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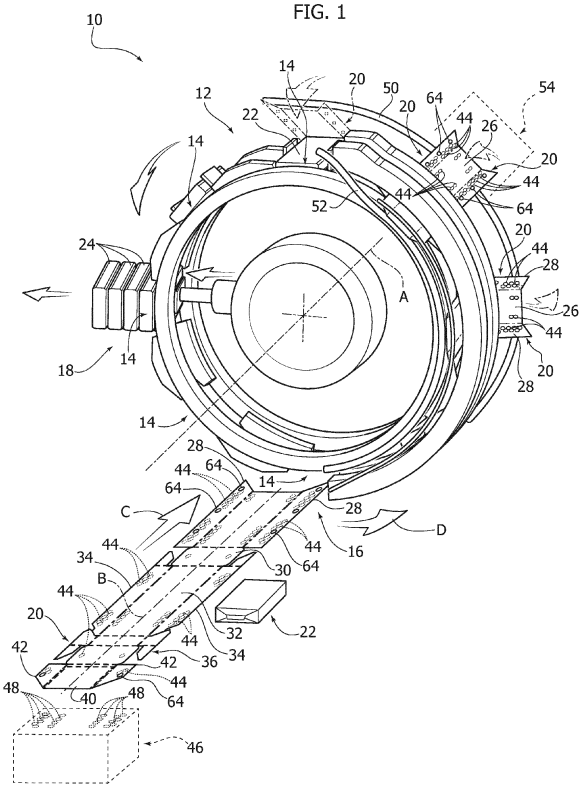
(54) A METHOD AND APPARATUS FOR PACKAGING PRODUCTS IN BOX-SHAPED PACKAGES

(57) A method for packaging products (22) in box-shaped packages (24), comprising:
- providing a package blank (20) having a longitudinal axis (B) parallel to its prevailing development direction,
- applying cold glue (44) on predetermined areas (26, 28, 30, 32, 34, 38, 42) of said package blank (20),
- positioning the package blank (20) and a respective product (22) in a respective seat (14) of a forming wheel rotatable in steps about a rotation axis (A),
- progressively folding said package blank (20) around the respective product (22) during the stepwise movement of said forming wheel (12) around said rotation axis (A),
- applying hot glue (64) on predetermined areas (28, 42) of said partially folded package blank (20) while said package blank (20) is temporarily in a stationary position, and
- completing the folding of the package blank (20) around the respective product (22).

FIG. 1



EP 3 680 184 A1

Description

Field of the art

[0001] The present invention refers - in general - to the packaging of products, and relates to a method and an apparatus for packaging products in box-shaped packages

[0002] The present invention was specifically developed for the packaging of smoking articles in rigid packages with a hinged cover. In the following description, reference will be made to this specific field of use without however losing generality.

Description of the prior art

[0003] An established technique for producing rigid packs of smoking articles with a hinged cover envisages the use of a forming wheel having a plurality of seats within which respective groups of smoking articles are placed, which have been previously wrapped in a sheet of metallized paper wrapping and respective cardboard package blanks. The forming wheel is rotatable in steps and transports the packages being formed between an inlet station and an outlet station. During the movement, the package blanks are progressively folded around the respective groups of smoking articles so as to form a package with the shape of a parallelepiped box.

[0004] During the path of package formation, various flaps of the package blanks are subsequently folded and glued together. In this type of application, cold glue (vinyl glue) is usually used which has better long-term sealing characteristics. However, cold glue takes a relatively long time to dry and set. Typically, the cold glue has a drying time that is greater than the time required for forming packages, so it is necessary to provide a drying tunnel at the outlet of the forming wheel. Until the complete drying of the cold glue, the packages are not stable and it is necessary to keep the flaps between which the cold glue has been applied in contact with each other.

[0005] To maintain the stability of the packages until the complete drying of the cold glue, it was previously proposed to use hot glue (hot melt) in addition to the cold glue. The hot glue ensures an immediate grip and allows obtainment of a stable and immediate fixing of the folded flaps of the package being formed.

[0006] Using hot glue in combination with cold glue allows reduction of the length of the drying path of the packages at the outlet of the forming wheel.

[0007] However, devices for applying hot glue are not without problems. One of the most critical aspects is that - in the case in which hot glue is used - folding of the flaps of the blank must be carried out immediately after the hot glue is applied.

