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(54) Apparatus for printing corrugated board

(57) Apparatus for printing particularly corrugated board comprising a number of print stations through which the board is arranged to pass successively to receive print images from one or more of the print stations, at least one of the print stations comprising a print cylinder (10) mounted in a laterally displaceable frame (20) which can be moved laterally (in a direction parallel to the cylinder axis) away from the board line, leaving in place substantially all the remaining parts of the print station, to allow changing of the printing plate or plates on the print cylinder while the printing apparatus can continue to operate with one or more of the other print stations. Each print station is preferably a top printer and includes rollers (18) or other conveying means for conveying the board through the station, whether or not the station is being used for applying print to the board.

FIG. 2

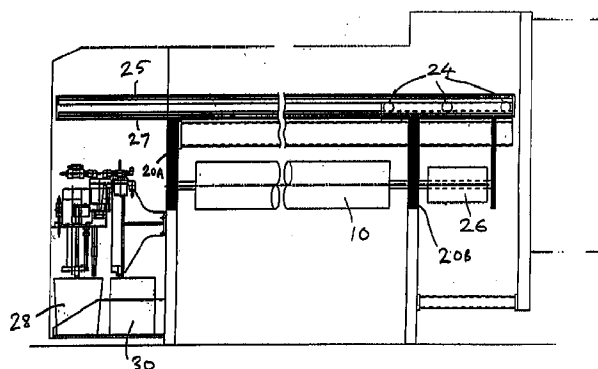
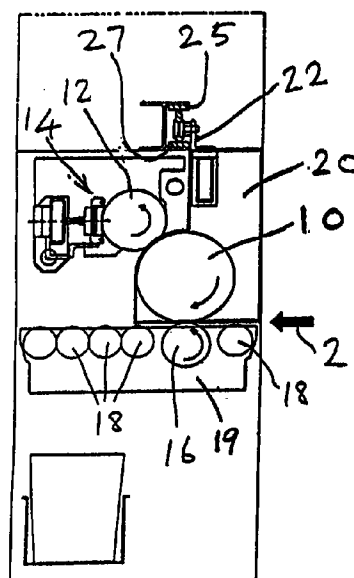


FIG. 1



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Description

[0001] This invention is concerned with apparatus for printing board or cut sections of board and particularly corrugated board, comprising a number of print stations through which the board is arranged to pass successively to receive print images from one or more of the print stations.

[0002] In such apparatus, each print station commonly includes a print cylinder fitted with one or more printing plates for receiving ink from, for example, an anilox roll, and for transferring appropriate print images to the board or board sections. The printing plate or plates on each print cylinder need to be replaceable to enable different printing requirements to be satisfied. The present invention is concerned with an arrangement for enabling the printing plates to be changed on one print cylinder without requiring the entire printing apparatus to be stopped.

[0003] According to the present invention, at least one of the print stations comprises a print cylinder mounted in a laterally displaceable frame which can be moved laterally (in a direction parallel to the cylinder axis) away from the board line, leaving in place substantially all the remaining parts of the print station, to allow changing of the printing plate or plates on the print cylinder while the printing apparatus can continue to operate with one or more of the other print stations.

[0004] Each print station is preferably a top printer: that is to say, it applies print to the upper surface of the board or board sections. In a preferred arrangement for flexographic printing, the print cylinder receives ink on its printing plate or plates from an anilox roll which remains in position (except for being moved slightly away from the print cylinder) when the print cylinder is displaced laterally to allow the printing plate or plates to be changed.

[0005] Each print station preferably includes conveyors, for example rollers, for conveying the board through the station, and those conveyors remain in place when the print cylinder is displaced laterally. Thus the conveyors remain available to convey board through the print station so as to allow the printing apparatus to continue operating while any given print station is being altered in preparation for applying the print needed for a subsequent order.

[0006] This invention contrasts with, and is an improvement over, prior proposals, for example one providing for the entire printer or the top portion thereof to be lifted vertically to allow the operator (who must then work on an overhead gantry) to change the printing plates. Another prior proposal involved displacing laterally the entire print station; this involves a number of problems, not least of which is the fact that the printing apparatus cannot then readily be kept in operation while one of the print stations is out of position. The provision, in accordance with the present invention, for displacing essentially only the print cylinder and leaving the

remainder of the printing station in position is a significant improvement over such prior proposals.

[0007] An example of a print station according to this invention is shown in the accompanying drawings.

