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(54) Support structure for a sheet feeder

(57) Support structure for a sheet feeder (4), which feeds items to a conveyor (5) situated nearby, includes a framework supporting a substantially horizontal plate,

rotating on a vertical axis. At least one slide, supporting the sheet feeder (4), is guided by means to slide on the plate. The plate and the slide allow to position the sheet feeder (4) beside or above the conveyor (5).

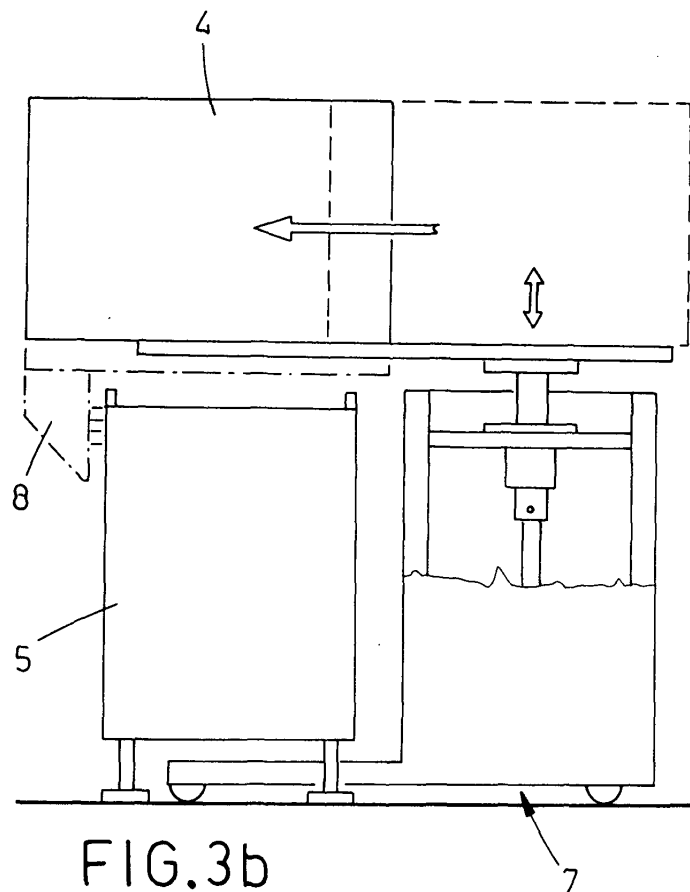


FIG. 3b

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Description

[0001] The present invention relates to automatic packaging of sheet items, with a particular reference to packaging with cellophane or paper and to envelope filling machines.

[0002] In particular, the present invention relates to the support structures for sheet feeders.

[0003] The devices for the automatic packaging of sheet items currently used include conveying means, above which one or more sheet feeders can be situated, and which finish with a station for wrapping, with cellophane or paper, the piles of items formed upstream, or for receiving the piles in an envelope.

[0004] The conveyors, operated continuously at high speeds, include a stationary support base, which has usually one or more longitudinal grooves with corresponding chains situated therein and having a plurality of pushing pins, known as "lugs", which move the corresponding piles of items.

[0005] For this purpose, pairs of following lugs define housing seats for the above piles of items.

[0006] The conveyors have also a pair of lateral abutments, connected to the stationary support base and usually adjustable, for guiding longitudinally each pile of items in a prefixed feeding direction.

[0007] In relation to the production specifics, the number of sheet feeders can be varied, in relation to the quantity of items forming the pile; for this purpose, the considerable longitudinal extension, typically characterizing the conveyors, is justified.

[0008] A pile of items can include for example, a main brochure and one or more enclosures, which are released by the relative sheet feeders onto the brochure moved by the lugs, in step relation with the conveyor operation.

[0009] In relation to the type and the number of enclosures to be added to the main brochure (book, magazine, periodical, etc.) and in relation to the trade specifics, it can be necessary to release the enclosures with the bound side oriented longitudinally or transversely with respect to the brochure feeding direction.

[0010] Therefore, this requires the possibility of placing each sheet feeder beside or astride of the conveyors, e.g. for releasing the enclosures with the bound side oriented respectively longitudinally and transversely with respect to the conveyor.

[0011] For example, there can be a plurality of sheet feeders, situated according to a prefixed sequence, beside and/or astride of the conveyor.

[0012] It can be necessary to change the configuration of one or more sheet feeders with respect to the conveyor, when the productive specifics change.