[0008] WO2010/119472 describes a forming wheel for packaging cigarettes in box-shaped packages, having a plurality of peripheral seats, each of which is configured to house a group of cigarettes and a cardboard package blank. The package blank has wings configured to form the smaller side walls of the package. This document envisages applying hot glue on the side wings of the package after the package has left the forming wheel. To apply the hot glue, dispensing devices are provided that move and deposit a strip of glue on each side of the blank. The movement of the glue dispensing units is complicated because it requires moving - with high acceleration - units that may have a weight in the order of 10-20 kg.

Object and summary of the invention

[0009] The present invention aims to provide a method and an apparatus for packaging products in box-shaped packages that overcome the problems of the prior art.

[0010] According to the present invention, this object is achieved, by a method and by an apparatus having the characteristics forming the subject of the claims.

[0011] The claims form an integral part of the disclosure provided here in relation to the invention.

Brief description of the drawings

[0012] The present invention will now be described in detail with reference to the attached drawings, given purely by way of non-limiting example, wherein:

- Figure 1 is a schematic perspective view of an apparatus for packaging products in box-shaped packages,
- Figure 2 is a plan view of a package blank,
- Figure 3 is a schematic perspective view illustrating a hot glue application assembly of the apparatus of Figure 1,
- Figure 4 is a perspective view from a different angle of the hot glue application assembly.

Detailed description

[0013] Figure 1 schematically illustrates an apparatus 10 for packaging products in box-shaped packages, in particular for packaging groups of smoking articles in rigid packages with a hinged lid. The apparatus 10 comprises a forming wheel 12 rotatable about a rotation axis A. The forming wheel 12 is rotated in steps around the axis A and comprises a plurality of seats 14 arranged on its periphery.

[0014] The apparatus 10 comprises an inlet station 16 in the forming wheel and an outlet station 18. The inlet station 16 is actually an intermediate station in the complete flow of the apparatus 10. In the inlet station 16, each seat 14 of the forming wheel 12 receives a respective cardboard package blank 20 and a respective product to be packaged 22. The product to be packaged 22 may be formed of a group of smoking articles wrapped in a metallized paper wrapper. The package blank 20 is folded around the product to be packaged 22 during the move-

ment of the forming wheel 12 from the inlet station 16 towards the outlet station 18. At various stations located along the periphery of the forming wheel 12, the package blank 20 is folded around the respective product 22. A package 24 is obtained downstream of the outlet station 18, having the form of a parallelepiped box enclosing the product 22. The package 24 leaves the outlet station 24 with two open side flaps. Closing the side flaps is carried out while the package leaves the forming wheel 12.

[0015] This packaging method is well known in the field of packaging smoking articles. The finished packages 24 are generally known in the art as rigid packs with a hinged cover. The structure and operation of the forming wheels configured to package groups of smoking articles in rigid packages with hinged covers are well known to experts in the field and do not require a detailed description. Apparatuses for packaging smoking articles in rigid packages with hinged covers including forming wheels for folding blanks of cardboard packages are described in various patent documents, such as, for example, EP0792806-B1 and EP2419335-B1. In order not to weigh down the present description, the devices known *per se,* configured for folding the package blank 20 aimed at producing box-shaped packages 24, will not be illustrated in detail.

[0016] Figure 2 is a plan view of a package blank 20 before it is fed to the forming wheel 12. The package blank 20 has a longitudinal axis B parallel to its prevailing development direction. The package blank 20 comprises a front wall 26, two outer side flaps 28 which project laterally from the front wall 26, a base wall 30, a rear wall 32, two inner side flaps 34 projecting laterally from the rear wall 32 and a cover portion 36 hinged to the rear wall 32. The lid portion 36 includes a rear wall 37 having two inner side cover flaps 39, an upper wall 38, a front cover wall 40 and two outer cover flaps 42 projecting laterally from the front cover wall 40. Terms such as "front", "rear", "upper", etc. refer to the position of these parts in a finished package arranged in such a way that the direction of its prevailing development coincides with the vertical direction, arranged with the openable side facing the observer, therefore the base wall and the upper wall are arranged, respectively, "below" and "above" and the front and rear walls, respectively, define the "front" and "rear" of the package.

[0017] Each package blank 20 has a plurality of cold glue points 44 applied to predetermined parts of the package blank 20 before it is fed to the forming wheel 12. With reference to Figure 1, the cold glue points 44 are applied to the package blanks 20 as they advance in a direction C parallel to the longitudinal axis B of the package blanks 20. Solutions are also possible in which the cold glue is applied onto the package blanks 20 as they advance in a transverse direction with respect to the axis B.

