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(54) DEVICE AND METHOD FOR HANDLING A ROLLABLE PRODUCT

(57) The present invention relates to a device (1) for handling a rollable product, such as a chain or a cable. The device (1) comprises a first and a second end piece (2,3), and a plurality of crossbars (6) extending between the first and second end piece (2,3) and configured to support the rollable product; wherein each of the first and second end piece (2,3) comprises a plurality of grooves (4), each groove (4) extending in a radially inward direction from a peripheral portion (2A,3A) of the first or the second end piece (2,3); and wherein each crossbar (6) comprises a first and second end portion (6A,6B), each having a shape complementary to the shape of the plurality of grooves (4) of the first and second end piece (2,3) for allowing releasable attachment of the crossbar (6) to the first and second end piece (2,3) by insertion of the first and second end portion (6A,6B) into one of the plurality of grooves (4) of the first and second end piece (2,3), respectively.

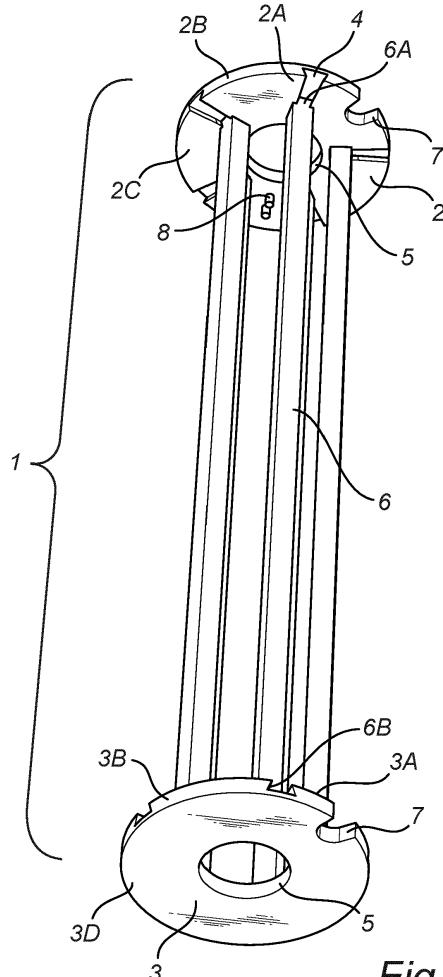


Fig. 2

Description**Technical field**

[0001] The present invention relates to devices for handling rollable products, such as chains or cables.

Background

[0002] Rollable products, such as chains or cables, are often stored and transported on reels. A reel is especially convenient for handling rollable products, since it facilitates easy winding and unwinding.

[0003] Commonly the rollable product and the reel is not produced at the same location, and thus the reel needs to be transported to the location of the rollable product for winding and subsequent transportation thereof.

[0004] However, reels are bulky, resulting in transportation with poor utilization of space. Since transportation is not only costly, but taxing on the environment, there is a need for an improved solution.

Summary

[0005] In view of the above, an object of the present invention is to provide a device for handling rollable products which device may be stored in a more space-efficient manner, or transported in a more space-efficient manner.

[0006] A further object is to provide a method for handling a rollable product in a more space-efficient manner.

[0007] Any benefit or technical effect discussed in relation any aspect of the present invention, and any embodiments thereof, may be applicable to any other aspect of the present invention.

[0008] According to a first aspect of the present invention, a device for handling a rollable product, such as a chain or a cable, is provided, the device comprising: a first and a second end piece, and a plurality of crossbars extending between the first and second end piece and configured to support the rollable product; wherein each of the first and second end piece comprises a plurality of grooves, each groove extending in a radially inward direction from a peripheral portion of the first or the second end piece; wherein each crossbar comprises a first and second end portion, each having a shape complementary to the shape of the plurality of grooves of the first and second end piece for allowing releasable attachment of the crossbar to the first and second end piece by insertion of the first and second end portion into one of the plurality of grooves of the first and second end piece, respectively.

[0009] Since the crossbar is releasably attached to the first and second end piece, a selectively assemblable and disassemblable device is provided. The device may thus be stored or transported in an unassembled state, in which it occupies less space than in an assembled state. To this end, end pieces and crossbars may e.g. be arranged in the same plane during storing or transporta-

tion. Hereby, a more space-efficient storage or transportation of the device is achieved. Further, a more cost-efficient solution is provided.

