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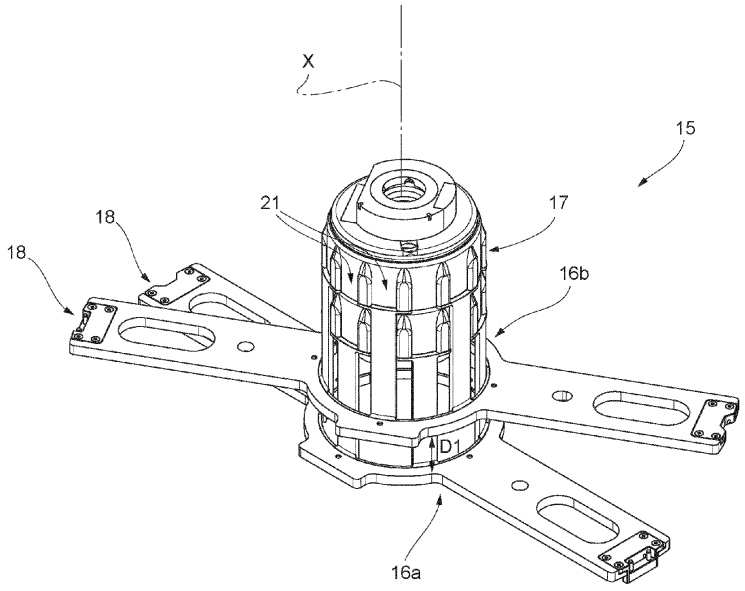
(54) REEL SUPPORT DEVICE FOR DOUBLE STACKING CONFIGURATION

(57) There is described a support device (16) for supporting a reel (5) of labelling material and comprising: a central hub (17) having a central axis (X) and a support base (18) radially extending from the central hub (17) and configured for supporting one reel (5) at a time; a first receiving surface (19a) and a first abutment surface (19b); a second receiving surface (20a) and a second abutment surface (20b); the support device (16) is configured for receiving a further support device (16) selectively onto the first receiving surface (19a), by abutment between such first receiving surface (19a) and the first abutment surface (19b) of said further support device (16), whereby a first axial distance (D1) is defined between the base (18) of the support device (16) and the base (18) of said further support device (16), or onto the second receiving surface (20a), by abutment between such second receiving surface (20a) and the second abutment surface (20b) of said further support device (16), whereby a second axial distance (D2) is defined between the base (18) of the support device (16) and the base (18) of said further support device (16), the second axial distance (D2) being different than the first axial distance (D1).

FIG. 4



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Description

TECHNICAL FIELD

[0001] The present invention relates to a support device for a reel of web of labelling material for the use in a labelling machine configured for labelling articles adapted to contain a pourable product, preferably a pourable food product.

BACKGROUND ART

[0002] Labelling machines are known, which are commonly used to prepare, transport and apply labels onto articles, such as bottles, flacons or containers of this sort, destined to be filled with a pourable product, in particular a pourable food product.

[0003] Particularly widespread is the use of glued labels, i.e. portions of a labelling material that are cut at appropriate lengths from a web of labelling material initially wound in form of continuous strip around one or more reels and then sprinkled with glue.

[0004] Particularly widespread are also labels of the tubular type, known as "sleeve labels" and obtained starting from a web of heat-shrinking film wound in form of a continuous strip around one or more storage reels; the sleeve labels are applied with a certain clearance on the respective articles and then heated in an oven to obtain their shrinking and perfect adhesion to the lateral surfaces of the articles themselves. These types of labels do not require the use of glue.

[0005] Regardless of the type of label used, a known labelling machine typically comprises:

- a carousel rotatable around a vertical axis and configured to convey a plurality of articles along a horizontal, arc-shaped labelling path; and
- at least one labelling module, peripherally arranged relatively to the carousel and configured to prepare, transport and feed a plurality of labels to the carousel at an application station, in order to apply such labels to respective articles.

[0006] According to a well-known configuration, a labelling module typically comprises:

- one or more support shafts for supporting in a rotatable manner one reel of labelling material at a time;
- a feed roller for unwinding the web off the relative reel and advance it along a feed path;
- a plurality of guide rollers, which support, in use, the web progressively unwound from the reel and guide it, in use, along the feed path;
- a cutting unit for repeatedly cut the web at a cutting station so as to separate a sequence of labels from the web itself; and
- a label transfer device, for example a known vacuum drum configured to receive, retain and advance each label and to feed each label to the carousel, at the application station.

[0007] In case glued labels are used, the labelling module further comprises a gluing roller for sequentially spreading glue the onto labels, prior to their application onto the relative articles.

[0008] Typically, labelling machines of the above type further comprise a reel feeding system associated with the labelling module and configured to supply the labelling module, and in particular the one or more support shafts thereof, with reels of labelling material.

[0009] Generally, the reel feeding system comprises a storage unit having a longitudinal axis and adapted for storing a plurality of reels axially stacked on top of one another.

[0010] Labelling machines configured to apply labels of different sizes, and in particular of different transversal widths, are increasingly widespread.

[0011] Furthermore, the need for applying such labels of different transversal width by means of the same labelling module is known.

[0012] In this regard, the storage unit must be configured to accommodate reels of different sizes, namely reels with different axial widths.

[0013] The need is felt in the sector for minimizing the space allocated for the stacked reels in the known storage units and/or for maximizing the use of the available space in the known storage units, while also increasing the autonomy of the respective labelling module and, ultimately, of the labelling machines of the aforementioned type.

DISCLOSURE OF INVENTION

[0014] It is therefore an object of the present invention to provide a reel support device which is designed to overcome at least one of the above-mentioned drawbacks in a straightforward and low-cost manner.

[0015] This object is achieved by a reel support device as claimed in the appended independent claim 1. Preferred embodiments of the present invention are laid down in the appended dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] 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 schematic top view, with parts removed for clarity, of a labelling machine having a web feeding system comprising a reel support device according to the present invention;

Figures 2 and 3 are perspective views respectively from above and below, and with parts removed for clarity, of the support device according to the present invention;

Figure 4 is a perspective view, with parts removed for clarity, of a pair of support devices stacked on top of one another according to a first stacking configuration;

Figure 5 is a larger-scale, sectioned perspective view, of the pair of support devices of Figure 4;

Figure 6 is a perspective view, with parts removed for clarity, of a pair of support devices stacked on top of one another according to a second stacking configuration;

Figure 7 is a larger-scale, sectioned perspective view, of the pair of support devices of Figure 5;

Figure 8 is a perspective view, with parts removed for clarity, of a storage unit of the web feeding device of Figure 1, including a plurality of support devices according to the invention and stacked one on top of the other according to the first stacking configuration;

Figure 9 is a perspective view, with parts removed for clarity, of the storage unit of Figure 8 including a plurality of support devices according to the invention and stacked one on top of the other according to the second stacking configuration.

BEST MODE FOR CARRYING OUT THE INVENTION

[0017] With reference to Figure 1, number 1 indicates as a whole a labelling machine for labelling articles 2, such as bottles, flacons, cans or containers of this sort, adapted to contain a pourable product, preferably a pourable food product.

[0018] In particular, labelling machine 1 is configured to apply labels 3 obtained from a web 4 of labelling material onto articles 2.

[0019] According to this preferred and non-limiting embodiment, labels 3 are glued labels, i.e. strips of labelling material that are cut at predetermined lengths from web 4 and then sprinkled with glue before their application on the respective articles 2, according to a manner known and not described in detail.

[0020] Web 4 is provided in the form of a continuous strip initially wound around reels 5 and is progressively unwound, in use, off each reel 5, according to a known manner.

[0021] As visible in Figure 1, labelling machine 1 comprises:

- a conveyor device, preferably a carousel 6 rotatable around a fixed axis (not shown), preferably vertical, and configured to advance a plurality of articles 2 along an arc-shaped labelling path, preferably horizontal;
- a labelling module 7 (only schematically shown), arranged peripherally relatively to carousel 6 and configured to prepare a plurality of labels 3 and feed them to the carousel 6 at an application station A, in order to apply labels 3 onto respective articles 2.