[0018] Figure 1 schematically shows - with 46 - a unit for applying cold glue, having a plurality of nozzles 48 that apply the cold glue points 44 onto the package blanks 20 advancing in direction C. In a possible embodiment, just a single row of nozzles 48 may be provided. Moreover, in a possible embodiment (not illustrated) applying cold glue can be carried out by means of disc applicators.

[0019] As illustrated in Figure 2, the cold glue points 44 can be arranged in arrays parallel to the longitudinal axis B and located symmetrically with respect to the axis B. The cold glue points 44 can be applied on the front wall 26, on the outer side flaps 28, on the base wall 30, on the rear wall 32, on the inner side flaps 34, on the upper wall 38, and on the outer cover flaps 42.

[0020] With reference to Figure 1, the individual package blanks 20 on which the cold glue points 44 have already been applied are positioned within respective seats 14 of the forming wheel 12, with the longitudinal axis B of the package blanks 20 perpendicular to the direction of movement D of the forming wheel 12. In each seat 14 of the forming wheel 12, a respective package blank 20 and a respective product to be packaged 22 are loaded. During the movement in the direction D from the inlet station 16 towards the outlet station 18, the package blank 20 is folded around the product to be packaged 22 by a plurality of folding devices until they take the form of a parallelepiped box. Figure 1 illustrates only two stationary folders 50, 52, which fold the front wall 26 and the cover portion 36 around respective transverse axes with respect to the longitudinal axis B. Other folding devices (not illustrated) carry out folding of the side flaps 28, 34 and of the other parts of the package blank 20 during the stepwise movement of the package blank 20 along the direction D.

[0021] With reference to Figures 3 and 4, the apparatus 10 comprises a hot glue application station 54, arranged to apply hot glue onto the partially folded package blanks 20 advancing in steps in the direction D. The hot glue application station 54 is located in a stationary position outside the forming wheel 12 and is controlled to apply hot glue points on the package blanks 20 while these are temporarily stopped during the stopping moments of the stepwise movement of the forming wheel 12.

[0022] In a possible embodiment, the hot glue application station 54 may comprise two dispensing units 56, each including three nozzles, arranged so as to apply hot glue points on a surface oriented at 90° with respect to the rotation axis A of the forming wheel 12 and a dispensing unit 60 including two nozzles 62, oriented to apply hot glue points on a surface parallel to the rotation axis A of the forming wheel 12.

[0023] The hot glue application station 54 can be configured to apply a plurality of hot glue points 64 on the outer side flaps 28 and on the outer cover flaps 42 of the cardboard blank 20 (see in particular Figure 2). In the illustrated example, three hot glue points 64 are applied to each of the first outer sides 28 and a hot glue point 64 is applied to each of the outer cover flaps 42. The hot glue points 64 on the first outer sides 28 are applied when the front wall portion 26 is partially folded and is oriented at 90° with respect to the rotation axis of the forming wheel 12. The hot glue points 64 on the side cover flaps

42 are applied while the upper wall 40 of the cover portion 36 is extended and oriented parallel to the rotation axis A of the forming wheel 12. With reference to Figure 2, the hot glue points 64 are applied in points not overlapped on the cold glue points 44.

[0024] In the illustrated embodiment, the hot glue application station 54 simultaneously applies all the hot glue points 64 during a single stop of the partially folded package blanks 20. During the stopping time of the package blanks 20, the hot- glue points 64 can be applied with precision, avoiding streaks or smears of the hot glue that would form if the hot glue was applied with a relative movement between the nozzles 58, 62 and the walls of the package blank 20.

[0025] The hot glue dispensing station 54 remains stationary during normal operation and can be moved from the operating position for maintenance operations (for example, to purge the nozzles 58, 62).

[0026] The fact of arranging the hot glue dispensing station 54 on the periphery of the forming wheel allows the hot glue points 64 to be applied before folding of the parts of the package blank 20 on which the hot glue is applied.

[0027] The cold glue points 44 (for example, vinyl glue) ensure a long-term sealing of the package 24. However, cold glue requires a relatively long time to dry and to ensure the necessary seal. The cold glue points 44 would not have time to dry during the folding steps of the blank 20.

[0028] The hot glue points 64 ensure an immediate seal, but tend to reduce the sealing capacity over time until the flaps are brought closer together. For this reason, the folding of the portions of the cardboard blank 20 on which the hot glue points 64 are applied must be carried out soon after applying the hot glue points 64. The hot glue points 64 keep the flaps close together even in the absence of a drying tunnel.

[0029] In this way it becomes possible to avoid stabilizing wheels and/or to reduce the length of the drying channel with respect to solutions according to the prior art.

