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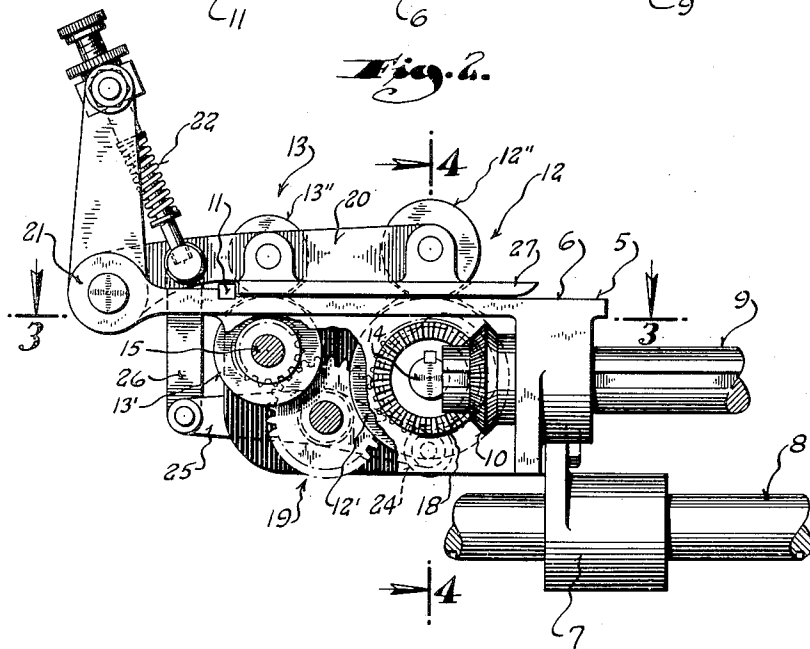
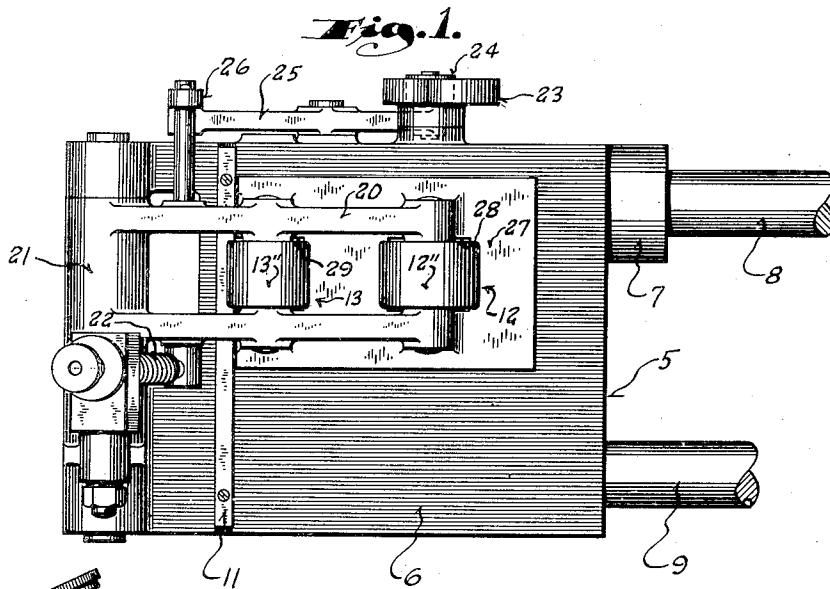
F. R. BELLUCHE