[0010] The device is may be configured to be reversibly disassemblable, such that it may be re-used.

[0011] That an end portion has a shape complementary to the shape of the plurality of grooves is to be understood as the end portion being configured to be readily insertable in the groove in at least one direction. In other words, the shape of at least one cross-section of the groove is complementary to the shape of the end portions.

[0012] According to at least one exemplary embodiment, each groove may be provided with an inlet accessible from a side edge of the first or the second end piece such that each first and second end portion is insertable in the radially inward direction into one of the plurality of grooves.

[0013] Hereby, a device which is easy to assemble is provided. The end portion may e.g. be inserted in the radially inward direction by force applied by means of a rubber mallet.

[0014] The end portions may have any shape. For example, the end portions may be substantially triangular.

25 **[0015]** Alternatively, the end portions may be substantially rectangular.

[0016] According to at least one exemplary embodiment, each end portion may be formed as a tenon or dovetail type.

[0017] Consequently, the grooves have a shape complementary to a dovetail shape. Hereby, the end portions, when arranged within a respective groove, prevents separation of the crossbar and an end piece in a longitudinal direction of the device.

[0018] The grooves may have any other shape in any other cross-section thereof. For example, the grooves may have a substantially rectangular cross-section as seen in a plane along the radial direction.

[0019] According to at least one exemplary embodiment, each groove may be tapered in the radially inward direction.

[0020] Hereby, the end portion wedgingly engages the groove. Thus, the force preventing separation of the crossbar and an end piece in the radial direction is stronger.

[0021] The crossbars may be made of any material. Preferably, the crossbars are made of a lightweight material, such as a lightweight polymeric material. Preferably, the crossbars are made of a plywood material. Furthermore, the first and second end piece are preferably made of the same material as the crossbars.

[0022] According to at least one exemplary embodiment, the plywood material of each crossbar may comprise layers oriented in planes parallel with a plane defined by a longitudinal axis of the device and a radial axis defined by the radial extension of the grooves associated with the crossbar.

[0023] Hereby, the crossbars are stronger in the radial

direction. Thus, the crossbars are better adapted to withstand forces in the radial direction, and thus better adapted to support the rollable product.

[0023] According to at least one exemplary embodiment, at least one of the first and second end piece may comprise a fastener for attaching the rollable product to the device.

[0024] Hereby, the rollable product may be attached to the device for easier winding of the product. The fastener may e.g. be a pair of plugs, such as woodens plugs, a hook, a noose or a clamp. The fastener may be arranged anywhere on the device. For example, the fastener may be arranged on a side of an end piece. Alternatively, the fastener may be arranged on a crossbar.

[0025] The device may be configured to be attached to a winder in order to facilitate more efficient winding of the rollable product. To this end, the device may comprise means for connecting to a winder. For example, each of the first and second end piece may comprise a projecting journal extending along a longitudinal axis of the device. A projecting journal may be attached to winder. Alternatively, each of the first and second end piece may be provided with a through-hole for receiving an shaft extending through the device along a longitudinal axis thereof. Hereby, the first and second end piece may be configured to receive a shaft of a winder.

[0026] According to a second aspect of the present invention, a method for handling a rollable product, such as a chain or a cable, is provided, the method comprising: sending a device for handling the rollable product in an unassembled state to a first location of the rollable product, the device comprising a first and a second end piece, and a plurality of crossbars; assembling the device at the first location by inserting a first and second end portion of each crossbar into one of a plurality of grooves of the first and second end piece, respectively, each groove extending in a radially inward direction from a peripheral portion of the first or the second end piece, wherein each first and second end portion has a shape complementary to the shape of the plurality of grooves, such that each crossbar is releasably attached to and extends between the first and second end piece; winding up, at the first location, the rollable product on the device such that it is supported by the plurality of crossbars, thereby obtaining a wound rollable product.

[0027] By sending the device in an unassembled state, a more space-efficient transportation of the device is facilitated.

[0028] According to at least one exemplary embodiment, inserting the first and second end portion of each crossbar into one of the plurality of grooves of the first and second end piece, respectively, may comprise inserting each of the first and second end portion into the associated groove via an inlet of the groove accessible from a side edge of the first or the second end piece.

[0029] Hereby, the device is more easily assembled. The end portion may be inserted by force applied by means of a rubber mallet.

