

Sept. 8, 1942.

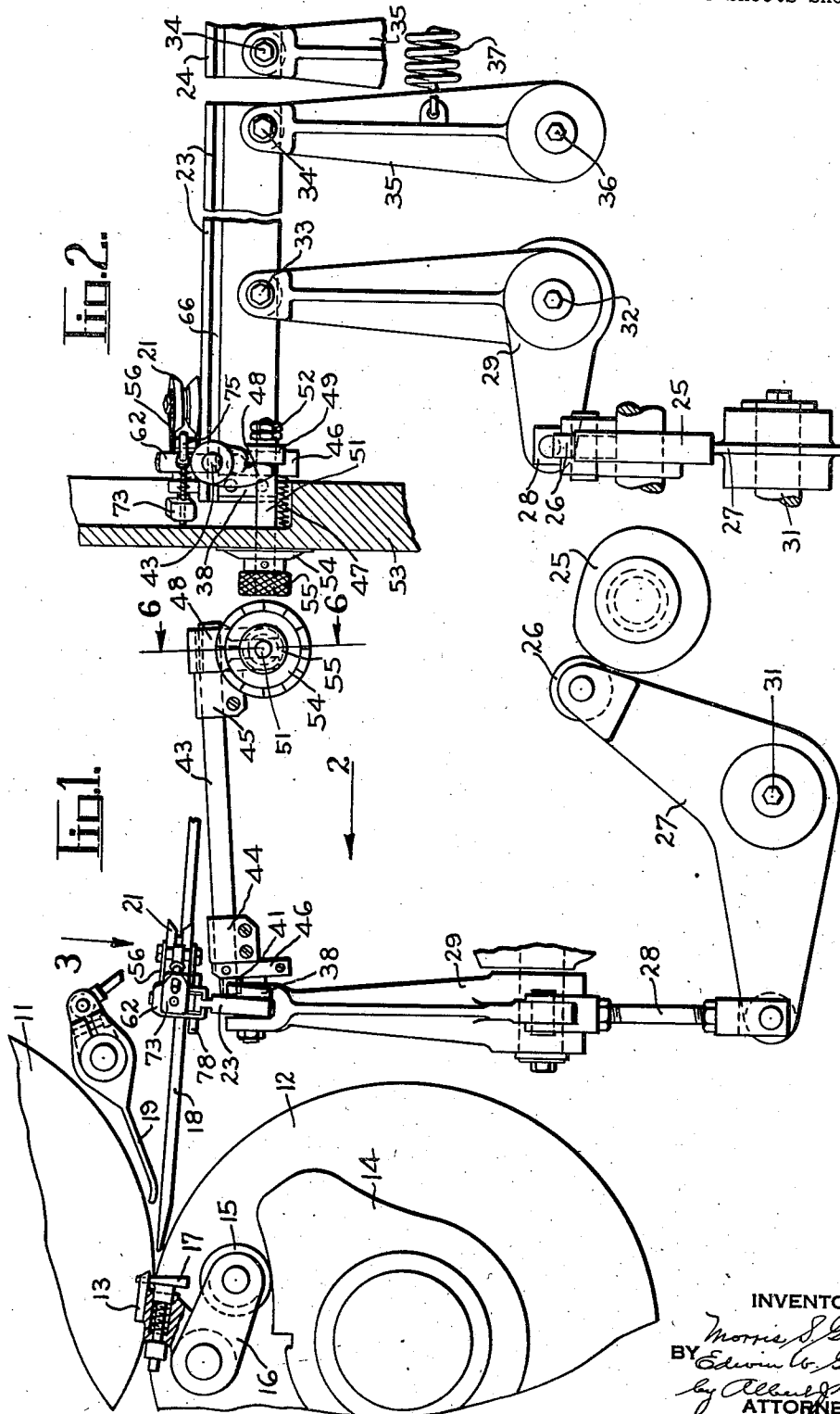
M. S. GUDGER ET AL

2,294,980

SHEET REGISTERING MECHANISM FOR PRINTING MACHINES

Filed Jan. 7, 1942

3 Sheets-Sheet 1



INVENTORS
Morris S. Gudger
BY Edwin C. Goodwin
by Albert J. Horton
ATTORNEY

Sept. 8, 1942.