[0022] Labelling module 7 comprises:

- a support unit 8, preferably in the form of two support shafts, for supporting in an unwindable manner each reel 5;
- a plurality of guide rollers 10, arranged operatively downstream of support unit 8, and configured to control the unwinding of web 4 off the respective reel 5, to support the web 4 progressively unwound from reel 5 and to guide web 4 along a feed path;
- a cutting unit 11 (known per se and only schematically shown) arranged downstream of guide rollers 10, along the feed path, and configured to repeatedly cut web 4 thereby separating a sequence of labels 3 therefrom; and
- a transfer drum 12, preferably a vacuum drum of the known type, arranged downstream of cutting unit 11, rotatable about a central axis and configured to transfer labels 3 to application station A for the application thereof onto respective articles 2.

[0023] Labelling module 7 further comprises a glue roller of the known type (not shown) for sprinkling each label 3 with glue prior to its application onto the respective article 2.

[0024] Labelling module 7 may also comprise a splicing device 13 configured for splicing the terminal portion of a first web 4 with the initial portion of a second web 4, according to a manner known and not described in detail.

[0025] In use, while such first web 4 is unwound from the respective first reel 5 in use, a new second reel 5, and hence a new web 4 (i.e. the second web 4) must be fed to labelling module 7, in order to correctly perform the splicing operation.

[0026] To this end, and in order to speed up and automatize the reel change operation, labelling machine 1 comprises a reel feeding system 14 for supplying reels 5 to labelling module 7.

[0027] Feeding system 14 comprises a storage unit 15 configured for storing a plurality of reels 5.

[0028] In detail, storage unit 15 has a longitudinal axis and is configured for storing reels 5 axially stacked (in a coaxial manner) one on top of the other.

[0029] To this end, storage unit 15 comprises a plurality of reel support devices 16, which are adapted to be axially stacked on top of one another.

[0030] In one embodiment, storage unit 15 includes at least a first support device 16a and a second support device 16b, axially stacked one on top of the other.

[0031] In light of the above, storage unit 15 is defined by at least two support devices 16 stacked one on top of the other.

[0032] Reference will be made in the following to a single support device 16 according to the present invention. The structural and functional features described for such support device 16 are applicable to each support device 16 that may be present in storage unit 15.

[0033] As visible in Figures 2 and 3, support device 16

comprises:

- a central hub 17 having a central axis X and adapted for the transport (or transfer) of the support device 16 itself, as better described in the following;
- a support base 18 radially extending from the central hub 17 and configured for supporting one reel 5 at a time.

[0034] In detail, hub 17 extends axially from base 18.

[0035] Preferably, base 18 includes two arms 18a which radially protrude from hub 17, and in particular from an axial end portion of hub 17 opposite from an axial free end portion of hub 17.

[0036] In practice, support device 16 is configured to support the respective reel 5 by means of base 18, whereby the flat part of such reel 5, i.e. the circular base of such reel 5, rests on arms 18a.

[0037] The hub 17 is configured to engage a central through hole of the supported reel 5.

[0038] According to a first aspect of the present invention, support device 16 comprises:

- a first receiving surface 19a and a first abutment surface 19b; and
- a second receiving surface 20a and a second abutment surface 20b.

[0039] According to a second aspect of the present invention, the support device 16 is configured for receiving a further support device 16 selectively onto the first receiving surface 19a, by abutment between such first receiving surface 19a and the first abutment surface 19b of the further support device 16, whereby a first axial distance D1 is defined between the base 18 of the support device 16 and the base 18 of the further support device 16, or onto the second receiving surface 20a, by abutment between such second receiving surface 20a and the second abutment surface 20b of the further support device 16, whereby a second axial distance D2 is defined between the base 18 of the support device 16 and the base 18 of the further support device 16, the second axial distance D2 being different than the first axial distance D1.

[0040] In particular, the support device 16 according to the invention is configured to be axially stacked with the further support device 16 selectively by abutment between its first receiving surface 19a and the first abutment surface 19b of the further support device 16 for defining a first stacking configuration (Figures 4 and 5) whereby said first axial distance D1 is defined between the respective bases 18 of the support device 16 and the further support device 16, or by abutment between its second receiving surface 20a and the second abutment surface 20b of said further support device 16 for defining a second stacking configuration (Figures 6 and 7) whereby said second axial distance D2 is defined between the respective bases 18 of the support device 16 and the further support device 16.

[0041] More in particular, the first receiving surface 19a is configured to receive in abutment the first abutment surface 19b of the further support device 16 for defining such first stacking configuration, and the second receiving surface 20a is configured to receive in abutment the second abutment surface 20b of the further support device 16 for defining such second stacking configuration.

[0042] With reference to Figures 4 and 5, storage unit 15 comprises at least a first support device 16a and a second support device 16b, which are stacked on top of one another, preferably in a coaxial manner.

[0043] For example, second support device 16b is stacked on top of first support device 16a.

[0044] In detail, when two or more support devices 16 are axially stacked, their hubs 17 mutually engage.

[0045] In light of the above, the first receiving surface 19a of the first support device 16a is configured to receive (in abutment) the first abutment surface 19b of the second support device 16b for defining the aforementioned first axial distance D1 between the respective bases 18 of the first support device 16a and of the second support device 16b.

[0046] Similarly, with reference to Figures 6 and 7, the second receiving surface 20a of the first support device 16a is configured to receive the second abutment surface 20b of the second support device 16b for defining the aforementioned second axial distance D2 between the respective bases 18 of the first support device 16a and second support device 16b.

[0047] In one embodiment, the second axial distance D2 is larger than the first axial distance D1.

[0048] According to a further aspect of the present invention, the support device 16 is configured such that:

- the first stacking configuration corresponds to a first mutual angular orientation between the support device 16 and the further support device 16, for example between the first support device 16a and the second support device 16b (Figure 4); and
- the second stacking configuration corresponds to a second mutual angular orientation, distinct from the first mutual angular orientation, between the support device 16 and the further support device 16, for example between the first support device 16a and the second support device 16b (Figure 6).

[0049] More specifically, the support device 16 is configured such that the first stacking configuration is activatable by arranging the first support device 16a and the second support device 16b in a stacked condition whereby they are at the aforementioned first angular mutual orientation, and such that the second stacking configuration is activatable by arranging the first support device 16a and the second support device 16b in a stacked condition whereby they are at the aforementioned second angular mutual orientation.

[0050] Hence, according to the invention, the storage unit 15 is configured to selectively assume a first stacking configuration, whereby:

- the first support device 16a and the second support device 16b are arranged at the first angular mutual orientation,
- the first abutment surface 19b of the second support device 16b abuts onto the first receiving surface 19a of the first support device 16a, and
- the first axial distance D1 is defined between the respective bases 18 of the first support device 16a and second support device 16b,

and a second stacking configuration, whereby:

- the first support device 16a and the second support device 16b are arranged at the second angular mutual orientation,
- the second abutment surface 20b of the second support device 16b abuts onto the second receiving surface 20a of the first support device 16a, and
- the second axial distance D2 is defined between the respective bases 18 of the first support device 16a and second support device 16b.

[0051] In other words, by selectively stacking the same two support devices 16 on top of one another with either the first mutual angular orientation or the second mutual angular orientation, it is possible to respectively obtain the first stacking configuration or the second stacking configuration, and therefore the first axial distance D1 or the second axial distance D2 between the two bases 18, respectively. The second axial distance D2 is greater than the first axial distance D1.

[0052] In this way, thanks to the configuration of the support device 16 according to the present invention, the storage unit 15 may accommodate both large-sized reels 5 (Figure 9) and small-sized reels 5 while always maximizing the use of the available space therein (Figure 8).