2,368,098

SIDE REGISTER FOR SHEET FEEDERS

Filed June 12, 1943

4 Sheets--Sheet 1



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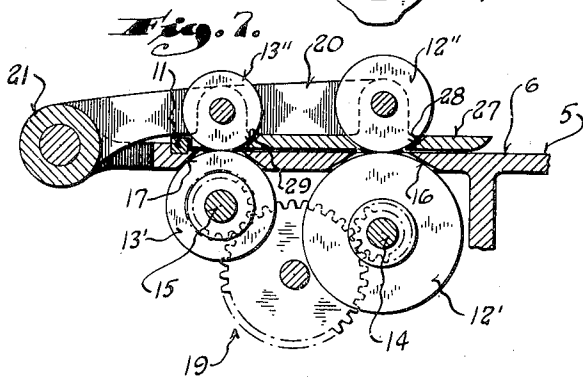
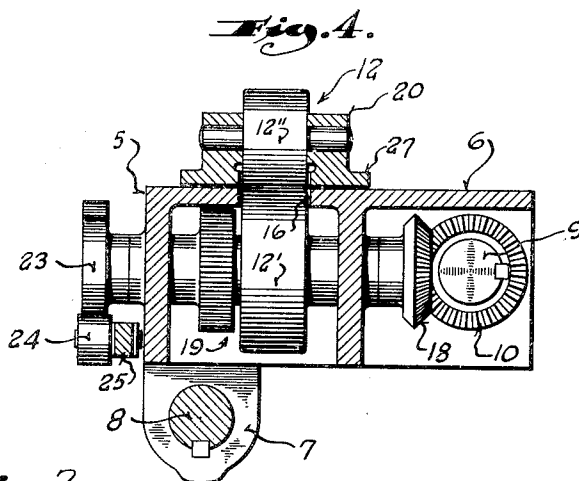
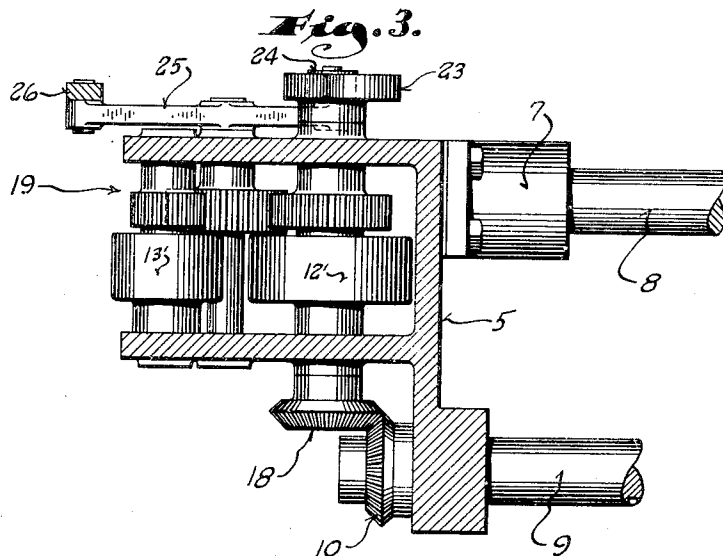
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SIDE REGISTER FOR SHEET FEEDERS

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4 Sheets-Sheet 2



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SIDE REGISTER FOR SHEET FEEDERS

Filed June 12, 1943 .

4 Sheets-Sheet 3

Fig. 5.