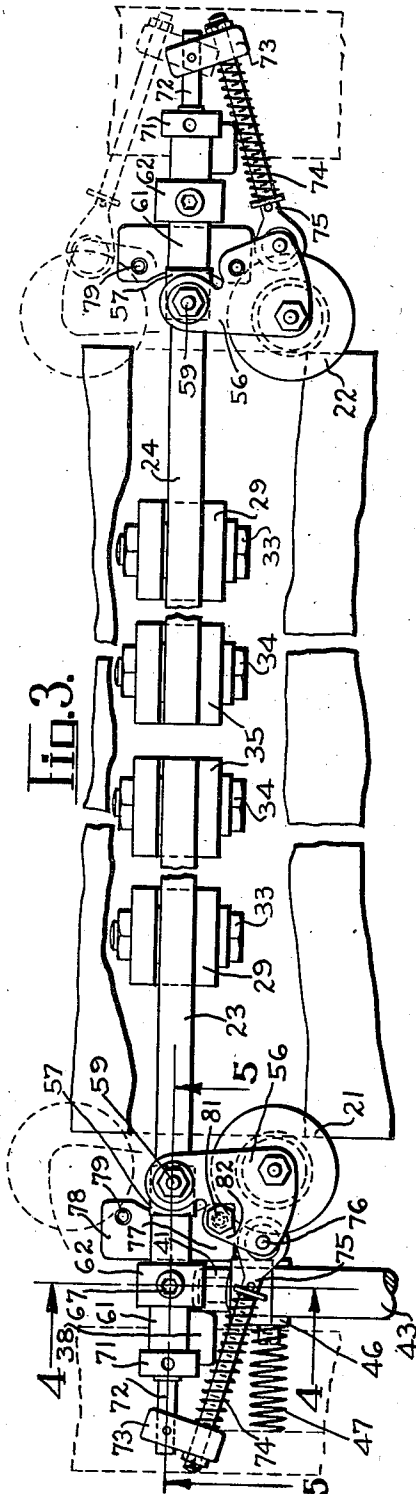
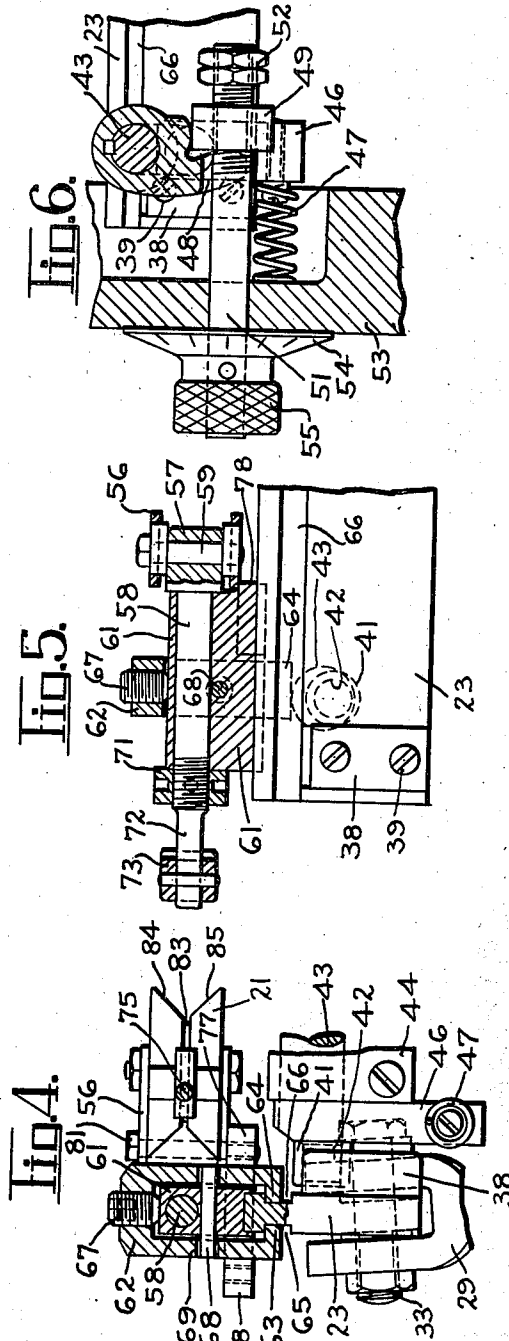
M. S. GUDGER ET AL

2,294,980

SHEET REGISTERING MECHANISM FOR PRINTING MACHINES

Filed Jan. 7, 1942

3 Sheets-Sheet 2



INVENTORS
Morris S. Gudger
BY Edwin W. Goodwin
by Albert J. Horton
ATTORNEY

Sept. 8, 1942.

