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SHEET GUIDE

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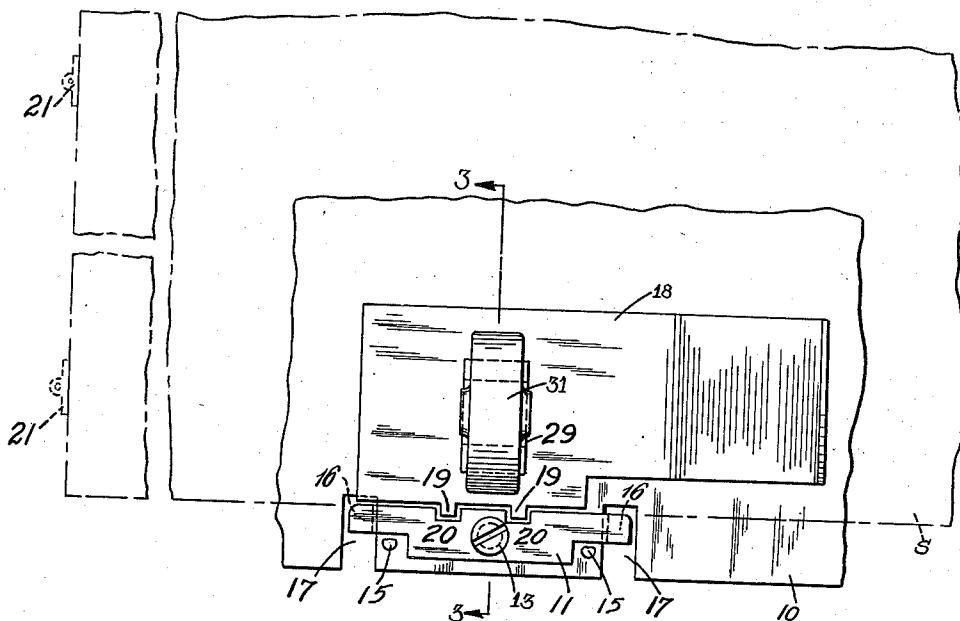


Fig. 1

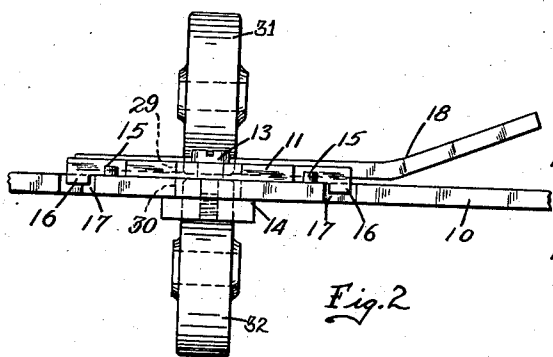


Fig. 2

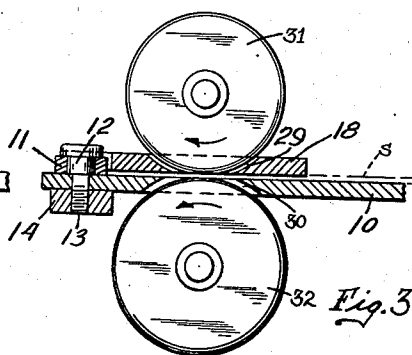


Fig. 3

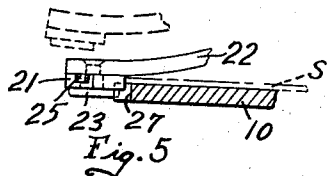


Fig. 5

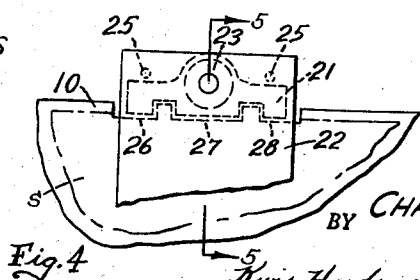


Fig. 4

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SHEET GUIDE

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11 Claims. (Cl. 271—58)

This invention relates to improvements in sheet guides, that is to say means for registering sheets in a sheet feeder used for presenting sheets to a printing press or other sheet handling machine.

