Dec. 16, 1941. E. W. PETERSON ET AL 2,266,068

SHEET FEEDING MECHANISM

Filed Nov. 15, 1940 3 Sheets-Sheet 1

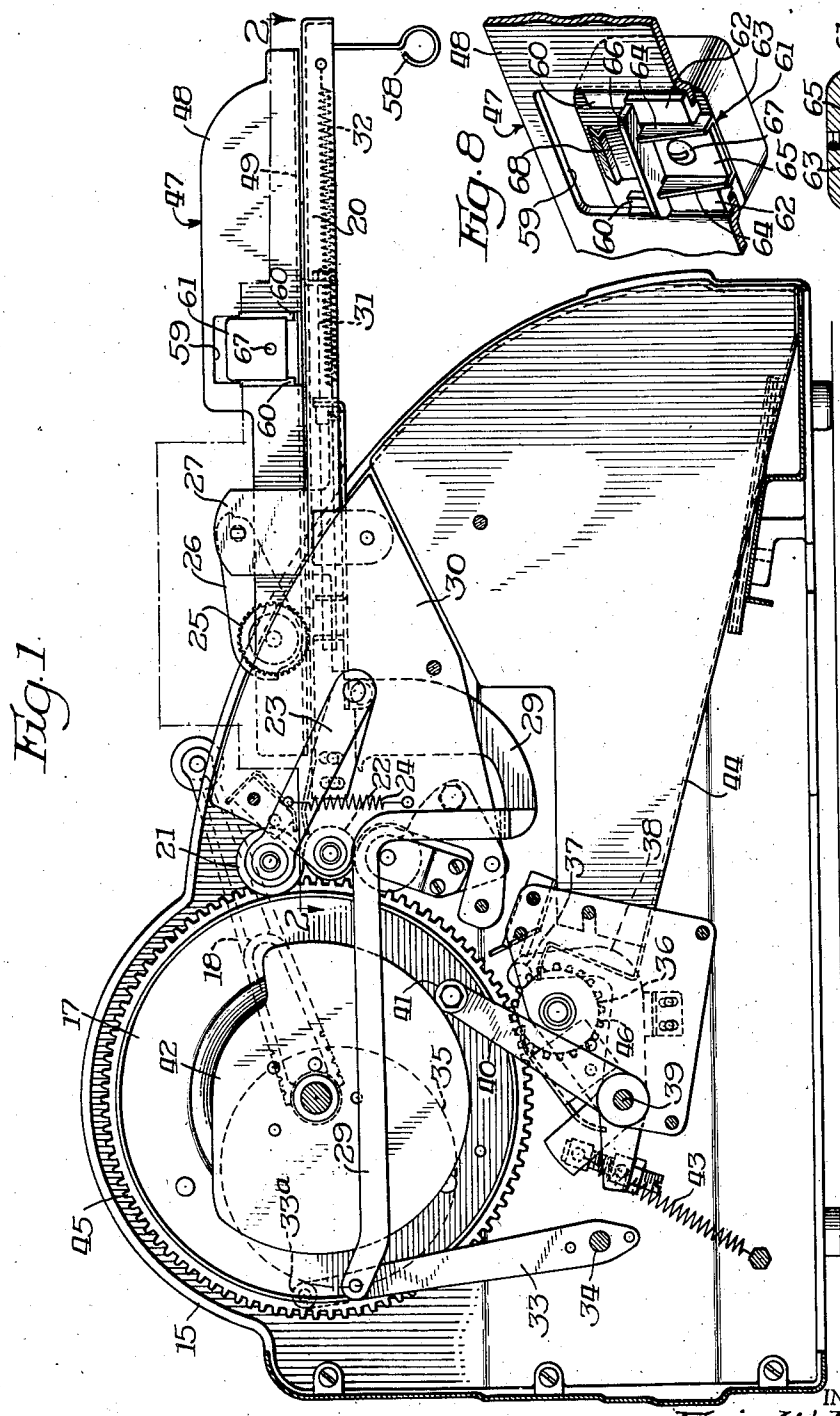


Fig. 1

Fig. 8

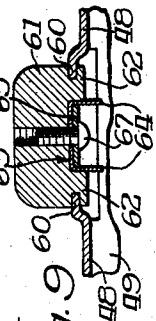


Fig. 9

INVENTORS:
Eric W. Peterson.
Hubert Jagger.