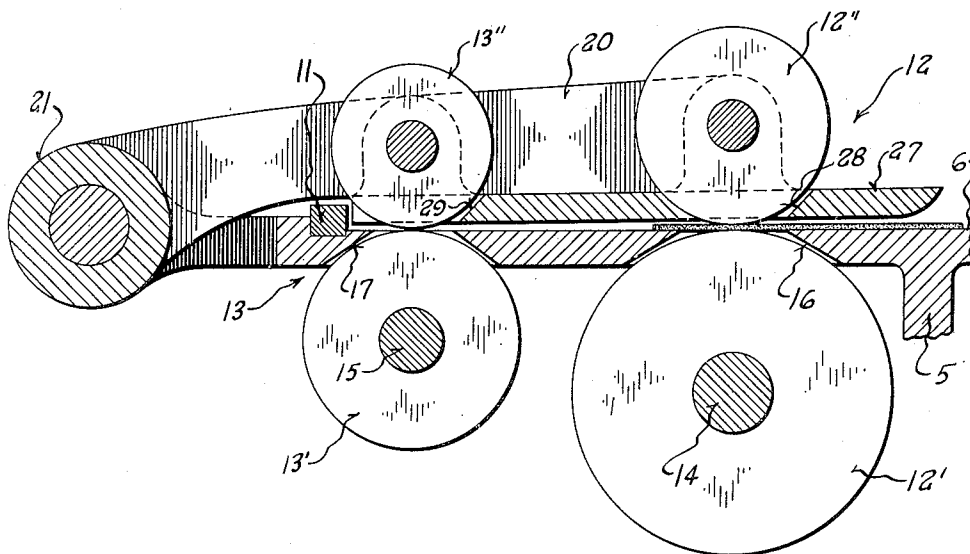
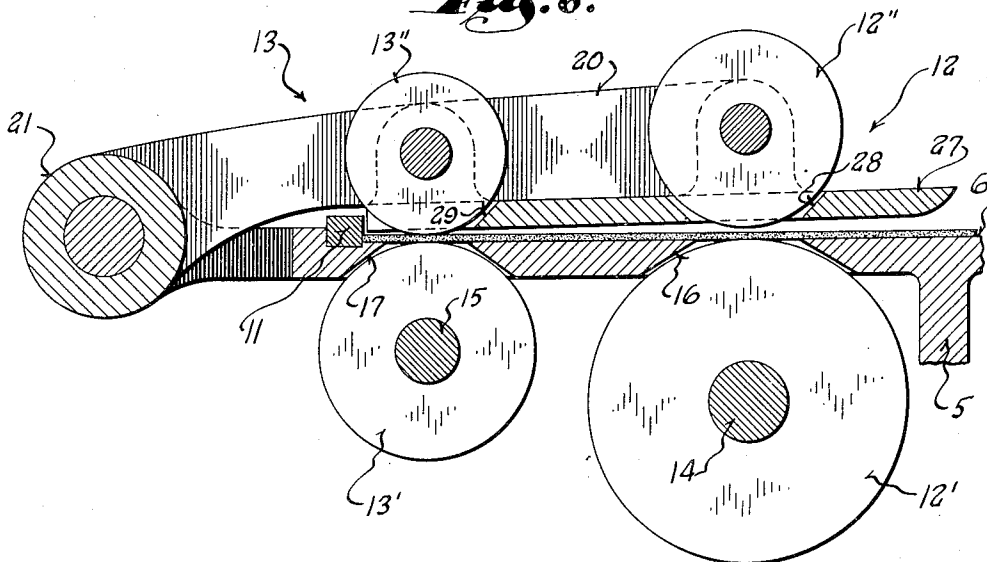


Fig. 6.



