.

In one form of the machine there is a side-lay and operating mechanism therefor at each side of the feed plate, each lay and mechanism being adjustable in position as aforesaid.

Screw means may be provided for effecting the lateral movements of the outer lay-carrying section.

In one construction of the machine an intermediate section, which is not necessarily removable, carries or co-operates with a front lay and, it may be, front sheet controlling devices such as means for slowing down the sheets approaching the front lay before they reach the lay and a suction gripper which holds the sheets down on to the plate for example as described in my application Serial No. 304,103, now Patent No. 2,753,184 or in my application Serial No. 304,101 filed August 13, 1955, now Patent No. 2,726,865.

Application No. 304,103 discloses a suction gripper carried on a lever arm beneath a feed plate and given an up and down rocking movement to rise and grip each sheet in turn and then to move in an arc downwardly and forwardly so as to slow down the sheet. Such grippers may be arranged to operate through openings in the non-removable sections of the present feed plate and to be adjustable therewith. Application No. 304,101 describes a suction gripper which rises through an opening in a feed plate until it contacts a sheet over the plate when it grips the sheets and immediately moves downwardly. Such grippers may be arranged to operate through openings in the non-removable sections of the present feed plate and to be adjustable therewith.

The side-lay and its operating mechanism may be of

the general construction as described in application Serial No. 225,249 filed May 8, 1951 and later in the specification, now Patent No. 2,712,936, suitably modified to meet the requirements of the present invention (e. g. to be operated by cams which are slidable on a cross shaft to permit the lateral adjustment). Alternatively the side-lay and mechanism may be as described in my application Serial No. 497,976 filed March 30, 1955. The side lay described in application No. 497,976 is carried above a feed plate and there is a roller also above the feed plate and a blade which is movable upwardly through a slot in the feed plate to press a sheet overlying the slot upwardly against the roller and then to move sideways to draw the edge of the sheet up to the side-lay. The side lay and roller may be carried by the adjustable outer section by the feed plate of the present invention and the blade be arranged to move upwardly through a slot in this section.

It is preferred that the outer edge of the section of the feed plate which carries the side-lay extends beyond and in alignment with the registering surface of the lay, thereby providing an index line by which squareness of registration of the side edges of the sheets may be visually checked.

The sections of the feed plate may be supported on cross bars extending between side frames for the machine and at least the removable sections may have downwardly directed forks fitting over the supporting cross bars and retained thereon by spring detents.

It is a feature of one construction of the machine according to the invention that, in front of the plate, there are supports for the front edges of the sheets, the supports being independently clamped to a cross bar and being spaced to provide gaps through which access by grippers to the front edges of the sheets may be obtained, the grippers being for the purpose of removing the sheets.

At least one of the sections of the feed plate (e. g. that carrying the side-lay) may be adjustable in its effective width. This adjustment may be obtained by constructing the section in two laterally movable parts with a narrow intervening gap. There may also be narrow gaps between the adjacent sections.

A specific example of a machine according to the invention will now be described, with reference to the accompanying drawings, in which:

Figure 1 is a plan view showing diagrammatically the centre and one side of the feed plate;

Figure 2 is an elevation, also diagrammatic, of the parts shown in Figure 1 as seen looking towards the press;

Figure 3 is a side view showing one of the removable sections of the feed plate;

Figure 4 is a plan view of the section seen in Figure 3;

Figure 5 is a view in the direction 5—5 in Figure 4;

Figure 6 is an elevation of one of the sheet supports used in the machine;

Figure 7 is a side view of the support used in Figure 6;

Figure 8 is a plan view of one of the side-lay mechanisms in its position of adjustment for a sheet of maximum size;

Figure 9 is a side view, partly in section, of the side-lay mechanism and

Figure 10 is a rear view of the side lay mechanism.

The machine forming the subject of this example is intended for use to feed individual sheets to a printing machine and is located between the side frame members 10 of the printing machine and is in part supported by square section cross bars 11, 12 extending between those frame members.