[0030] With respect to corresponding known solutions, the layout of the machine can be shortened by 1-1.5 m while maintaining the same quality of the packages. The retrofit on previous machines is relatively simple since the structure of the forming wheel 12 remains unchanged.

[0031] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments can be widely varied with respect to those described and illustrated, without thereby departing from the scope of the invention as defined by the claims that follow.

Claims

1. A method for packaging products (22) in box-shaped packages (24), comprising:

- providing a package blank (20) having a longitudinal axis (B) parallel to its prevailing development direction,
- applying cold glue (44) on predetermined areas (26, 28, 30, 32, 34, 38, 42) of said package blank (20),
- positioning the package blank (20) and a respective product (22) in a respective seat (14) of a forming wheel rotatable in steps about a rotation axis (A),
- progressively folding said package blank (20) around the respective product (22) during the stepwise movement of said forming wheel (12) around said rotation axis (A),
- applying hot glue (64) on predetermined areas (28, 42) of said partially folded package blank (20) while said package blank (20) is temporarily in a stationary position, and
- completing the folding of the package blank (20) around the respective product (22).

2. A method according to claim 1, wherein the application of hot glue is carried out in a hot glue application station (54) comprising a plurality of stationary nozzles (58, 62).

3. A method according to Claim 1 or Claim 2, wherein the longitudinal axis (B) of said package blank (20) is orthogonal to the direction of movement (D) of said forming wheel (12).

4. A method according to any one of the preceding claims, wherein the hot glue (64) is applied on a portion of said package blank (20) oriented orthogonally with respect to the rotation axis (A) of said forming wheel (12) and on a portion of said package blank (20) oriented parallel to said rotation axis (A).

5. A method according to any one of the preceding claims, wherein said cold glue (44) and said hot glue (64) are applied in the form of glue points that do not overlap each other.

6. An apparatus for packaging products (22) in box-shaped packages (24), comprising:

- a forming wheel (12) rotatable about a rotation axis (A) and having a plurality of seats (14) configured to receive respective products (22) and respective package blanks (20),
- a plurality of folding devices (50, 52) configured for folding package blanks (20) around respective products (22),
- a cold glue dispensing station (46) for applying cold glue (44) to pre-established areas (26, 28, 30, 32, 34, 38, 42) of said package blanks (20)

upstream of the forming wheel (12), and
- a hot glue application station (54) arranged to apply hot glue (64) on pre-established areas (28, 42) of said partially folded package blanks (20) while said package blanks (20) located on forming wheel (12) are temporarily in a stationary position, the hot glue application station (54) being located in a position upstream of a region of the forming wheel (12) in which the package blanks (20) are closed around their respective products (22).

7. An apparatus according to claim 6, wherein said hot glue application station (54) comprises a plurality of first nozzles (58) oriented for applying hot glue points (64) on a surface (28) orthogonal to the rotation axis (A) of the forming wheel (12) and a plurality of second nozzles (62) arranged to apply hot glue points (64) on a surface (42) parallel to the rotation axis (A) of the forming wheel (12).