In the conventional apparatus of this kind the sheets as they come down the feed board or table are brought to rest against two or more front stops or guides, which generally consist of blocks having some material extent for engagement with the sheet edge, by which the sheets are properly aligned transversely. Then while thus stationary so far as the direction of sheet travel is concerned, the sheet is drawn laterally against a side guide which generally consists of a block which also has some longitudinal extent, for example two or three inches, in the direction of sheet travel.

Owing to inaccuracies which sometimes occur in cutting or trimming of sheets, the front edges of the sheet are sometimes not straight but are convex or concave, so that they present their edges at an angle to a sheet guide which is positioned accurately perpendicular to the direction of sheet travel. This results in a variable slight buckling of the edge of the sheet at each guide which impairs sheet register.

Furthermore, when one of a pair of conventional guides for registering the front edge of the sheet is adjusted forward or backward independently of the other guide, the faces of the two guides are thrown out of parallelism, so that, even though the edge of the sheet is straight it will not contact the guides squarely.

It also happens at times that sheets are not cut precisely square. In such cases, where rigid side guides are employed, if the side guide is properly positioned for a square sheet, the edge of a sheet which is not square will not at first contact the side guide throughout its length, but will strike it at first at its front or rear end. Such a condition results in a variable buckling of the edge of the sheet which impairs side registering, so that printing is not accurately positioned with respect to the edges of the sheet or, in the case of multiple printing, the register between colors is imperfect.

The general purpose of the present invention is the provision of a guide block, adapted for either front or side registering, which will adjust itself to variations in the shape of the sheets so as to present its full extent to the edge of the sheet during the registering operation, whether or not the sheets are cut precisely square or straight, and whether or not the position of

one guide of a pair located along the same edge of the sheet is shifted relative to the other.

Further objects and features of novelty will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawing, in which

Fig. 1 is a plan view of a fragment of the feed board of a sheet feeding machine equipped with my improved side guide.

Fig. 2 is a side elevational view of the same.

Fig. 3 is a transverse vertical sectional view taken substantially on the line 3—3 of Fig. 1.

Fig. 4 is a fragmental plan view of the front edge of a feed board, with my improved front guide in operative position, and

Fig. 5 is a vertical sectional view taken substantially along the line 5—5 of Fig. 4.

In the drawing, a fragment of a feed board 10 along one side of the machine is illustrated. On the feed board near one edge thereof, there is mounted a side guide block 11 having a dimension of substantial extent in the direction of sheet travel. This side guide is arranged to swing upon a shouldered portion 12 of a flat head screw 13 which extends through a hole in the feed board and is threaded into a block 14 rigidly fastened by any suitable means to the bottom of the feed board. The shouldered portion 12 of the screw fits a hole in the side guide 11 closely, but without binding, this hole being located midway between the ends of the block. The head of screw 13 also holds guide 11 closely against feed board 10, but without binding.

The angle of swing of the block may be limited by two pins 15 which project upwardly a short distance from the surface of the feed board and serve to prevent movement of the block beyond the small amount necessary to accommodate the maximum expectable variations in the sheets. Projections 16 depend from the ends of the side guide, and extend into recesses 17 in the feed board, so that it is impossible for a sheet to become wedged between the feed board and the side guide.

A guide plate 18 of conventional form overlies each sheet S as it travels into place for front register, and to better prevent possible deflection of the edge of the sheet upwardly this guide plate has small extensions 19 which project into notches 20 formed in the side guide block 11.

At the front end of the feed board 10 retractable front guides are employed for front registering the sheets. While these guides may be of the conventional type, I prefer to employ guides

21 which are oscillatable through a small angle just as is the side guide 11 above described. Their operative position is indicated in Fig. 1.

These guides 21 are carried upon the underside of arms 22 at the forward ends of the latter, which arms swing up and down about a transverse horizontal axis above the sheet path. The mounting and operation of these swinging arms 22 is not herein disclosed, such devices being well-known in the art. A screw 23, similar to screw 13, holds each guide 21 against the lower side of its arm 22. Pins 25, similar to pins 15, limit the extent of oscillation of the guide. The block 21 extends somewhat below the surface of feed board 10, and has portions running rearwardly into recesses 26, 27 and 28 in the front edge of the feed board, so that all possibility of deflection of the sheet edge upwardly or downwardly is avoided. These front guides of course descend to the full line position of Fig. 5 at the proper time in the cycle for front registering the sheet, and after the sheet has been front registered and then side registered, they rise to the broken line position of that figure in order to permit forward travel of the registered sheet.