BY:
Zabel, Carlson, Fritzlaugh & Wells.
Attys

Dec. 16, 1941. E. W. PETERSON ET AL 2,266,068

SHEET FEEDING MECHANISM

Filed Nov. 15, 1940 3 Sheets-Sheet 2

Fig. 2.

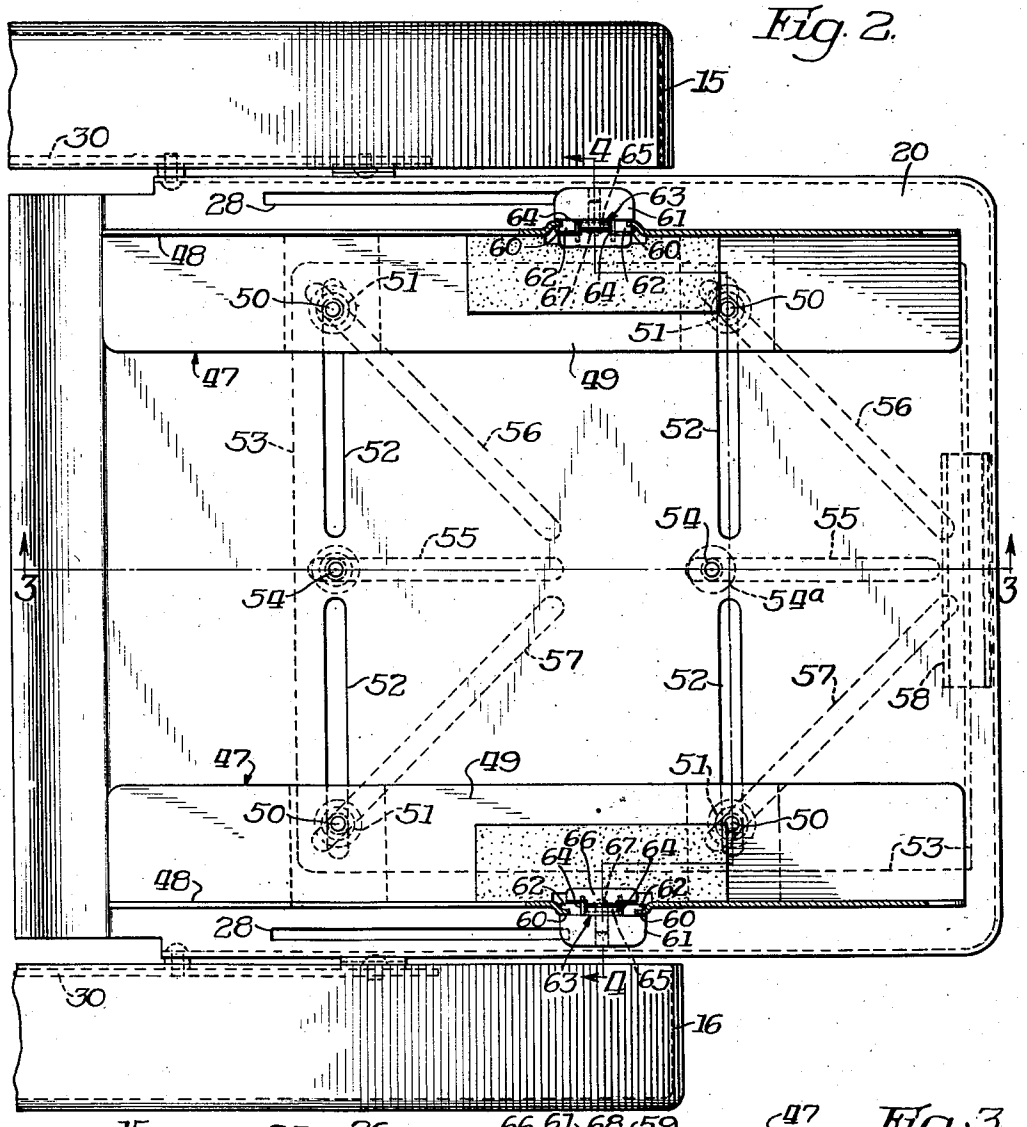
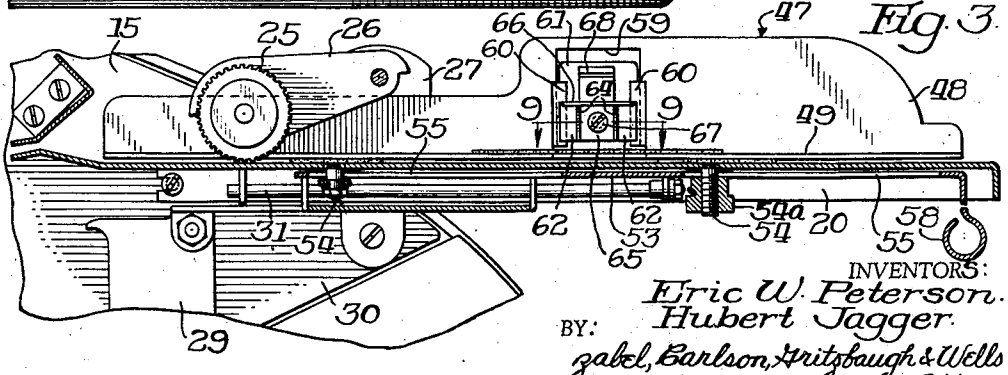


