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(54) FOLDING UNIT AND PACKAGING ASSEMBLY COMPRISING A FOLDING UNIT

(57) There is described a folding unit (1) for a packaging assembly configured to form, seal and fold a plurality of pillow packs (3); the folding unit (1) is configured to perform one or more folding operations on the pillow packs (3) so as to transform the pillow packs (3) into corresponding finished packages (2); the folding unit (1) comprises at least one moving unit (11) adapted to cyclically move along a folding path (P) and which has a receiving element (17a) for supporting one single pillow pack (3) and/or package (2) at a time from an input station (I) to an output station (0); the receiving element (17a) is configured to cooperate with a first end (50) of the package (2); the moving unit (11) comprises at least one retaining member (27) configured to cooperate with the package (2) and defining an abutment for a second end (60) of the package (2), opposite to the first end (50); the retaining member (27) is movably carried by the moving unit (11) at least between a first position, in which the retaining member (27) is detached from the package (2) and a second position, in which the retaining member (27) cooperates with the package (2) and defines the abutment for the second end (60); the retaining member (27) is movably carried by the moving unit (11) between the first position and the second position along a direction (C) transversal to the folding path (P).

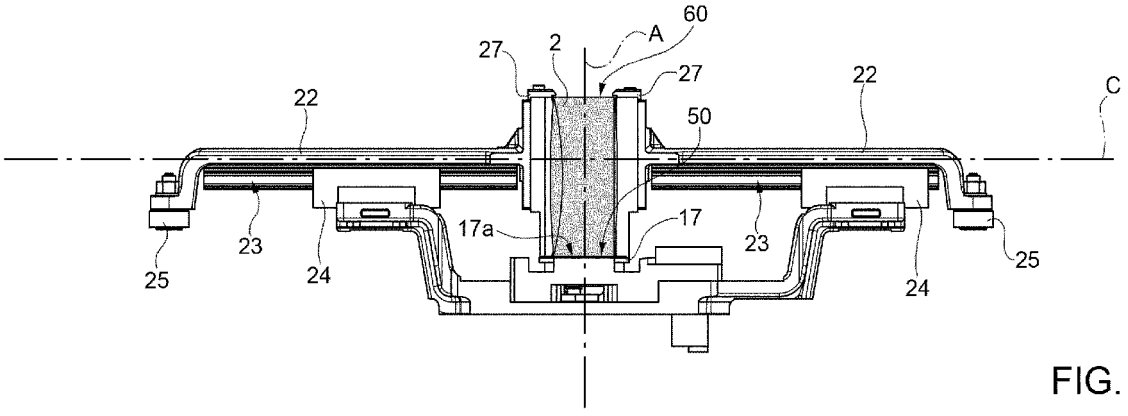

FIG. 3B

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Description

TECHNICAL FIELD

[0001] The present invention relates to a folding unit for a packaging assembly configured to form, seal and fold a plurality of packages containing a pourable product, in particular a pourable food product.

[0002] The present invention also relates to a packaging assembly configured to form, seal and fold a plurality of packages containing a pourable product, in particular a pourable food product, and comprising a folding unit.

BACKGROUND ART

[0003] As it is generally known, many pourable food products, such as fruit juice, UHT (ultra-high temperature-treated) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

[0004] A typical example is the parallelepiped-shaped package for pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by folding and sealing a laminated web of packaging material.

[0005] In particular, the packaging material has a multilayer structure, known and not described in detail.

[0006] The packages are normally produced on fully automatic packaging assemblies, in which a continuous tube is formed from the web of packaging material.

[0007] Typically, the known packaging assemblies comprise a forming unit, a folding unit and an outfeed device.

[0008] In particular, the web of packaging material is folded and sealed longitudinally to form the tube, and then the tube is fed to the forming unit along a vertical direction.

[0009] In order to complete the forming operations, the tube is filled from above with the pourable food product by means of a pipe and is formed, sealed and subsequently cut along equally spaced transversal cross sections.

[0010] Pillow packs are obtained thereby, which have a longitudinal sealing band, a top transversal sealing band and a bottom transversal sealing band.

[0011] More specifically, each pillow pack usually comprises a prismatic main portion, which has a longitudinal axis, a top end portion and a bottom end portion opposite to one another. In detail, the top end portion and the bottom end portion define respective transitions from the main portion towards the top sealing band and the bottom sealing band, respectively.

[0012] Each pillow pack further comprises an elongated rectangular top end fin, arranged at the top end portion, and an elongated rectangular bottom end fin, arranged at the bottom end portion. In detail, the top end fin and the bottom end fin protrude orthogonally from the respective top end portion or bottom end portion.

[0013] Each pillow pack also comprises two pairs of substantially triangular flaps projecting from opposite sides of the respective top end portion or bottom end portion.

[0014] After being formed, sealed and cut, the pillow packs are typically fed to the folding unit, which is configured to perform one or more folding operations on the pillow packs, so as to obtain respective finished packages.

[0015] Typically, the folding unit comprises an endless conveyor configured to advance the pillow packs and then the folded packages along an endless folding path defined by the endless conveyor.

[0016] In detail, the folding path comprises an input station, at which the folding unit receives a plurality of formed and sealed semi-finished pillow packs from the forming unit, and an output station, at which the fully-folded and finished packages are fed to the outfeed device.

[0017] In greater detail, the folding path generally comprises a top straight branch, a bottom straight branch and two curved branches, which are opposite to one another and connect, on respective opposite sides, the top straight branch and the bottom straight branch.

[0018] In particular, the input station is arranged at the curved branch adjacent to the forming unit, hereafter first curved branch, and the output station is arranged at the bottom straight branch, downstream of the curved branch opposite to the first curved branch, hereafter second curved branch.