[0030] According to at least one exemplary embodiment, the method may further comprise shipping the wound rollable product to a second location different from the first location of the rollable product.

[0031] Hereby, the wound rollable product is shipped in a state in which it is easy to unwind once it reaches its destination, thereby being easily accessible for an intended consumer.

[0032] According to at least one exemplary embodiment, the method may further comprise unwinding the wound rollable product at the second location; and disassembling the device.

[0033] The device may e.g. be disassembled by application of force on the cross bars in a radially outwards direction. Thus, the crossbars may be extracted in a radially outwards direction. The force may e.g. be applied by pliers. The device may be disassembled in reversible manner, such that it may be re-used.

[0034] Unwinding may comprise connecting the device to a winder by a means for connecting the device to a winder. The means may e.g. be a projecting journal extending along a longitudinal axis of the device, or a through-hole for receiving an shaft extending through the device along a longitudinal axis thereof.

[0035] According to at least one exemplary embodiment, the method may further comprise returning the device, in the unassembled state, to the first location.

[0036] Hereby, the device may be transported, after having been used to support a rollable product, in a more space-efficient manner.

Brief description of the drawings

[0037] These and other embodiments of the present invention will now be described in more detail, with reference to the appended drawings showing exemplary embodiments of the present invention, wherein:

Fig. 1 is a schematic exploded view of the device according to the first aspect of the present invention. Fig. 2 is a schematic perspective side view the device in Fig. 1 in an assembled state.

Fig. 3A is a schematic view of an end portion of a crossbar of the device Fig. 1 and Fig. 2.

Fig. 3B is a schematic perspective view of an end piece of the device in Fig. 1 and Fig 2, further illustrating the plurality of grooves having a shape complementary to the shape of the end portion in Fig. 3A.

Detailed description of the drawings

[0038] In the following detailed description, some embodiments of the present invention will be described. However, it is to be understood that features of the different embodiments are exchangeable between the embodiments and may be combined in different ways, unless anything is specifically indicated. Even though in the following description, numerous details are set forth to

provide a more thorough understanding of the present invention, it will be apparent to one skilled in the art that the present invention may be practiced without these details. In other instances, well known constructions, such as that of a plywood material, or functions, such as winding of a rollable product, are not described in detail, so as not to obscure the present invention.

[0039] Fig 1 shows an exploded view of a device 1 for handling a rollable product, such as a chain or a cable, according to a first aspect of the present invention. Here, the device 1 is in an unassembled state. The device 1 comprises a first end piece 2 and a second end piece 3. Here, the first and second end pieces 2, 3 are shaped as flat, substantially circular disks. However, the first and second end pieces 2, 3 are not limited to being circular. For example, the end pieces 2, 3 may be substantially quadratic, or hexagonal, or polygonal.

[0040] The first and second end pieces 2, 3 are preferably made of a plywood material. However, the first and second end pieces 2, 3 could alternatively be made of any other lightweight material, such as a lightweight polymeric material.

[0041] Each of the first and second end piece 2, 3 comprises a plurality of grooves 4. Each groove 4 extends in a radially inward direction from a peripheral portion 2A of the first end piece 2 or a peripheral portion 3A of the second end piece 3. The plurality of grooves 4 are further illustrated in and discussed in relation to Fig. 3B.

[0042] Each of the first and second end piece 2, 3 further comprises a respective through-hole 5 for receiving a shaft. The shaft may e.g. extend through the device 1 along a longitudinal axis thereof, when the device 1 is in an assembled state (shown in Fig. 2). Thus, the device 1, when in an assembled state, may receive a shaft of a winder in order to facilitate more efficient winding of a rollable product to be wound on the device 1. The device 1 may comprise an alternative means for connecting to a winder, such as a projecting journal. For example, each of the first and second end piece 2, 3 may comprise a projecting journal extending along a longitudinal axis of the device 1. Alternatively, one end piece 2, 3 comprises a projecting journal, whereas the other end piece 2, 3 comprises a through-hole 5.

[0043] Each of the first and second end piece 2, 3 further comprises a respective cut-out 7. The cut-out 7 is configured to receive a member for preventing rotation of the device 1 around the longitudinal axis thereof. For example, the member may be a shaft connected to a rigid wall or floor, such that the device in an assembled state may be stored on the shaft in a rotationally stable manner. It is to be understood that, for the device 1 to be configured to be stored in a rotationally stable manner, it is sufficient if only one end piece 2, 3 comprises a cut-out 7.

