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(72) Inventor: **Petratto, Giorgio**
10078 Venaria Reale (TO) (IT)

(74) Representative: **Spandonari, Carlo, Dr. Ing. et al**
Spandonari & Modiano s.r.l.
corso Duca degli Abruzzi 16
10129 Torino (IT)

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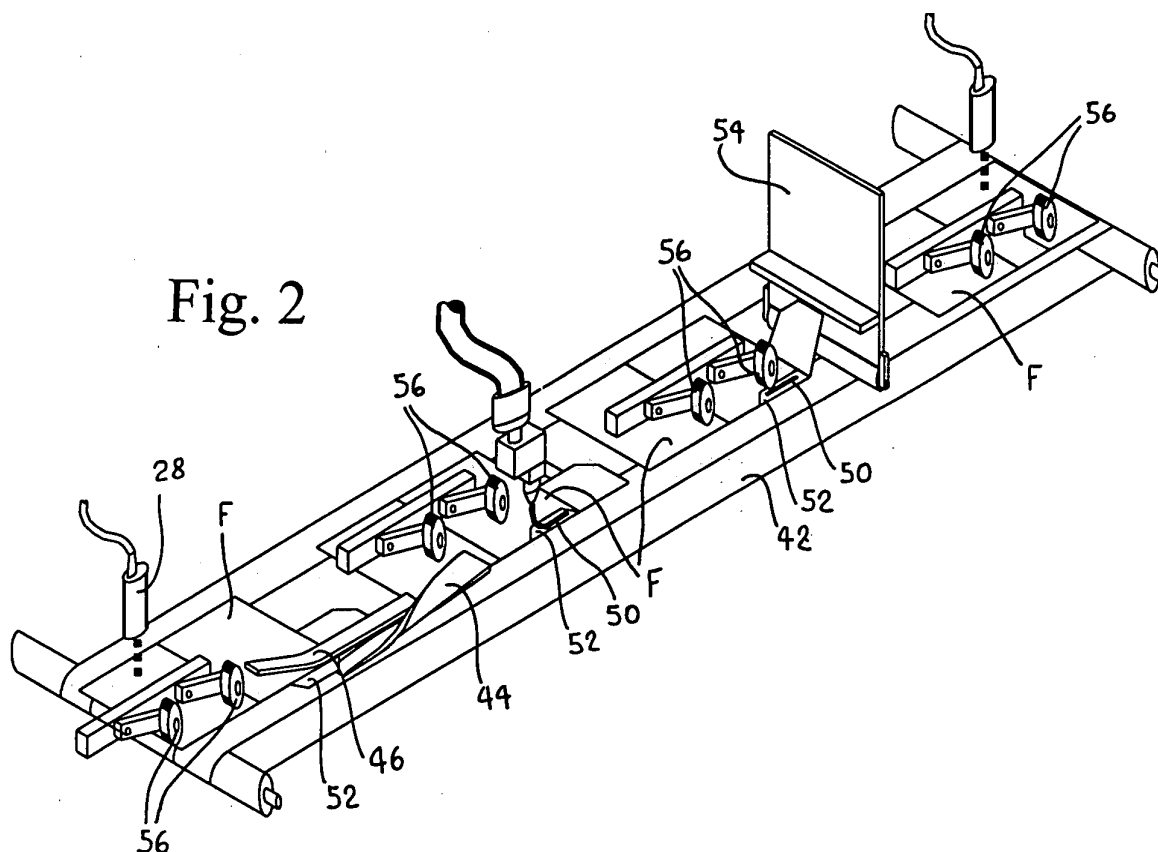
(71) Applicant: **Petratto, Giorgio**
10078 Venaria Reale (TO) (IT)

(54) **Creasing-folding machine for paperboard sheets**

(57) A creasing-folding machine (10) for paperboard sheets comprises in sequence a sheet-feeder (12), motorized feeding rollers (20, 22), a transversal creasing assembly (30) and a motorized conveyor belt (42) for feeding the sheet (F) to a transversal folding assembly (54). The machine also comprises a helically twisted,

rectilinear folding guide (44) extending parallel to the conveyor belt (42), between the creasing assembly (30) and the transversal folding assembly (54), and cooperating with a pressure member (46) arranged side-by-side in order to progressively fold the sheet (F) along a line (L) that is parallel to the feeding direction.