[0053] It is stated that, for the purpose of the present description, a large-sized reel 5 is defined as a reel 5 having an axial width corresponding at most to the second axial distance D2, and a small-sized reel 5 is defined as a reel 5 having an axial width corresponding at most to the first axial distance D1.

[0054] Accordingly, in order to store a large-sized reel 5 in the storage unit 15, it is sufficient to stack a first support device 16a in the storage unit 15 and then stack a second support device 16b on top of first support device 16a by selecting/activating the second stacking configuration. The second axial distance D2 is then established between the bases 18 of the first support device 16a and second support device 16b, which is appropriate for accommodating the large-sized reel 5 (supported by the first support device 16a).

[0055] Conversely, in order to store a small-sized reel 5 in the storage unit 5, it is sufficient to stack a first support device 16a in the storage unit 15 and then stack a second support device 16b on top of first support device 16a by selecting/activating the first stacking configuration. The first axial distance D1 is then established between the bases 18 of the first support device 16a and second support device 16b, which is appropriate for accommodating the small-sized reel 5 (supported by the first support device 16a).

[0056] Therefore, it is not necessary to always provide an axial distance corresponding to the axial width of the large-sized reel 5, between the stacked support devices 16 in the storage unit 15.

[0057] In light of the above, the support device 16 according to the present invention allows for maximizing the use of the available space in storage unit 15.

[0058] Conveniently, the second receiving surface 20a is arranged in a position radially more external than the first receiving surface 19a (Figure 2), and the second abutment surface 20b is arranged in a position radially more external than the first abutment surface 19b (Figure 3) .

[0059] This peculiar structural feature enables the implementation of the selection between the first stacking configuration and the second stacking configuration in a simple manner, as better explained below.

[0060] Conveniently, the first receiving surface 19a, the first abutment surface 19b, the second receiving surface 20a and the second abutment surface 20b are axial, so that said abutment between the first receiving surface 19a and the first abutment surface 19b is defined in the axial direction and so that that said abutment between the second receiving surface 20a and the second abutment surface 20b is defined in the axial direction.

[0061] This allows for easy centering between two support devices 16 during abutment, thereby minimizing stacking errors.

[0062] Preferably, the first receiving surface 19a, the first abutment surface 19b, the second receiving surface 20a and the second abutment surface 20b are obtained on the central hub 17.

[0063] This allows for a more compact configuration and further reduces centering errors during stacking.

[0064] Advantageously, the second receiving surface 20a and the second abutment surface 20b extend about the central axis X in a discontinued manner.

[0065] More specifically, the second receiving surface 20a includes a plurality of portions which are separated from one another by axial passages 21, are angularly distributed about the central axis X and are angularly interspersed with the passages 21 (which are in turn angularly distributed about axis X).

[0066] Similarly, the second abutment surface 20b includes a plurality of portions separated from one another and angularly distributed about the central axis X.

[0067] Advantageously, the support device 16a is configured such that each passage 21 can be crossed by a respective portion of the second abutment surface 20b of the further support device 16, so as to allow the abutment

between the first receiving surface 19a and the first abutment surface 19b (Figure 4).

[0068] For example, to obtain the situation depicted in Figures 4 and 5, the passages 21 of the first support device 16a have been crossed by the respective portions of the second abutment surface 20b of the second support device 16b.

[0069] In practice, the support device 16 according to the invention is configured such that its passages 21 are axially aligned with, and crossed by, the respective portions of the second abutment surfaces 20b of the further support device 16, while the first stacking configuration is being set with the support device 16 and the further support device 16 adopting the first mutual orientation.

[0070] Furthermore, the support device 16 is configured such that when the support device 16 and the further support device 16 (and for example the first support device 16a and the second support device 16b) are arranged at the aforementioned second angular mutual orientation, each portion of the second receiving surface 20a is axially aligned with a respective portion of the second abutment surface 20b of said further support device 16, for defining said second stacking configuration.

[0071] It is stated that the first mutual angular orientation can correspond to a plurality of first angular orientations, and the second mutual angular orientation can correspond to a plurality of second angular orientations.

[0072] In this way, the selection between the first stacking configuration and the second stacking configuration can be performed in an easy and simple manner, minimizing the errors in selecting between such two configurations.

[0073] In fact, it is sufficient to axially stack two or more support devices 16, by axially engaging the hub 17 of a first support device 16a with the hub 17 of a second support device 16b, and by choosing the first or second mutual angular orientations between these latter, to selectively activate either the first stacking configuration or second stacking configuration.

[0074] In this way, small-sized reels 5 and/or large-sized reels 5 can be stored in storage unit 15 in a very straightforward way, while also minimizing the occupied space in storage unit 15.

[0075] Advantageously, feeding system 14 further comprises a gripping device 22 (for example a robotic arm) configured to sequentially grip each support device 16 at the central hub 17 thereof for transferring the respective reel 5 from the storage unit 15 to the labelling module 7. The gripping device 22 can be part of a robot or part of a cobot.

[0076] In this way, it is possible to easily control the orientation in an automatic and repeatable manner, thereby sensibly reducing errors and machine downtime.

[0077] In one embodiment, feeding system 14 includes a sensor for detecting the size of each reel 5, and a control unit.

[0078] In such embodiment, the control unit is configured to control a movement of the gripping device 22 based on the information received by the sensor, so as to impart to the relative support device 16 the correct orientation, thereby selecting/activating the first stacking configuration or the second stacking configuration.

[0079] From the foregoing, it is clear how the support device 16 according to the present invention allows to implement a method for stacking reels 5 of labelling material for the labelling of articles 2 adapted to contain a pourable product, the method comprising the steps of:

- supporting each reel 5 by means of a support device 16;
- axially stacking a first support device 16a and a second support device 16b on top of one another;

wherein the step of axially stacking is carried out by selectively:

- abutting the first abutment surface 19b of the second support device 16b onto the first receiving surface 19a of the first support device 16a, so as to define the first axial distance D1 between the respective bases 18 thereof; or
- abutting the second abutment surface 20b of the second support device 16b onto the second receiving surface 20a of the first support device 16a, so as to define the second axial distance D2 between the respective bases 18 thereof.

[0080] The advantages of the support device 16 according to the present invention will be clear from the foregoing description.

[0081] In particular, thanks to the configuration of the support device 16 according to the present invention, the space allocated for the stacked reels 5 in the storage unit 15 can be minimized, thereby maximizing the use of the available space therein.

[0082] Furthermore, this allows for increasing the autonomy of the labelling module 7 and, ultimately, of the labelling machine 1, because the increase in available space in storage unit 15 allows for a larger number of reels 5 to be stored therein.

[0083] Ultimately, the overall productivity of the labelling machine 1 is increased.

[0084] Clearly, changes may be made to support device 16 as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

Claims

1. Support device (16) for supporting a reel (5) of labelling material for labelling articles (2) adapted to contain a pourable product, the support device (16) comprising:

- a central hub (17) having a central axis (X) and adapted for the transport of the support device (16);
- a support base (18) radially extending from the central hub (17) and configured for supporting one reel (5) at a time;
- a first receiving surface (19a) and a first abutment surface (19b);
- a second receiving surface (20a) and a second abutment surface (20b);

wherein the support device (16) is configured for receiving a further support device (16) selectively onto the first receiving surface (19a), by abutment between such first receiving surface (19a) and the first abutment surface (19b) of said further support device (16), whereby a first axial distance (D1) is defined between the base (18) of the support device (16) and the base (18) of said further support device (16), or onto the second receiving surface (20a), by abutment between such second receiving surface (20a) and the second abutment surface (20b) of said further support device (16), whereby a second axial distance (D2) is defined between the base (18) of the support device (16) and the base (18) of said further support device (16), the second axial distance (D2) being different and greater than the first axial distance (D1).

2. Support device as claimed in claim 1, wherein the support device (16) is configured to be axially stacked with said further support device (16) selectively by abutment between its first receiving surface (19a) and the first abutment surface (19b) of said further support device (16) for defining a first stacking configuration whereby said first axial distance (D1) is defined between the respective bases (18) of the support device (16) and the further support device (16), or by abutment between its second receiving surface (20a) and the second abutment surface (20b) of said further support device (16) for defining a second stacking configuration whereby said second axial distance (D2) is defined between the respective bases (18) of the support device (16) and the further support device (16).