[0044] The device 1 may further comprise fastener 8 for attaching a rollable product to the device 1. Hereby, the rollable product may be attached to the device 1 for easier winding of the product. The fastener 8 may e.g. be a hook, a noose or a clamp. Here, the fastener 8 is a

pair of plugs, such as a pair of wooden plugs. Here, the fastener 8 is arranged on an inner side 2C of the first end piece 2. Naturally, the fastener 8 may instead be arranged on an inner side 3C of the second end piece 3.

5 Furthermore, the device 1 may comprise two fasteners 8, wherein one fastener 8 is arranged on the inner side 2C of the first end piece 2, whereas the other fastener 8 is arranged on the inner side 3C of the second end piece 3. Alternatively, any fastener 8 may be arranged on a crossbar 6.

[0045] The device 1 further comprises a plurality of crossbars 6 extending between the first and second end piece 2, 3. The plurality of crossbars 6 are preferably made of a plywood material. However, the plurality of crossbars 6 could alternatively be made of any other lightweight material, such as a lightweight polymeric material. Preferably, the plurality of crossbars 6 and the first and second end pieces 2, 3 are made of the same material. However, the plurality of crossbars 6 may be made of a material different from the material of the first and second end pieces 2, 3.

[0046] Each crossbar 6 is configured to be releasably attached to the first and second end piece 2, 3. To this end, each crossbar 6 comprises a first and second end portion 6A, 6B, each having a shape complementary to the shape of the plurality of grooves 4 of the first and second end piece 2, 3, wherein a first end portion 6A is configured to be arranged in a groove 4 of the first end piece 2 and a second end portion 6B is configured to be arranged in a groove 4 of the second end piece 3. An end portion 6A, 6B, and the engagement with a groove 4 thereof, is further illustrated in and discussed in relation to Fig. 3A and Fig. 3B.

[0047] In Fig. 2, the crossbars 6 are releasably attached to the first and second end piece 2, 3. As such, the device 1 is in an assembled state. The crossbars 6, when the device is in an assembled state, are configured to support a rollable product. Preferably, the plywood material of each crossbar 6 may comprise layers oriented in planes parallel with a plane defined by a longitudinal axis of the device 1 and a radial axis defined by the radial extension of the grooves 4 associated with the crossbar 6. Hereby, the crossbars 6 are configured to support a greater weight of rollable product.

[0048] In the assembled state, the longitudinal extension of each crossbar 6 is substantially perpendicular to a radial extension of each of the first and second end piece 2, 3. Thus, the space occupied by the assembled device 1 is greater than that of the crossbars 6 and end pieces 2, 3 of the unassembled device, if the crossbars 6 and end pieces 2, 3 are stacked such that the longitudinal extension of each crossbar 6 is substantially parallel to the radial extension of each of the first and second end piece 2, 3. Therefore, the device 1 may be sent in an unassembled state to a first location of a rollable product, after which the device 1 is assembled at the first location by inserting a first and second end portion 6A, 6B of each crossbar 6 into one of a plurality of grooves 4 of the first

and second end piece 2, 3, respectively, such that each crossbar is releasably attached to and extends between the first and second end piece 2, 3, wherein the space occupied by the device 1 in the assembled state is greater than the space occupied by the device 1 in the unassembled state.

[0049] Here, the device 1 comprises five crossbars 6. That is, the device comprises the same number of crossbars 6 as grooves 4 of the respective end piece 2, 3, such that each crossbar 6 is releasably attached to a respective groove 4 of the first and second end piece 2, 3. However, the device 1 is not limited to having the same number of crossbars 6 as grooves 4 of the respective end piece 2, 3. The device 1 may thus have more grooves on a respective end piece 2, 3 than crossbars 6.

[0050] In Fig. 2, every crossbar 6 is shown to have a length substantially greater than a radius of the first end piece 2 and/or the second end piece 3, such that the device 1 has a large aspect ratio. However, it is to be understood that the device may have any aspect ratio. A radius of the first end piece 2 and/or the second end piece 3 may e.g. be equal to the respective lengths of the crossbars 6. Alternatively, a radius of the first end piece 2 and/or the second end piece may be greater than the respective lengths of the crossbars 6.