[0013] Generally, it can be necessary for an enclosure, a booklet, a leaflet or any other sheet item to be added to a main brochure, to be oriented longitudinally or transversely with respect to the latter, therefore, the sheet feeder must be arranged laterally or astride of the

conveyor, in relation to the needs.

[0014] Known sheet feeders are carried by support structures connected rigidly to the edges of the conveyors, laterally or astride of the latter.

[0015] The main disadvantage of the support structures lies in the fact that they do not allow any change of the orientation, with which the sheet feeder releases an enclosure with respect to the main brochure moved by the conveyor.

[0016] In some cases, the orientation of the enclosure with respect to the main brochure can be changed by changing the orientation of the main brochure on the conveyor, adjusting the lateral abutments, if such adjustment is possible.

[0017] This is possible only within the maximum excursion allowed by the lateral abutments and only if the operation of other, possible sheet feeders, connected to the conveyor, is not altered.

[0018] The above operations are particularly difficult and very often the size of the main brochures does not allow to change their orientation on the conveyor.

[0019] With reference to Figure 1, known sheet feeders 90 are articulated to a support frame, situated below and not shown, connected rigidly to the edges of a conveyor 92, in the region corresponding to a peripheral vertical axis 95.

[0020] Consequently, the sheet feeders 90 can be arranged laterally (position L) or astride of (position C) the conveyor 92 by a simple rotation with respect to the peripheral axis 95, by 90°.

[0021] Another disadvantage of the above mentioned support framework derives from the fact that it requires considerable operation space for the transition of the sheet feeder 90 from the lateral position L to the astride position C, and vice-versa, with respect to the conveyor 92.

[0022] This kind of structure requires, considering the same number of sheet feeders, a conveyor 92 which is longitudinally bigger, and consequently more expensive and cumbersome.

[0023] Moreover, the support framework is usually fastened to the edges of conveyor 92, which results in extremely difficult removal and replacing of the framework, e.g. during the installation, maintenance etc.

[0024] The object of the present invention is to propose a support structure for a sheet feeder, feeding items to a conveyor situated nearby, which allows to position the sheet feeder beside or above the conveyor, thus limiting the operation space and the time necessary for such transitions.

[0025] Another object of the present invention is to propose a support structure for a sheet feeder, which is particularly functional and extremely reliable, and which allows to feed items to the conveyor with the desired orientation.

[0026] A further object of the present invention is to propose a support structure for sheet feeders, whose construction is essential, which is relatively cheap and

which allows simple and rapid installation and maintenance operations.

[0027] The above mentioned objects are obtained in accordance with the contents of the claims.

[0028] The characteristic features of the invention will be pointed out in the following description of some preferred but not exclusive embodiments, with reference to the enclosed figures, in which:

- Figure 1 is a schematic, top view of a sheet feeder supported by a relative structure, according to prior art, and of the conveyor connected thereto, in two operation configurations referred to;
- Figure 2 is a schematic, top view of a sheet feeder supported by a relative structure, proposed by the present invention, and of the conveyor connected thereto, in two particularly significant operation configurations;
- Figure 3a is a schematic, lateral view of a conveyor, a sheet feeder and the relative support structure, proposed by the present invention;
- Figure 3b is a schematic, lateral view of a conveyor, a sheet feeder and the relative support structure, proposed by the present invention, in two particularly significant operation configurations.

[0029] Having regards the enclosed figures, the reference numeral 1 indicates the framework of a support structure for a sheet feeder, proposed by the present invention.

[0030] The substantial constituent elements of the framework 1 include support and moving means 7, for example wheels, and an actuator 6 for the vertical operation of a substantially horizontal plate 2.

[0031] The stem 6a of the actuator 6 allows, in known way, to support the plate 2 with possibility to rotate on an axis coincident with the axis of the stem.

[0032] The plate 2 forms guiding means 2a for horizontal guiding of a slide 3, to define e.g. a dovetail coupling.

[0033] The slide 3 carries a relative sheet feeder 4.

[0034] It is to be specified that the rotation axis of the plate 2 is situated in the central part thereof.

[0035] According to another embodiment, the plate 2 has a parallelepiped shape and it forms, on two opposite lateral faces, suitable guides for the slides supporting the sheet feeder.

[0036] As it has been shown in Figure 2, the sheet feeder 4 cooperates with a conveyor 5, connected thereto.

[0037] The sheet feeder 4 can be situated beside or above the conveyor 5, as it will be pointed out later on.