M. S. GUDGER ET AL

2,294,980

SHEET REGISTERING MECHANISM FOR PRINTING MACHINES

Filed Jan. 7, 1942

3 Sheets-Sheet 3

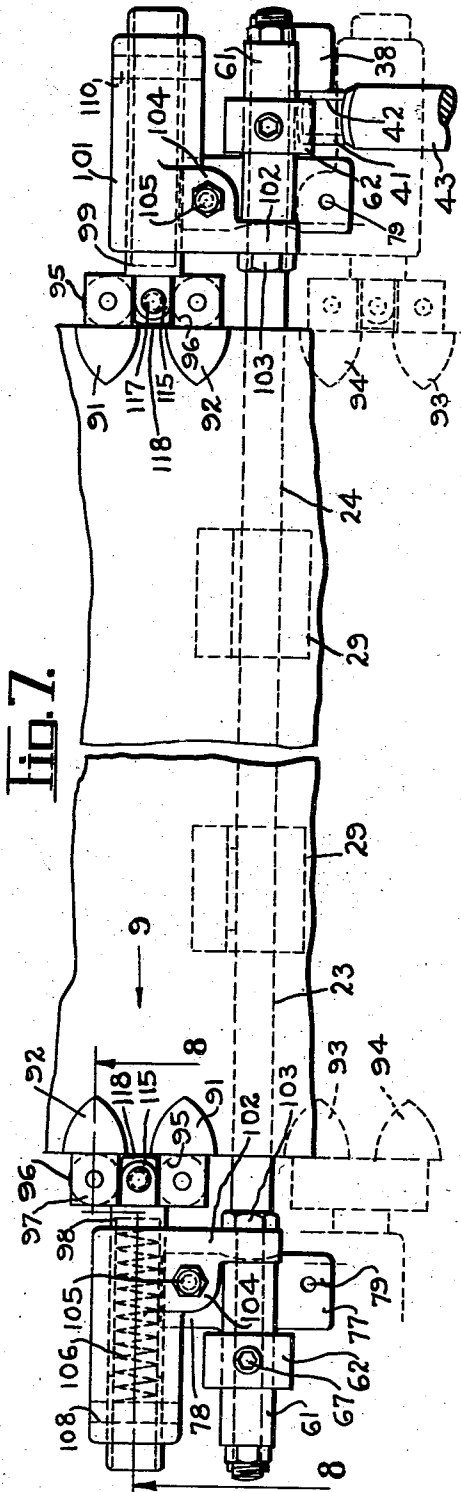
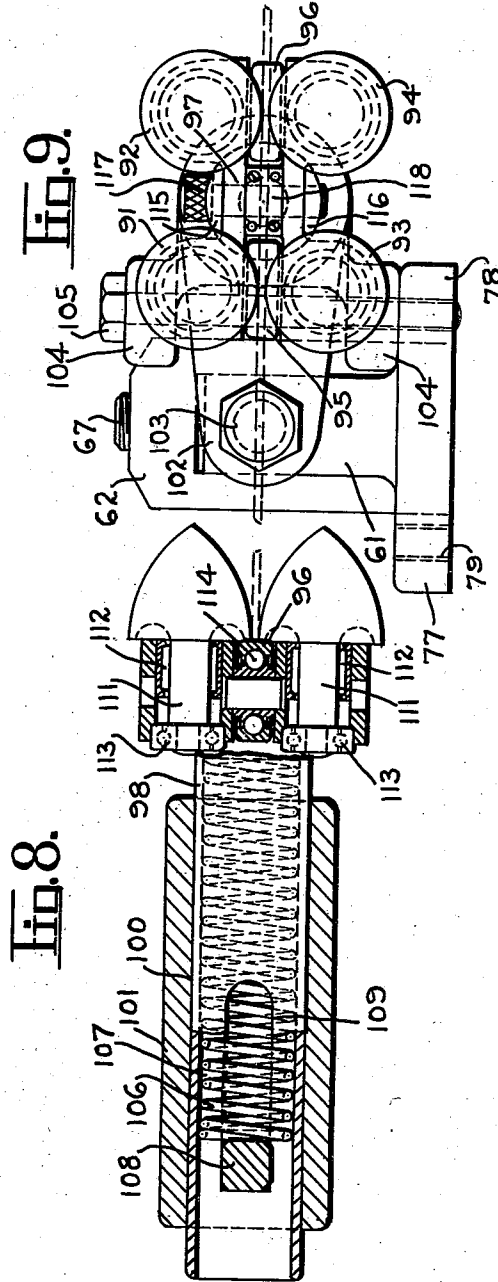


Fig. 9.

Fig. 8.

