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(54) A flexographic print unit.

(57) A flexographic print unit (11) which may be combined in a machine line with a number of other such print units connected together such that sheets may pass successively along the line, the unit including opposed inlet and outlet slots (14), a printing cylinder (15), an impression cylinder (16), an ink transfer roller (17) and an ink reservoir (18). The unit is contained within a housing 23 into which a continuous stream of filtered and pressurised air is introduced thus to establish and maintain therein a pressure at a level greater than atmospheric pressure, and includes an escape vent (24). The excess pressure within the housing ensures that no dust or fibre may enter the print unit to contaminate the ink or to foul the various roll surfaces.

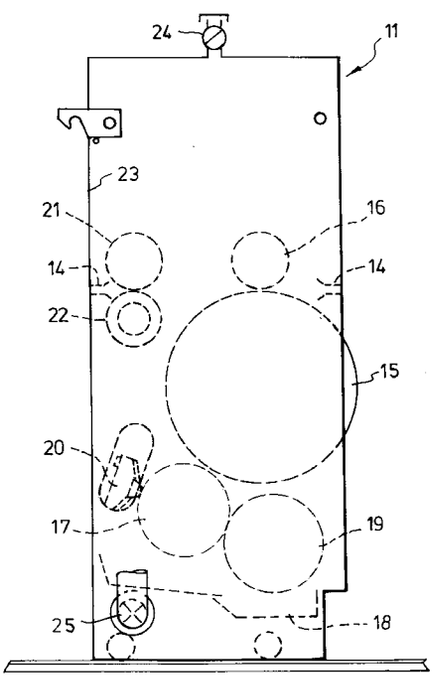

FIG.2

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THIS INVENTION concerns flexographic print units which may be operated individually or in combination with other print units in plant known as flexo-folder-gluers or rotary die cutting lines, where the or each print unit is adapted to apply a printed image to a moving flat sheet or a succession of sheets passing through the unit.

In such a unit a rotary printing cylinder carries an engraved or moulded printing plate, and ink is picked up from a reservoir by a transfer roller and transferred to the printing cylinder so that in turn the image is transferred to the flat sheet as it passes tangentially across the surface of the printing cylinder during rotation thereof.

In order to maintain perfect definition in the printed image it is essential to avoid the ingress into the unit of any dust or fibres which could become embedded in the engraved or moulded surface, and the present invention is intended to provide means to meet this objective.

According to the present invention, there is provided, a flexographic print unit for applying a printed image to a moving flat sheet, comprising a housing having inlet and outlet apertures for the passage there through of said sheet, and containing a print cylinder, an impression cylinder, an ink transfer roller and an ink reservoir; characterised by means to cause a stream of air to flow outwardly from said housing thus to ensure that the ingress of dust and fibre into the print unit is at least substantially avoided.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying schematic drawings in which:-

Fig. 1 shows the typical lay-out of a known flexo-printer and rotary die cutting line wherein individual sheets are fed successively through a number of flexographic print units each applying a different image or colour, and through units including a die cutter and waste stripper;

and Fig. 2 is an enlarged side view illustrating one of such flexographic print units incorporating the invention.

Referring now to the drawings, in the example illustrated in Fig. 1 a machine line comprises a sheet feeder unit 10 adapted to feed paperboard sheets successively and in register to a number, in this case 4, of individual flexographic print units 11. These are followed by a rotary die cutting unit 12 and a unit 13 for stripping waste material from the cut sheets. In the operation of a line of machinery of this kind the successive sheets may pass on to a further unit for folding and gluing the sheets to produce formed but collapsed boxes.

The multiple images, perhaps in various colours, which are printed onto the sheets during their passage through the line of print units may contain close definition, and to ensure that this is maintained it is essential that no dust or fibre is permitted to enter the print units either to contaminate the ink or to become embedded in the engraved or moulded image on the surface of the print cylinder.

Conventionally, each print unit is mounted on rails so that the entire line of machinery may be separated into individual parts for maintenance, and is contained within a housing consisting essentially of side walls which latch together when the plant is assembled.

In accordance with the invention, each print unit is entirely enclosed within an individual housing, save for opposed inlet and outlet slots for the passage through the unit of the sheets to be printed. Such slots are illustrated at 14 in Fig. 2.

As can be seen, each print unit 11 includes a driven rotary printing cylinder 15, an impression cylinder 16 forming a nip with the printing roller 15, through which the sheets may pass, an ink transfer roller 17, an ink reservoir 18, a rubber covered wipe roller 19 and a doctor blade assembly 20. Pull rolls 21 and 22 provide a further nip for driving the sheets through the machine.