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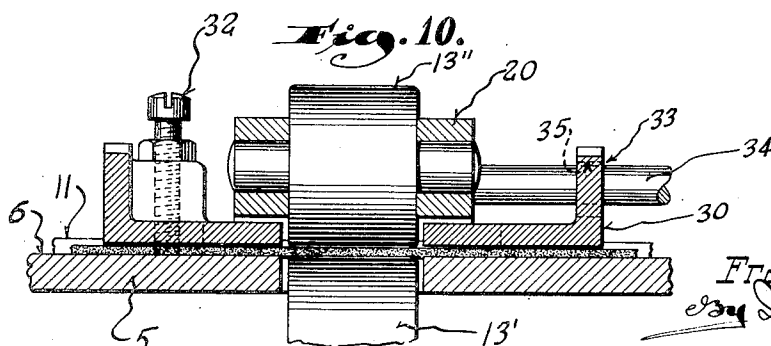
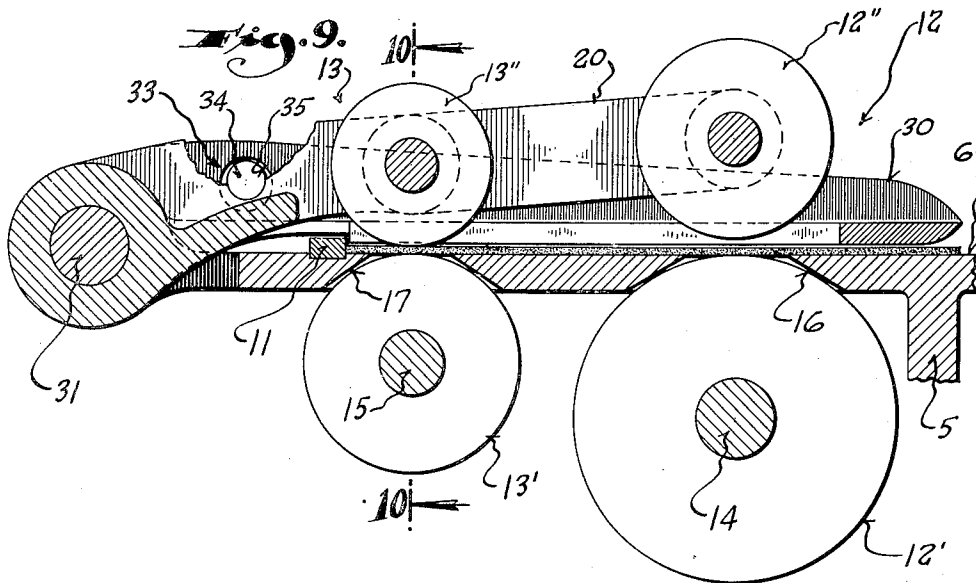
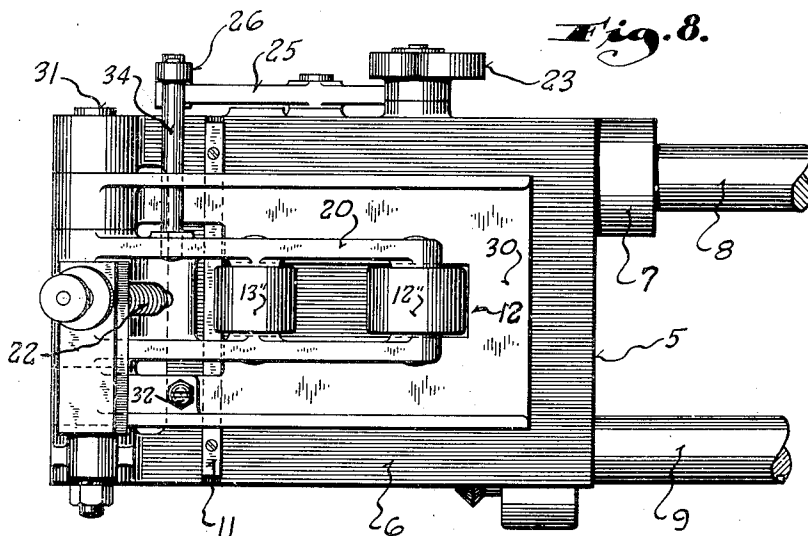
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SIDE REGISTER FOR SHEET FEEDERS

Filed June 12, 1943

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,368,098

SIDE REGISTER FOR SHEET FEEDERS

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13 Claims. (Cl. 271—59)

This invention relates to side registers for sheet feeders and refers particularly to roller type side registers.

The customary roller type side register consists of a guide against which the side edge of the sheet is drawn as it comes to rest at the front guide of the press. A pair of cooperating rollers arranged above and beneath the sheet draw the sheet towards the side guide. The upper roller is spring pressed into engagement with the lower roller and is periodically raised and lowered to permit a sheet to be fed between the rollers. The lower roller is constantly driven in the proper direction to exert a side pull on the sheet as long as the upper roller is down on the sheet.

In order to assure bringing the sheets fully against the side guide regardless of their distance from the guide the period of dwell of the rollers on the sheet had to be long enough to move the sheets the maximum distance. As a result the driven roller slipped on the undersurface of the sheet after the sheet engaged the side guide for a period depending upon the initial position of the sheet.

Inasmuch as wide variance in the lateral position of the sheets as loaded on the feeder is inevitable, the rollers of the side registers of the past were of necessity spaced a substantial distance in from the side guide to reach all sheets. In practice this distance was at least one and one-half inches. Hence, the point at which the rollers last engaged the sheet and where the slippage occurred invariably was at an area where printing had to be done. On many grades of paper this slippage was quite serious as it disturbed the paper coating to the extent that it would not take the ink.

It is therefore an object of the present invention to provide a side register wherein this objection of past roller type side registers is entirely obviated.

