(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
10 March 2011 (10.03.2011)

PCT

(10) International Publication Number
WO 2011/027204 A1

(51) International Patent Classification:
B65H 45/30 (2006.01) *B65H 35/04* (2006.01)
B65H 35/06 (2006.01)

(21) International Application Number:
PCT/IB2010/002150

(22) International Filing Date:
1 September 2010 (01.09.2010)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
TO2009A000676 2 September 2009 (02.09.2009) IT

(72) Inventor; and
(71) Applicant : **PETRATTO, Giorgio** [IT/IT]; Via Puccini, 38, Pianezza (IT).

(74) Agents: **JORIO, Paolo** et al.; c/o Studio Torta S.r.l., Via Viotti, 9, I-10121 Torino (IT).

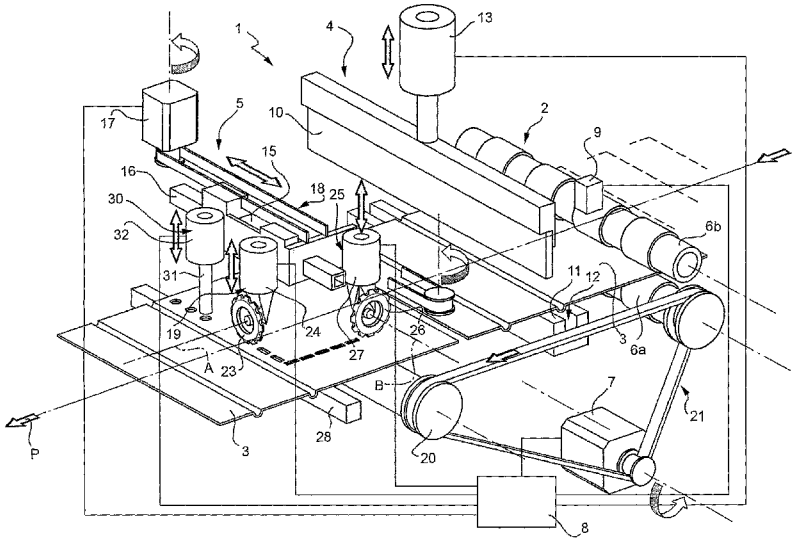
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) Title: CREASING UNIT FOR PROCESSING WEB MATERIAL BLANKS



(57) Abstract: A creasing unit (1) for processing sheet material blanks (3), having a blank feed device (2) for feeding blanks (3) along a feed path (P); a strike creasing assembly (4), in turn having a creasing blade (10) crosswise to the feed path (P) and movable up and down substantially vertically; and an auxiliary assembly (5) located downstream from the strike creasing assembly (4), and m turn having a carriage (15) movable horizontally crosswise to the feed path (P), and at least one perforating head (19, 25) fitted to the carriage (15).

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CREASING UNIT FOR PROCESSING SHEET MATERIAL BLANKS

TECHNICAL FIELD

The present invention relates to a creasing unit for processing sheet material blanks.

The unit according to the invention is preferably designed for use in the bookbinding and (post-print) paper industry for producing brochures, folders, envelopes, etc., and is located in series with and upstream from an independent or on-line folding machine, to form crease lines in the sheet material, along which the material is subsequently folded.

Here and hereinafter, the term "blank" is intended to mean both simple rectangular paper, cardboard, or plastic sheets of any size, and die-cut blanks of any shape in general.

BACKGROUND ART

As is known, blanks for producing products in the bookbinding or paper industry, such as brochures, book-covers, envelopes, etc., are folded on folding machines. When working with thick material, it is advisable to first "crease" the fold lines, i.e. to deform the fibres and so weaken the material, to prevent damaging the material during the folding operation.

Strike creasing units are known, which substantially comprise a feed device for feeding blanks successively along a feed path; and a striker blade, which is positioned crosswise to the feed path, and

moves substantially vertically up and down to crease, i.e. locally deform, the blanks crosswise, against a supporting die.