[0038] With reference to the configuration, in which the sheet feeder 4 passes above the conveyor 5, stabilizing means 8 are provided for supporting the sheet

feeder 4, which stabilizing means engage removably with the bearing framework of the conveyor 5.

[0039] Now the operation of the support structure for a sheet feeder proposed by the present invention, will be described.

[0040] With reference to Figure 3a, according to the working configuration taken into consideration, the sheet feeder 4 is situated beside the conveyor 5, with which it cooperates.

[0041] In this way, the sheet items, released onto the corresponding conveyor 5 have a longitudinal orientation with respect to the operation direction of the latter.

[0042] This means that a prefixed axis of the items is parallel to the above mentioned operation axis.

[0043] If the production needs require a transversal orientation of the sheet items axis with respect to the operation direction, the sheet feeder 4 is situated above the conveyor 5.

[0044] For this purpose, a regular sequence of the following operations, schemed in Figure 3b, is performed:

- operation of the actuator 6 to raise the plate 2, and consequently the sheet feeder 4;
- rotation of the plate 2 by 90° with respect to the relative axis;
- horizontal sliding of the slide 3 with respect to the guiding means 2a;
- fastening of the stabilizing means 8 to the conveyor 5 to support the sheet feeder 4.

[0045] It is understood that the above sequence is performed by an operator to a degree necessary to arrange the sheet item on the conveyor 5 in a desired way, for example centered with respect to the vertical middle plane of the conveyor 5.

[0046] An advantage of the present invention results from having defined a support structure for a sheet feeder, which allows to move the latter beside or above a corresponding conveying member, by simple and rapid configuration operations, reducing the operation space necessary to perform a possible transition.

[0047] In this way, the orientation, longitudinal or transversal, of a prefixed axis of the sheet items placed on the conveyor by the relative sheet feeder, can be changed with few simple operations and without any tool.

[0048] It is also to be noted that the support structure proposed by the present invention and the relative sheet feeder can be advantageously connected to any packaging or envelope filling machine, without any change.

[0049] Moreover, the construction of the support structure is elementary, and the support structure is functional and cheap.

[0050] Further, the use and installation simplicity reduces considerably the time needed by an operator to

put the device into operation.

Claims

1. Support structure for a sheet feeder feeding items to a conveyor (5) situated nearby, **characterized in that** it includes a framework (1), which supports a substantially horizontal plate (2), rotating on a vertical axis, on which at least one slide (3), guided by means (2a), slides; said slide (3) supporting the sheet feeder (4), with said plate (2) and slide (3) being provided for positioning said sheet feeder (4) beside or above the conveyor (5).

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2. Structure, as claimed in claim 1, **characterized in that** said vertical axis passes through the central area of the plate (2) to reduce the lateral width of the plate (2) during the rotation.

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3. Structure, as claimed in claim 1, **characterized in that** it includes actuator means (6), connected to said framework (1) and carrying the rotating plate (2) and moving the latter vertically in both directions.

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4. Structure, as claimed in claim 1, **characterized in that** it includes means (7) situated below said framework (1) and supporting and moving said framework close to and far from said conveyor (5).