INVENTORS

Morris S. Gudger
BY *Edwin W. Goodwin*
by Albert H. Horton
ATTORNEY

UNITED STATES PATENT OFFICE

2,294,980

SHEET REGISTERING MECHANISM FOR
PRINTING MACHINES

Morris S. Gudger, New York, and Edwin W. Goodwin, New Rochelle, N. Y., assignors to R. Hoe & Co., Inc., New York, N. Y., a corporation of New York

Application January 7, 1942, Serial No. 425,814

20 Claims. (Cl. 271—58)

This invention relates to sheet registering mechanism for printing machines adapted for printing metal, cardboard or similar sheets, and more particularly to means for registering the side edges of sheets being fed to the printing machine.

Machines of this kind are usually provided with means to feed the sheets in timed relation with rotary printing cylinders, to position them against stops adapted to be engaged by the forward edge of the sheet, and side register means are arranged to be engaged by the side edges of the sheet, whereby the sheet will be registered both longitudinally and transversely with the printing plates. Due to slight variations in the width of the sheets, it is customary to have a registering means for one side edge of the sheet positively located against an adjustable stop while another and similar registering means is adapted to impose a spring bias on the opposite sheet edge to insure positive engagement of the side edge of the sheet being registered against the positively located registering means. It is also customary to simultaneously move the side registering means toward and away from the sheet edge in timed relation to the forward motion of the sheet, so as to register the sheet and then relieve it from engagement with the side registering means, thus ensuring smooth and accurate feeding of the sheets after they are registered.

Instances occasionally occur when it is desirable to print sheets which differ considerably in length, meaning the dimension lying in the direction of their movement in the machine, and it is contemplated as one object of this invention to provide an improved form of sheet registering mechanism that is readily adaptable to register either relatively long or short sheets.

Another object of this invention is to provide in a sheet registering mechanism of the kind defined, means to efficiently and quickly adjust the stop means for the positive registering means while the machine is running.

Further objects are to provide means in a sheet registering mechanism of the kind defined, to guide the sheets against and between the registering means with a minimum of friction being imposed thereon, and means whereby any distortion of an edge of the sheet by the registering means will be limited in its extent.

It is also an object of this invention to provide a sheet registering mechanism of generally improved construction, whereby the device will be simple, durable and inexpensive in construction.

tion, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A preferred embodiment of the invention and a modified form of the same is illustrated in the accompanying drawings, wherein:

Figure 1 is a vertical side view of a portion of a printing machine, partly in section and with parts broken away, showing the invention applied thereto;

Figure 2 is a fragmental view of parts shown in Figure 1 looking in the direction of arrow 2 in that figure;

Figure 3 is an enlarged fragmental and broken plan view of the sheet registering mechanism shown in Figures 1 and 2 looking in the direction of arrow 3 in Figure 1;

Figure 4 is an enlarged sectional view taken generally on the line 4—4 of Figure 3;

Figure 5 is an enlarged sectional view taken generally on the line 5—5 of Figure 3;

Figure 6 is an enlarged sectional view taken generally on the line 6—6 of Figure 1;

Figure 7 is a plan view of a modified form of the registering mechanism;

Figure 8 is a sectional view taken on the line 8—8 of Figure 7; and

Figure 9 is an end view of the mechanism shown in Figure 7.

Referring now to the drawings and particularly to Figures 1 and 2, the printing machine to which this invention is shown applied, includes a plate cylinder 11 and an impression cylinder 12. The impression cylinder 12, in this instance, carries sheet grippers 13 adapted to be actuated in timed relation with the feeding operation of the sheets and with the rotation of the cylinders 11 and 12 by a stationary cam 14 acting thereon through a roller 15 and lever arm 16. A stop member 17 is carried by the support for the gripper 13. The sheets engage this stop 17 before they are gripped by the gripper 13 and carried between the cylinders 11 and 12 to be printed upon.

Sheets are fed along a guide 18 which directs them to the bite of the cylinder. A series of

swinging fingers 19, one of which is shown in a raised position in Figure 1, are swung downward by means (not shown) after the passage of each sheet, and raised on the approach of the following sheet, the purpose of these fingers being to prevent premature passage of the sheet to the cylinder when they are depressed, and when raised to the position shown, they act to insure that the leading edge of the sheet rests on the guide 18 and is prevented from passing over the grippers 13.

As herein disclosed, the sheets are fed along the guide 18 in proper timed relation from a source of supply and are caused to engage a side registering mechanism embodying this invention.

The side registering mechanism disclosed in Figures 1-6, includes broadly, a pair of rollers 21 and 22 (Figure 3) disposed one at either side of the path of the sheet, and means to move these rollers toward and away from each other to engage the side edges of the sheets and effect side register thereof during the period they are passing. The means to so move the rollers 21 and 22 includes a pair of bars 23 and 24 arranged to be reciprocated. The means for moving the bar 23 is shown and it will be understood that identical means is provided to similarly move the bar 24.