It is also known to use an auxiliary head, featuring a circular blade with a horizontal axis perpendicular to the feed path of the blanks, to perform operations, such as creasing, perforating, cutting, etc., in a direction parallel to the blank feed path.

To perform additional crosswise operations (such as perforating tear-off slips), however, the creasing blade must be replaced with a perforating blade, which is a time-consuming job to dismantle and assemble the blades, and which therefore calls for shutting down the unit.

DISCLOSURE OF INVENTION

It is an object of the present invention to provide a creasing unit designed to eliminate the above drawbacks typically associated with known units.

The above object is achieved by a unit as claimed in Claim 1.

BRIEF DESCRIPTION OF THE DRAWING

A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the attached drawing showing a schematic view in perspective.

BEST MODE FOR CARRYING OUT THE INVENTION

Number 1 in the attached drawing indicates as a whole a creasing unit in accordance with the present invention.

Unit 1 substantially comprises a feed device 2 for feeding sheet material blanks 3 successively along a feed path P, a strike creasing assembly 4, and an auxiliary assembly 5 arranged in series along path P.

More specifically, feed device 2 comprises a blank loader (not shown); and two feed rollers 6a, 6b, which have respective parallel axes crosswise to path P, and are tangent to each other on opposite sides of the feed plane to receive blanks 3 from the loader and feed them successively along path P.

One of the feed rollers (6a) is powered by an electric motor 7, which is position-controlled by a programmable control unit 8 in response to position signals from a sensor 9 facing the feed plane. And a second powered roller 20 is connected to electric motor 7 and feed roller 6a by a synchronous belt drive 21.

The second powered roller 20 is located downstream from feed rollers 6a, 6b along path P. The distance between second powered roller 20 and feed rollers 6a, 6b is exaggerated in the drawing, for reasons of clarity, and must actually be less than the maximum length of blanks 3, to enable second powered roller 20 to pick up the blanks before they are released from feed rollers 6.

Creasing assembly 4 comprises a horizontal creasing blade 10 positioned crosswise over path P, and which moves vertically up and down to interact with the blanks 3 positioned underneath; and a die 11 located beneath path P, at creasing blade 10, and having a cavity 12

complementary in shape to the blade.

Creasing blade 10 is moved up and down by any known device indicated schematically by 13 in the drawing, and which may, for example, comprise an electric or fluidic vertical-axis linear actuator, or, preferably, a horizontal-axis actuator acting on a toggle mechanism.

Auxiliary assembly 5 comprises a carriage 15 movable along a horizontal guide 16 crosswise to path P, and powered by an electric motor 17 also controlled by control unit 8 via a belt drive 18.

Carriage 15 supports a first auxiliary head 19 for making perforations crosswise to path P, and which comprises a vertical circular perforating blade 23 with its axis A parallel to path P, and an actuator 24 for moving blade 23 from a raised rest position to a lowered work position. Blade 23 rotates idly and, when set to the work position contacting blanks 3, is rotated by the movement of carriage 15 to make crosswise perforations. A supporting bar 28 is located beneath the feed plane of blanks 3, along the operating line of blade 23, to support the blanks as they are perforated by blade 23.

Carriage 15 preferably also supports a second auxiliary head 25 for making perforations parallel to path P. The second auxiliary head 25 is substantially identical to the first, and comprises an idle circular perforating blade 26, and an actuator 27 for moving blade 26 from a raised rest position to a lowered work position. In this case, however, blade 26 is positioned

with its horizontal axis B perpendicular to path P, and, when set to the work position, is rotated by blanks 3 moving along path P, to make longitudinal perforations. Blade 26 is conveniently located vertically over powered roller 20, so powered roller 20 supports blanks 3 as they are perforated by blade 26.

Carriage 15 also supports an optional third auxiliary head 30 for drilling holes, e.g. for loose-leaf ring binders, and which also comprises a tool 31 - in this case, a vertical-axis bit - powered by an electric motor (not shown); and an actuator 32 for moving tool 31 from a raised rest position to a lowered work position.

