

[54] **SHEET DELIVERY ARRANGEMENT FOR PRINTING PRESSES**

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271/205, 206; 214/6 DK, 6 P

[56] **References Cited**

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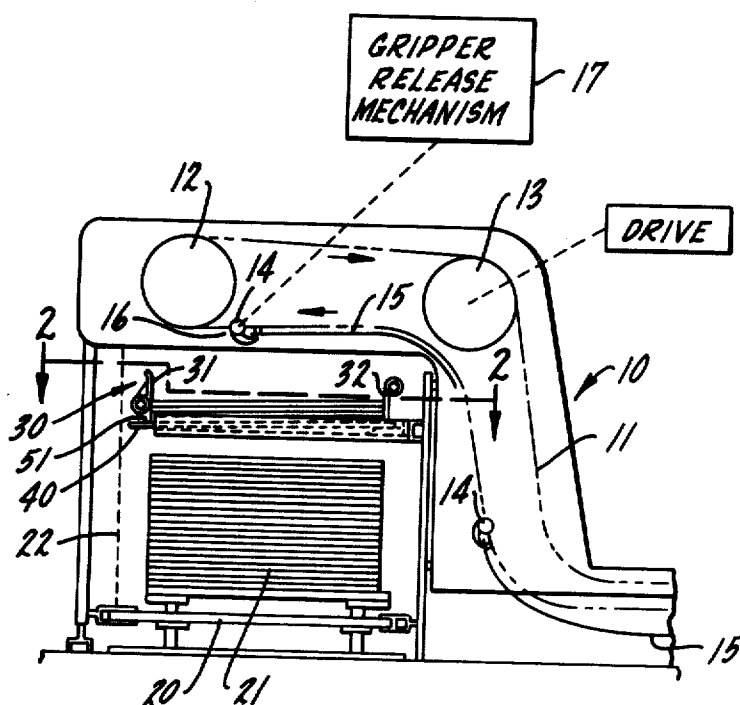
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[57] **ABSTRACT**