Movement of the bars 23 and 24 away from each other is effected by cams 25 (Figures 1 and 2) through rollers 26, levers 27, links 28 and levers 29. The levers 27 and 29 are pivotally supported on stud shafts 31 and 32 respectively. The levers 29 are pivotally secured to the respective bar 23 or 24 adjacent the outer end of each by a pin 33. The inner end of each of the bars 23 and 24 is pivotally secured by a pin 34 to an arm 35 pivotally supported upon a stud shaft 36. A spring 37 having one end secured to the arm 35, and the other end to any suitable anchorage, biases the arm 35 and through it the bar 23 or 24, the lever 29, the link 28, and the lever 27, to maintain the roller 26 in operative contact with the cam 25.

The bars 23 and 24 are each provided with a stop block 38, herein shown secured to the outer ends of the bars by screws 39. Each of these stop blocks 38 is arranged to engage against a roller 41 (Figures 3, 4 and 5), mounted on an eccentric end 42 of a shaft 43, journaled in bearings 44 and 45 (Figures 1 and 4), secured to a convenient stationary machine part (not shown). An arm 46 (Figures 4 and 6), secured to the shaft 43 adjacent its eccentric end 42 is arranged to be biased by a spring 47 to rock the shaft 43 in the proper direction to press a finger 48, secured upon the other end of the shaft 43, against a stop nut 49 screw threaded upon an end of a stud 51, and prevented from turning by the finger 48, the nut being limited in movement thereon by lock nuts 52. The stud 51 extends through a side frame members 53, and has a dial 54 secured thereto outside of the frame 53. The dial 54 is provided with a knob 55 by which it and the stud 51 may be rotated to adjust the stop nut 49 thereon, and through the finger 48 and the shaft 43, vary the position of the eccentric end 42, and adjust the point of engagement of the stop block 38 with the roller 41 and through it, the travel of the roller 21. Although these parts are shown only in connection with the bar 23 and used for registering sheets from their left hand edges, it will be understood that duplicate parts are provided on the opposite side of the machine for cooperation with the bar 24 when it is desired to register sheets from their right hand edges.

The rollers 21 and 22 are each carried in a bifurcated arm 56 pivoted to an enlarged end 57 (Figure 5) of a shaft 58 by a pin 59. The shaft 58 is journaled in a bracket 61 releasably clamped to the respective bar 23 or 24. The means herein shown for clamping the brackets 61 to the respective bars 23 and 24 includes an inverted U-shaped yoke 62 (Figure 4) having inturned shoulders 63 and 64 adapted to enter lengthwise grooves 65 and 66 provided adjacent the upper edge of the bars. A set screw 67 screw threaded through the yoke 62 engages the upper surface of the bracket 61 to pull the respective bar 23 or 24 upwardly against the lower surface of the bracket 61 to clamp it thereto. A pin 68 passing through the bracket 61 with its ends passing freely through enlarged holes 69 in the arms of the yoke 62 limits the movements of the yoke 62 in respect to the bracket 61.

The shaft 58 is clamped in the bracket 61 by a circular nut 71 (Figure 5) screw threaded on its end opposite its enlarged end 57, and is provided with an extension 72 upon which a spring abutment member 73 is secured. A compression spring 74 (Figure 3), reacting between the abutment member 73 and a rod 75 pivotally secured at 76 to the roller supporting arm 56 is provided to bias the arm 56 and through it the roller 21 or 22 toward the adjacent edge of the sheet passing between the rollers. The bracket 61 has lugs 77 and 78 extending from opposite sides thereof, each lug having a screw threaded hole 79, adapted to receive a locking screw 81 which passes through a lug 82 provided on the roller supporting arm 56. By means of the screw 81, the arm 56 may when desired, be securely clamped to the bracket 61. Either roller 21 or 22 may thus be made a registering stop, against which the sheet is pressed by the other roller. The rollers 21 and 22 are each provided with a groove 83 midway between their ends, and are tapered inwardly as at 84 and 85 from their ends toward this groove 83 to guide a sheet therein.