8. An apparatus according to claim 7, wherein said first nozzles (58) and said second nozzles (62) are stationary.

FIG. 1

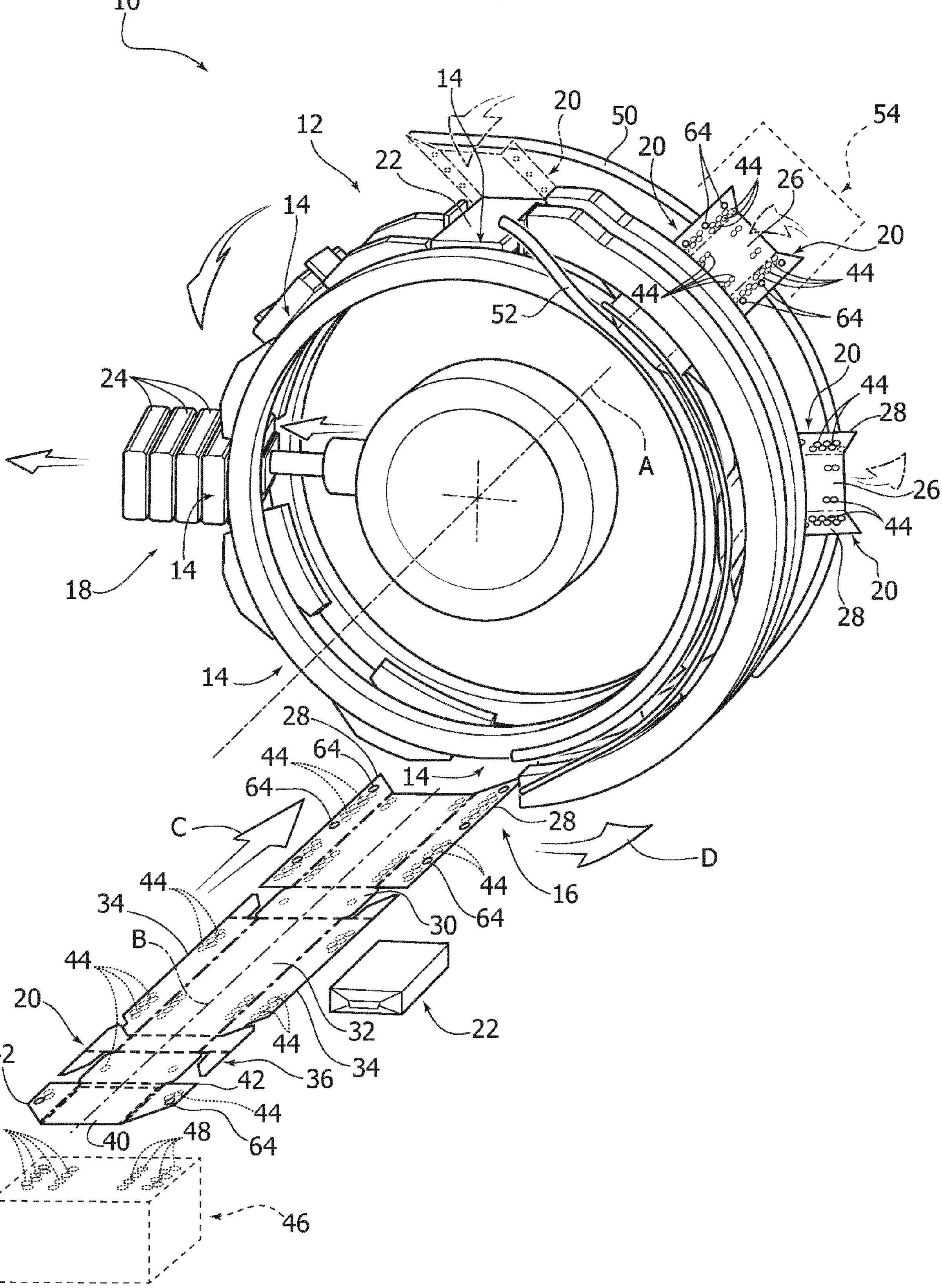