3. Support device as claimed in claim 2, wherein:

- the first receiving surface (19a) is configured to receive in abutment the first abutment surface (19b) of said further support device (16) for defining said first stacking configuration, and
- the second receiving surface (20a) is configured to receive in abutment the second abutment surface (20b) of said further support device (16) for defining said second stacking configuration.

4. Support device as claimed in claim 2 or 3, wherein the support device (16) is configured such that:

- the first stacking configuration corresponds to a first angular mutual orientation between the support device (16) and the further support device (16), and
- the second stacking configuration corresponds to a second angular mutual orientation, distinct from the first angular mutual orientation, between the support device (16) and the further support device (16).

5. Support device as claimed in claim 4, wherein the support device (16) is configured such that the first stacking configuration is activatable by arranging the support device (16) and said further support device (16) in a stacked condition whereby the support device (16) and the further support device (16) are at said first angular mutual orientation, and such that the second stacking configuration is activatable by arranging the support device (16) and said further support device (16) in a stacked condition whereby the support device (16) and the further support device (16) are at said second angular mutual orientation.

6. Support device as claimed in any one of the foregoing claims, wherein the second receiving surface (20a) is arranged in a position radially more external than the first receiving surface (19a), and the second abutment surface (20b) is arranged in a position radially more external than the first abutment surface (20a).

7. Support device as claimed in claim 6, wherein the second receiving surface (20a) and the second abutment surface (20b) extend about the central axis (X) in a discontinued manner.

8. Support device as claimed in claim 7, wherein the second receiving surface (20a) includes a plurality of portions which are separated from one another by axial passages (21), are angularly distributed about the central axis (X) and are angularly interspersed with the passages (21), and the second abutment surface (20b) includes a plurality of portions separated from one another and angularly distributed about the central axis (X),
the support device (16) being configured such that each passage (21) can be crossed by a respective portion of the second abutment surface (20b) of said further support device (16), so as to allow said abutment between the first receiving surface (19a) and the first abutment surface (19b).

9. Support device as claimed in claims 4 and 8, wherein the support device (16) is configured such that the

passages (21) are axially aligned with, and crossed by, the respective portions of the second abutment surfaces (20b) of the further support device (16), while the first stacking configuration is being set with the support device (16) and the further support device (16) adopting the first mutual orientation.

10. Support device as claimed in claim 9, wherein the support device (16) is configured such that each portion of the second receiving surface (20a) is axially aligned with a respective portion of the second abutment surface (20b) of said further support device (16) when the support device (16) and the further support device (16) are at said second angular mutual orientation, for defining said second stacking configuration.

11. Reel feeding system (14) for supplying reels (5) of labelling material to a labelling module (7) of a labelling machine (1) for labelling articles (2) adapted to contain a pourable product, the reel feeding system (14) including a storage unit (15) configured for storing a plurality of said reels (5) and comprising at least a first support device (16a) and a second support device (16b), each of said first device (16a) and second device (16b) being as claimed in any one of the foregoing claims and said first device (16a) and second device (16b) being axially stacked one on top of the other;
wherein:

- the first receiving surface (19a) of the first support device (16a) is configured to receive the first abutment surface (19b) of the second support device (16b) for defining said first axial distance (D1) between the respective bases (18) of the first support device (16a) and second support device (16b); and
- the second receiving surface (20a) of the first support device (16a) is configured to receive the second abutment surface (20b) of the second support device (16b) for defining said second axial distance (D2) between the respective bases (18) of the first support device (16a) and second support device (16b).

12. Reel feeding system as claimed in claim 11, wherein the storage unit (15) is configured to selectively assume a first stacking configuration, whereby:

- the first support device (16a) and the second support device (16b) are arranged at a first angular mutual orientation,
- the first abutment surface (19b) of the second support device (16b) abuts onto the first receiving surface (19a) of the first support device (16a), and
- said first axial distance (D1) is defined between the respective bases (18) of the first support device (16a) and second support device (16b),

and a second stacking configuration, whereby:

- the first support device (16a) and the second support device (16b) are arranged at a second angular mutual orientation,
- the second abutment surface (20b) of the second support device (16b) abuts onto the second receiving surface (20a) of the first support device (16a), and
- said second axial distance (D2) is defined between the respective bases (18) of the first support device (16a) and second support device (16b).

13. Reel feeding system as claimed in claim 11 or 12, and further comprising a gripping device (14) configured to sequentially grip each support device (16a, 16b) at the central hub (17) thereof for transferring the respective reel (5) from the storage unit (15) to said labelling module (7), the gripping device (14) being preferably part of a robot or cobot.

14. Labelling machine (1) for labelling articles (2) adapted to contain a pourable product, the labelling machine (1) comprising:

- a conveyor device (6) for advancing a sequence of articles (2) to be labelled along a labelling path;
- a labelling module (7) for labelling the articles (2) advanced along the labelling path; and
- a reel feeding system (14) as claimed in any one of claims 11 to 13.

15. Method for stacking reels (5) of labelling material for the labelling of articles (2) adapted to contain a pourable product, the method comprising the steps of:

- supporting each reel (5) by means of a support device (16) as claimed in any one of claims 1 to 10;
- axially stacking a first support device (16a) and a second support device (16b) on top of one another;

wherein the step of axially stacking is carried out by selectively:

- abutting the first abutment surface (19b) of the first support device (16b) onto the first receiving surface (19a) of the second support device (16a), so as to define the first axial distance (D1) between the respective bases (18) of the first support device (16a) and the second sup-

port device (16b); or
- abutting the second abutment surface (20b) of the first support device (16b) onto the second receiving surface (20a) of the second support device (16a), so as to define the second axial distance (D2) between the respective bases (18) of the first support device (16a) and the second support device (16b).