[0019] Typically, the folding units of the known type further comprise a plurality of folding devices movably coupled to the endless conveyor so as to cyclically move, in use, along the folding path.

[0020] In detail, each folding device is configured to receive one pillow pack at a time at the input station, to carry such pillow pack along the folding path, from the input station to the output station, and to interact with such pillow pack to perform one or more relative folding operations thereon, thereby obtaining a respective finished package.

[0021] In greater detail, while each pillow pack is carried along the folding path:

- the top end portion and the bottom end portion of such pillow pack are pressed towards each other, so as to form a top end and a bottom end of the package opposite to each other;
- the top end fin and the bottom end fin are folded onto the top end and the bottom end of the package, respectively; and
- the triangular flaps of the top end portion are folded outwards onto the respective lateral walls of the main portion and the triangular flaps of the bottom end portion are folded inwards onto the respective bottom end.

[0022] A folding device adapted to be implemented in the above-mentioned folding unit is known from EP-B-2586719, and substantially comprises:

- a plate adapted to receive and support one single pillow pack to be folded at a time;
- a paddle, which projects perpendicularly from the plate and is adapted to cooperate in contact with one lateral wall of the main portion of such pillow pack, so as to push this latter along the folding path; and
- a pair of shells which are integrally movable along the folding path, are also movable towards each other relatively to the paddle and transversally to the folding path, and are configured to fold the triangular flaps of the top end portion onto the lateral walls.

[0023] In detail, the plate is adapted to cooperate in contact with the top end portion of the pillow pack.

[0024] In light of the above, the pillow pack is carried along the first curved branch and the subsequent straight branch in an upside-down position, while being transformed into a folded finished package. Then, the package is turned by 180° along the second curved branch, so that the package is fed to the outfeed device, along the bottom straight branch, in a right-side-up position.

[0025] In the configuration described in EP-B-2586719, the shells are movable towards each other between:

- a fully closed position, in which the shells exert a pressure onto the relative pillow pack, so as to perform the folding operations thereon; and
- an open position, in which the shells are detached from the relative pillow pack or the relative finished package.

[0026] Furthermore, the shells may be also arranged in a closed position, in which the shells grip the relative finished package without exerting any pressure thereon.

[0027] In this last configuration, the shells are configured to surround the package, after the relative folding operations have been completed thereon, so as to carry the package to the output station.

[0028] The folding units of the above-described type usually operate at high speed, that is to say, the folding devices cyclically move along the folding path at high speed.

[0029] Consequently, the packages are advanced from the input station to the output station at high speed.

[0030] This may cause the packages to slide out from their nominal positions, i.e. from the respective seats defined between each pair of shells and the relative paddle due to the centrifugal force that may arise and act on such packages, in particular when the packages are advanced along the second curved branch of the folding path.

[0031] This can lead to mispositioning of the packages, which could compromise their discharge to the outfeed device, thereby causing production jamming.

DISCLOSURE OF INVENTION

[0032] It is therefore an object of the present invention to provide a folding unit, which is designed to overcome the above-mentioned drawback in a straightforward and low-cost manner.

[0033] This object is achieved by a folding unit as claimed in claim 1.

[0034] It is a further object of the present invention to provide a packaging assembly, which is designed to overcome the above-mentioned drawback in a straightforward and low-cost manner.

[0035] This object is achieved by a packaging assembly as claimed in claim 8.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a top perspective view, with parts removed for clarity, of a folding unit according to the present invention;

Figure 2 is a schematic side view, with parts removed for clarity, of the folding unit of Figure 1;

Figures 3A and 3B are two front views, with parts removed for clarity, of a folding device of the folding unit of Figure 1 in two different operating conditions;

Figure 4 is a perspective view of a pillow pack the folding unit of Figure 1 is fed with.

BEST MODE FOR CARRYING OUT THE INVENTION

[0037] With reference to Figure 1, number 1 indicates as a whole a folding unit for a packaging assembly (known per se and not shown) configured to form, seal and fold a plurality of pillow packs 3 containing a pourable product, in particular a pourable food product such as fruit juice, milk, wine, tomato sauce, etc.

[0038] In particular, pillow packs 3 may be obtained from a tube, which is formed in a known manner upstream of folding unit 1 by longitudinally folding and sealing a web (not shown) of packaging material.

[0039] After being formed, the tube is filled with the pourable food product and is fed to a forming unit (not shown) of the packaging assembly. In the forming unit, the tube is sealed and cut along equally spaced cross-sections to form the plurality of semi-finished pillow packs 3, which have a longitudinal sealing band, a top transversal sealing band and bottom transversal sealing band.

[0040] More specifically, as shown in particular in Figure 4, each pillow pack 3 comprises a prismatic main portion 4, having a longitudinal axis A and being defined by four lateral walls 4a (only two visible in Figure 4) and two shaped walls 4b (only one visible in Figure 4). Each pillow pack 3 further comprises a top end portion 5 and a bottom end portion 6, axially opposite to one another.

In detail, axis A extends between top end portion 5 and bottom end portion 6, and top end portion 5 and bottom end portion 6 define respective transitions from main portion 4 towards the top sealing band and the bottom sealing band.

[0041] Each pillow pack 3 also comprises an elongated rectangular bottom end fin 7, protruding from bottom end portion 6, and an elongated rectangular top end fin 8, protruding from top end portion 5.

[0042] In detail, top end fin 8 and bottom end fin 7 protrude axially from the respective top end portion 5 or bottom end portion 6, and define the top sealing band and the bottom sealing band of pillow pack 3, respectively.

[0043] More precisely, top end fin 8 and bottom end fin 7 extend along a direction orthogonal to axis A.

[0044] In addition, each pillow pack 3 comprises two pairs of substantially triangular flaps 9, which project from opposite sides of top end portion 5 and bottom end portion 6, respectively.