To this end it is another object of this invention to provide a side register wherein the pair of rollers which last engage the sheet are so close to the side register that in practically all cases the area at which the objectionable slippage occurs lies in the margin of the sheet not printed.

The disposition of the final sheet engaging rollers so close to the side guide entails the provision of other means for pulling the sheet into the bite of these rollers, and it is therefore another object of this invention to provide a second set or pair of rollers spaced far enough from the side guide to reach sheets fed even at a maximum distance from the side guide and to further provide

means for automatically rendering this second set or pair of rolls ineffective the instant the other set takes over control of the sheet.

As in the side registers of the past, the present invention employs a pivoted shoe cooperating with the base across which the sheets move to form a throat for guiding the sheet as it is drawn sideways by the cooperating rollers; and it is a further object of this invention to provide means whereby this throat remains constant during the time the sheet is actually moving toward the side guide, but is opened wide concurrently with the separation of the rollers to accommodate the insertion of the next sheet.

The time available for side registry is short, especially in the more modern, high-speed feeders. Hence, it is a further object of this invention to drive the two sets of rollers at different peripheral speeds with the initial set (which first engages a sheet) traveling at high speed, and the final pair (which last engages the sheet and actually feeds it against the side guide) traveling at a slower peripheral speed.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed in accordance with the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a top plan view of a side register constructed in accordance with this invention;

Figure 2 is a front plan view thereof with parts broken away and in section;

Figure 3 is a horizontal sectional view taken through Figure 2 on the plane of the line 3—3;

Figure 4 is a cross-sectional view taken through Figure 2 on the plane of the line 4—4;

Figure 5 is a cross-sectional view through the side guide and the two sets of rollers on a greatly enlarged scale and illustrating a sheet in the bite of the initial rollers;

Figure 6 is a view similar to Figure 5 but illustrating the sheet against the side guide and the initial rollers separated and ineffective;

Figure 7 is a view similar to Figure 2 with parts omitted and illustrating the drive transmission by which the peripheral speed of the

rollers nearest the side guide is slower than that of the other rollers;

Figure 8 is a top plan view similar to Figure 1 of a side register embodying a slight modification of this invention;

Figure 9 is a cross-sectional view through the side guide illustrated in Figure 8, said view being similar to Figures 5 and 6; and

Figure 10 is a detail cross-sectional view through Figure 9 on the plane of the line 10—10.

Referring now more particularly to the accompanying drawings, in which like numerals indicate like parts, the numeral 5 designates the base of the side register the top surface 6 of which provides a table across which the sheets are fed. The base is carried by a bracket 7 slidable on a transverse tie rod or supporting member 8 of the feeder (not shown) to enable the entire mechanism to be adjusted laterally to accommodate sheets of different widths. To enable such lateral adjustment of the entire mechanism the drive shaft 9 has the drive pinion 10 of the mechanism slidably splined thereto.

Extending up from the table top 6 is a side guide 11. Sheets fed onto the table top and coming to rest against the front guide (not shown) are drawn laterally against this side guide to effect the desired side registry. For this purpose two sets or pairs of cooperating rollers 12 and 13 are provided. The former may be referred to as the initial rollers and the latter as the final rollers. Both sets or pairs of rollers consist of a lower driven roller and an upper drop roller. The driven rollers 12' and 13' are mounted on shafts 14 and 15, respectively, journaled in suitable bearings carried by the base 5 beneath its table top 6.

The shafts 14 and 15 are so located that the upper portions of these lower driven rollers 12' and 13' protrude through openings 16 and 17, respectively, in the table top and have their peripheries substantially tangent to the surface of the table top. The drive for these lower driven rollers is taken from the pinion 10 with which a bevel gear 18 meshes. The gear 18 is fixed to the shaft 14 of the lower driven roller 12' and the shaft 15 of the other driver roller is driven through a train of gears 19.

The upper drop rollers 12'' and 13'' are both freely rotatably mounted on an arm 20 pivotally connected to the base as at 21. In effect, therefore, the arm 20 and the base constitute hingedly connected jaws between which the sheets are fed. A spring 22 yieldingly urges the arm 20 downwardly toward the table top to maintain the drop rollers firmly engaged with their cooperating driven rollers or the top of a sheet in position therebetween.