Figure 1 is a view of the print station in the direction of the axis of the print cylinder;

Figure 2 is a view of the print station in the direction of board travel indicated by the arrow 2 in Figure 1, omitting some of the parts of the print station; and Figure 3 is a view similar to Figure 2, but showing the print cylinder in the laterally displaced position.

[0008] As shown in Figure 1, the print station comprises a print cylinder 10 carrying printing plates (not shown) for applying print images to corrugated board sections conveyed in the direction of the arrow 2. Ink is applied to the printing plates by means of an anilox roll 12 which is uniformly coated with ink by means of a chambered doctor blade assembly 14. Below the print cylinder 10 there is an impression roll 16 which holds the moving board sections against the printing plates on the cylinder 10. Also included in the print station are a number of rolls 18 for conveying board sections in the form of box blanks through the print station. The conveying rolls 18 are mainly located in a suction chamber 19 whereby suction in the chamber 19 draws the board section downwards into driving engagement with the rolls 18.

[0009] A different conveyor arrangement may be used. For example, it may involve rolls above the board line and a vacuum chamber above the board line for drawing the board sections upwards into engagement with the conveying rolls.

[0010] The print cylinder 10 is mounted in a frame 20 which includes an operator-side sub-frame 20A and a drive-side sub-frame 20B. A bracket 22 secured to the top of the frame 20 carries a number of wheels 24 which can run between upper and lower rails or guides 25,27 to enable the frame 20 to be displaced laterally to carry the print cylinder 10 clear of the board line: that is to say, to the position shown in Figure 3. The wheels may have V-shaped peripheral cross-sections and in that case the tracks would have corresponding V-sectioned grooves for locating the wheels.

[0011] When the print cylinder 10 is in position above the board line, the frame 10 may be secured by a clamping arrangement (not shown) which is released when the print cylinder is required to be displaced laterally to allow for printing plate changing. Before the print cylinder is displaced laterally it may be lifted slightly clear of the impression cylinder 18, for example by means incorporated in the frame 20.

[0012] As shown in Figure 2, the print cylinder 10 has an associated drive motor 26 which is an independent drive such as a servo motor. The motor 26 preferably remains connected to the print cylinder when the cylinder is displaced laterally, as shown in Figure 3.

[0013] The conveyor rolls 18 may also have an independent drive; that is to say, independent of the drive to the anilox roll 12 and of the drive to the print cylinder. The drive for the rolls 18 of each print station may be controlled to ensure proper registration of the print images applied to the board sections at successive print stations.

[0014] Figure 2 also shows an ink pail 28 from which, during printing, ink is pumped into the ink chamber of the assembly 14. Adjacent to the pail 28 there is a container 30 for washing liquid. A washing operation may be carried out on the anilox roll by pumping washing liquid into the chamber of the assembly 14 while the print cylinder is in the laterally displaced position for printing changing purposes. Separate washing provisions may be provided for the printing plates on the cylinder 10.

[0015] For the sake of lightness, the print cylinder 10 may comprise mainly a composite non-metallic material.

cylinder laterally.

6. Apparatus according to any one of claims 1 to 5, in which the print cylinder has an independent drive motor (26).

Claims

1. Apparatus for printing board or cut sections of board, comprising a number of print stations through which the board is arranged to pass successively to receive print images from one or more of the print stations, at least one print station comprising a print cylinder (10) mounted in a laterally displaceable frame (20) which can be moved laterally away from the board line, leaving in place substantially all the remaining parts of the print station, to allow changing of the printing plate or plates on the print cylinder while the printing apparatus can continue to operate with one or more of the other print stations.
2. Apparatus according to claim 1, in which each print station is a top printer for applying print images to the upper surface of the board or board sections.
3. Apparatus according to claim 1 or claim 2, in which the print station is a flexographic printer, the print cylinder (10) being arranged to receive ink on its printing plate or plates from an anilox roll (12) which remains in substantially a fixed position while the print cylinder is displaced laterally to allow the printing plate or plates to be changed.
4. Apparatus according to any one of claims 1 to 3, in which the print station includes roller or other conveying means (18) for conveying the board or board sections through the station and which remain in place when the print cylinder is displaced laterally.
5. Apparatus according to any one of claims 1 to 4, in which the print cylinder (10) is mounted in a frame (20) carrying wheels (24) arranged to run along guides (25,27) for moving the frame and the print