[0051] In order to disassemble the device 1, such that it is in an unassembled state, the crossbars 6 are extracted in a radially outward direction, opposite the radial inward direction. Extraction of the crossbars 6 may e.g. be performed by application of force by pliers, or any other suitable tool. The device 1 may be disassembled in reversible manner, such that it may be re-used. In other words, the crossbars 6 may be arranged in the respective groove 4 such that they may be extracted in a way that does not damage the end portion 6A, 6B or the groove 4.

[0052] Fig. 3A shows an end portion 6A, 6B of a crossbar 6. Here, the end portion 6A, 6B is shaped formed like a tenon of dovetail type. The end portion 6A, 6B may alternatively have any shape. For example, the end portion 6A, 6B may be substantially triangular. Alternatively, the end portion 6A, 6B may be substantially rectangular.

[0053] Fig. 3B shows an end piece 2, 3. Here, the end piece 2, 3 comprises five grooves 4 extending in a radially inward direction from a peripheral portion 2A, 3A. Each groove 4 is provided with an inlet 4A accessible from a side edge 2B, 3B of the end piece 2, 3. Hereby, an end portion 6A, 6B is insertable in the radially inward direction into a groove 4. The end portion 6A, 6B may e.g. be inserted in the radially inward direction by force applied by means of a rubber mallet, or any other suitable tool.

[0054] Each groove 4 has a shape complementary to that of the end portion 6A, 6B. Thus, the inlet 4A of the groove 4 has a shape complementary to a dovetail shape, such that the end portion 6A, 6B may be inserted therein. Since the end portion 6A, 6B may have any shape, it is to be understood that the inlet 4A may have any complementary shape.

[0055] Furthermore, each groove 4 is tapered in the

radially inward direction. Hereby, the end portion end portion 6A, 6B wedgingly engages the groove 4 upon insertion therein.

[0056] The grooves 4 may alternatively 4 have any other shape in any other cross-section thereof. For example, the grooves 4 may have a substantially rectangular cross-section as seen in a plane along the radial direction. Furthermore, a groove 4 may e.g. be arranged as a recess accessible only in a direction perpendicular to the radial direction, such that an end portion 6A, 6B is insertable in the groove 4 in the longitudinal direction.

[0057] Here, the grooves 4 have a depth smaller than the thickness of the end piece 2, 3, such that the groove is only accessible from a side edge 2B,3B and an inner side 2C,3C of the end piece 2, 3. However, the grooves 4 may be arranged through the end piece 2, 3, such that the groove is also accessible from an outer side 2D,3D of the end piece 2, 3. In such example, the end portion 6A, 6B may be arranged through the groove 4.

[0058] The end piece 2, 3 further comprises a means 9 for receiving a fastener 8. Here, the means 9 is a pair of holes 9 configured for receiving a pair of plugs 8.

[0059] The person skilled in the art realizes that the present invention by no means is limited to the embodiments described above. The features of the described embodiments may be combined in different ways, and many modifications and variations are possible within the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. The word "comprising" does not exclude the presence of other elements or steps than those listed in the claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements.

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Claims

1. A device (1) for handling a rollable product, such as a chain or a cable, the device (1) comprising:

40 a first and a second end piece (2,3), and a plurality of crossbars (6) extending between the first and second end piece (2,3) and configured to support the rollable product;

45 wherein each of the first and second end piece (2,3) comprises a plurality of grooves (4), each groove (4) extending in a radially inward direction from a peripheral portion (2A,3A) of the first or the second end piece (2,3); and

50 wherein each crossbar (6) comprises a first and second end portion (6A,6B), each having a shape complementary to the shape of the plurality of grooves (4) of the first and second end piece (2,3) for allowing releasable attachment of the crossbar (6) to the first and second end piece (2,3) by insertion of the first and second end portion (6A,6B) into one of the plurality of

grooves (4) of the first and second end piece (2,3), respectively.

2. Device (1) of claim 1, wherein each groove (4) is tapered in the radially inward direction. 5

3. Device (1) of claim 1 or 2, wherein each end portion (2,3) is formed as a tenon of dovetail type.

4. Device (1) according to any one of the preceding claims, 10
wherein each groove (4) is provided with an inlet (4A) accessible from a side edge (2B,2C) of the first or the second end piece (2,3) such that each first and second end portion (6A,6B) is insertable in the radially inward direction into one of the plurality of grooves (4). 15

5. Device (1) according to any of the preceding claims, 20
wherein the first and second end piece (2,3) and the plurality of crossbars (6) are made of a plywood material.