To permit the sheets to be fed between the rollers the arm 20 is periodically raised and lowered by a cam 23 fixed to the driven shaft 14 and on which a cam follower 24 rides. The cam follower or roller 24 is carried by one end of a medially pivoted lever 25 the opposite end of which is connected to the arm 20 by a link 26. Thus as the cam, which of course is timed with the advance of the sheets by the feeder, lifts the arm 20 a sheet moves across the table top between the two hingedly connected jaws comprising the arm 20 and the table top and comes to rest against the front guide (not shown).

If the feeder has been loaded with the sheets very close to their position of proper side registry the sheets so fed may move between both sets or pairs of rollers, but always the sheet will

come to rest between the initial rollers which are farthest from the side guide. Thus as the spring 22 causes the arm 20 to descend the drop roller 12'' will engage the top face of the sheet and through coaction with the lower driven roll 12' the sheet will be drawn laterally into the bite of the final rollers 13'—13''.

The instant the sheet enters the bite of these final rollers the arm 20 will be raised as shown in Figure 6, thus lifting the drop roller 12'' off the top of the sheet and leaving the sheet free of the objectionable wear caused by the slippage under pressure of the driven roll 12' on its undersurface.

To insure against the sheet being buckled as it is drawn laterally by the initial rollers the arm 20 has its lower portion formed as a guide shoe 27 which like the table top is provided with openings 28 and 29 for the drop rollers to project therethrough.

The peripheral speed of the two driven rollers may be equal, or more preferably as shown in Figure 7, the peripheral speed of the final driven roller 13' may be slower than that of the initial roller 12'. This reduction in speed is effected by selecting the proper sized gears in the gear train 19.

With the final rollers traveling at slower speed than the initial rollers the sheet is drawn toward the side guide with sufficient rapidity to insure the completion of the side registering within the allotted time, while at the same time the final engagement of the sheet with the side guide is effected at reduced speed to guard against buckling and other objections caused by the sheet striking the guide with too great force.

In the embodiment of the invention thus far described, the throat formed by the shoe 27 and the top of the base 5, varies in width with raising and lowering of the drop rollers. In the construction shown in Figures 8, 9 and 10, the width of the throat remains constant. To this end, the shoe 30, which corresponds to the shoe 27 of the previously described construction, is pivotally mounted independently of the arm 20 which carries the drop rollers 12'' and 13''. Both the shoe and the arm 20 are pivoted on a common shaft 31 mounted on the base and located outwardly beyond the side guide 11.

As is customary, the arm 20 is yieldingly urged downwardly toward the base by the compression spring 22, but the shoe 30 is not affected by this spring pressure. Gravity alone holds the shoe 30 in the position determined by the adjustment of a set screw 32. By means of this adjustment the opening of the throat is set and as noted hereinabove this opening remains constant during the time the sheet is registered and until the drop rollers are lifted to permit the next sheet to be inserted. At this time a lost motion connection 33 between the shoe 30 and the arm 20 lifts the shoe when the arm 20 is raised by the action of the cam 23 as described hereinbefore.

The lost motion connection 33 is conveniently formed by the passage of the rod 34 which extends from the side of the arm 20 and to which the link 26 is connected, through a hole 35 in one flange of the shoe 30. The difference in size between the hole 35 and the diameter of the rod determines the extent of the lost motion.

From the foregoing description, taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art, that this invention provides a substantial improvement in the side registers of sheet feeders

in that it eliminates the occurrence of faults in the printing surface of the sheets caused by slippage of the rollers on the sheet; and that the manner in which the correction is accomplished is simple and automatically adapted to variations in the lateral position of the sheets, which is a variable factor.

What I claim as my invention is:

1. A side register for sheet feeders comprising: a guide; a plurality of sheet engaging means spaced different distances from the guide and each operable to pull the sheet toward the guide; and means automatically operable upon engagement of the sheet by the sheet pulling means nearest the guide for freeing the sheet from the other sheet pulling means.