Fig. 3.



INVENTORS:
Eric W. Peterson.
Hubert Jagger.

BY:
Zabel, Barlson, Fritzbaugh & Wells
Attys.

Dec. 16, 1941. E. W. PETERSON ET AL 2,266,068

SHEET FEEDING MECHANISM

Filed Nov. 15, 1940 3 Sheets-Sheet 3

Fig. 4.

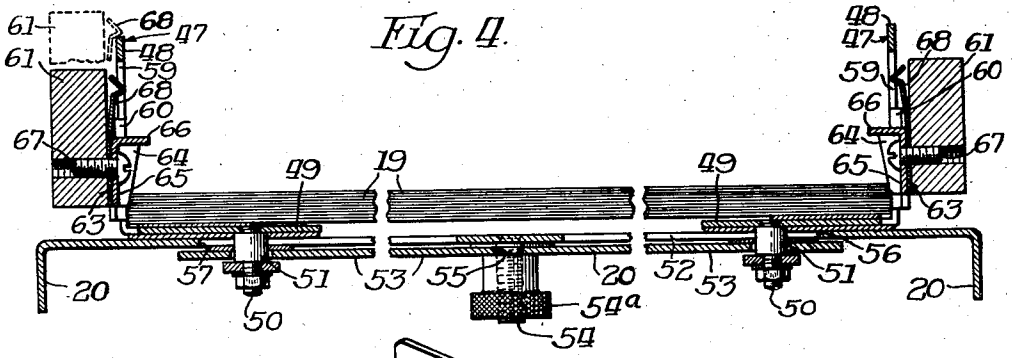


Fig. 5.

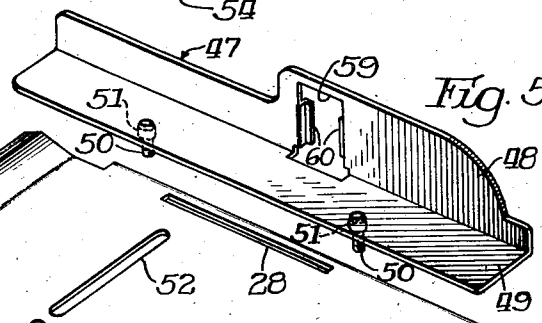
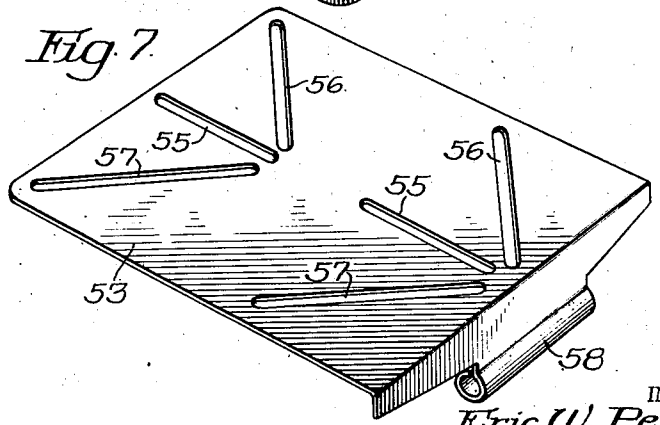


Fig. 6.

Fig. 7.



INVENTORS:
Eric W. Peterson.
Hubert Jagger.