Actuators 24, 27, 32 and the electric motor of tool 31 are controlled by control unit 8.

Unit 1 operates as follows.

Blanks 3 are fed along path P by feed device 2, and can each be stopped in a predetermined crosswise creasing position by position control of motor 7.

Blank 3 is then fed to auxiliary assembly 5 for additional processing as required.

More specifically, to perforate the blank crosswise, first auxiliary head 19 is activated to lower blade 23 onto blank 3; and carriage 15 is operated to move blade 23.

To perforate the blank longitudinally, second auxiliary head 25 is activated to lower blade 26 onto blank 3; only, in this case, the blade is moved by the

forward movement of blank 3 along plane P.

Control unit 8 can be programmed so auxiliary heads 19 and 25 each make one or a number of parallel perforations, which may be continuous or discontinuous.

Finally, to drill the blank, the drilling position is established by combining the longitudinal position of blank 3 along path P by position control of feed device 2, and the crosswise position of third auxiliary head 30 by means of carriage 15.

Clearly, changes may be made to unit 1 without, however, departing from the scope of the accompanying Claims.

More specifically, second and third auxiliary heads 25, 30 may be eliminated; and blades 13, 26 of first and/or second auxiliary head 19, 25 may be creasing or cutting blades.

Auxiliary assembly 5 may be located upstream from creasing assembly 4.

And, finally, different auxiliary heads, such as laser or gluing devices, may be provided in addition to or instead of those described.

CLAIMS

1) A creasing unit (1) for processing sheet material blanks (3), comprising a blank feed device (2) for feeding blanks (3) along a feed path (P); and a strike creasing assembly (4), in turn comprising a creasing blade (10) crosswise to the feed path (P) and movable up and down substantially vertically; the unit being characterized by comprising an auxiliary assembly (5) located in series with the strike creasing assembly (4), and in turn comprising a carriage (15) movable horizontally crosswise to the feed path (P), and at least a first work head (19) fitted to said carriage (15).

2) A unit as claimed in Claim 1, characterized in that said first work head (19) comprises a first circular blade (23) with an axis (A) parallel to said feed path (P).

3) A unit as claimed in Claim 2, characterized in that said first work head (19) comprises an actuator (24) for moving said first blade (23) from a raised rest position to a lowered work position contacting said blanks (3).

4) A unit as claimed in Claim 3, characterized by comprising a control unit (8) for controlling said blank feed device (2), said strike creasing assembly (4), the movement of said carriage (15), and said actuator (24) of said first work head (19).

5) A unit as claimed in one of Claims 2 to 4, characterized in that said first blade (23) is a perforating blade.

6) A unit as claimed in one of Claims 2 to 4, characterized in that said first blade is a cutting blade.

7) A unit as claimed in any one of the foregoing Claims, characterized by comprising at least a second work head (25) fitted to said carriage (15).

8) A unit as claimed in Claim 7, characterized in that said second work head (25) comprises a second circular blade (26) with a horizontal axis (B) perpendicular to said feed path (P).

9) A unit as claimed in Claim 8, characterized in that said second blade (26) is a perforating blade.

10) A unit as claimed in Claim 8, characterized in that said second blade is a cutting blade.

11) A unit as claimed in Claim 8, characterized in that said second blade is a creasing blade.

12) A unit as claimed in any one of the foregoing Claims, characterized by comprising a vertical-axis third work head (30) fitted to said carriage (15).