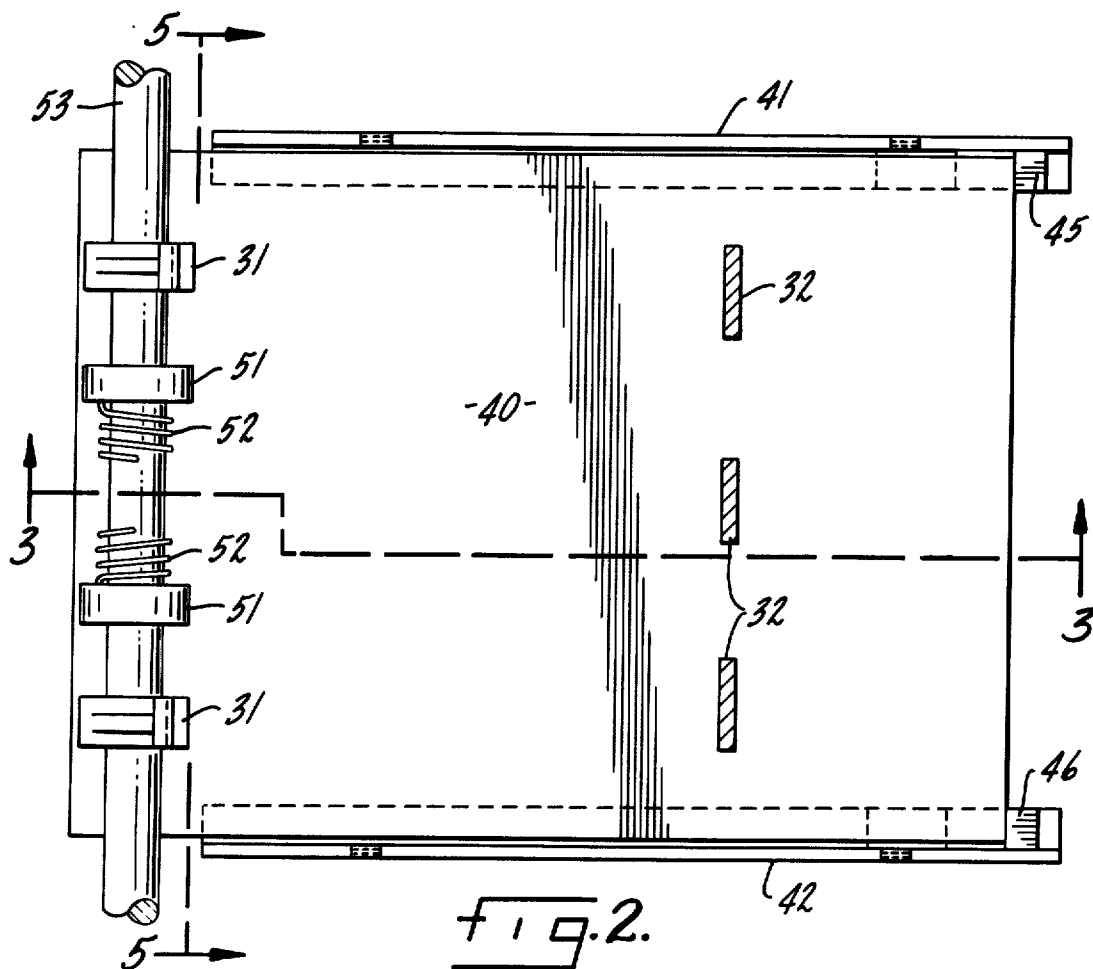
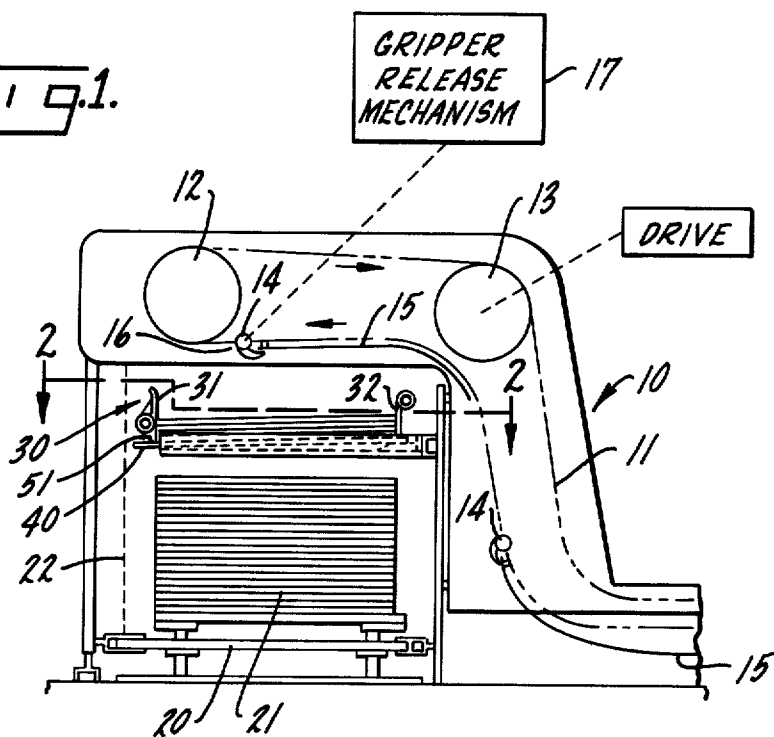
A sheet delivery arrangement for sheet-fed printing presses which includes a conveyor for depositing sheets one by one upon a delivery platform, front edge and rear edge sheet guides being provided for positioning the sheets as the sheets fall from the conveyor to form an orderly pile. A pair of horizontal guide rails are spaced outwardly from, and a short distance below, the sheet guides and serve to support an auxiliary pile board which is manually inserted into the descending stream of sheets for temporarily intercepting and accumulating the sheets so as to permit removal of the filled delivery platform and substitution of an empty delivery platform. The guide rails include means for camming the auxiliary pile board upwardly into engagement with the rear edge sheet guide incident to the final portion of the insertion movement to insure that the sheets are deposited in accurate position on the auxiliary pile board. The disclosed camming means is in the form of a pair of ramps or wedges located at the rear ends of the guide rails. Preferably, as part of the combination, the front edge sheet guides have springs for biasing the same downwardly into contact with the auxiliary pile board.