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FIG. 2

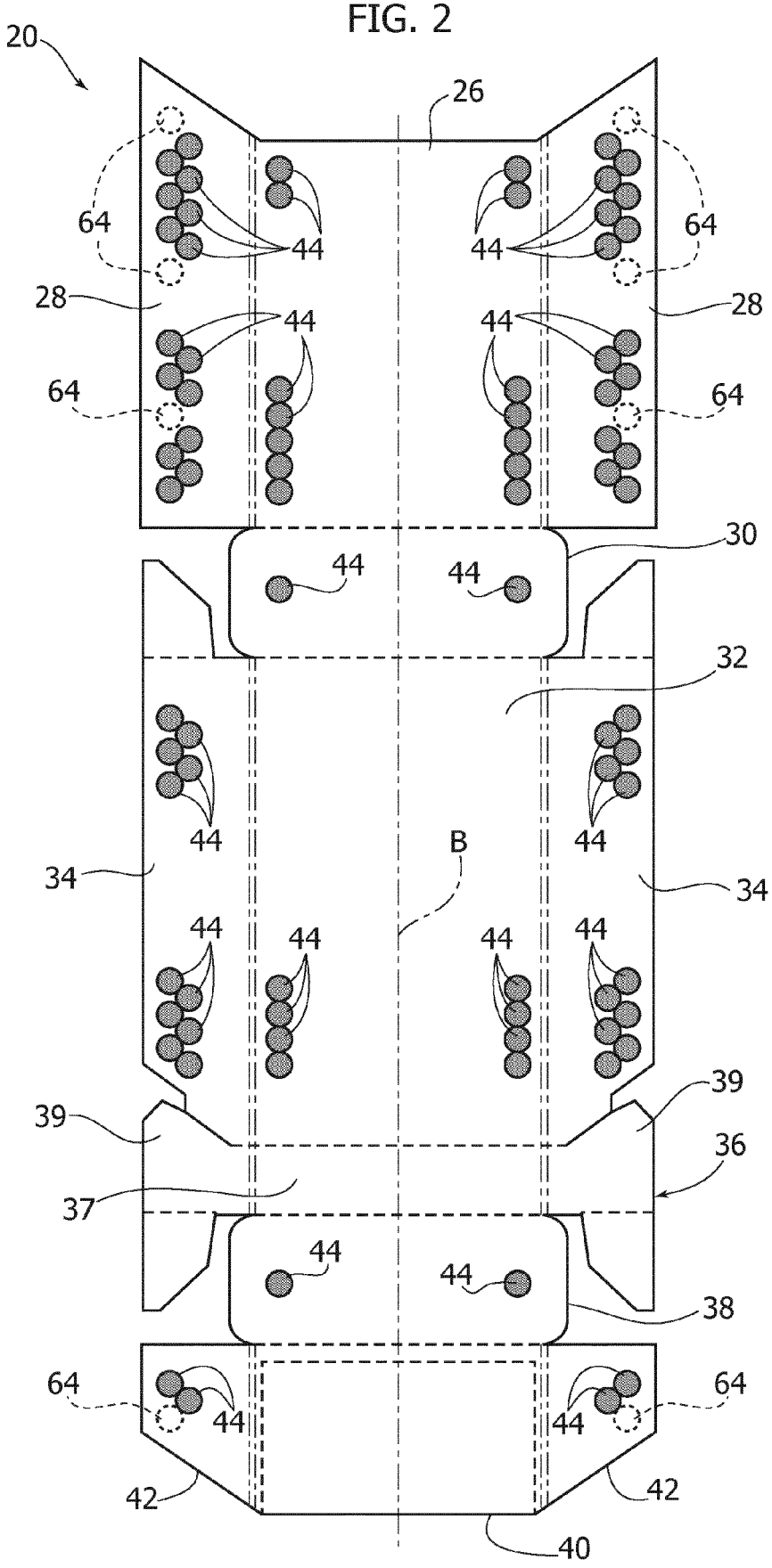

FIG. 3

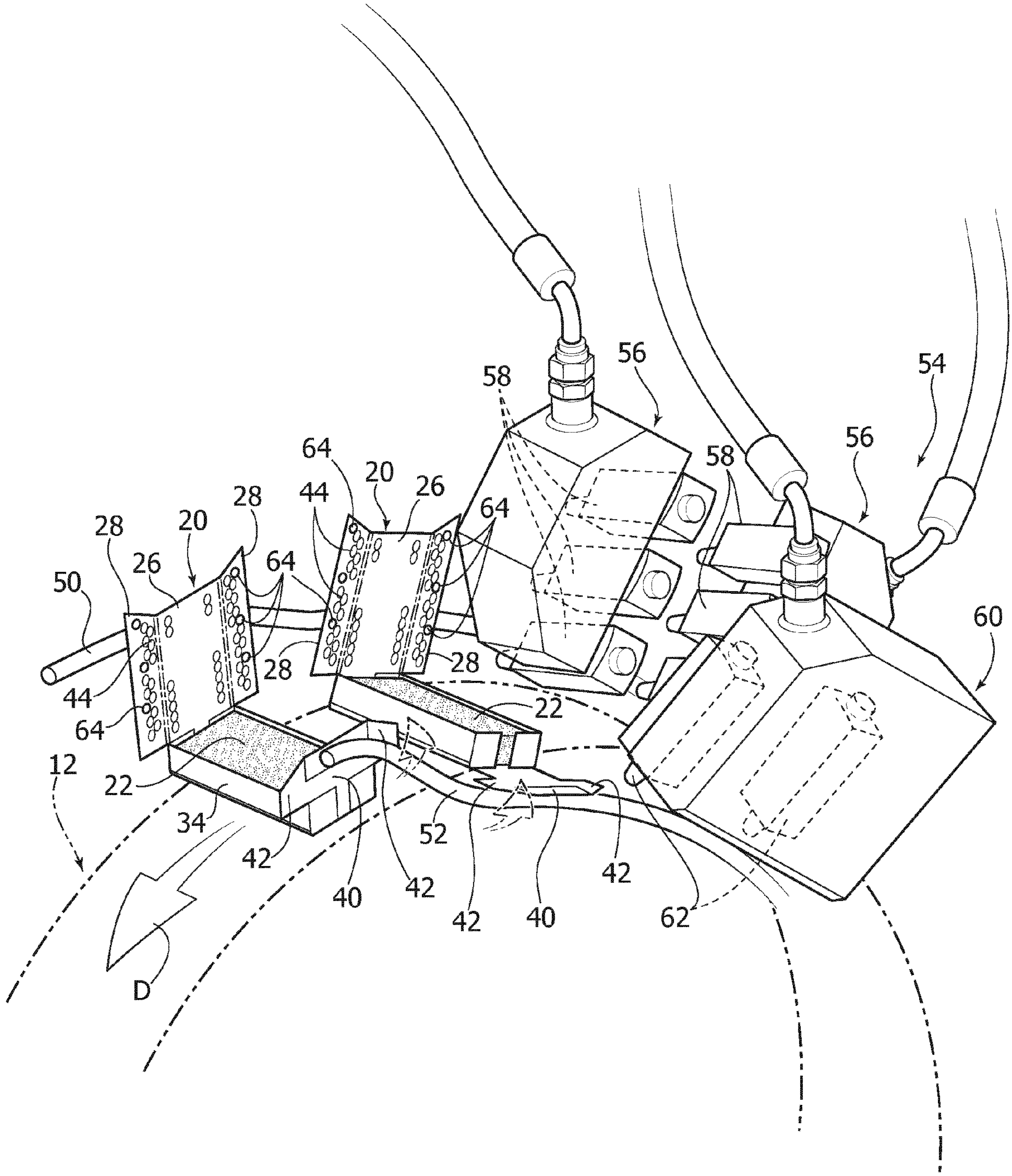