Fig. 2



Description

[0001] The present invention relates to a creasing-folding machine for paperboard sheets, for manufacture of folders, CD cases, and the like,

[0002] In known creasing-folding machines, typically for the manufacture of book covers, the sheets are sent from a sheet-feeder to a creasing station, where creases are impressed along lines that are transversal to the feeding direction, and then they are carried to a folding station, e.g. a buckle-folding station, where the sheet is folded along the crease.

[0003] However, such machines are unable to make longitudinal folds, i.e. parallel to the feeding direction, upon the sheets, as required for the manufacture of some folders, CD cases, and the like. Although such creases can be made by the same punch that trims the board blank, the punch does not allow variations of the creases such as required for some kinds of folders.

[0004] A main object of the present invention is to provide a creasing-folding machine which is improved with respect to the machines mentioned above, which is also adapted to produce folds that are parallel to the feeding direction of the sheet and are also programmable in number and position.

[0005] This object and other aims and advantages, which will better appear below, are achieved by a creasing-folding machine having the features recited in claim 1, while the other claims state other advantageous features.

[0006] The invention will be now described in more detail by way of non limiting example, with reference to the accompanying drawings, wherein:

Fig. 1 is a side view of the creasing-folding machine according to the invention;

Fig. 2 is a perspective view of a portion of the creasing-folding machine according to the invention;

Fig. 3 is a perspective view of three sheet-folding steps performed by the creasing-folding machine according to the invention.

[0007] In the example shown in the figures, a creasing-folding machine 10 is arranged for manufacturing a folder from a sheet F already been trimmed in a previous trimming step.

[0008] Accordingly, with reference to the above figures, creasing-folding machine 10 comprises a conveyor belt 12 supported on a pair of pulleys 14, 16, one of them being a driving pulley and the other a snub pulley. A pair of idle pressure rollers 18 are arranged above the conveyor belt and are adapted to maintain sheet F adherent to belt 12 while feeding. A pair of superposed feeding rollers 20, 22 are arranged downstream of belt 12. Lower roller 20 is driven by a motor 24 via a belt drive or chain drive, while upper roller 22 is pivotally sup-

ported at the end of linkages 26 and rests on the lower roller. A sensor 28 is arranged downstream of feeding rollers 20, 22. A first creasing assembly 30 is arranged downstream of sensor 28, and comprises a vertically translatable, transversal shaping blade 32 whose ends are supported by respective toggles 34. Each toggle 34 is driven by a hydraulic cylinder 36 that horizontally engages its middle hinge. A counter-blade 38 opposes blade 32. Downstream of first creasing assembly 30 is arranged a second creasing assembly 130 similar to the first one, but in which transversal shaping blade 132, with its driving means 134, 136, and counter-blade 138 are upturned by 180°.

[0009] A motorized conveyor belt 42 is arranged downstream of the creasing assembly and, according to this invention, a helically twisted, rectilinear folding guide 44 extends parallel to it and cooperates with a respective pressure member 46 arranged side-by-side and close to guide 44, in order to receive the incoming sheet F and to progressively fold it along a line L that is parallel to the feeding direction. The upstream portion of sliding block 46 is lifted to guide the insertion of the sheet between the sliding block and folding guide 44.

[0010] Advantageously, glue-dispenser 48 are arranged downstream of folding guides 44 and are adapted to deposit stripes of glue 50 on the edges 52 of sheet F which are to be joined to other parts of the sheet.

[0011] Finally, the motorized conveyor belt feeds the sheets to a transversal folding assembly 54 of a known kind, e.g. a buckle-fold assembly.

[0012] Further idle pressure rollers 56, having the same task of rollers 18, are arranged above motorized conveyor belt 42 along the path of sheet F.

[0013] The operation of the machine is controlled by a control unit, not shown, which is programmable by the operator. The sheet is supplied by conveyor belt 12 and is then picked up by feeding rollers 20, 22. Sensor 28 checks the right position of the sheet. The speed of the rollers and their stops during the function of shaping blade 32 are adjusted in relation to the operator settings. Shaping blade 32, by impacting counter-blade 38, creates the transversal creases. Sheet F is then folded along longitudinal lines by helical guides 44 and pressure member 46, and then glue-dispenser 48 leave stripes of glue 50 on it while translating on motorized belt 42. Transversal folding assembly 54 finally folds the sheet along the transversal line Z of the crease, thereby forming a pocket T.

[0014] As will be obvious to the person skilled in the art, the arrangement of helical guides 44, pressure members 46 and glue-dispenser 48 can be changed in relation to the shape and the size of the product to be manufactured. Although the latter, by way of example, has been described as a folder, in practice it may have different shapes.