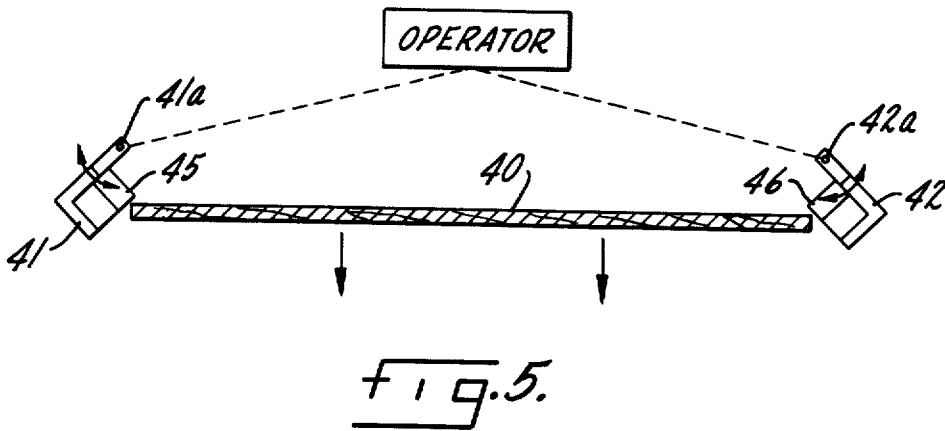
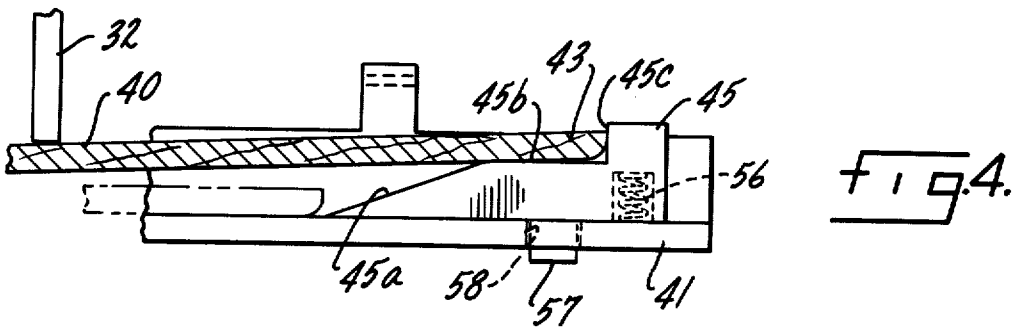
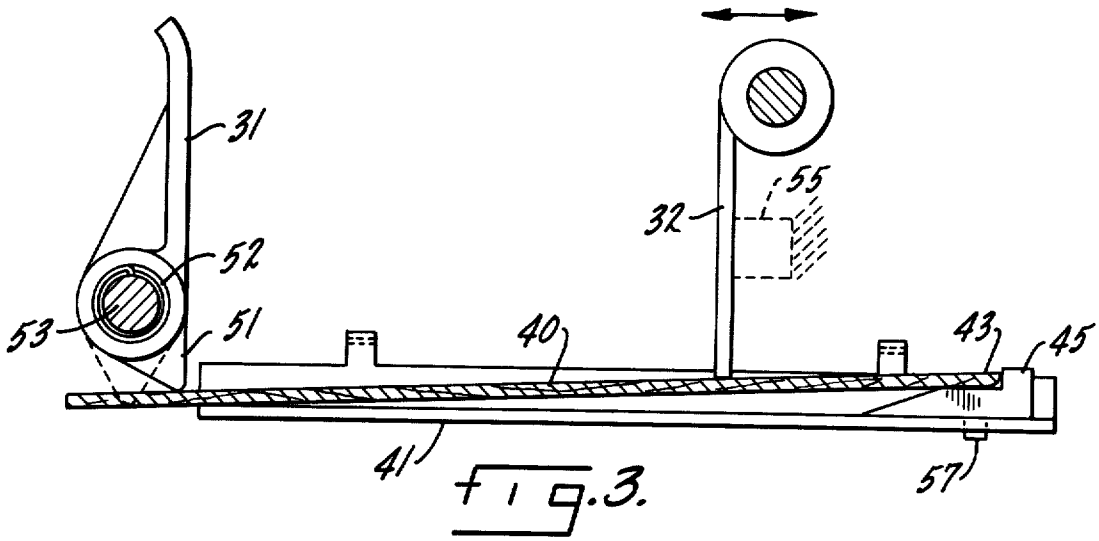
3 Claims, 5 Drawing Figures



SHEET 1 OF 2

Fig. 1.