6. Device (1) according to claim 5, wherein the plywood material of each crossbar (6) comprises layers oriented in planes parallel with a plane defined by a longitudinal axis of the device (1) and a radial axis defined by the radial extension of the grooves (4) associated with the crossbar (6). 25

7. Device (1) according to any one of the preceding claims, 30
wherein at least one of the first and second end piece (2,3) comprises a fastener (8) for attaching the rollable product to the device (1).

8. Device (1) according to any one of the preceding claims, 35
wherein each of the first and second end piece (2,3) comprises a projecting journal extending along a longitudinal axis of the device (1). 40

9. Device (1) according to any one of claims 1 to 7, 45
wherein each of the first and second end piece (2,3) is provided with a through-hole (5) for receiving a shaft extending through the device (1) along a longitudinal axis thereof.

10. Method for handling a rollable product, such as a chain or a cable, the method comprising: 50

sending a device (1) for handling the rollable product in an unassembled state to a first location of the rollable product, the device comprising a first and a second end piece (2,3), and a plurality of crossbars (6); 55
assembling the device at the first location by inserting a first and second end portion (6A,6B) of each crossbar into one of a plurality of grooves (4) of the first and second end piece (2,3), respectively, each groove (4) extending in a radially inward direction from a peripheral portion (2A,3A) of the first or the second end piece (2,3), wherein each first and second end portion (6A,6B) has a shape complementary to the shape of the plurality of grooves (4), such that each crossbar (6) is releasably attached to and extends between the first and second end piece (2,3);
winding up, at the first location, the rollable product on the device (1) such that it is supported by the plurality of crossbars (6), thereby obtaining a wound rollable product.

11. Method of claim 10, wherein inserting the first and second end portion (6A,6B) of each crossbar (6) into one of the plurality of grooves (4) of the first and second end piece (2,3), respectively, comprises inserting each of the first and second end portion (6A,6B) into the associated groove (4) via an inlet (4A) of the groove (4) accessible from a side edge (2B,3B) of the first or the second end piece (2,3). 25

12. Method of claim 10 or 11, further comprising shipping the wound rollable product to a second location different from the first location of the rollable product. 30

13. Method of claim 12, further comprising unwinding the wound rollable product at the second location; and disassembling the device (1). 35