The entire unit is contained within a housing 23. The interior of the housing is supplied via an inlet 25 with a continuous stream of filtered and pressurised air which is permitted to vent from the housing in a controlled manner via an adjustable outlet 24 thus to ensure that the pressure within the housing 23 is maintained at a level above atmospheric pressure. This condition ensures that no dust or fibre may enter the print unit to contaminate the ink or to foul the various roll surfaces.

The pressurised air is supplied, preferably at low pressure in the order of perhaps less than 5mm water gauge to each operating unit within the machine. The volume and velocity of air supplied should not be so great as to cause premature drying of the ink but may indeed enhance controlled drying.

The air may be supplied to a line of machines such as those described in relation to Fig. 1, either individually, at the same or at different levels of pressure and/or volume, or alternatively from a common supply manifold valve-connected to each unit.

In an alternative embodiment, the invention may be carried out by providing means on each unit in the regions of the slots 14, to direct a stream of filtered air outwardly through the slots, there being sufficient room left between units in the line to permit escape of said air streams.

Claims

1. A flexographic print unit for applying a printed image to a moving flat sheet, comprising a housing (23) having inlet and outlet apertures (14) for the passage therethrough of said sheet and containing a print cylinder (15) an ink transfer roller (17) and an ink reservoir (18); characterised by

means (25) to cause a stream of air to flow outwardly from said housing thus to ensure that the ingress of dust and fibre into the print unit is at least substantially avoided.

2. A flexographic print unit according to Claim 1, further characterised by means (25) to supply air to the interior of said housing and to maintain a pressure therein at a level greater than atmospheric pressure.

3. A flexographic print unit according to Claim 1, wherein said apertures are comprised by a pair of opposed slots in said housing.

4. A flexographic print unit according to Claim 2, wherein said air supply means is adapted to provide within the housing a pressure which exceeds atmospheric pressure by less than 5mm water gauge.

5. A flexographic print unit according to any preceding claim, including means permitting air to vent from the housing in a controlled manner.

6. A flexographic print unit according to any preceding claim, in combination with at least one other such print unit in a line of machines mounted on rails so that the entire line of machinery may be separated into individual parts for maintenance, the housing of each print unit including means for latching together consecutive pairs of such units on said rails when the plant is assembled.

7. A flexographic print unit according to Claim 6, in combination with several other such units and with a rotary die cutting unit and a further unit for stripping waste material from the cut sheets, said units all being mounted on said rails and attachable together.

8. A flexographic print unit according to Claim 2, in combination with other units connected in a line such that sheets may pass successively along the line, said air supply means being provided in the form of a common supply manifold selectively connectable by valved connectors to each unit in the line.

9. A flexographic print unit according to any one of claims 1 to 7, in combination with other units connected in a line such that sheets may pass successively along the line, each unit having a separate air supply means valve-connected thereto.

10. A flexographic print unit according to Claim 1, including means in the regions of said inlet and outlet apertures to direct a stream of filtered air upwardly through the apertures.