2. A side register for sheet feeders comprising: a side guide; a pair of rollers close to the guide and operable to pull a sheet therebetween against the guide; another pair of rollers spaced farther from the guide and likewise operable to pull a sheet therebetween toward the guide; and means for automatically separating the last named pair of rollers to free the sheet therefrom upon entry of the sheet between the first named pair of rollers.

3. A side register for sheet feeders comprising: a side guide; sheet gripping and pulling means close to the side guide for gripping a sheet and pulling it toward the side guide; other sheet gripping and pulling means spaced farther from the side guide for gripping a sheet and pulling it into the bite of the first named sheet gripping and pulling means; and means for freeing the sheet from said other sheet gripping and pulling means before the sheet comes to rest against the side guide.

4. A side register for sheet feeders comprising: a side guide; a final sheet gripping and pulling means close to the side guide for pulling a sheet into engagement with the side guide, said final sheet gripping and pulling means including a roller engageable with the top surface of the sheet; an initial sheet gripping and pulling means spaced farther from the side guide for pulling a sheet into the bite of the final sheet gripping and pulling means, said initial sheet gripping and pulling means including a roller engageable with the top surface of the sheet; and a pivoted arm on which said rollers of both sheet gripping and pulling means are mounted, the pivot for the arm lying laterally beyond the roller of the final sheet gripping and pulling means so that as said roller rides onto the sheet the arm is moved on its pivot to lift the roller of the initial sheet gripping and pulling means off the sheet.

5. A side register for sheet feeders comprising: a side guide; a pair of rollers close to the side guide for drawing a sheet into engagement with the side guide, one of said rollers being engageable with the topside and the other with the bottomside of the sheet; another pair of rollers spaced farther from the side guide and adapted to draw a sheet laterally and feed it between the first pair of rollers, said other pair of rollers comprising an upper roller engageable with the topside and a bottom roller engageable with the bottomside of the sheet; means for driving the bottom rollers of the two pairs of rollers; and a pivoted arm supporting the top rollers of both pairs of rollers, the pivot for the arm being so located that the top roller of the first pair lies between the pivot and the top roller of the second pair so that the entry of a sheet between the

first pair of rollers automatically lifts the top roller of the second pair off the sheet.

6. A side register for sheet feeders comprising: a side guide; a pair of rollers close to the side guide for drawing a sheet into engagement with the side guide, one of said rollers being engageable with the topside and the other with the bottomside of the sheet; another pair of rollers spaced farther from the side guide and adapted to draw a sheet laterally and feed it between the first pair of rollers, said other pair of rollers comprising an upper roller engageable with the topside and a bottom roller engageable with the bottomside of the sheet; means for driving the bottom rollers of the two pairs of rollers; a pivoted arm supporting the top rollers of both pairs of rollers, the pivot for the arm being so located that the top roller of the first pair lies between the pivot and the top roller of the second pair so that the entry of a sheet between the first pair of rollers automatically lifts the top roller of the second pair off the sheet; and means for periodically raising and lowering the pivoted arm to permit the advance of sheets between the rollers.

7. A side register for sheet feeders comprising: a base having a surface across which sheets are fed; a side guide projecting up from said surface and against which sheets are moved to establish proper side registry; a plurality of driven rollers mounted on the base with their peripheries substantially tangent to and exposed at said surface of the base, one of said rollers being close to the side guide and the other farther removed therefrom; an arm pivoted on the base at a point beyond the side guide and overlying the table top; and means carried by said arm in line with the rollers to cooperate therewith and cause the rollers to draw sheets laterally toward the side guide, the engagement of a sheet between the first named roller and its cooperating means causing the pivoted arm to raise and lift the cooperating means above the second named roller off the sheet.

8. A side register for sheet feeders comprising: a base having a surface across which sheets are fed; a side guide projecting up from said surface and against which sheets are moved to establish proper side registry; a plurality of driven rollers mounted on the base with their peripheries substantially tangent to and exposed at said surface of the base, one of said rollers being close to the side guide and the other farther removed therefrom; an arm pivoted on the base at a point beyond the side guide and overlying the table top; means carried by said arm in line with the rollers to cooperate therewith and cause the rollers to draw sheets laterally toward the side guide, the engagement of a sheet between the first named roller and its cooperating means causing the pivoted arm to raise and lift the cooperating means above the second named roller off the sheet; and means for driving the two driven rollers at different peripheral speeds and with the roller nearest the side guide having a slower peripheral speed than the other roller so that the final movement of the sheet into engagement with the side guide is slow.