BY
Zabel, Carlson, Gritzbaugh & Wells.
Attys

Patented Dec. 16, 1941

2,266,068

UNITED STATES PATENT OFFICE

2,266,068

SHEET FEEDING MECHANISM

Eric W. Peterson, Oak Park, and Hubert Jagger, Maywood, Ill., assignors to Ditto, Incorporated, Chicago, Ill., a corporation of West Virginia

Application November 15, 1940, Serial No. 365,792

14 Claims. (Cl. 271—61)

This invention relates to sheet feeding mechanism and is shown applied to a rotary gelatin type duplicating machine as representing one of its many uses. It is the object of the invention to provide an improved form and arrangement of the parts of a sheet feeding mechanism whereby the top sheet of a pile may be more readily slid edgewise off the pile and whereby the machine may be more quickly and easily adjusted for use with sheets of different widths.

According to this invention, an improved form of means is provided for applying pressure inwardly on the side edges of a pile of sheets near the top face of the pile whereby a frictional grip is applied lightly to the top sheet for resisting forward edgewise movement of the sheet and thus keeping the sheet more fully under the control of the means for removing such top sheet, and whereby the top sheet is buckled upwardly between its side edges for the entrance of air underneath the sheet so as to counteract any possible tendency for the sheet to be held in position by a suction effect. For accomplishing the desired results, an improved form of downwardly tapered side pressure member is employed at each side of the pile, comprising a pair of plates preferably of metal spaced a short distance apart and slidably mounted so as to be movable freely by gravity for engagement with successive top sheets as the height of the pile decreases.

Another feature of the improved sheet feeding mechanism comprises a new arrangement of mounting and controlling means for the side bars by which the side pressure members are carried so as to enable an operator to move the bars at opposite sides of the mechanism in unison by the manipulation of a single operating part for adjusting the distance between the side bars to accommodate different widths of paper, the arrangement being such as to keep the side bars continuously in parallelism.

It is another object of the invention to improve mechanisms of this type in sundry details hereinafter pointed out. The preferred means by which the several objects have been attained are illustrated in the accompanying drawings, in which—

Fig. 1 is a side face view of an improved duplicating machine embodying the invention;

Fig. 2 is a horizontal sectional view taken substantially at the line 2—2 of Fig. 1 but with the sheet forwarding means removed from the machine;

Figs. 3 and 4 are vertical sectional views taken substantially at the line 3—3 and the line 4—4, respectively, of Fig. 2, with the sheet forwarding means added in Fig. 3;

Fig. 5 is a perspective view of one of the side bars of the machine;

Fig. 6 is a perspective view of the table or tray upon which the pile of sheets are positioned for feeding to the machine;

Fig. 7 is a perspective view of an operating plate slidably mounted on the bottom face of the table or tray;

Fig. 8 is a perspective view of one of the side pressure members in position on a fragmentary portion of one of the side bars; and

Fig. 9 is a horizontal sectional view taken substantially at the line 9—9 of Fig. 3.

Referring now to the several figures of the drawings, in which corresponding parts are indicated by the same reference characters, 15 and 16 indicate standards at opposite sides of the machine rigidly connected together by any suitable means, each of said standards being preferably formed of sheet metal pressed into dished form. Between the standards 15 and 16, a drum 17 of any approved type is rotatably mounted, adapted to carry around a gelatin pad as is usual in rotary gelatin duplicating machines. The drum 17 is rotated by means of a crank handle 18 fixedly connected therewith. A pile 19 of copy sheets is supported on a table or tray 20, as shown in Fig. 4, in position to be fed one at a time between two cooperating forwarding rollers 21 and 22 by which the sheet is presented in position for operative engagement with the gelatin pad on the drum 17 as to be carried around by the drum. The upper forwarding roller 21 is in position for engagement with the face of the drum so as to act as the impression roller for applying the required pressure against successive copy sheets. In the arrangement shown, the combination impression and forwarding roller 21 is rotatably mounted between arms 23 swingingly mounted at opposite sides of the machine, coiled springs 24 connected with said arms serving to press the roller 21 against the drum and the roller 22.