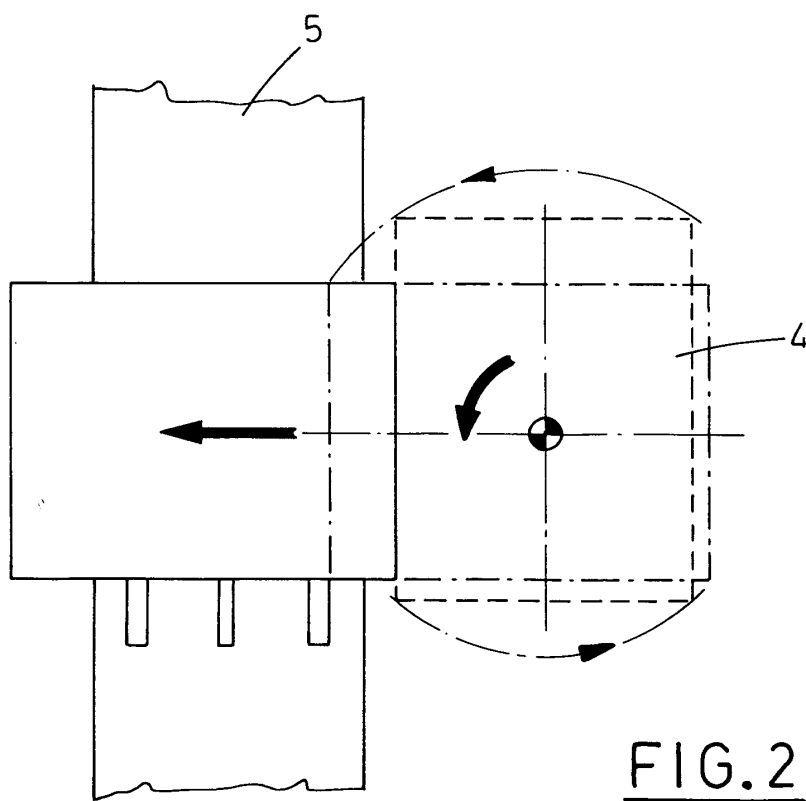
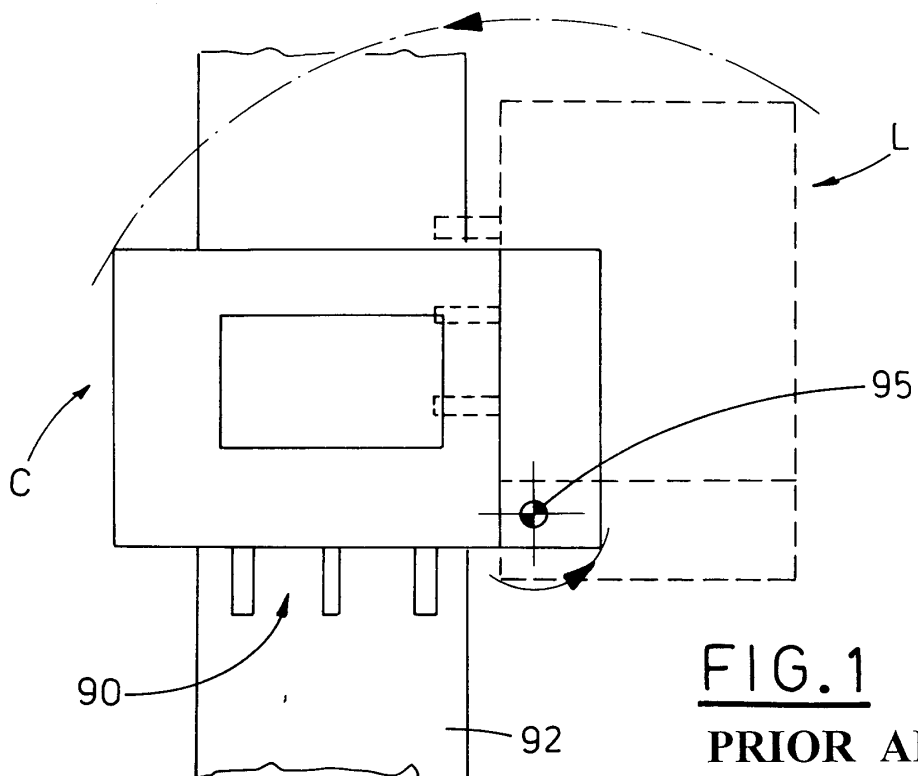
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5. Structure, as claimed in claim 5, **characterized in that** said moving means (7) include a plurality of wheels connected to the lower part of said framework (1).