Assuming that a sheet is being fed along the guide 18 (Figure 1) toward the cylinders 11 and 12 in properly timed relation, when it has partially passed between the rollers 21 and 22, the cams 25 actuate the levers 29 to permit each roller 21 and 22 to be moved by the spring 37, toward and against the adjacent side edge of the sheets. One of the rollers, and as herein shown, the roller 21 has its spring 74 rendered ineffective by the locking screw 81, and its inward movement is limited by the engagement of the stop block 38 on the bar 23 (Figure 5) with the roller 41 on the eccentric end 42 of the shaft 43. At this time, the sheet is forced against the roller 21 and into the groove 83, by the roller 22, due to the biasing action of the spring 74 on the roller 22, to register the sheet sidewise with respect to its left hand edge. Shortly after this operation takes place, the cams 25 (Figure 1) withdraw the rollers 21 and 22 from engagement with the sheet, which moves along with the cylinders and in contact with the forward edge stop 17, the speed of which is slightly less than the feeding speed of the sheet, and it is gripped by the grippers 13.

The registering mechanism of this invention is adapted to efficiently register either long or short sheets, and thus if relatively long sheets, which for comparison may be considered as from 36 to 50 inches in length are being fed, the rollers 21 and 22 are disposed as shown in full lines in Figures 1 and 3. Now should it be desired to feed shorter sheets which may be from 24 to 35 inches

in length, the rollers 21 and 22 are swung over forwardly toward the cylinders 11 and 12 as indicated in dotted lines in Figure 3. Such an operation is accomplished by removing the lock screw 81, loosening the circular nut 71 (Figure 5) to release the shaft 58 in the bracket 61 and rotating it with the arm 56, the abutment 73, the spring 74, and the rod 75 into such dotted position (Figure 3) whereby the side stops or rollers 21 and 22 will be moved nearer to the printing cylinders. The nut 71 is then tightened and the lock screw 81 inserted at either side of the machine as desired depending on at which side edge the sheets are to be registered. It is obvious that sheet side edge stops or registering means have been provided adapted to be positioned in either of two positions with respect to a front or forward edge stop, or along the path of the advancing sheet to adapt the mechanism to register different lengths of sheets, and the register stop adjusting mechanism disclosed permits exceedingly accurate adjustment of side register of the sheets without stopping the machine.

In the modified form of side registering means illustrated in Figures 7, 8 and 9, the rollers 21 and 22, the arms 56 and the springs 74 of Figures 1 to 6, have been replaced by a cluster of six rollers disposed at each side of the sheet. Each cluster of rollers includes four substantially cone-shaped rollers 91, 92, 93 and 94 and two cylindrical rollers 95 and 96 (Figure 9). These six rollers are all mounted in a frame 97 (Figure 7) carried by and pivotally secured to a hollow cylindrical spindle 98 or 99. The spindle 98 or 99 is slidably mounted in the bore 100 of a bracket 101, said bracket having an arm 102 extending therefrom at right angles to the axis of the bore 100 and adapted to be clamped to the inner end of the bracket 61 by a bolt 103 extending lengthwise through the shaft receiving bore of the bracket 61. A lug 104 extends from the bracket 101 and has a hole therein to align with the screw threaded hole 79 in the lugs 77 and 78 of the bracket 61, whereby a screw 105 passed through the hole in the lug 104 and screwed into one of the threaded holes 79, will clamp the bracket 101 securely to the bracket 61. The bolt 103 in addition to securing the bracket 101 to the bracket 61, also forms a shaft upon which the bracket 101 may swing when the screw 105 is removed.

This form of the invention is shown as arranged to register sheets with respect to their right hand side edges, although as in the previously described form, the parts are reversible, so that registration may be effected from either side edge of the sheets. The spindle 98 is adapted to slide in the bore 100 of the bracket 101, and is biased inwardly toward the adjacent sheet edge by a spring 106. The spring is disposed in the bore 107 (Figure 8) of the spindle 98, and reacts between a pin 108 and the bracket 101 at the inner end of the bore 100. The pin 108 is fixed in the bracket 101 and passes through an axially elongated slot 109 in the spindle 98.

The spindle 99 is fixed to the bracket 101 by a pin 110 (Figure 7) which passes through these parts and thereby prevents sliding movement of the spindle in the bracket. No spring is provided in the bore 107 of the spindle 99. The stop block 38 and the roller 41 on the eccentric end 42 of the shaft 43 is shown in operative position in respect thereto, the rollers 95 and 96 carried by the spindle 99 being the sheet registering means or stops against which the sheet side edge is pressed

by the spring biased rollers 95 and 96 carried by the spindle 98.