[0045] After being formed, sealed and cut, pillow packs 3 are fed to folding unit 1, which is configured to perform one or more folding operations on pillow packs 3, so as to transform pillow packs 3 into corresponding fully-folded finished packages 2.

[0046] As visible in Figure 1, folding unit 1 comprises an endless conveyor 10 configured to advance semi-finished pillow packs 3 and finished packages 2 along an endless folding path P defined by endless conveyor 10.

[0047] In particular, folding path P comprises an input station I, at which folding unit 1 receives the plurality of pillow packs 3 from the forming unit, and an output station 0, at which the fully-folded and finished packages 2 exit from folding unit 1 to be fed to an outfeed device (not shown) and subsequently exit from the packaging assembly.

[0048] According to this non-limiting preferred embodiment shown, folding path P has a substantially oval-shaped profile and comprises a first curved branch P1, a top straight branch P2, a second curved branch P3 and a bottom straight branch P4.

[0049] In detail, first curved branch P1 and second curved branch P3 are opposite to one another and connect, on respective opposite sides, top straight branch P2 and bottom straight branch P4.

[0050] In greater detail, top straight branch P2 extends from first curved branch P1; second curved branch P3 extends from top straight branch P2; and bottom straight branch P4 extends from second curved branch P3 and is connected to first curved branch P1.

[0051] In particular, input station I is arranged at first curved branch P1, i.e. the one adjacent to the forming unit, and output station 0 is arranged at bottom straight branch P4, i.e. the one adjacent to the outfeed device.

[0052] In light of the above, pillow packs 3 and packages 2 are advanced, from input station I, first along first curved branch P1, then along top straight branch P2, subsequently along second curved branch P3 and eventually along bottom straight branch P4, along which packages 2 reach output station O.

[0053] In particular, pillow packs 3 and packages 2 are advanced from input station I to output station 0 with their respective axes A orthogonal to folding path P.

[0054] As visible in Figures 1 and 2, folding unit 1 further comprises a plurality of moving units, in particular folding devices 11 (only five shown in Figure 1) movably coupled to conveyor 10 so as to cyclically move along folding path P.

[0055] More specifically, each folding device 11 is adapted to move along folding path P and has a receiving element 17a for supporting one single pillow pack 3 and/or package 2 at a time, from input station I to output station O.

[0056] According to this non-limiting preferred embodiment, folding devices 11 form an endless transport element, in the example shown a chain 14 (Figure 2), formed by a plurality of consecutive links, each one defined by a single folding device 11.

[0057] In detail, chain 14 is looped about a pair of driving members, preferably a pair of coaxial sprockets 15, and about a cam (not shown).

[0058] In greater detail, chain 14 is driven by sprockets 15, so that the consecutive folding devices 11 can be moved on conveyor 10 and along folding path P.

[0059] Hence, chain 14 is configured to carry pillow packs 3 and packages 2 along folding path P, from input station I to output station O.

[0060] Since all folding devices 11 are identical to one another, only one single folding device 11 according to one non-limiting preferred embodiment of the present invention will be described in the following, for the sake of brevity.

[0061] However, all the features disclosed hereinafter for such folding device 11 are applicable to each folding device 11 of folding unit 1.

[0062] As shown in Figures 1 and 3A-3B, folding device 11 comprise:

- at least one moving member, preferably a plate 17, defining receiving element 17a and configured for carrying one single pillow pack 3 and/or package 2 at a time, from input station I to output station 0, and movably carried by folding device 11;
- a paddle 18, which projects orthogonally from plate 17 and is adapted to cooperate in contact with one lateral wall 4a of main portion 4 of pillow pack 3 and/or package 2, so as to push pillow pack 3 and/or package 2 along folding path P; and
- a pair of shells 19, which are arranged on opposite sides of plate 17, are movable along folding path P integrally with paddle 18, are also movable towards one another along a direction C orthogonal to folding path P and said axis A, and are configured to fold triangular flaps 9 of top end portion 5 onto lateral walls 4a.

[0063] It is specified that, throughout the folding oper-

ations, top end portion 5 of pillow pack 3 is transformed into a top end 50 of package 2, and bottom end portion 6 of pillow pack 3 is transformed into a bottom end 60 of package 2.

[0064] The package 2, therefore, extends along longitudinal axis A. In particular, longitudinal axis A extends from top end 50 to bottom end 60. Longitudinal axis A is arranged transversal to folding path P.

[0065] In detail, plate 17 is adapted to cooperate in contact with top end 50. Hence, pillow pack 3/package 2 is carried by folding device 11 with top end portion 5/top end 50 facing plate 17.

[0066] In light of the above, pillow pack 3 is carried, from input station I, along first curved branch P1 and the subsequent top straight branch P2 of folding path P in an upside-down position. Along first curved branch P1 and top straight branch P2, such pillow pack 3 is transformed into a package 2. Then, package 2 is turned by 180° along second curved branch P3, and eventually is fed to the outfeed device at output station O in an upright position.

[0067] After package 2 exits from folding unit 1, folding device 11 advances along bottom straight branch P4 until it reaches again first curved branch P1 and input station I.

[0068] As visible in Figure 1, paddle 18 mirrors the shape of lateral wall 4a it cooperates in contact with.

[0069] Similarly, as visible in Figures 3A-3B, shells 19 define respective surfaces 21, which are adapted to cooperate in contact with lateral walls 4a and shaped walls 4b of pillow pack 3.

[0070] In detail, surfaces 21 face one another and mirror lateral walls 4a of main portion 4, so as to control the final shape of pillow pack 3 to be folded.

[0071] In greater detail, surfaces 21 are configured to cooperate with triangular flaps 9 of top portion 5 so as to fold them outwards onto corresponding lateral walls 4a of main portion 4.