The guide plate 18 and the feed board 10 are cut away at 29 and 30 respectively to permit upper and lower rollers 31 and 32 to grip each sheet after it is front registered and draw it into engagement with the side guide. Mechanism for moving these rollers relatively toward and away from each other and for rotating them is well-known in the art and therefore is not herein illustrated or described.

The operation of a sheet feeding machine is not altered in any way by the invention. As the sheets come down the feed board they are stopped momentarily by the front guides 21 and front registered, these guides adjusting themselves upon their pivots 23 to fit the sheet edge, and while thus stopped each sheet is drawn by the rollers 31, 32 over against the side guide 11. As the sheet comes into engagement with the side guide, the latter adjusts itself about pivot 12 to contact throughout its extent the edge of the sheet, thereby contributing very considerably to accurate registration.

While in the drawing and in the foregoing description the invention is applied to a side guide mechanism in which the sheet is pulled against the guide, it should be understood that the invention is equally applicable to a mechanism in which the pivoted side guide is moved bodily into engagement with the sheet, in other words to a "push" guide.

Having thus described my invention, I claim:

1. In a sheet feeder, a feed board, and means for guiding a sheet edge comprising a block of substantial extent in the direction of said edge having a bearing upon which it is adapted to move into parallelism with the sheet edge in response to contact with the sheet edge.

2. In a sheet feeder, a feed board, and means for guiding a sheet edge comprising a block of substantial extent in the direction of said edge mounted to swing on an axis at right angles to said feed board into parallelism with the sheet edge in response to contact with the sheet edge.

3. In a sheet feeder, a sheet support, guide means for registering an edge of a sheet on the

sheet support, a guide adapted to contact another edge of the sheet for registering the sheet, and mounting means for said last mentioned guide adapted to permit movement of said guide relative to said mounting means into parallelism with the sheet edge in response to contact with that edge.

4. In a sheet feeder, a sheet support, guide means for registering an edge of a sheet on the sheet support, and a guide adapted to contact another edge of the sheet for registering the sheet, said last mentioned guide being mounted to move about an axis perpendicular to the plane of the sheet to take a position in parallelism with the edge of the sheet in response to contact with the sheet.

5. In a sheet feeder, a feed board, guide means for front registering each sheet, and a side guide of substantial extent in the direction of sheet travel mounted to swing on an upright axis in response to pressure exerted by said sheet as the latter is moved sidewise for side registration.

6. In a sheet feeder, a feed board, guide means for front registering each sheet, a side guide of substantial extent in the direction of sheet travel mounted to swing on an upright axis into parallelism with the sheet edge in response to contact with that edge, and means causing relative lateral movement between each sheet and said guide for side registering the sheet.

7. In a sheet feeder, a feed board, means for guiding a sheet edge comprising a block of substantial extent along said edge mounted to swing on an axis at right angles to said feed board into parallelism with the sheet edge in response to contact with said sheet edge, and means for limiting the swinging movement of said block.

8. In a sheet feeder, a feed board, guide means for front registering each sheet, and a side guide mounted to swing on an upright axis, said side guide having sheet engaging longitudinally spaced feet depending below the surface of said feed board on opposite sides of said axis.

9. In a sheet feeder, a feed board, guide means for front registering each sheet, a side guide having a dimension of substantial extent in the direction of sheet travel, a pivot perpendicular to the feed board upon which said side guide is mounted intermediate its ends, and means for moving each front registered sheet laterally into engagement with said side guide for side registering the same, the latter movement of the sheet exerting pressure on said guide to swing it into parallelism with the edge of the sheet.

10. In a sheet feeder, a sheet support, a guide for registering an edge of a sheet on the sheet support, a guide for registering another edge of the sheet, and mounting means for each of said guides adapted to permit movement of the guide relative to its mounting means in response to contact with an edge of said sheet for alignment of the guide with the edge of the sheet.

11. In a sheet feeder, a feed board, means for guiding a sheet edge comprising a pivot extending upwardly from the feed board at right angles to its surface, and a guide block of substantial extent in the direction of said edge mounted intermediate its ends on said pivot to swing in response to contact with said sheet edge.

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