Means is employed for feeding the sheets from the pile 19 one at a time to the forwarding rollers 21 and 22. This means comprises rollers 25 rotatably mounted on an arm 26 which is mounted to swing freely upwardly and downwardly between brackets 27 which are slidable longitudinally of the table 20 along slots 28 at opposite sides of the table. The brackets 27 are connected with links 29 for sliding movement longitudinally of the machine on frame plates 30 by means com-

prising slide bars 31, coiled springs 32 serving normally to hold the brackets in their rearmost positions. The links 29 by which the brackets 27 are actuated are connected at their forward ends with arms or levers 33 swingingly mounted on a cross shaft 34 mounted between the standards 15 and 16. One of the levers 33 is provided at its upper end with a roller 33a rotatably mounted thereon in position to be moved forwardly by a cam or eccentric 35 adapted to rotate with the drum 17. The mounting for the rollers 25 includes a one-way clutch arrangement of any suitable type by which the rollers are permitted to rotate freely as they roll toward the right in Fig. 1 but are held against rotation during their movement toward the left in said figure so as to be effective for causing the top sheet to slide edgewise toward the left from the pile of sheets.

Means is provided for stripping the copy sheets from the drum comprising stripping rollers 36 and 37, the former of which is rotatably mounted on a fixed axis and the latter of which is rotatably mounted between arms 38 swingingly mounted on a shaft 39 which is rocked in timed relation to the rotation of the drum by means of an arm 40 and roller 41 engaging a cam 42 carried by the drum. A spring 43 holds the roller 41 continuously in operative engagement with said cam 42. The stripping mechanism operates in the well-known manner for taking in the copy sheets from the drum and delivering the sheets to a tray 44. The stripping roller 36 is driven by a gear 45 carried around by the drum and meshing with a pinion 46 connected with the roller. By the arrangement just described, the roller 37 is moved inwardly and outwardly toward and from the center of the drum. Upon the outward movement of the roller, the leading edge of a copy sheet is engaged by the roller and moved outwardly into the bite of the rollers 36 and 37 so as to be pulled loose from the gelatin pad as the drum 17 rotates.

It is believed to be unnecessary to describe further the parts above referred to, since they form in and of themselves no part of our present invention.

In the arrangement herein shown, side margin bars 47 are provided, formed from sheet metal bent into angular form comprising vertically positioned portions 48 and horizontally positioned portions 49. Each of the horizontally positioned plate portions 49 is provided with two downwardly extending lugs 50 in the form of pins riveted into position, as is best shown in Fig. 4, enlarged body portions 51 of said pins or lugs engaging slots 52 in the table in directly transverse position therein, as is clearly shown in Fig. 6. In the arrangement shown, the pins 50 are provided with suitable washers and nuts on their lower ends for holding the bars in any desired adjusted position with respect to the table 20.

For controlling the position of the side bars 47, and for moving them toward and from each other on the table, a wide plate 53 is provided underneath the table so as to be movable longitudinally of the table. For mounting the plate 53 in position, the table is provided with downwardly extending lugs 54 in the form of pins riveted into position thereon so as to engage longitudinally extending slots 55 in the plate, the lugs 54 being provided with suitable nuts on their lower ends for holding the plate 53 from removal from the lugs. The rearmost one of these nuts is indicated by the numeral 54a and is arranged for being tightened readily against the plate for locking it against sliding movement. The plate 53 is further provided with backwardly converging slots 56 and 57 at opposite sides of the plate adapted to engage the lugs 50 carried by the side bars 47 as above described. The arrangement is such that upon movement of the plate 53 forwardly toward the left in Fig. 3, the lugs 50 are caused to move inwardly along the obliquely positioned slots 56 and 57 for moving the side bars 47 toward each other. Upon movement of the plate backwardly, the lugs 50 are caused to move outwardly along the obliquely positioned slots for carrying the side bars 47 outwardly with respect to each other. The arrangement is such that the side bars 47 are always moved at the same time and at the same rate of movement for effecting the desired adjustments through the medium of the plate 53.

For facilitating the movement of the plate 53, the rear end portion of the plate is bent downwardly to provide a handle 58 so as to enable an operator to give the side bars the desired simultaneous and equal adjustments very quickly and easily for accommodating different widths of sheets.

The side bar members, by which pressure is applied on the opposite side edges of the top sheet of a pile of sheets between the side margin bars 47, are slidably mounted in openings 59 formed in the vertically positioned plate portions 48. These openings 59 are cut in such manner as to provide inwardly projecting lugs 60 at opposite sides of the openings, such lugs being preferably offset slightly from the body of the plate portion 48. Each of the side pressure members comprises a body portion in the form of a metal block 61 having mounting fingers 62 formed thereon in spaced relation to the face of the block for the reception of the lugs 60. By this means the blocks 61 are slidable upwardly and downwardly within the openings 59.