[0072] As shown in Figure 1, each shell 19 is connected to conveyor 10 of folding unit 1 by means of a relative arm 22 extending along direction C.

[0073] In detail, arms 22 define corresponding slides 23 (Figures 3A and 3B) extending along direction C and configured to engage respective guides 24 integrally carried by folding device 11 on opposite sides of paddle 18.

[0074] In greater detail, each arm 22 carries, on its end opposite to relative shell 19, a roller 25 configured to engage a relative endless cam 26 (Figure 1).

[0075] More precisely, folding unit 1 comprises two cams 26 arranged at opposite lateral sides of conveyor 10 and extending along a direction parallel to part of folding path P. In particular, cams 26 are configured to control, together with rollers 25, a movement of arms 22 transversal to folding path P and, hence, the movement of shells 19 towards one another along direction C between:

- an open position, in which shells 19 are detached from pillow pack 3 or package 2;
- a fully closed position, in which shells 19 exert a pressure onto pillow pack 3, so as to perform the folding operations thereon (as disclosed in EP-B-2586719 and not described in detail); and
- a closed position, in which shells 19 grip package 2 without exerting any pressure thereon.

[0076] In detail, shells 19 are arranged in the open position at input station I and move from the open position towards the fully closed position when folding device 11 is advancing along the top straight branch P2 of folding path P.

[0077] In greater detail, shells 19 move back from the fully closed position towards the open position when folding device 11 is advancing along the bottom straight branch P4 of folding path P.

[0078] In particular, each shell 19 moves between the fully closed position and the open position when the respective roller 25 engages corresponding operative portions of cam 26, converging to or diverging from folding path P.

[0079] According to a manner known and described in EP-B-2586719, in order to complete the folding operations on pillow pack 3, top end portion 5 and bottom end portion 6 are pressed towards each other, so as to form top end 50 and bottom end 60.

[0080] Furthermore, top end fin 8 is folded onto top end 50, bottom end fin 7 is folded onto bottom end 60, triangular flaps 9 of bottom end portion 6 are folded inwards onto bottom end 60 and triangular flaps 9 of top portion 5 are folded outwards onto corresponding lateral walls 4a of main portion 4.

[0081] After the folding operations are completed, package 2 is carried by folding device 11 along the remaining portion of top straight branch P2, along second curved branch P3 and along bottom straight branch P4, until package 2 reaches output station O.

[0082] This advancement of folding device 11 and, therefore, of package 2 along folding path P occurs at high speed.

[0083] Advantageously, folding device 11 comprises a pair of retaining members, preferably a pair of retaining fingers 27 configured to cooperate with package 2 and defining an abutment for bottom end 60, so as to prevent a displacement of package 2 away from receiving element 17a and transversally, in particular orthogonally, to folding path P.

[0084] In particular, retaining members 27 are configured to prevent the displacement of package 2 away from receiving element 17a, orthogonally to folding path P and along axis A.

[0085] More precisely, bottom end 60 is configured to abut against retaining members 27 at least when package 2 is advanced along second curved branch P3. Hence, retaining members 27 are configured to prevent the displacement of package 2 away from a center of curvature K of second curved branch P3.

[0086] In detail, as folding device 11 advances at high

speed along second curved branch P3, a centrifugal force may arise and may be exerted on package 2, causing package 2 to move away from center of curvature K, i.e. to slide along axis A, and orthogonally to both direction C and folding path P.

[0087] As visible in Figures 1 and 3A-3B, each retaining finger 27 is carried by one respective shell 19.

[0088] In particular, each retaining finger 27 is mounted on a top portion of the respective shell 19 and protrudes from such shell 19 along direction C and towards package 2.

[0089] More precisely, each retaining finger 27 protrudes from an edge of the top portion of the respective shell 19.

[0090] In detail, retaining fingers 27 are movable along direction C at least between:

- a first position, in which retaining fingers 27 are detached from package 2 (Figure 3A); and
- a second position, in which retaining fingers 27 cooperate with package 2 and define the abutment for bottom end 60 (Figure 3B).

[0091] In light of the above, retaining fingers 27 are in the second position when shells 19 are in the fully closed position or in the closed position.

[0092] In particular, retaining fingers 27 are carried (moved) to the second position when shells 19 are controlled (moved) to the fully closed position or to the closed position.

[0093] Conversely, retaining fingers 27 are in the first position, when shells 19 are in the open position.

[0094] Hence, retaining fingers 27 are configured to cooperate with package 2 and to define an abutment for bottom end 60 when shells 19 are in the closed position or in the fully closed position.

[0095] The operation of folding unit 1 is described hereinafter with reference to a single folding device 11 advancing on conveyor 10 and starting from a condition in which folding device 11 is advancing along first curved branch P1 and is receiving one respective pillow pack 3 at input station I.

[0096] More precisely, plate 17 receives and supports one pillow pack 3 and paddle 18 pushes the lateral wall 4a of pillow pack 3 along folding path P. The movement of folding device 11 along folding path P is controlled, as described above, by sprockets 15.

[0097] In this condition, shells 19 are in the open position.

[0098] As folding device 11 advances along top straight branch P2 of folding path P, rollers 25 start to engage the operative portion of cam 26 arranged at top straight branch P2.

[0099] At the same time, arms 22 are controlled to move along direction C, thereby causing the sliding of slides 23 through guides 24. In this way, shells 19 move, due to the interaction between rollers 25 and cams 26, from the open position towards the fully closed position.

[0100] Accordingly, retaining fingers 27 are carried by shells 19 from the second position towards the first position.

[0101] At this point, pillow pack 3 is folded and transformed into package 2, and folding device 11 starts to advance along second curved branch P3. Shells 19 move from the fully closed position to the closed position.