The machine incorporates a feed plate which is carried by cross bars 13, 14 between side frame members 15 which are located between the frame members 10 of the printing machine. The feed plate is divided into eleven sections—six are shown and marked 16 to 21—each of

generally rectangular form with its length extending in the feeding direction.

The outermost section 16 at each side of the feed plate carries a side-lay mechanism 24 and is slidable along the cross bars 13, 14. A screwed spindle 26 passing through the adjacent side frame member 15 and engaging in a nut 27 on the section is provided for effecting the sideways movements of the section. The section may be clamped by a screw 29 to the cross bar 13 in any of its positions of adjustment.

The second, third and fifth sections, 18, 19 and 21, from each side of the feed plate have downwardly directed forks 30, 31 which fit over the cross bars 13, 14. One arm of each of the forks rests on the square section cross bars 11, 12 of the printing machine. Spring detents 34 engaging the lower parts of the cross bars 13, 14 hold the sections in place but permit ready removal of the sections.

The fourth section, 19, from each side of the feed plate is supported for sliding movements on the cross bars and carries a slow down device 35 and suction gripper 36 as above described. There is also a front lay 37 associated with each of these two sections.

The central section 21 of the feed plate is provided by a fixed frame member which has a downward step at 38.

At the front of the feed plate (i. e. adjacent to the printing press) there are twelve independent supports 40 for the front edges of the sheets. These supports are keyed to a cross shaft 41 and clamped thereto by hinged split clamps 42 and bolts 43. The supports extend upwardly with an inverted L shape. The shaft 41 also carries the front lays 37 and is given an oscillatory motion to raise and lower the lays in well known manner. The supports 40 also move with the shaft. When the lays are in their raised position ready to receive and register a sheet, the supports are in the position shown in Figure 7 in which the cross limbs 44 of the L shape lie partly beneath the chamfered edges 45 of the several sections and are partly level with the upper surfaces of the sections and so serve as extensions of the support surface for the sheets, lying between the grippers 46 by which the sheets are transferred to the printing machine. When the front lays are lowered—by anti-clockwise rotation of shaft 41 as viewed in Figure 7—the supports are also lowered.

The inner edge portion 48 of each of the outermost sections 16 is constructed separately and is carried by two arms 49 slidable in guideways in the section. Accordingly this inner edge portion may be adjusted laterally with regard to the main body of the section. Clamping screws 95 are provided for holding the portions 48 in their adjusted positions.

Each of the side-lays embodies a pair of friction wheels or rollers 51, 52 as described in application Serial No. 225,249 mentioned above. The upper wheel 51 is carried by a bracket 54 providing a smoother plate 55 and arranged for operation also as described in application Serial No. 225,249. To facilitate the lateral adjustment of the side-lay with the section 15 of the feed plate which carries it, the operations of the mechanism are effected by means of cams 57, 58 which are slidable along a rotatable cross shaft 59. Beneath each cam is a rocker arm 60, 61 carrying a follower roller, 62, 63, and each arm is connected by a flexible chain 64, 65 to a second arm 68, 69 above the cam. The upper arm 68 is connected by a further flexible chain, 70, to an arm 72 on a spindle 73 which carries the lower friction wheel 52 and there is a return spring 74 attached to another arm 75 on the spindle. The arrangement accordingly is that rotation of the cam 57 effects a partial rotation of the friction wheel 52 and the return movement is effected by the spring 74. The other upper arm, 69, is connected by a chain and rod 80 to the smoother plate and bracket 54, this connection being effected through an adjustable spring 86.

The registering surface 90 of each side-lay is arranged substantially as described in application Serial No. 225,249, and immediately in front of the surface there is a flat strip 92 which constitutes the upper surface of the section of the feed plate, apart from the above described adjustable edge portion. The outer side edge 93 of this strip is aligned with the registering surface 90 and so provides an index by which squareness of the sheets may be checked. The front edge of the section has an extension in the form of a spring strip 94 which is adjustable to lie alongside the adjacent grippers 46 and so to act as an additional support for the sheets. The spring is clamped by screw 95.