SHEET DELIVERY ARRANGEMENT FOR PRINTING PRESSES

In the starting of a new pile of sheets upon an auxiliary pile board, which is interposingly inserted into the path of sheets dropped from a conveyor, it is important for the front and rear edge guides to be in close proximity to the auxiliary pile board. In the prior art this has been accomplished by securing the guides to linkage so that they are retracted when the auxiliary pile board is inserted, and with the linkage serving subsequently to lower the guides down into engagement with the board. Imparting the raising and lowering movement to the guides requires a relatively complicated and expensive mechanism.

It is an object of the present invention to provide means for bringing an auxiliary pile board into close proximity with the rear edge stops by camming the rear edge of the board upwardly on ramps or wedges incident to the final portion of the insertion movement. It is a more general object to accomplish simply and reliably, by stationary ramps or wedges, what has been achieved heretofore only with complex mechanism.

Other objects and advantages of the invention will become apparent by reading the attached detailed description and upon reference to the drawings in which:

FIG. 1 is a diagrammatic side view of a sheet delivery mechanism for a sheet-fed printing press;

FIG. 2 is a plan view taken along line 2—2 in FIG. 1 showing the auxiliary pile board with its sheet guides and guide rails as viewed from the top;

FIG. 3 is a vertical section taken along the line 3—3 in FIG. 2;

FIG. 4 is an enlarged fragmentary view of the right-hand portion of FIG. 3.

FIG. 5 is a diagram looking along section line 4—4 in FIG. 2.

While the invention has been described in connection with a preferred embodiment, it will be understood that I do not intend to be limited to the particular embodiment shown but intend, on the contrary, to cover the various alternative and equivalent constructions included in the spirit and scope of the appended claims.

Turning now to the drawings there is disclosed in FIG. 1 a delivery mechanism 10 for receiving sheets from a sheet-fed printing press and for stacking the sheets in a pile for removal. The delivery mechanism includes a conveyor in the form of a pair of chains 11 trained about pulleys 12, 13 and carrying gripper mechanisms spaced therealong, two of such mechanisms being indicated at 14 carrying sheets 15. A sheet is freed from its gripper at the point of release 16 by action of a suitable gripper release mechanism 17 which is per se well known in the art.

The sheets released from the grippers are deposited upon a platform 20 to form a pile 21. As is well known in the art, the platform 20 is supported by chains or the like, diagrammatically indicated at 22, enabling the platform to be raised to an initial elevated position and to be subsequently lowered slowly as the sheets accumulate. For the purpose of controlling the position of the sheets as they descend, a guiding assembly 30 is provided, which includes front edge guides 31 and rear edge guides 32 which have vertical inwardly facing guide surfaces.

In carrying out the present invention, a pair of horizontal guide rails are provided, spaced outwardly from,

and a short distance below, the sheet guides for supporting an auxiliary pile board which is manually inserted into the descending stream of sheets to temporarily intercept and accumulate the sheets, thereby permitting removal of a filled delivery platform and substitution of an empty delivery platform. Referring to FIG. 2 the auxiliary pile board, indicated at 40, is supported on rails 41, 42, the rails being of "angle" cross section and supported outboard of the edge guides in a plane lying slightly below the edge guides. It is primary feature of the invention that the rear edge guides 32, instead of being vertically movable with respect to the board, are relatively stationary, and means are provided for camming the rear edge of the board, indicated at 43, so that the board is raised into close proximity to the rear edge guides automatically as insertion is completed. In the present instance, this camming is accomplished by a pair of ramp or wedge members 45, 46, which are shown in profile in FIGS. 3 and 4 and which are secured to the rear ends of the respective rails 41, 42.

Thus when it is desired to intercept the flow of sheets without turning off the conveyor, the auxiliary pile board 40 is shoved endwise (from left to right as viewed in the drawings) along the surfaces of the guide rails 41, 42 and in a position below the edge guides. During the last few inches of insertion movement the rear edge of the auxiliary pile board encounters the wedges 45, 46 which cam the edge of the board upwardly into the position shown in FIG. 3 in which the board is in close engagement to the lower edges of the rear edge guides. The close proximity between the board and edge guides insures that the sheets which are subsequently deposited on the board are accurately positioned and cannot "slip under" the guides 32.