[0102] As package 2 advances along second curved branch P3, bottom end 60 abuts against retaining fingers 27 due to the centrifugal force acting on package 2.

[0103] Therefore, any movement of package 2 away from plate 17 (receiving element 17a) and along axis A, caused by the centrifugal force, is prevented by retaining fingers 27, as bottom end 60 of package 2 abuts thereon.

[0104] Along second curved branch P3, package 2 is turned by 180°, from an upside-down position to an upright position.

[0105] Eventually, folding device 11 advances along bottom straight branch P4, where shells 19 move back to the open position, and package 2 is discharged to the outfeed device at output station O.

[0106] Then, folding device 11 moves again along first curved branch P1, and is ready to pick another pillow pack 3 at input station I.

[0107] The operation is repeated cyclically for each pillow pack 3 to be folded and for each folding device 11 that may be present in folding unit 1.

[0108] The advantages of folding unit 1 according to the present invention will be clear from the foregoing description.

[0109] In particular, retaining fingers 27 prevent package 2 from sliding out from its nominal positions inside the respective receiving element 17a defined by the relative folding device 11, especially when such package 2 is advanced along second curved branch P3 of folding path P.

[0110] In this way, any mispositioning of packages 2 is prevented, thereby avoiding any production jamming.

[0111] Clearly, changes may be made to folding unit 1 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

[0112] In particular, according to a possible variant not shown, folding device 11 may comprise only one single retaining finger 27.

Claims

1. A folding unit (1) for a packaging assembly configured to form, seal and fold a plurality of pillow packs (3) containing a pourable product; said folding unit (1) being configured to perform one or more folding operations on said pillow packs (3) so as to transform said pillow packs (3) into corresponding fully-folded finished packages (2); said folding unit (1) defining an endless folding path (P) comprising an input station (I), at which said folding unit (1) receives, in use,

said pillow packs (3), and an output station (O), at which said packages (2) exit from said folding unit (1);
said folding unit (1) comprising at least one moving unit (11) adapted to cyclically move along said folding path (P) and having a receiving element (17a) for supporting one single pillow pack (3) and/or package (2) at a time from said input station (I) to said output station (0); said receiving element (17a) being configured to cooperate with a first end (50) of said package (2);
characterized in that said moving unit (11) comprises at least one retaining member (27) configured to cooperate with said package (2) and defining an abutment for a second end (60) of said package (2), opposite to said first end (50), so as to prevent a displacement of said package (2) away from said receiving element (17a) and transversally to said folding path (P);
in that said retaining member (27) is movably carried by said moving unit (11) at least between:

- a first position, in which said retaining member (27) is detached from said package (2); and
- a second position, in which said retaining member (27) cooperates with said package (2) and defines said abutment for said second end (60); and

in that said retaining member (27) is movably carried by said moving unit (11) between said first position and said second position along a direction (C) transversal to said folding path (P).

2. The folding unit as claimed in claim 1, wherein said package (2) has a longitudinal axis (A) extending from said first end (50) to said second end (60) and arranged transversal, in use, to said folding path (P); and wherein said retaining member (27) prevents displacement of said package (2) along said axis (A).

3. The folding unit as claimed in claim 2, wherein said moving unit (11) further comprises a pair of folding members (19), which are arranged on opposite sides of said receiving element (17a) with respect to said direction (C), are movable towards one another along said direction (C), and are configured to cooperate with one pillow pack (3) at a time so as to perform said folding operations and transform said pillow pack (3) into said package (2);
said retaining member (27) being carried by one of said folding members (19).

4. The folding unit as claimed in claim 3, wherein said moving unit (11) comprises two retaining members (27), each being respectively carried by one of said folding members (19).

5. The folding unit as claimed in claim 4, wherein said folding members (19) are configured to move at least between:

- an open position, in which said folding members (19) are detached from said pillow pack (3) and/or package (2); and
- a closed position, in which said folding members (19) cooperate with said pillow pack (3) and/or package (2) ;

said retaining members (27) being in said second position when said folding members (19) are in said closed position.

6. The folding unit as claimed in any one of claims 3 to 5, wherein said retaining member (27) protrudes from the respective folding member (19) along said direction (C) and towards said receiving element (17a).

7. The folding unit as claimed in any one of the foregoing claims, wherein said folding path (P) comprises at least one curved branch (P3) located between said input station (I) and said output station (O); said second end (60) being configured to abut against said retaining member (27) at least when said package (2) is advanced along said curved branch (P3); said retaining member (27) being configured to prevent displacement of said package (2) away from a center of curvature (K) of said curved branch (P3).

8. A packaging assembly configured to form, seal and fold a plurality of pillow packs (3) containing a pourable product; said packaging assembly comprising:

- a forming unit configured to form and seal a plurality of said pillow packs (3);
- a folding unit (1) according to any one of the foregoing claims; said folding unit (1) being configured to receive said pillow packs (3) from said forming unit at said input station (I), to perform one or more folding operations on said pillow packs (3) so as to obtain respective fully-folded finished packages (2), and to release said packages (2) at an output station (0).