FIG. 1

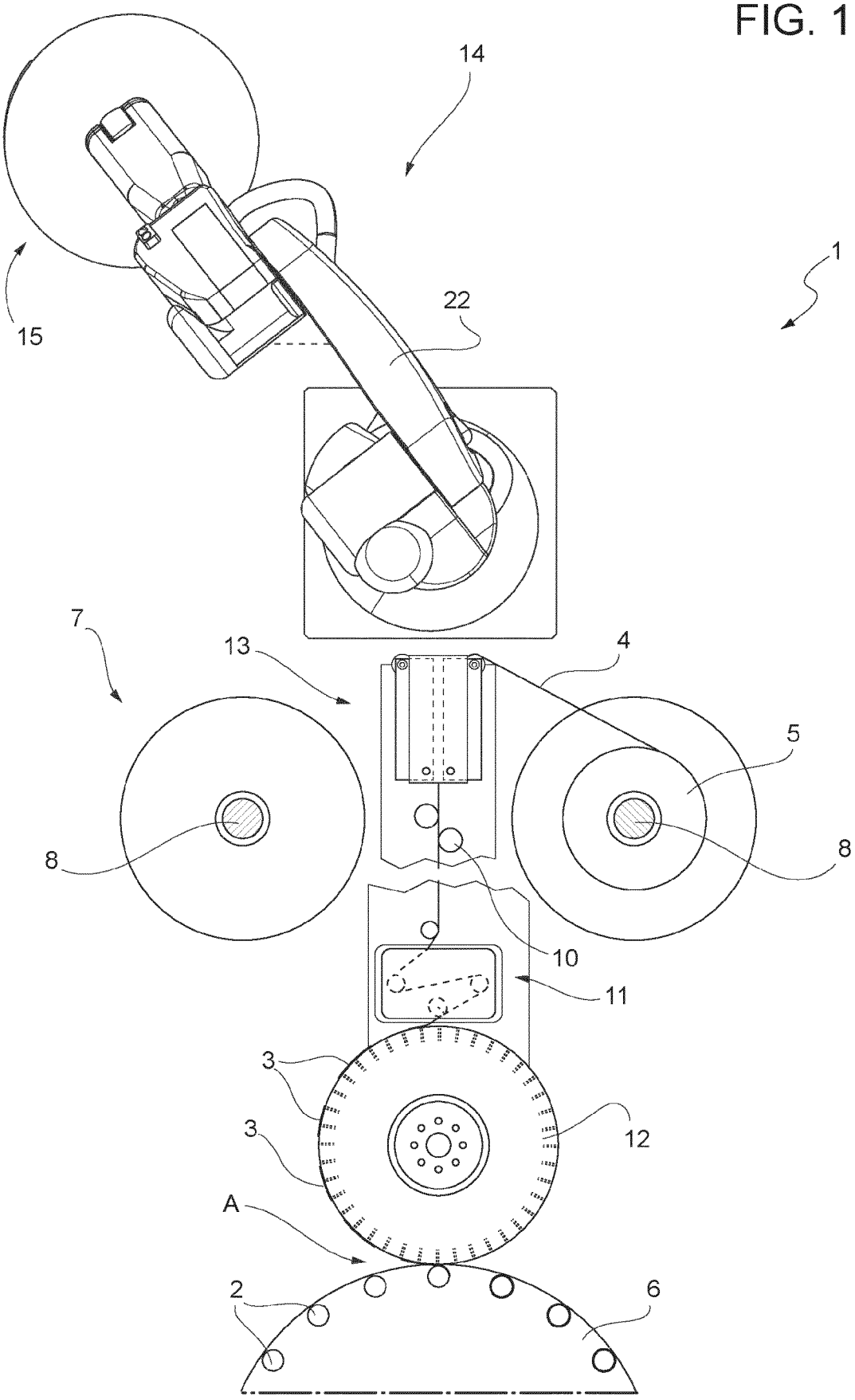


FIG. 2

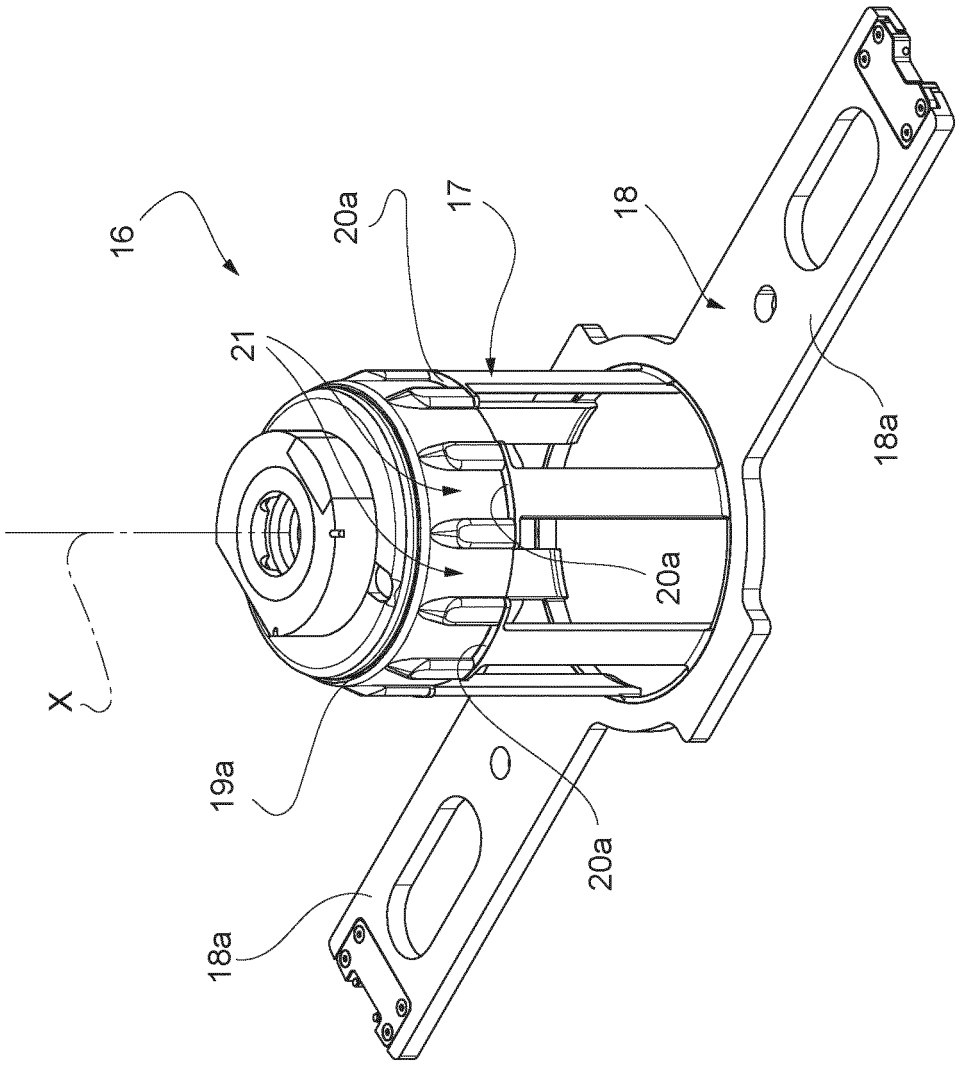
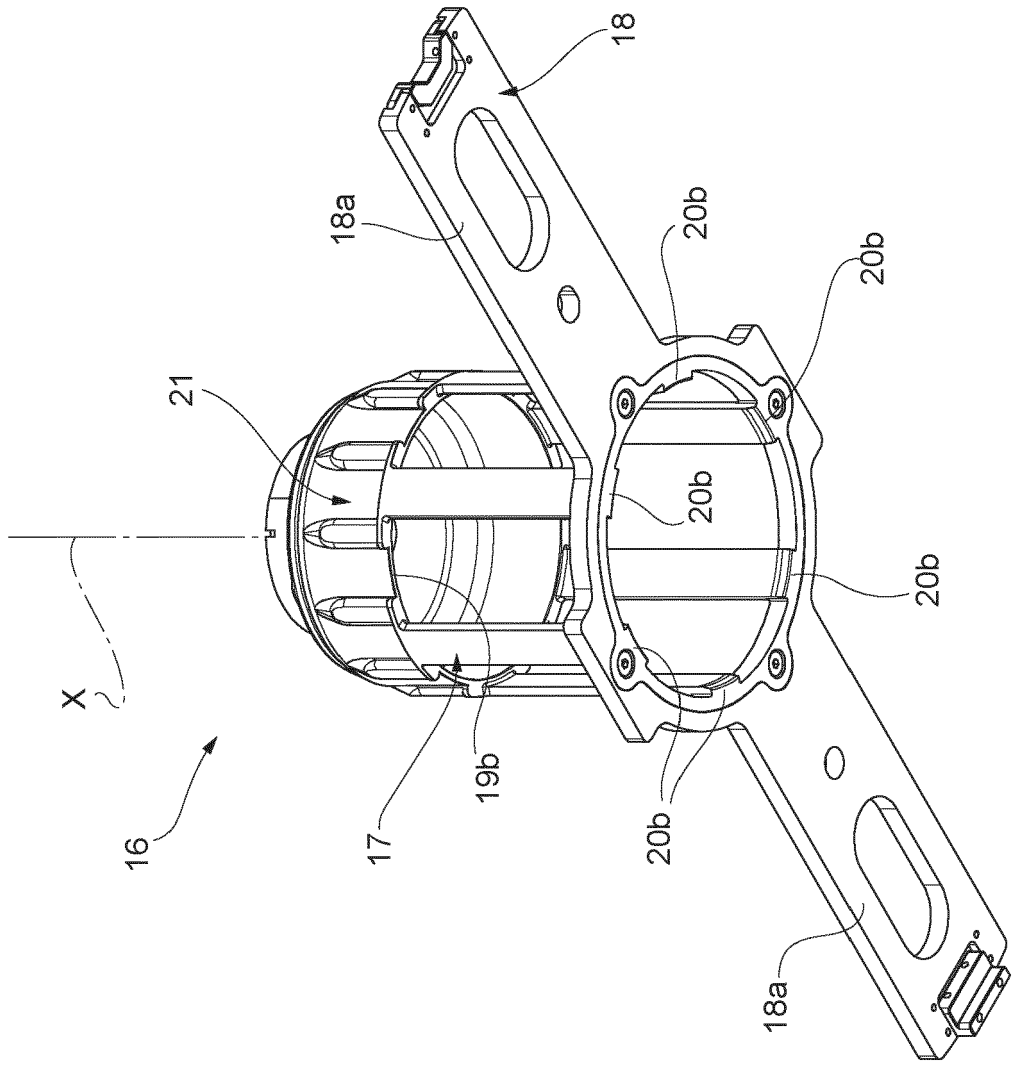