9. A side register for sheet feeders comprising: a base having a flat table top across which sheets are fed; a side guide extending up from the table top and against which the sheets are brought to bear; a plurality of driven rollers carried by the base, one close to the side guide and another farther away from the side guide, said rollers

having their upper portions extending through openings in the table top and having their peripheries substantially tangent to the table top; a drop roller for each of said driven rollers to cooperate therewith and cause sheets to be drawn toward the side guide; a pivoted arm on which said drop rollers are mounted; means pivotally mounting said arm outwardly of the side guide so that engagement of a sheet between the driven roller nearest the side guide and its drop roller raises the arm to free the sheet from the other rollers; and cam means for periodically raising and lowering the pivoted arm.

10. A side register for sheet feeders comprising: a base having a flat table top across which sheets are fed; a side guide extending up from the table top and against which the sheets are brought to bear; a plurality of driven rollers carried by the base, one close to the side guide and another farther away from the side guide, said rollers having their upper portions extending through openings in the table top and having their peripheries substantially tangent to the table top; a drop roller for each of said driven rollers to cooperate therewith and cause sheets to be drawn toward the side guide; a pivoted arm on which said drop rollers are mounted; means pivotally mounting said arm outwardly of the side guide so that engagement of a sheet between the driven roller nearest the side guide and its drop roller raises the arm to free the sheet from the other rollers; cam means for periodically raising and lowering the pivoted arm; and a guide shoe on the arm overlying the table top of the base to cooperate with the drop rollers in holding the sheet flat on the table top.

11. A side register for sheet feeders comprising: a base having a surface across which sheets are fed; a side guide projecting up from said surface and against which sheets are moved to establish proper side register; a plurality of driven rollers mounted on the base with their peripheries substantially tangent to and exposed at the surface of the base, one of said rollers being close to the side guide and the other farther removed therefrom; an arm pivoted to the base at a point beyond the side guide and overlying the base; drop rollers carried by said arm to cooperate with said driven rollers in drawing a sheet on the base against the side guide; cam means for periodically

raising and lowering said arm to enable insertion of sheets between said rollers; a pivoted shoe overlying the table top and cooperating therewith to form a throat; and a lost motion connection between the arm and the shoe whereby said shoe retains a predetermined position with respect to the base to form a throat of constant width during the side registering, but is lifted off the base by the cam actuated raising of the arm.

12. A side register for sheet feeders comprising: a base; a shoe pivoted to the base and cooperating therewith to form a throat; a side guide on the base at the inner end of the throat against which sheets to be registered are drawn; an arm pivoted to the base and overlying the top thereof; cooperating sets of rollers carried by the arm and the base for drawing a sheet in the throat against the side guide; means for periodically lifting the arm to separate the rollers for the reception of sheets therebetween; and a lost motion connection between the arm and the shoe whereby said shoe remains in a predetermined position with respect to the base forming a throat of constant width during the side registering, but is lifted off the base as the arm is periodically lifted.

13. A side register for sheet feeders comprising: a base having a surface across which sheets are fed; a side guide projecting up from said surface of the base and against which sheets are moved to establish proper side registry; a shoe pivoted to the base and overlying the same to cooperate therewith in the formation of a throat for guiding sheets in their movement toward the side guide; an adjustable stop for setting the opening of the throat; a driven roller carried by the base with its peripheries substantially tangent to and exposed at the top surface of the base; a drop roller cooperable with said driven roller; a movable support for said drop roller; means for periodically lifting said movable stop to separate the rollers and accommodate the feeding of sheets therebetween; and a lost motion connection between said support and the shoe whereby the lifting of the support by said last named means lifts the shoe while any motion of the drop roll during the side registering of the sheets leaves the shoe undisturbed so that the opening of the throat remains constant during side registry.

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