The rollers 91, 92, 93 and 94 are journaled in the frame 97 by having shanks 111 (Figure 8) extended through roller bearings 112 and ball bearings 113 mounted in the frame 97. The rollers 95 and 96, as herein shown, are the outer races of ball bearings 114, and a tangential line joining their peripheries is substantially parallel to the direction the sheet is being fed. The axes of the cone-shaped rollers 91 and 93 (Figure 9) are intersected by the axis of the roller 95, and the axes of the cone-shaped rollers 92 and 94 are intersected by the axis of the roller 96, whereby these cone-shaped rollers 91, 93 and 92, 94 define a wedge shaped space between their adjacent sides to engage the upper and lower surfaces of the sheet edge to guide the sheet toward the rollers 95 and 96.

The frame 97 is disposed in between lugs 115 and 116 (Figure 9) extending from the spindle 98, and is secured thereto by a removable pin 117, the arrangement being such that a slight amount of pivotal movement of the frame 97 on the pin 117 in respect to the spindle 98 is permitted. Intermediate the rollers 95 and 96 and secured to the frame 97, is a stop surface constituted by a member 118 (Figures 7 and 9), the sheet facing surface of which is preferably set approximately .002 of an inch, back from a line tangent to the peripheries of the rollers 95 and 96, so that bending of the edge of the sheet that might be caused by pressure against the small area of the rollers 95 and 96 engaged by the sheet as it advances, will be avoided, due to the much greater area of the face of the stop member 118 which may be a separate part, as shown, or be a portion of the frame 97.

As in the previously described form, shown in Figures 1-6 inclusive, the cluster of rollers may be rotated from the full line position shown in Figure 7, and adapted to register relatively short sheets to the position indicated by dotted lines to adapt them to register relatively long sheets. This change-over is readily effected by loosening the bolt 103, removing the screw 105 and rotating the bracket 101 on the bolt 103 as a shaft into the desired position. The screw 105 is then inserted in the hole 79 in line therewith, and the bolt 105 is again tightened. In both of the above described forms, either side of the sheet may be registered against a positioned stop member by the proper manipulation of the parts.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiments be considered in all respects as illustrative and not restrictive, reference being had to the claims rather than to the foregoing description to indicate the scope of the invention.

What we claim is:

1. In a sheet fed printing machine having registering means engaged by the forward edge of an advancing sheet, second means at one side of the sheet to engage one of its side edges, third means at the other side of the sheet to engage the opposite side edge and press the sheet against the second means, and other means to position each side edge engaging means in either of two positions in the direction of travel of the advancing sheets.

2. In a sheet fed printing machine having a registering member disposed in position to be

engaged by the forward edge of an advancing sheet, a first means adapted to engage one side edge of the sheet to register the sheet, a second means adapted to engage the opposite side edge of the sheet to press the sheet against the first means, supports for the first and second means, and means to position the first and second means in either of two positions in respect to the supports and in the direction of travel of the advancing sheets.

3. In a sheet fed printing machine, a side registering mechanism, including a first reciprocating means adapted to engage one side edge of the sheet to register the sheet, a second reciprocating means adapted to engage the opposite side edge of the sheet to press the sheet against the first means, and other means to adjust the sheet registering position of the first means while the machine is running.

4. In a sheet fed printing machine, a side registering mechanism, including a first reciprocating means adapted to engage one side edge of the sheet to register the sheet, a second reciprocating means adapted to engage the opposite side edge of the sheet to press the sheet against the first means, other means to adjust the sheet registering position of the first means while the machine is running, and means to position the first and second means in either of two positions in the direction of travel of the advancing sheets.

5. In a sheet registering mechanism for a sheet fed printing machine, a first means adapted to engage one side edge of an advancing sheet, a second means adapted to engage the opposite side edge of the sheet, means to reciprocate the first and second means to register the sheet, and means to position the first and second means in either of two positions with respect to the reciprocating means.

6. In a sheet registering mechanism for a sheet fed printing machine, a first movable means adapted to engage one side edge of an advancing sheet, a second movable means adapted to engage the opposite side edge of the sheet, means to adjust the sheet engaging position of one of said movable means while the machine is running, and means to position the first and second means in either of two positions along the path of the advancing sheet.

7. In a sheet registering mechanism for a sheet fed printing machine, a first means adapted to engage one side edge of an advancing sheet, a second means adapted to engage the opposite side edge of the sheet, means to bias one of the sheet engaging means toward the other to press a sheet thereagainst, means to adjust the sheet engaging position of the means toward which the sheet is pressed while the machine is running, and means to position the first and second means in either of two positions along the path of the advancing sheet.

8. In a sheet registering mechanism for a sheet fed printing machine, a first means adapted to engage one side edge of an advancing sheet, a second means adapted to engage the opposite side edge of the sheet, the first and second means each being mounted to swing on an axis transverse to the direction the sheet is being fed, to position them in either of two positions along the path of the advancing sheet.