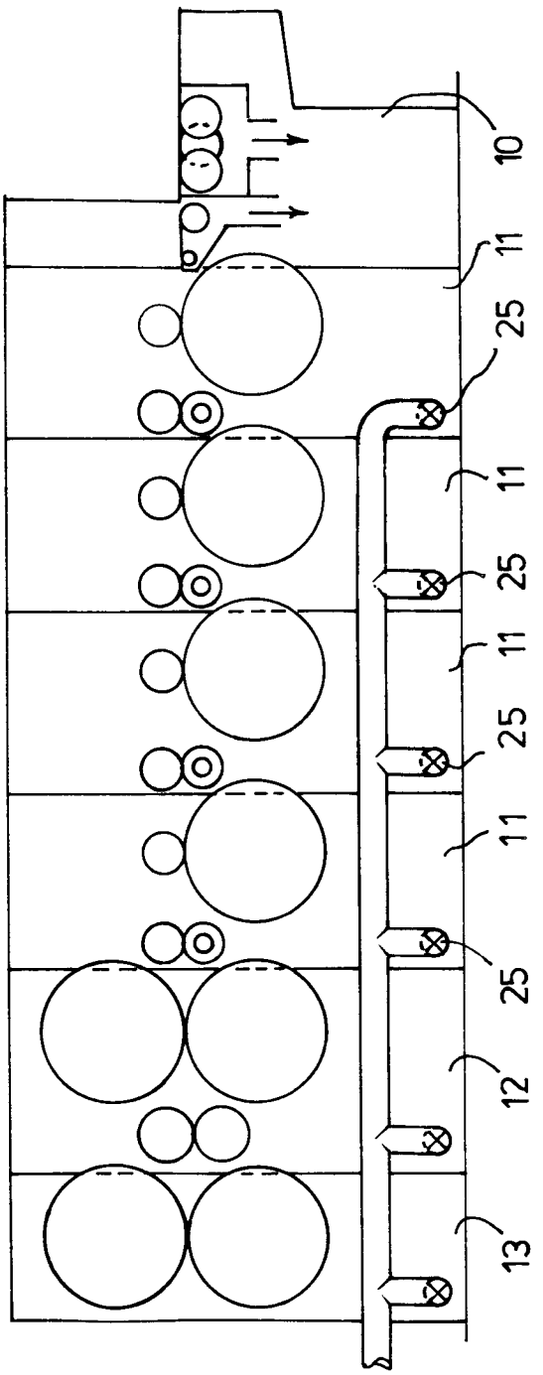

FIG.1

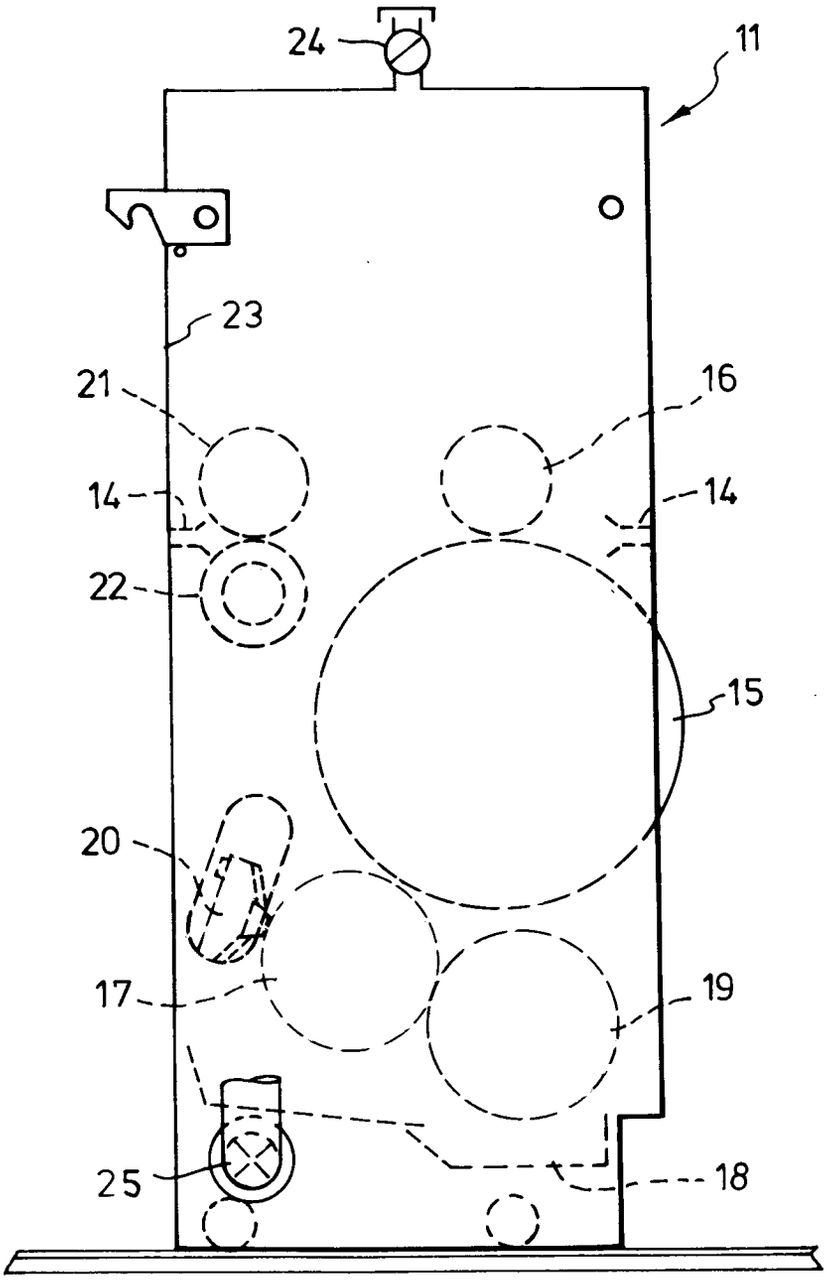

FIG.2

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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 9617

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.5)
A	US-A-3 436 265 (T. A. GARDNER) * the whole document *	1,2	B41F13/42 B41F13/00
A	EP-A-0 084 740 (HERVE ET FILS SA) * the whole document *	1,2	
A	NL-A-8 302 812 (ANDERSON & VREELAND BV) * the whole document *	1,2	
A	DE-A-2 949 659 (AGFA GEVAERT AG) * the whole document *	1,2	
A	GB-A-545 336 (GOSS PRINTING PRESS CO LTD) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B41F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 JANUARY 1992	DELZOR F.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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