On the inner face of each of the blocks 61 between the mounting fingers 62, there is mounted a channel member 63 the side plate portions 64 of which are downwardly tapered, with the inwardly facing edges of said side plate portions obliquely disposed in overhanging position with respect to the top sheet of the pile of sheets on the table. Inside of the channel member 63, a plate 65 is mounted, provided with a horizontally positioned plate portion 66 extending outwardly as a shield over the upper ends of the side plate portions 64. A machine screw 67 serves to secure the channel 63 and the plate 65 removably in position on the body member 61, so as to enable an operator easily and quickly to substitute a new channel member 63 whenever the parts become worn from long-continued use.

On the intermediate web portion of the channel 63, we have provided an upwardly extending latch arm 68 which is adapted to have a camming engagement with the comparatively narrow portion at the upper edge of the plate 48 above the opening 59 for holding the block 61 and its connected parts releasably in raised position when desired, such arm 68 being sufficiently resilient for insuring the desired operative engagement of the parts.

With the side bars 47 adjusted into snug engagement with the side faces of the pile 19 of sheets, as shown in Fig. 4, the downwardly tapered channel members 64 overhang the top sheet and force the outer edges of the top sheet inwardly sufficiently to cause a slight upward buckling of such top sheet so as to afford access for air to the bottom face of the sheet. This

serves to counteract any possible tendency for the sheet to be held in position by a suction effect and insures that the top sheet shall be slidable easily edgewise with respect to the next lower sheet. With pressure applied thus evenly at both side edges of the top sheet, there is no tendency for displacement of the sheet from its normally centered position on the pile of sheets and the feeding operation is expedited without in any way interfering with the even and smooth delivery of the copy sheet in the desired adjusted position.

While we prefer to employ the form and arrangement of parts as above described, it is to be understood that our invention is not limited strictly thereto except so far as the claims may be so limited, since changes might well be made in the form and arrangement of the parts without departing from the spirit of the invention.

We claim:

1. A sheet feeding mechanism comprising in combination a table, side pressure members at opposite sides of the table for engagement with opposite side faces of a pile of sheets supported by the table, and means for supporting said side pressure members so as to be movable freely upwardly and downwardly and with the paper engaging faces of said pressure members converging upwardly and at such distance from each other as to buckle the top sheet of the pile slightly between the members.

2. A sheet feeding mechanism comprising in combination a table adapted to support a pile of sheets of paper thereon, supports at opposite sides of the table, and side pressure members movably mounted on said supports so as to be movable upwardly and downwardly for engagement with the side edges of the top sheet of the pile and arranged with their paper engaging faces converging upwardly and at such distance from each other as to buckle the top sheet slightly between them.

3. A sheet feeding mechanism comprising in combination a table adapted to support a pile of sheets of paper thereon, supports rising above the table at opposite sides thereof, blocks slidable upwardly and downwardly on said supports, and side pressure members mounted on the inner faces of said blocks with their inner faces in slightly convergent position upwardly so as to overhang the top sheet of the pile and at such distance from each other as to buckle the top sheet slightly between them.

4. In a sheet feeding mechanism, the combination of a table, side pressure members at opposite sides of the table each comprising two downwardly tapered plates in spaced relation to each other for engagement with opposite side faces of a pile of sheets supported by the table, and means for supporting said side pressure members so as to be movable freely upwardly and downwardly with the inner edge faces of said plates in oblique position overhanging the top sheet of said pile and at such distance from each other as to buckle the top sheet slightly.

5. In a sheet feeding mechanism, the combination of a table, side pressure members at opposite sides of the table each comprising a body portion and an outwardly open channel portion removably mounted on said body portion with the side plates of the channel downwardly tapered for engagement in oblique position with opposite side faces of a pile of sheets supported by the table, and means for supporting said side pressure members so as to be movable freely upwardly and downwardly for continued engagement with said pile of sheets as the sheets are fed one at a time from the top thereof.

6. In a sheet feeding mechanism, the combination of a table, side bars at opposite sides of the table each comprising an upwardly extending plate portion having an opening therethrough at an intermediate point therealong, blocks mounted on said plate portions so as to be slidable upwardly and downwardly in said openings, and outwardly open channel portions removably mounted on the inner faces of said blocks having the side plate portions of each of the channels tapered downwardly for engagement in oblique position with opposite side faces of a pile of sheets supported by the table and at such distance from each other as to buckle the top sheet upwardly into slightly spaced relation to the next lower sheet.