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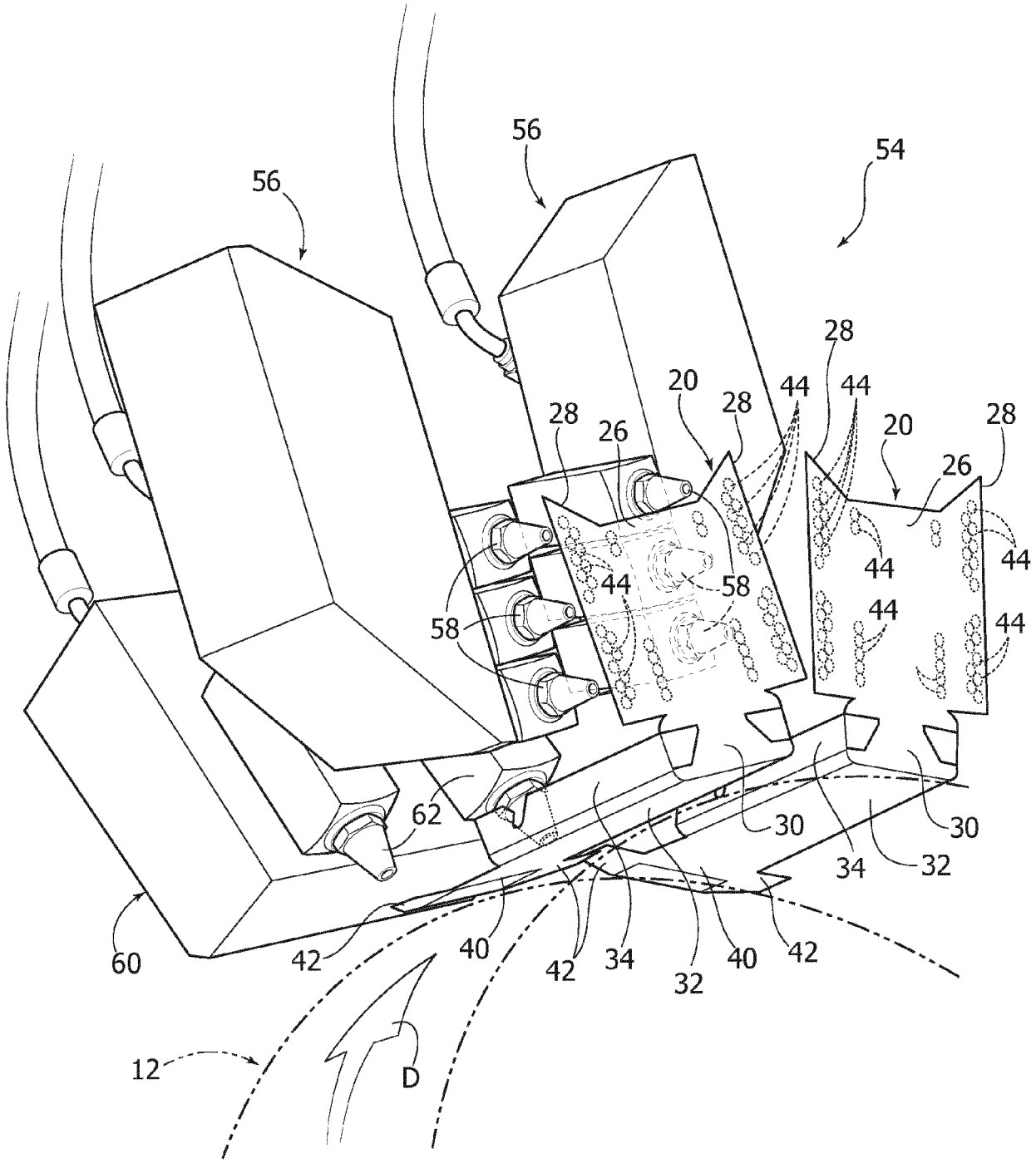
FIG. 4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EUROPEAN SEARCH REPORT