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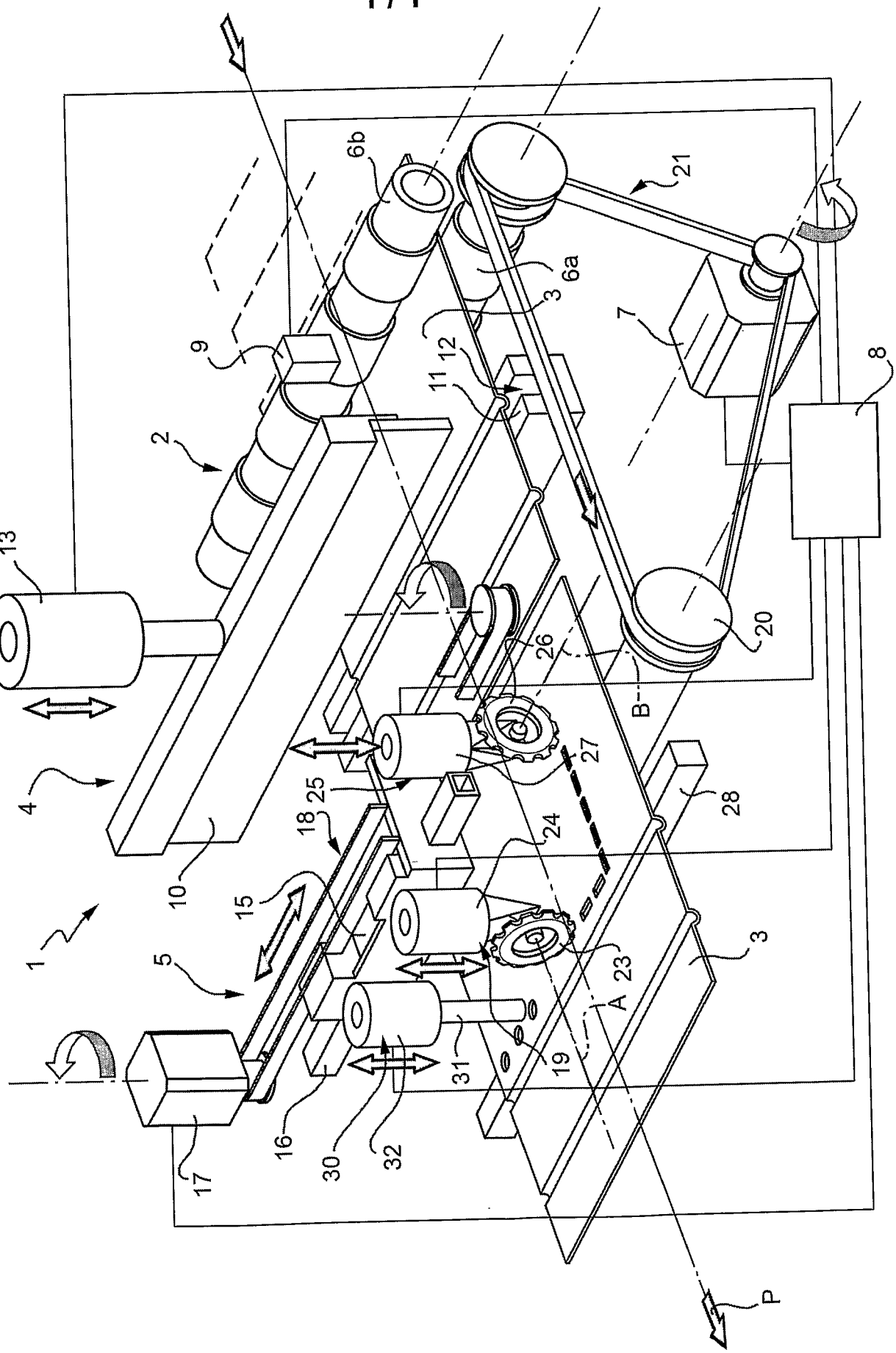
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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/002150

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65H45/30 B65H35/06 B65H35/04
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65H B31F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 380 407 A (PETRATTO GIORGIO [IT]) 14 January 2004 (2004-01-14) the whole document	1-12
A	EP 1 398 142 A (PETRATTO GIORGIO [IT]) 17 March 2004 (2004-03-17) the whole document	1-12

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 November 2010	01/12/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Jezierski, Krzysztof

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2010/002150

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1380407 A	14-01-2004	DE 60318360 T2	08-01-2009
		IT T020020131 U1	09-01-2004
EP 1398142 A	17-03-2004	NONE	