FIG. 1

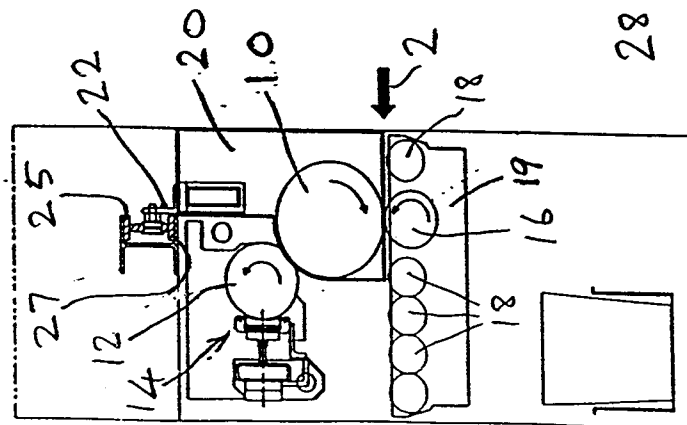


FIG. 2

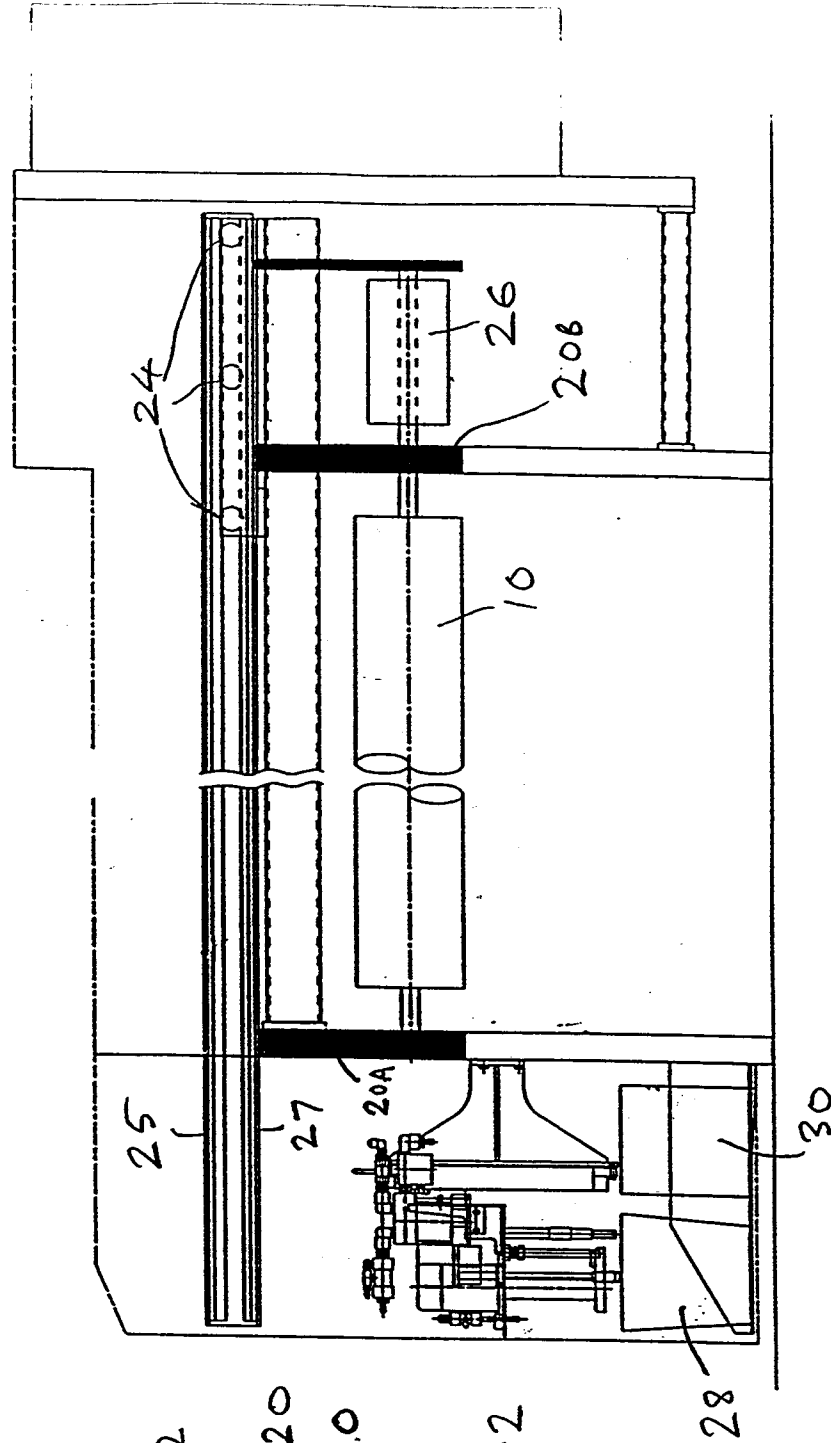
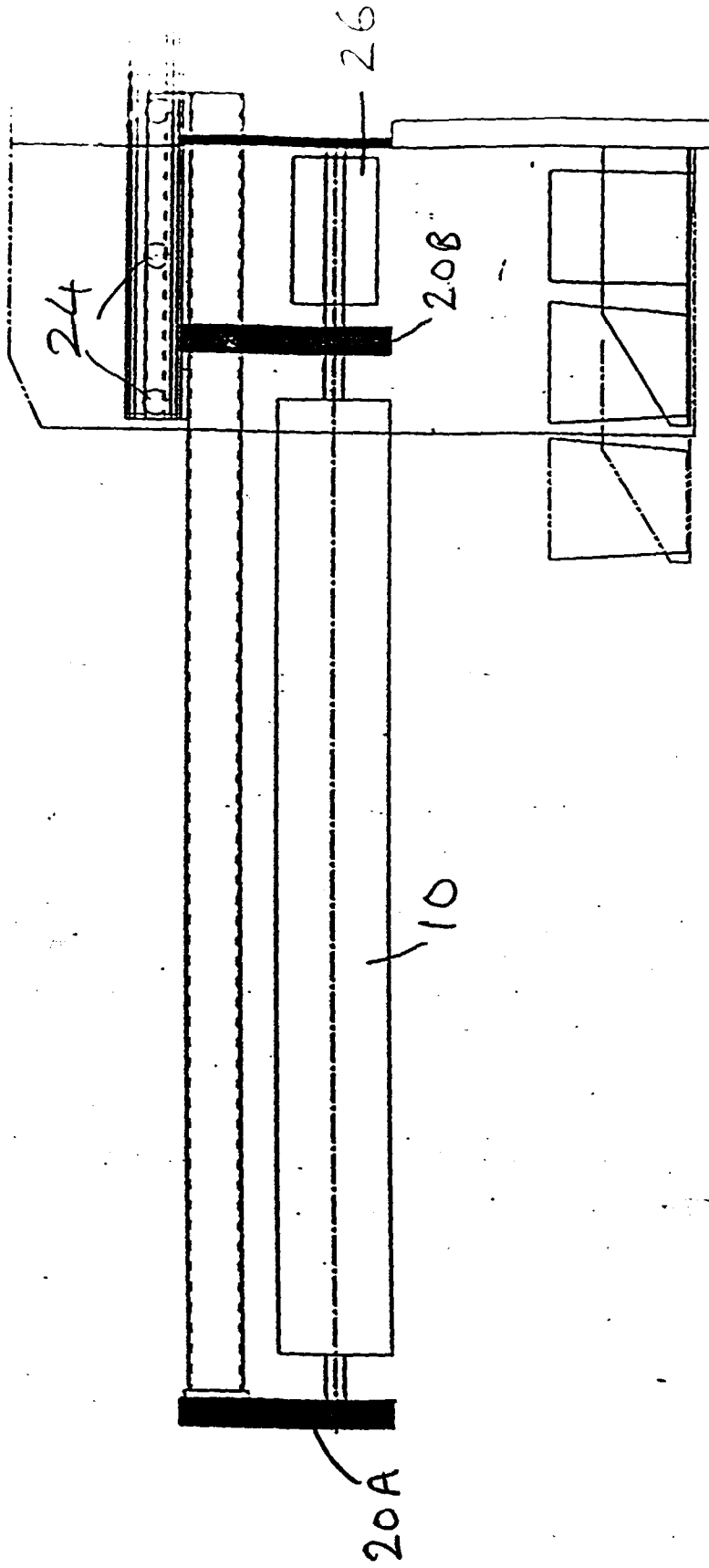


Fig. 3





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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 5024

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US 5 385 091 A (CUIR JEAN-PIERRE ET AL) * the whole document *	1-6	B41F13/00
Y	EP 0 667 235 A (TETRA LAVAL HOLDINGS & FINANCE) * the whole document *	1-6	
A	US 5 490 461 A (BEAUDOIN LEON W) * figure 2 *	1-6	
A	DE 44 04 758 A (ROLAND MAN DRUCKMASCH) * the whole document *	1-6	
A	EP 0 737 569 A (BIELLONI CASTELLO S P A) * the whole document *	1-6	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B41F
Place of search		Date of completion of the search	Examiner
THE HAGUE		4 December 1997	Madsen, P
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