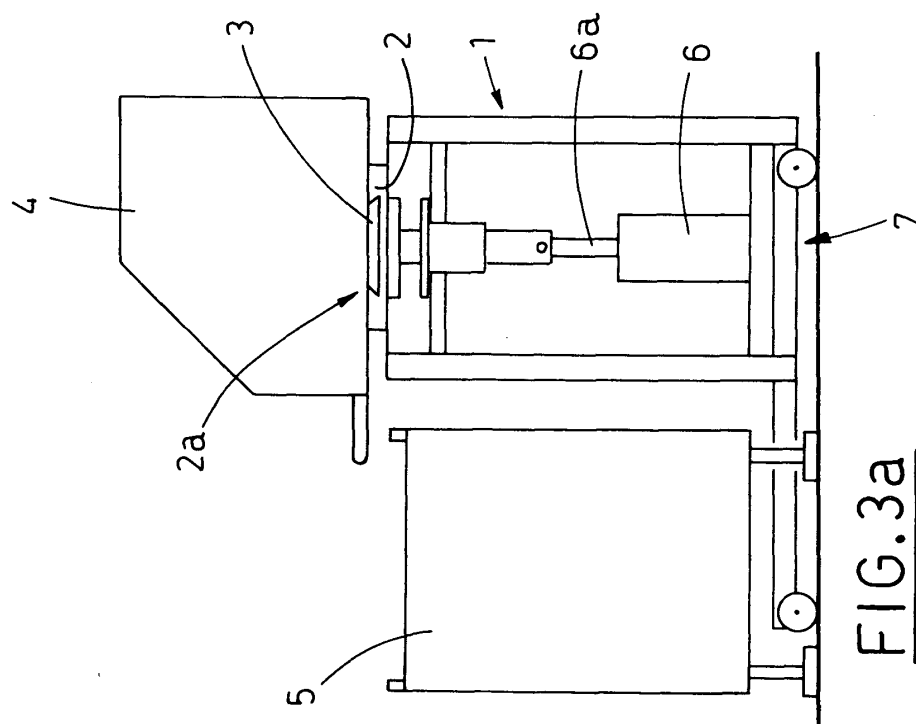
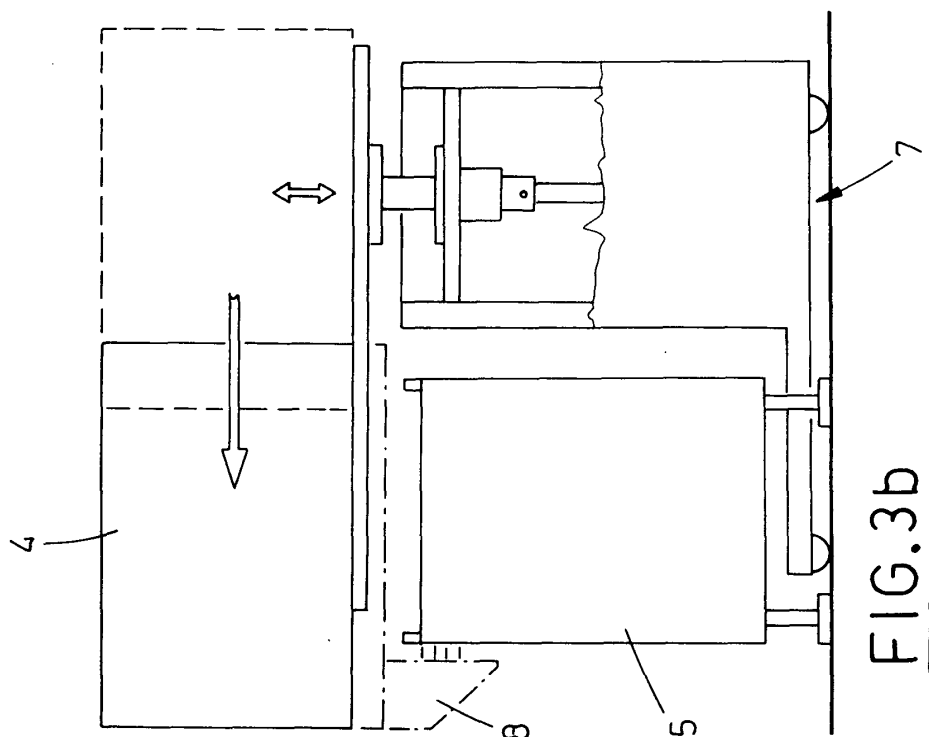
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6. Structure, as claimed in claim 1, **characterized in that** said guiding means (2a) define a dovetail coupling.

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7. Structure, as claimed in claim 1, **characterized in that** said guiding means (2a) are situated beside said plate (2).

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8. Structure, as claimed in claim 1, **characterized in that** it includes stabilizing means (8), which couple removably with the bearing framework of said conveyor (5), to support said sheet feeder (4) in the configuration, in which it passes before said conveyor (5).

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EUROPEAN SEARCH REPORT

Application Number
EP 05 01 2191

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.7)
A	US 2002/043753 A1 (RICHTER LUTZ ET AL) 18 April 2002 (2002-04-18) -----	1	B65H1/00 B65H39/04
X	US 4 568 071 A (RICE ET AL) 4 February 1986 (1986-02-04) * column 1, line 62 - column 2, line 5; figures * -----	1-3	
X	US 6 416 219 B1 (PFLAUM MICHAEL ET AL) 9 July 2002 (2002-07-09) * column 2, line 48 - line 50; figures 2,4 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65H B65G B43M
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 August 2005	Examiner Uhlig, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 01 2191

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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12-08-2005

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