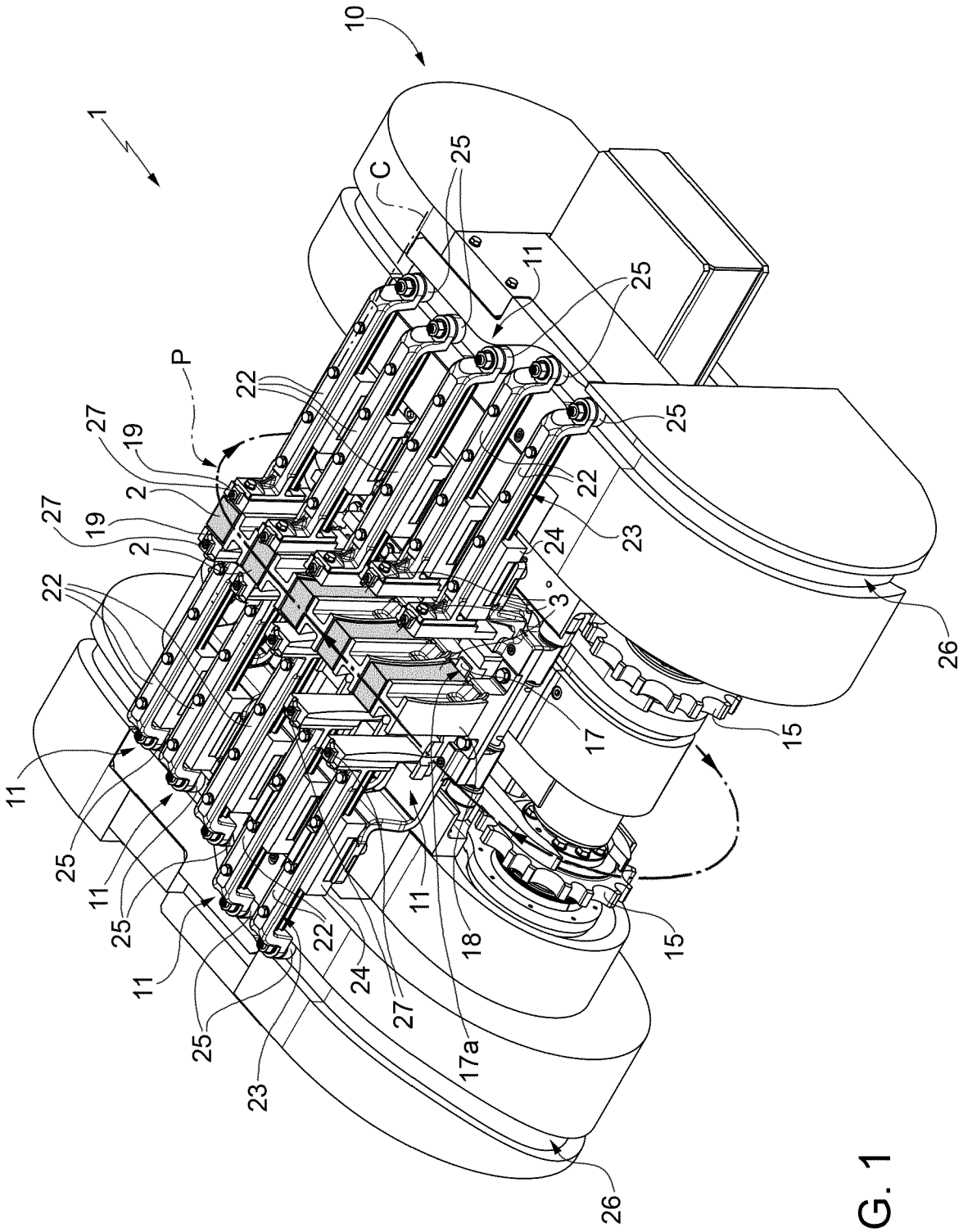
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FIG. 1