14. Method of claim 13, further comprising returning the device (1), in the unassembled state, to the first location. 40

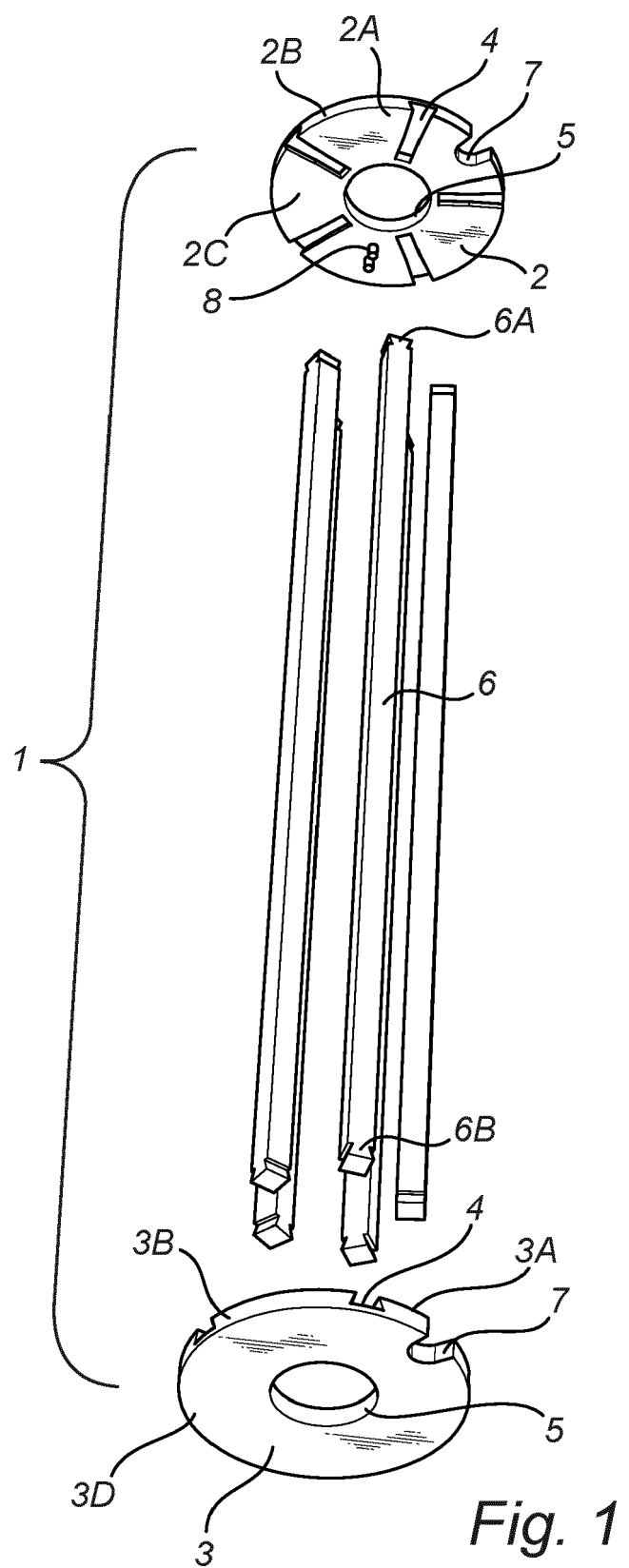


Fig. 1

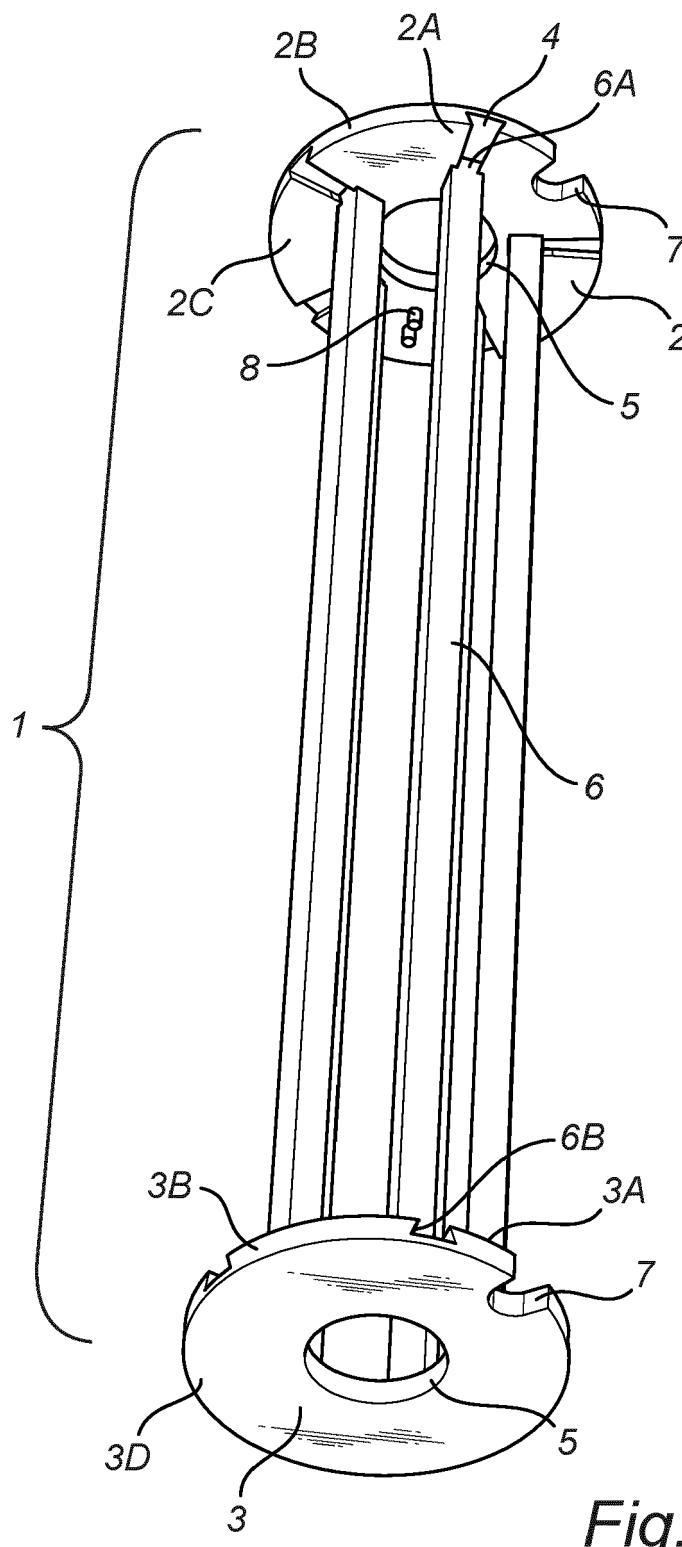


Fig. 2

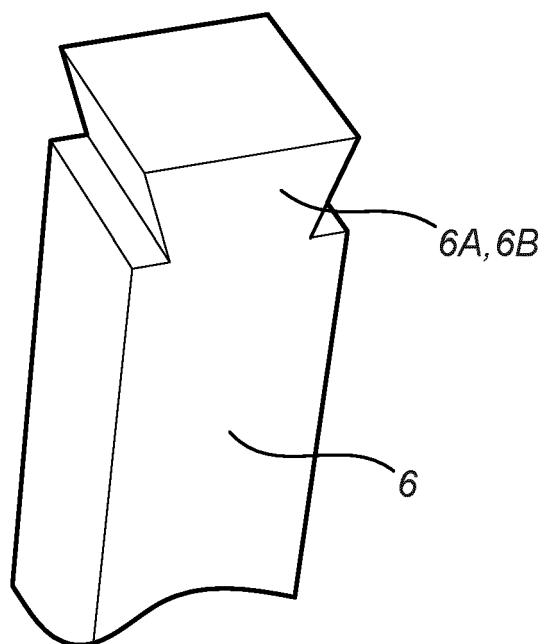