Application Number
EP 20 15 0997

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	EP 2 419 335 A2 (GIMA SPA [IT]) 22 February 2012 (2012-02-22) * figure 2 *	1-6 7,8	INV. B65B19/12 B65B19/22 B65B51/00
A	EP 2 850 002 A1 (GD SPA [IT]) 25 March 2015 (2015-03-25) * figure 6 *	1-8	B65B51/02
A	EP 1 454 829 A1 (GD SPA [IT]) 8 September 2004 (2004-09-08) * the whole document *	1,6	
A	US 5 766 121 A (SPADA VALTER [IT]) 16 June 1998 (1998-06-16) * the whole document *	1,6	
A	US 3 802 325 A (BARDENHAGEN D ET AL) 9 April 1974 (1974-04-09) * the whole document *	1,6	
A	EP 2 423 112 A1 (FOCKE & CO [DE]) 29 February 2012 (2012-02-29) * figures 4,5 *	7	TECHNICAL FIELDS SEARCHED (IPC) B65B
A	DE 10 2008 029929 A1 (FOCKE & CO [DE]) 31 December 2009 (2009-12-31) * figures 3,4 *	1,6	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 April 2020	Ungureanu, Mirela

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 15 0997

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08-04-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2419335 A2	22-02-2012	CN 102448828 A	09-05-2012
		EP 2419335 A2	22-02-2012
		ES 2499191 T3	29-09-2014
		IT 1394943 B1	27-07-2012
		PL 2419335 T3	28-11-2014
		PT 2419335 E	10-09-2014
		US 2012031051 A1	09-02-2012
		WO 2010119472 A2	21-10-2010
EP 2850002 A1	25-03-2015	EP 2850002 A1	25-03-2015
		JP 5933116 B2	08-06-2016
		JP 2015520709 A	23-07-2015
		RU 2014150542 A	20-07-2016
		WO 2013171540 A1	21-11-2013
EP 1454829 A1	08-09-2004	AT 376958 T	15-11-2007
		CN 1535898 A	13-10-2004
		DE 602004009719 T2	28-08-2008
		EP 1454829 A1	08-09-2004
		JP 4444696 B2	31-03-2010
		JP 2004269055 A	30-09-2004
		US 2004231297 A1	25-11-2004
US 5766121 A	16-06-1998	DE 69603231 D1	19-08-1999
		DE 69603231 T2	16-12-1999
		EP 0747289 A1	11-12-1996
		IT GE950064 A1	09-12-1996
		US 5766121 A	16-06-1998
US 3802325 A	09-04-1974	FR 2174006 A1	12-10-1973
		JP S4891300 A	28-11-1973
		US 3802325 A	09-04-1974
EP 2423112 A1	29-02-2012	CN 102431211 A	02-05-2012
		DE 102010035320 A1	01-03-2012
		EP 2423112 A1	29-02-2012
		PL 2423112 T3	30-09-2014
DE 102008029929 A1	31-12-2009	BR PI0913883 A2	27-10-2015
		CN 102123914 A	13-07-2011
		DE 102008029929 A1	31-12-2009
		EP 2303702 A1	06-04-2011
		JP 5391274 B2	15-01-2014
		JP 2011525460 A	22-09-2011
		PL 2303702 T3	31-10-2012
		US 2011152050 A1	23-06-2011

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 15 0997

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08-04-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 2009156135 A1	30-12-2009

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2010119472 A **[0008]**
- EP 0792806 B1 **[0015]**
- EP 2419335 B1 **[0015]**