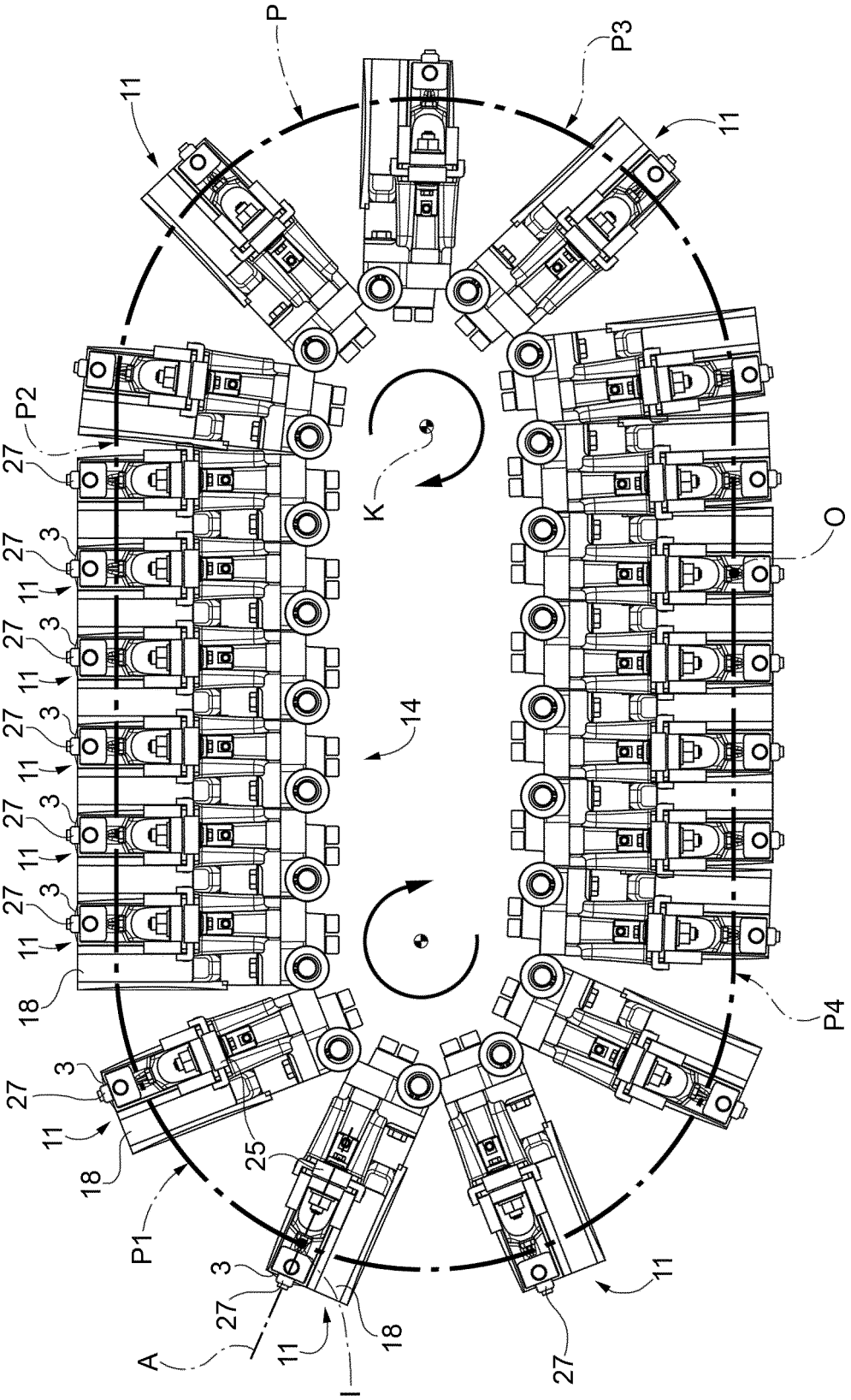
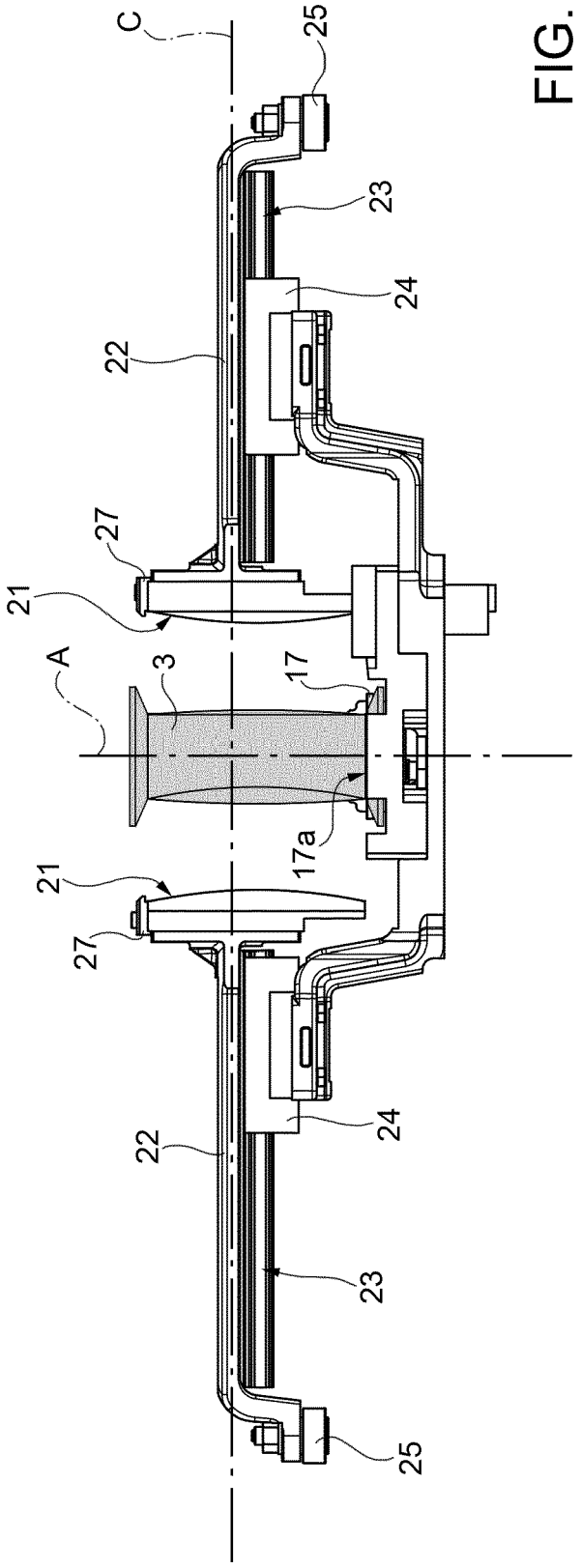