Fig. 3A

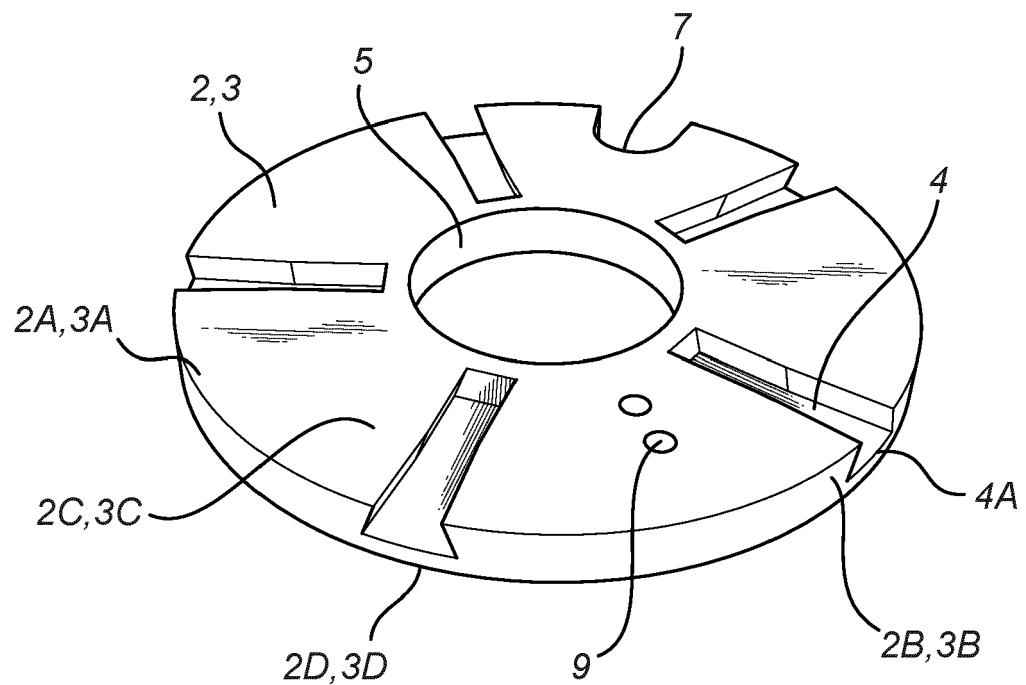


Fig. 3B



EUROPEAN SEARCH REPORT

Application Number

EP 22 17 9636

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

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