In carrying out the invention, the front edge guides are preferably supplemented by spring pressed front guides 51 having torsion springs 52 and which are supported upon a transversely extending shaft 53. The guides 51 are biased in a clockwise direction as viewed in FIG. 3. Consequently, when board 40 is manually inserted the guides 51 yield slightly, with the lower edges thereof being pressed into contact with the board, so that the sheets falling upon the board are positively positioned at the front as well as at the rear, insuring establishment of an accurate temporary pile. Since the path of the board is below the guides, the insertion, which is unimpeded, may be done very quickly, between the falling sheets.

Subsequently, after the platform 20 has been unloaded, and after it has been raised to an elevated position directly under the auxiliary pile board 40, the auxiliary pile board may be quickly withdrawn endwise, with a motion opposite to the inserting movement, so that the sheets which have been collected on the auxiliary board in the interim fall downwardly upon the platform to serve as the beginning of a new pile, thereby completing the unloading cycle.

Alternatively the guide rails 41, 42 may be hinged at 41a, 42a as is shown in FIG. 5 for outward swinging movement to permit the auxiliary pile board 40, and the sheets collected thereon, to drop straight down into contact with the platform to begin the formation of the new pile. To insure that the board 40, under such circumstances, drops promptly and evenly, the guide rails 41, 42 are both coupled to a suitable manual operator 43a for synchronized swinging movement.

In the above discussion it has been assumed that the ramp or wedge members **45**, **46** on the rails **41**, **42** are made of "solid" material such as metal, plastic, or even wood, and that the board **40** has sufficient inherent resilience so as to "give" slightly in the event that the board bottoms against the lower ends of the rear edge guides **32** before it reaches the top of the ramp. In a typical insertion sequence the board starts at the level shown dot-dash in FIG. 4 and is cammed upwardly along the surface **45a** until the board reaches the "plateau" surface **45b**. The height of the plateau, relative to the thickness of the board, and relative to the lower ends of the rear edge guides, is such that the board comes into close proximity to, or touches, the lower ends of the guides as the plateau is reached, following which the rear end of the board slides along the plateau until it strikes the stop surface **45c** which is integral with the wedge. To prevent the rear edge stops **32** from being crowded rearwardly by the board, the guides may be held in position by any suitable type of limit stop, for example, that shown at **55** in FIG. 3.

In order to make the height of the plateau surface **45b** less critical it is contemplated that the ramps or wedges may embody resilience, for example, by making them of resilient material (with suitably hard wear surfaces) or by incorporating a springy element. Such spring element, if used, may be in the form of a recessed coil spring such as shown at **56**, rubber plug, or the like. Regardless of whether the wedge is solid or includes a resilient factor it may be simply secured with respect to the supporting rail by means of a dowel such as that indicated at **57** having a free fit with respect to a registering opening **58** in the rail. If it is desired for any reason to vary the depth of insertion of the board, a plurality of holes **58** may be provided at spaced intervals along the rear portion of each rail.

What is claimed is:

1. A sheet delivery arrangement for sheet-fed printing presses comprising, in combination, a frame, a delivery platform mounted in the frame, a conveyor for conveying sheets seriatim from the printing press and for depositing them one by one upon the delivery platform to form a pile, horizontally spaced front edge and rear edge sheet guides mounted in the frame below the conveyor for arresting forward movement and for positioning the sheets as the sheets fall from the conveyor onto the platform to form a uniform pile on the platform, means for lowering the platform as the pile builds up, a pair of horizontal guide rails on the frame, said guide rails being spaced outwardly from and a short distance below the sheet guides and serving to support an auxiliary pile board which is inserted into the descending stream of sheets passing through the sheet guides for temporarily intercepting and accumulating such sheets thereby permitting removal of a filled delivery platform and substitution of an empty delivery platform, the guide rails including means for camming the auxiliary pile board upwardly into close proximity to the rear edge sheet guides incident to the final portion of its insertion movement so that sheets are deposited in accurate position upon the auxiliary pile board.

2. The combination as claimed in claim 1 in which the camming means is in the form of a pair of wedges at the rear ends of the respective guide rails for engaging the leading edge of an auxiliary pile board as it completes its insertion movement for camming such leading edge upwardly so that the auxiliary pile board is brought into close proximity to the rear sheet guides.

3. The combination as claimed in claim 1 in which the front edge sheet guides have means for biasing the same downwardly into contact with the auxiliary pile board.

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