In use, when it is desired to feed and register sheets of maximum width all the sections 16-20 at each side and the centre section 21 are employed and they may be spaced apart to a small extent as shown in Figure 1. All of the front edge supports 40 are also employed. Either of the side-lay mechanisms is used as is most convenient and an exact adjustment of the position of the registering surface may be effected by the screw means 26, 27. This adjustment may be accompanied by adjustment of the position of the edge portion 48 of the outer section. If it is desired to use the machine for smaller sheets one or more of the removable sections (i. e. the second 17, third 18, and fifth 20, sections) are removed and the side sections 16 and the sections 19 carrying the slow down units are adjusted accordingly. Front edge supports 40 which are not needed may also be removed.

I claim:

1. A sheet feeding machine embodying a feed plate on to which sheets are fed in succession and on which side registration of the individual sheets is effected, support means for the plate, said plate providing a substantially continuous surface in the direction transverse to the feed direction of the sheets and being divided in said transverse direction into two outer and at least one inner sections of which one outer section is adjustable on the support means in the said transverse direction and the inner section is readily removable and replaceable to accommodate such transverse adjustment of the outer section, a side-lay carried by said one outer section for movement therewith and means for gripping a sheet lying on the plate and for drawing the sheet in the transverse direction laterally up to the side lay to effect side registration thereof, said gripping means also being movable with said one outer section.

2. A machine as claimed in claim 1 in which both outer sections are adjustable as aforesaid and each has a side lay and gripping means movable therewith.

3. A machine as claimed in claim 1, including screw means for effecting the transverse adjustment of the outer section.

4. A machine as claimed in claim 1 and including at least one intermediate section which is transversely adjustable and a front lay at the front of this section.

5. A machine as claimed in claim 1 and including at least one intermediate section which is transversely adjustable and a sheet slow down device adjustable with said section.

6. A machine as claimed in claim 1 and including at least one intermediate section which is transversely adjustable and a suction gripper operative to hold successive sheets down on to the section and adjustable with the section.

7. A machine as claimed in claim 1 in which the means for gripping and drawing the sheet comprise two wheels arranged to grip a sheet between them, cam means for effecting partial rotation of one of the wheels while gripping a sheet and cam means for separating the wheels to receive and release the sheet, the wheels and cam means being transversely adjustable with the outer section as a unit.

8. A machine as claimed in claim 1 in which the outer side edge of the outer section which carries the side lay

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extends beyond and in alignment with, the registering surface of the lay, thereby providing an index line by which squareness of registration of the side edges of the sheets may be visually checked.

9. A machine as claimed in claim 1 in which the support means comprise machine side frames and cross bars extending between the side frames and carrying the plate.

10. A machine as claimed in claim 9 in which at least one removable section has downwardly directed forks fitting over the supporting cross-bars and retained therein by spring detents.

11. A machine as claimed in claim 1 including, in front of the plate, supports for the front edges of the sheets, the supports being spaced to provide gaps through which access by grippers to the front edges of the sheets may be obtained, the grippers being for the purpose of removing the sheets.

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12. A machine as claimed in claim 11 in which the supports are movable beneath the level of the plate during the removal of the front portions of the sheets.

13. A machine as claimed in claim 11 in which at least one of the sections of the feed plate is adjustable in its effective width.

References Cited in the file of this patent

UNITED STATES PATENTS

1,029,159	Westerbeck	June 11, 1912
1,562,271	Aldrich	Nov. 17, 1925
2,248,004	Lipton	July 1, 1941
2,699,941	Huck	Jan. 18, 1955

FOREIGN PATENTS

904,185	France	Oct. 29, 1945
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