FIG. 2


C
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23
24
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27
21
A
3
17
17a
21
27
22
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23
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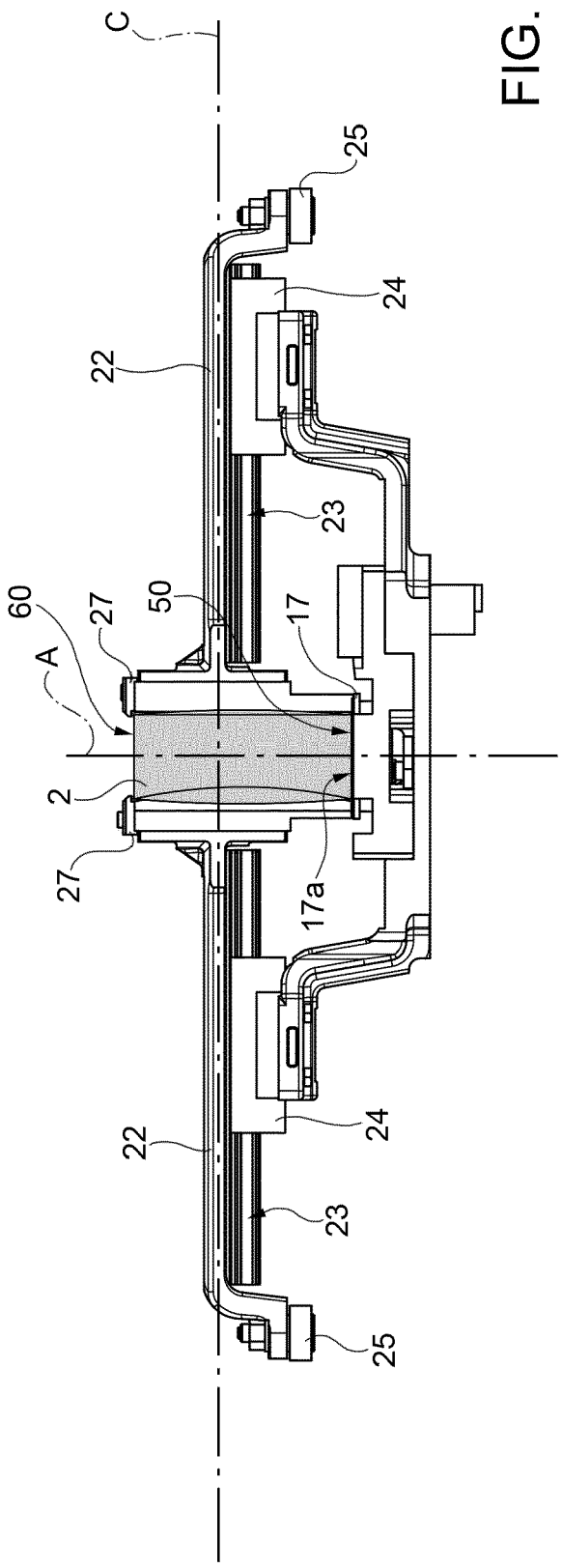
FIG. 3A


C
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22
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60
27
50
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A
2
27
17a
22
24
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FIG. 3B

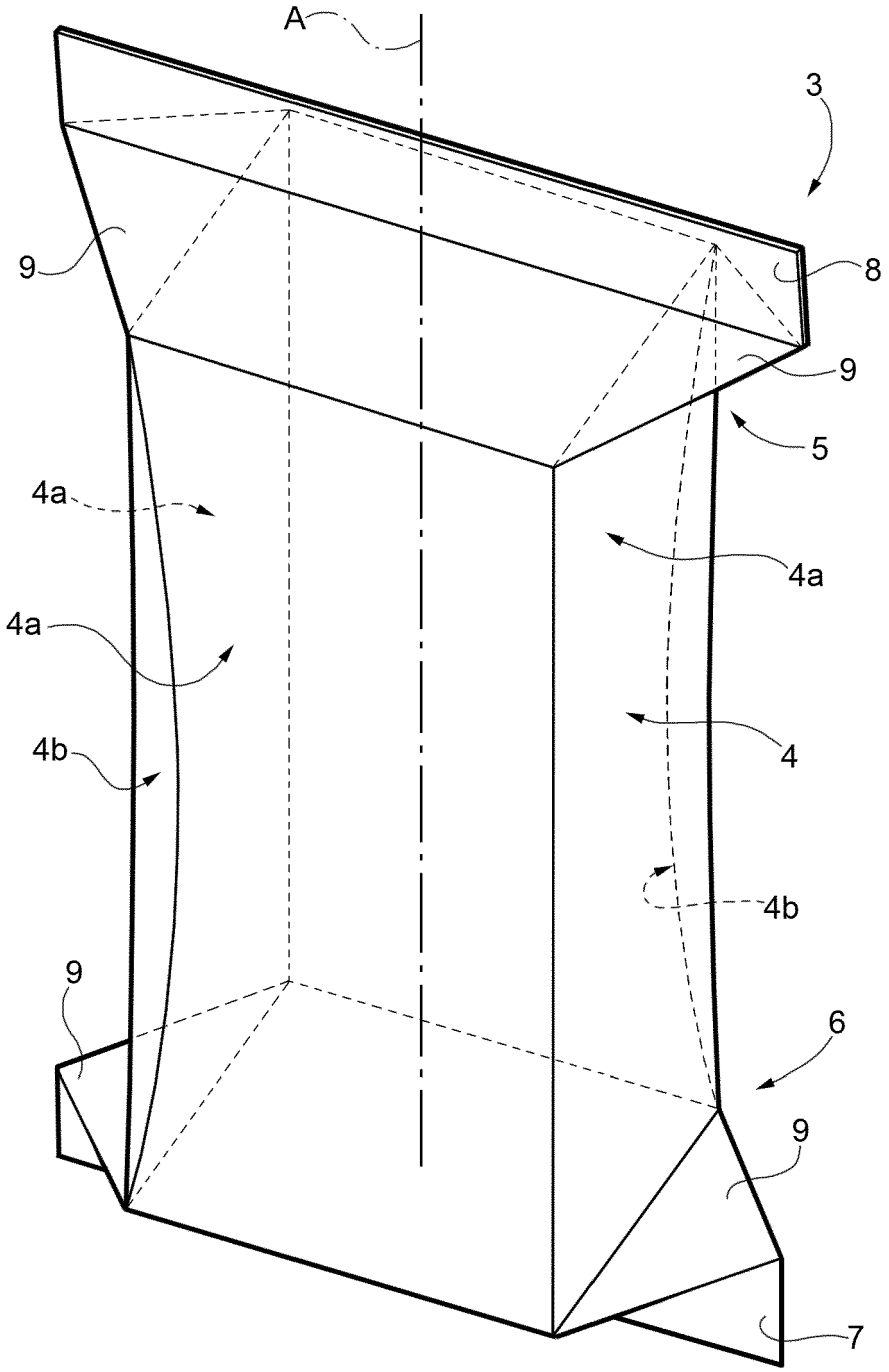

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
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B65B
B65G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 August 2018	Ungureanu, Mirela

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