[0015] Likewise, the sheet-feeding devices, creasing-blade driving devices and transversal folding devices, such as above described, may be replaced by other

technically equivalent devices.

[0016] A preferred embodiment of the invention has been described, but obviously the person skilled in the art may make different changes, depending on the requirements, within the same inventive concept.

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Claims

1. A creasing-folding machine (10) for paperboard sheets comprising, in sequence: 10

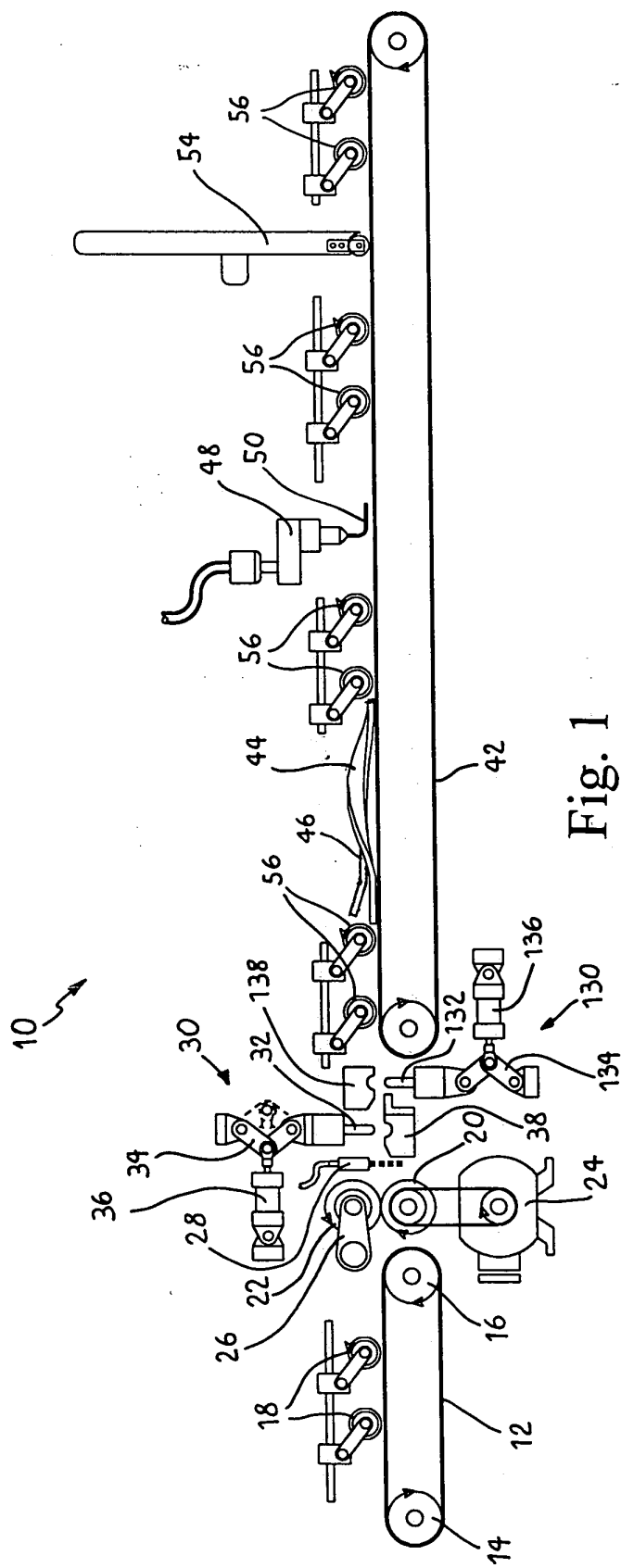
- a sheet-feeder (12),
- motorized rollers (20, 22) for feeding a sheet (F), 15
- at least one transversal creasing assembly (30), and 20
- a motorized conveyor belt (42) adapted to feed the sheet (F) to a successive transversal folding assembly (54),

characterized in that it also comprises at least one helically twisted, rectilinear folding guide (44) extending parallel to the motorized conveyor belt (42) between the creasing assembly (30) and said transversal folding assembly (54), and adapted to cooperate with a respective pressure member (46) arranged side-by-side and close to it, in order to progressively fold the sheet (F) along a line (L) that is parallel to the feeding direction of the sheet (F). 25 30

2. The machine of claim 1, **characterized in that** it comprises at least one glue-dispenser (48) that is arranged downstream of said folding guide (44) and is adapted to deposit stripes of glue (50) on the sheet (F). 35 40