9. In a sheet registering mechanism for a sheet fed printing machine, a first means adapted to engage one side edge of an advancing sheet, a second means adapted to engage the opposite side

edge of the sheet, and means to support the first and second means for swinging movement into either of two positions along the path of the advancing sheet to better control both relatively long and short sheets.

10. In a sheet registering mechanism for a sheet fed printing machine, a first means adapted to engage one side edge of an advancing sheet, a second means adapted to engage the opposite side edge of the sheet, means to support each means for swinging movement on an axis transverse to the direction in which the sheet is fed, and means to position each means either forwardly or rearwardly of the axis on which it swings.

11. In a sheet registering mechanism for a sheet fed printing machine, a first means adapted to engage one side edge of an advancing sheet, a second means adapted to engage the opposite side edge of the sheet, means to move the first and second means into sheet registering position, and an adjusting device associated with one of the sheet engaging means and operable while the machine is running, to limit its sheet registering movement.

12. In a sheet registering mechanism for a sheet fed printing machine, a roller rotatable on a vertical axis and adapted to engage a side edge of an advancing sheet, a support for the roller, means to pivot the support to swing on an axis transverse to the direction a sheet is fed, the axis of the support pivot being offset from the axis of the roller whereby the roller may be swung into either of two positions along the path of the advancing sheet.

13. In a sheet registering mechanism for a sheet fed printing machine, a pair of rollers disposed at one side of an advancing sheet and spaced apart in the direction in which the sheet is fed, and a support for the rollers to hold them in position to engage the side edge of the sheet and including a stop member positioned to be engaged by the sheet if its edge is bent by one of the rollers.

14. In a sheet registering mechanism for a sheet fed printing machine, a pair of rollers disposed at each side of an advancing sheet, the rollers of each pair being spaced apart in the direction in which the sheet is fed, and a sheet stop surface between the rollers of each pair and parallel to the path of travel of the sheet, the said stop surface being slightly spaced from a side edge thereof.

15. In a sheet registering mechanism for a sheet fed printing machine, a pair of tapered rollers supported one above the other and rotatable on horizontal axes to define a wedge-shaped space between their adjacent sides, and a cylindrical roller rotatable on a vertical axis to be engaged by the edge of an advancing sheet directed toward it by the tapered rollers.

16. In a sheet registering mechanism for a sheet fed printing machine, a pair of cylindrical rollers disposed at each side of an advancing sheet, the rollers of each pair being spaced apart in the direction in which the sheet is fed, and two pairs of tapered rollers, one tapered roller of each pair supported above and one below each cylindrical roller, to define a wedge-shaped space between the adjacent sides of the tapered rollers of each pair and to direct the sheet edge toward the cylindrical rollers.

17. In a sheet registering mechanism for a sheet fed printing machine, a pair of tapered rollers supported one above the other to rotate

on horizontal axes and define a wedge-shaped space between their adjacent sides, a cylindrical roller rotatable on a vertical axis to be engaged by the edge of an advancing sheet directed toward it by the tapered rollers, and a stop surface parallel to the path of travel of the advancing sheet and slightly spaced from the edge thereof when it is engaged by the cylindrical roller.

18. In a registering mechanism for a sheet fed printing machine, means for engaging the side edges of sheets fed to the machine, including rollers supported to rotate on vertical axes, and other rollers supported to rotate on horizontal axes and arranged to guide the sheet into engagement with the first mentioned rollers, whereby side register of the sheet is effected substantially without friction between the sheet and the registering mechanism.

19. In a registering mechanism for a sheet fed printing machine, means for engaging the side edges of sheets fed to the machine, including rollers supported to rotate on vertical axes, other

rollers supported to rotate on horizontal axes and arranged to guide the sheet into engagement with the first mentioned rollers, and a stop surface positioned to be closely adjacent the side edge of a sheet being registered, to prevent injurious bending of the edge of the sheet should it be slightly bent by the first mentioned rollers.

20. In a registering mechanism for a sheet fed printing machine, means for engaging the side edges of sheets including a cluster of rollers in a support arranged at each side of an advancing sheet, each cluster including a roller supported to rotate on a vertical axis to engage a side edge of the sheet, and a pair of rollers rotatable on horizontal axes to bear against the upper or lower surfaces of the sheet and guide it into engagement with the first mentioned roller, the support for the rollers being shiftable to and from a first position and a second position to register both relatively long and short sheets.

MORRIS S. GUDGER.
EDWIN W. GOODWIN.