7. A sheet feeding mechanism comprising in combination a table, side pressure members at opposite sides of the table for engagement with opposite side faces of a pile of sheets supported by the table, means for supporting said side pressure members so as to be movable freely upwardly and downwardly and with the paper engaging faces of said pressure members converging upwardly and at such distance from each other as to buckle the top sheet of the pile slightly between the members, and latch means adapted automatically to hold said side pressure members in raised position when moved upwardly.

8. A sheet feeding mechanism comprising in combination a table, side pressure members at opposite sides of the table for engagement with opposite side faces of a pile of sheets supported by the table, means for supporting said side pressure members so as to be movable freely upwardly and downwardly and with the paper engaging faces of said pressure members converging upwardly and at such distance from each other as to buckle the top sheet of the pile slightly between the members, and resilient latch arms extending upwardly from said side pressure members adapted by engagement with said supports when the members are moved upwardly to hold said members releasably in raised position.

9. In a sheet feeding mechanism, the combination of a table, side bars at opposite sides of the table each comprising an upwardly extending plate portion having an opening therethrough at an intermediate point therealong, blocks mounted on said plate portions so as to be slidable upwardly and downwardly in said openings, outwardly open channel portions removably mounted on the inner faces of said blocks having the side plate portions of each of the channels tapered downwardly for engagement in oblique position with opposite side faces of a pile of sheets supported by the table and at such distance from each other as to buckle the top sheet upwardly into slightly spaced relation to the next lower sheet, and resilient latch arms extending upwardly from said channel portions adapted by a camming engagement with the side bars above the openings therein when said blocks are moved upwardly to hold said blocks and attached channel portions in raised position.

10. In a sheet feeding mechanism, the combination of a table, side margin bars mounted on said table at opposite side portions thereof so as to be movable toward and from each other in parallel relationship, means for causing said side bars in their transverse movements to remain in substantially unchanged position longitudinally of the table, means slidable longitudinally of the

table adapted by sliding engagement with said side bars to move them at the same time and through equal distances toward and from each other, and means for locking said longitudinally slidable means in adjusted position on said table.

11. In a sheet feeding mechanism, the combination of a table, side margin bars mounted on said table at opposite side portions thereof so as to be movable toward and from each other in parallel relationship, means for causing said side bars in their transverse movements to remain in substantially unchanged position longitudinally of the table, and a wide plate movable longitudinally of the table having backwardly converging slots therein at opposite sides of the table adapted by sliding engagement with lugs carried by said side bars to move said side bars simultaneously and equally toward and from each other.

12. In a sheet feeding mechanism, the combination of a table slotted directly transversely thereof, side margin bars slidably mounted on said table and having vertically positioned lugs extending downwardly into engagement with said slots for causing said side bars to remain in unchanged position longitudinally of the table while moving toward and from each other transversely of the table, and means movable longitudinally of the table having obliquely positioned slots therein adapted by sliding engagement with said lugs to move the side bars toward and from each other in unison.

13. In a sheet feeding mechanism, the combination of a table slotted directly transversely thereof, side margin bars slidably mounted on said table and having vertically positioned lugs engaging said slots for causing said side bars to remain in unchanged position longitudinally of the table while moving toward and from each other transversely of the table, and plate means movable longitudinally of the table having obliquely positioned slots therein adapted by sliding engagement with said lugs to move said side bars transversely at the same time and through equal distances toward and from each other upon longitudinal movement of the plate.

14. In a sheet feeding mechanism, the combination of a table slotted directly transversely thereof, side margin bars having vertically positioned lugs engaging said slots for causing said side bars to remain in unchanged position longitudinally of the table while moving toward and from each other transversely of the table, other vertically positioned lugs extending downwardly from said table, and a wide plate positioned underneath said table with longitudinally extending slots therein engaging said second-named lugs for permitting the plate to move longitudinally of the table while being held against angular movement with respect thereto, said plate having backwardly converging slots therein at opposite sides of the table adapted by sliding engagement with said first-named lugs to move said side bars transversely simultaneously and equally toward and from each other upon longitudinal movement of said plate.

ERIC W. PETERSON.
HUBERT JAGGER.