3. The machine of claims 1 or 2, **characterized in that** said creasing assembly (30) comprises a transversal shaping blade (32), which is supported by a vertically operating toggle linkage (34, 134) driven by a hydraulic cylinder (36, 136) that horizontally engages the middle hinge of the toggle linkage (34, 134), and a counter-blade (38) which opposes said transversal shaping blade (32). 45 50

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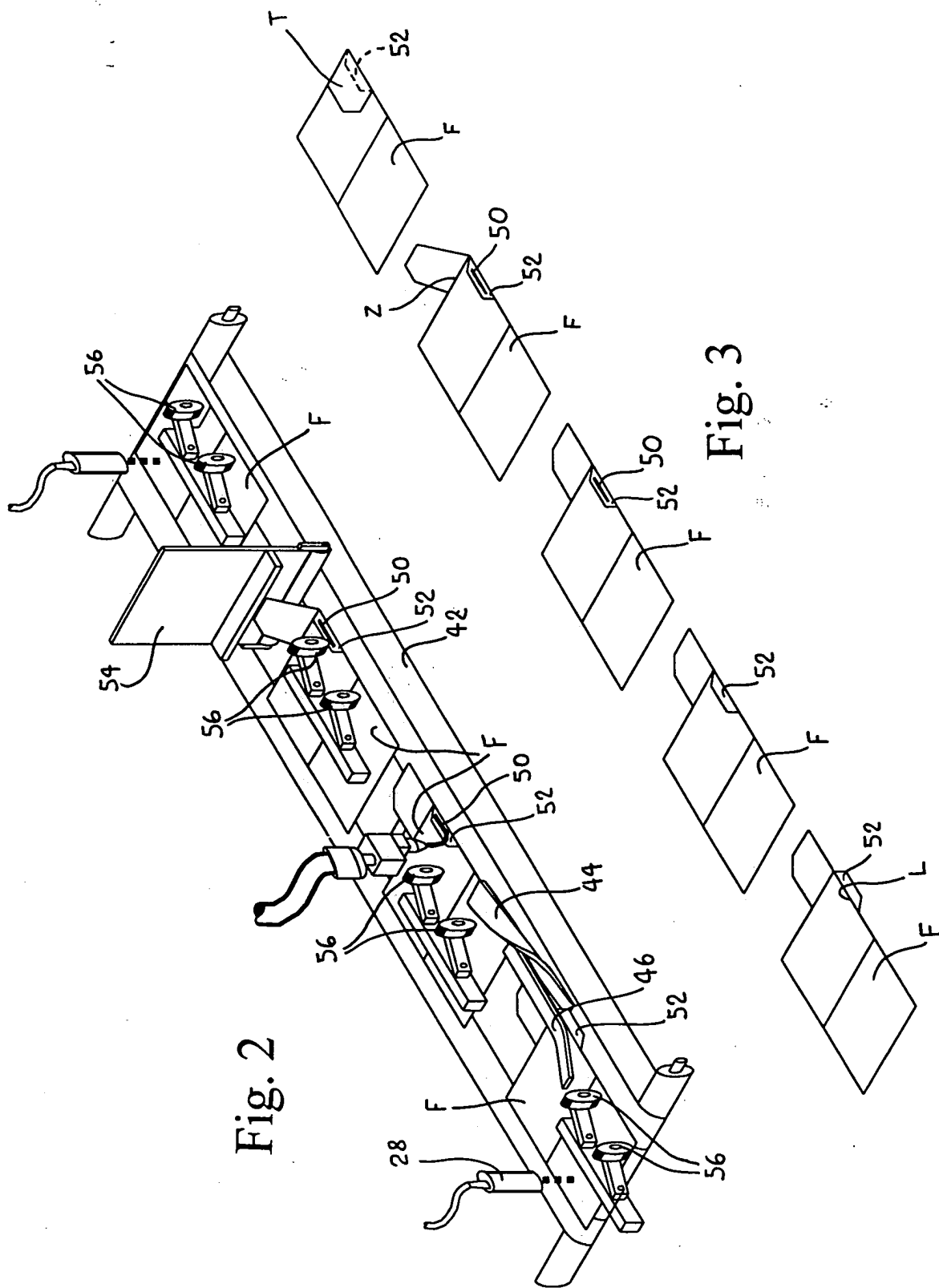


Fig. 2

Fig. 3



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 03 01 5261

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B31B B65D
Place of search MUNICH		Date of completion of the search 10 December 2003	Examiner Farizon, P
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
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EP 03 01 5261

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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