FIG. 3



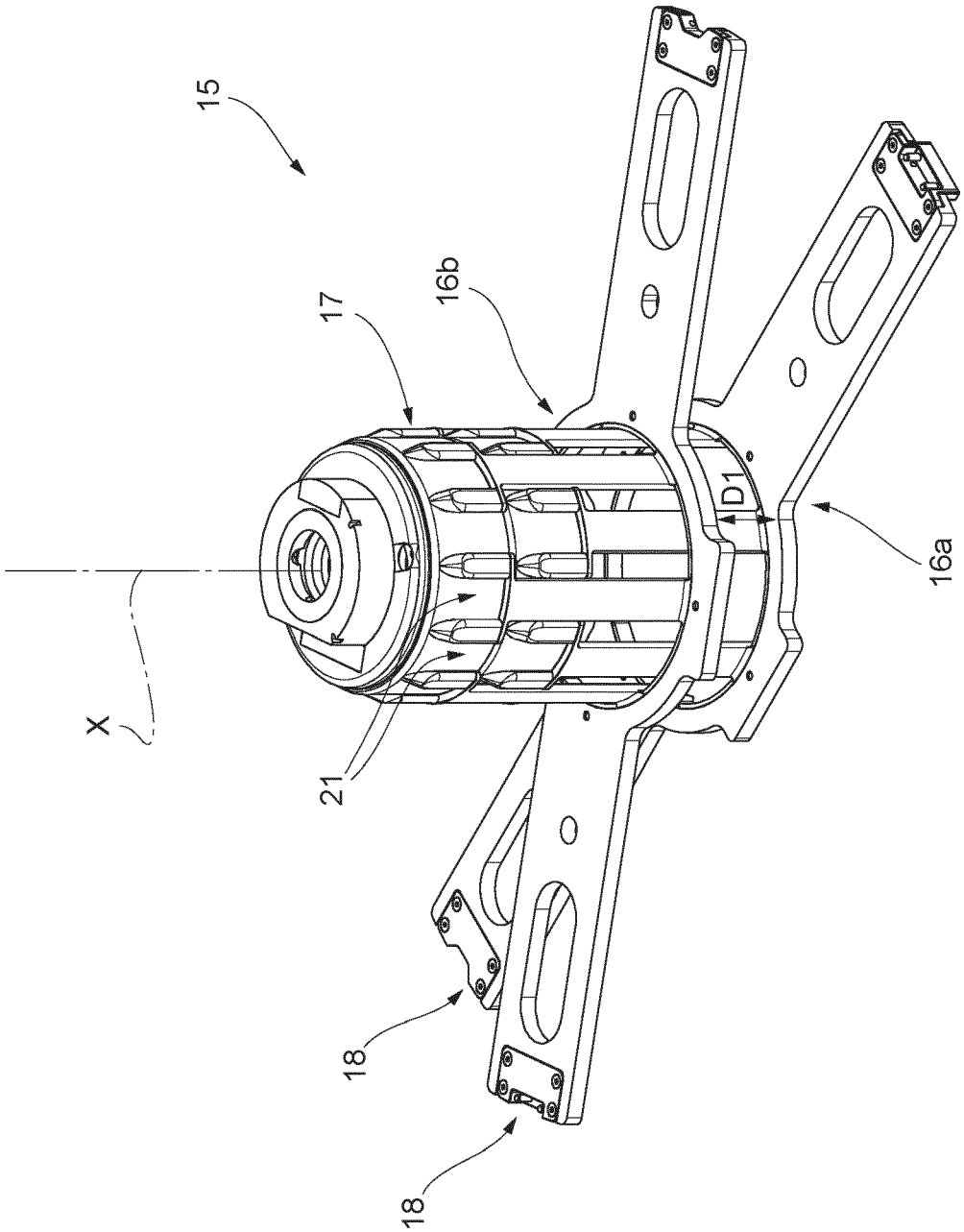


FIG. 4

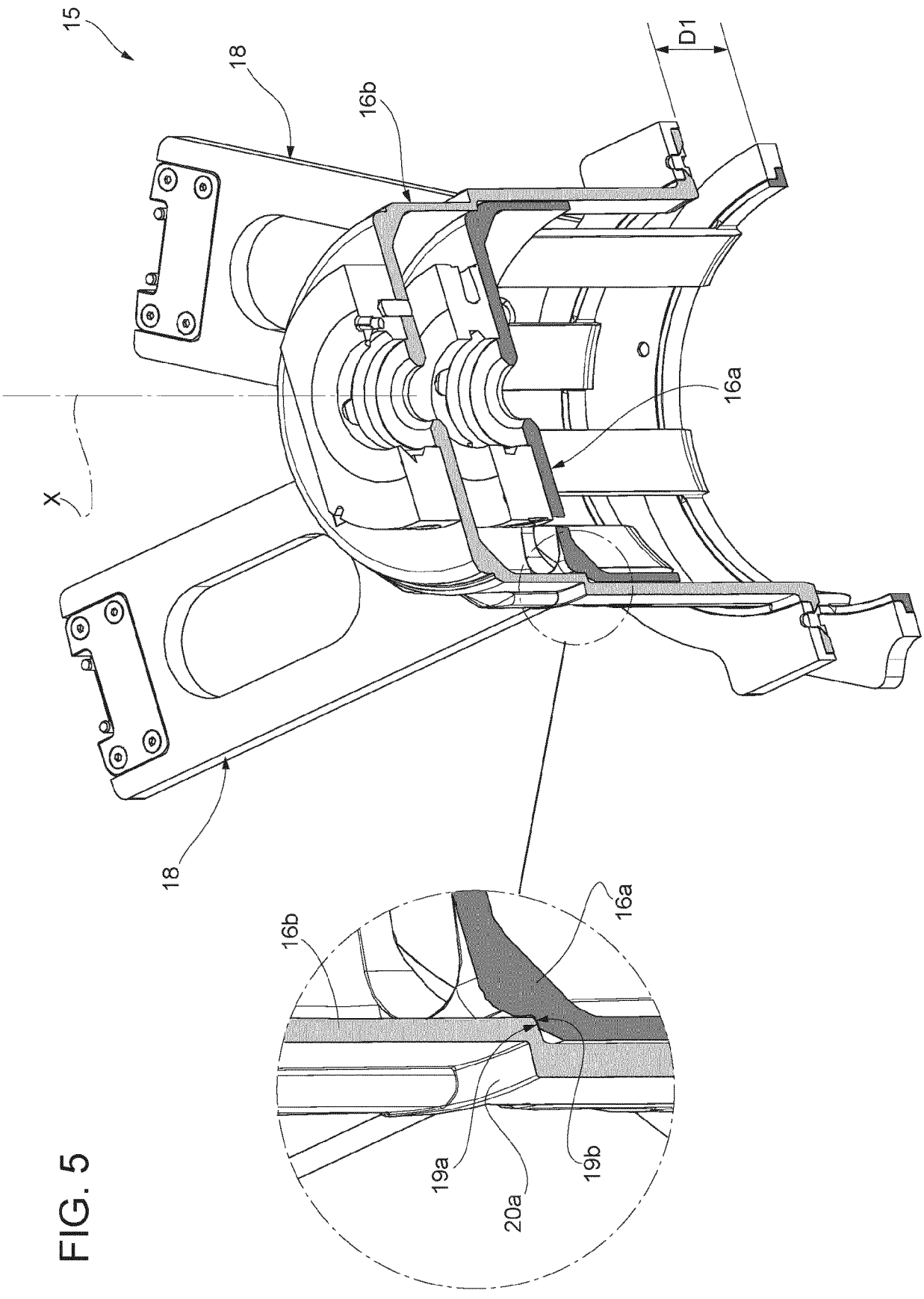


FIG. 5

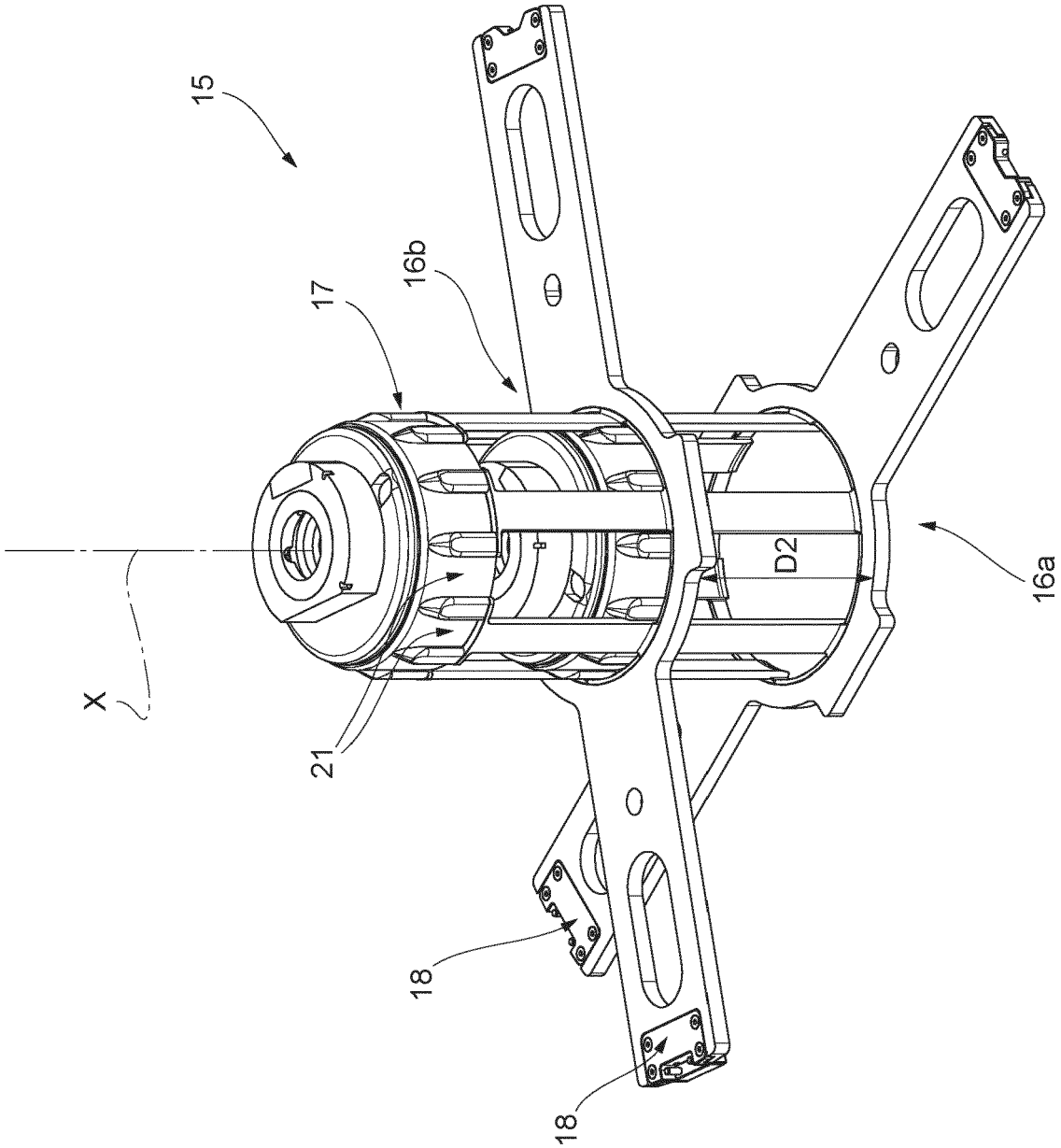


FIG. 6

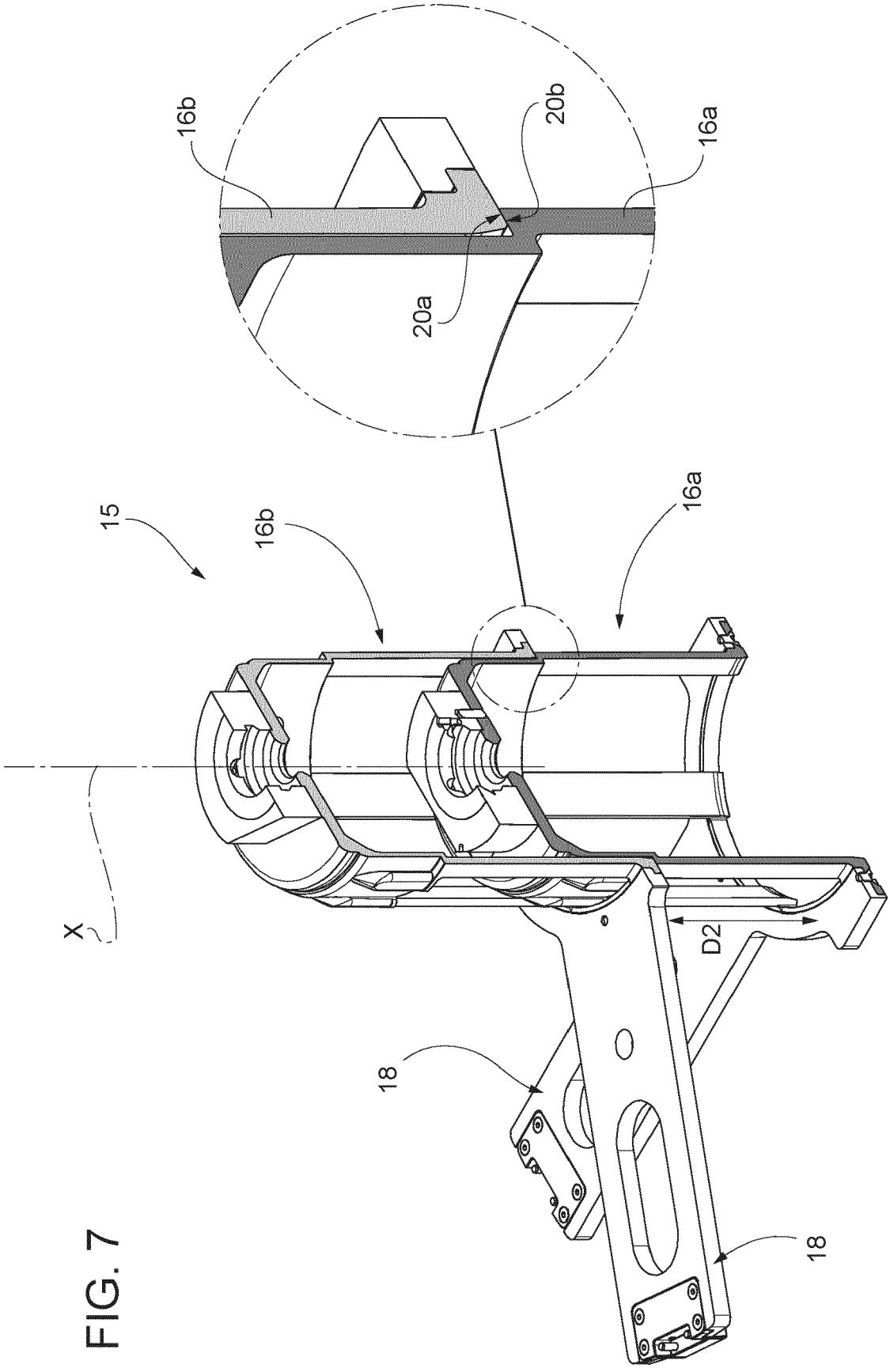


FIG. 7

FIG. 8

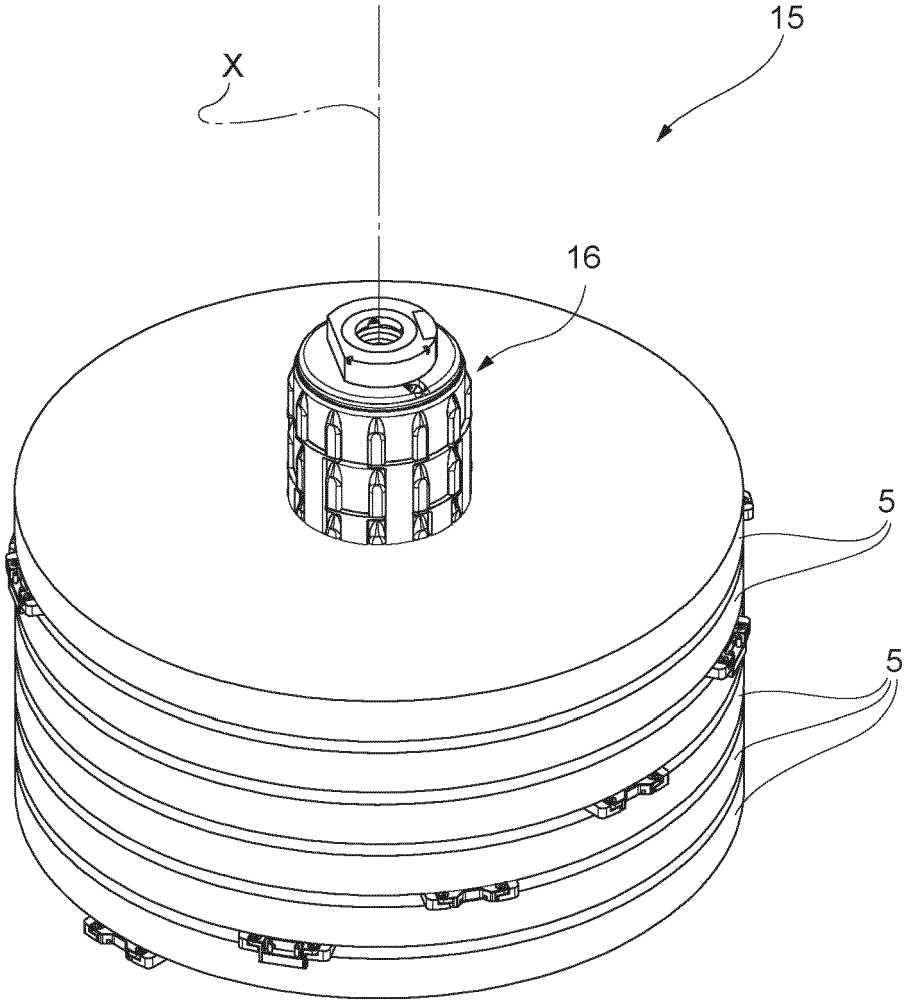
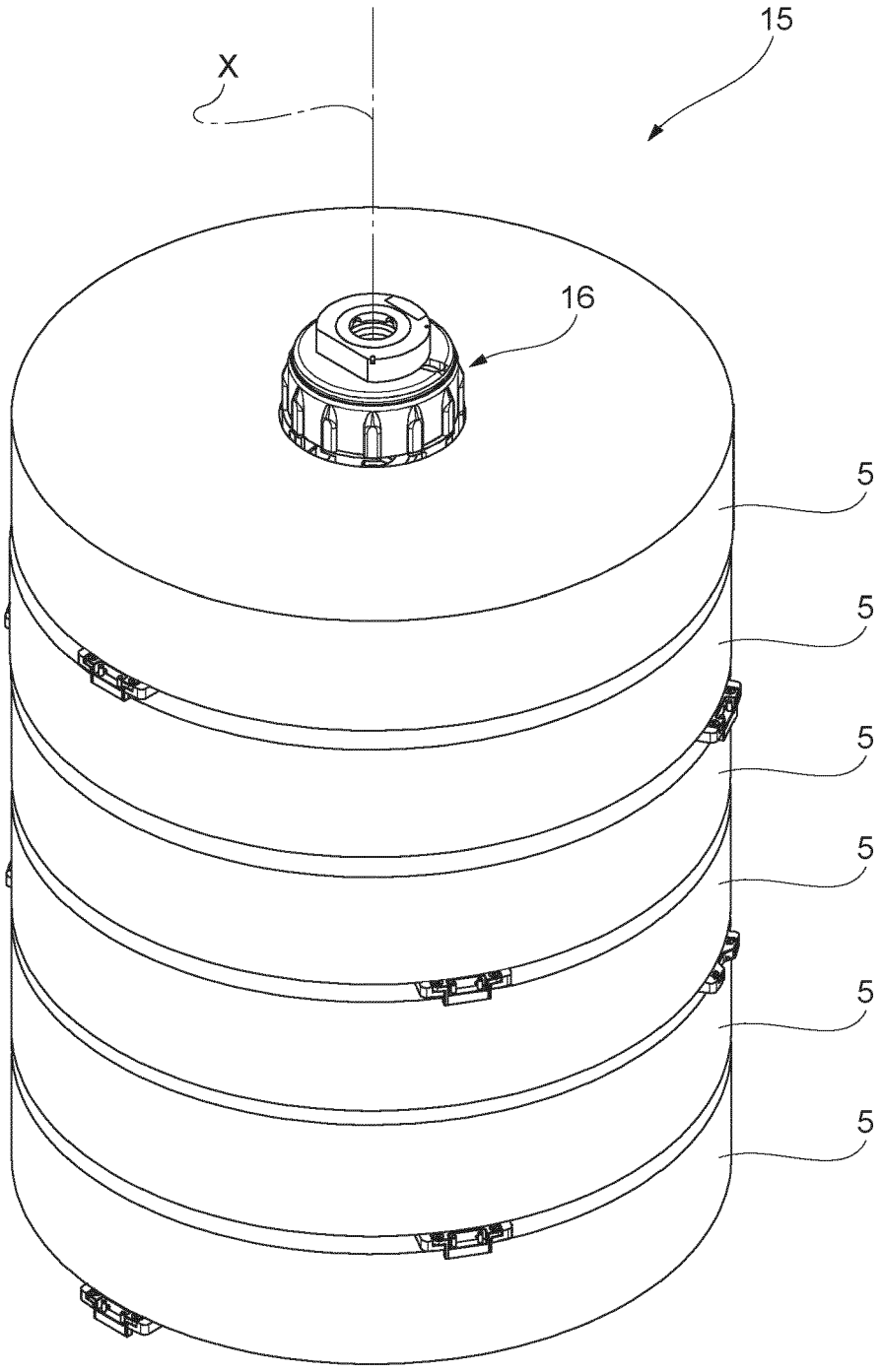


FIG. 9



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EUROPEAN SEARCH REPORT

Application Number
EP 23 20 9293

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 3 760 550 A1 (SIDEL PARTICIPATIONS [FR]) 6 January 2021 (2021-01-06) * the whole document * -----	1-15	INV. B65H19/12

TECHNICAL FIELDS SEARCHED (IPC)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	1 May 2024	Haaken, Willy

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01-05-2024

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EP 3760550 A1	06-01-2021	NONE	

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