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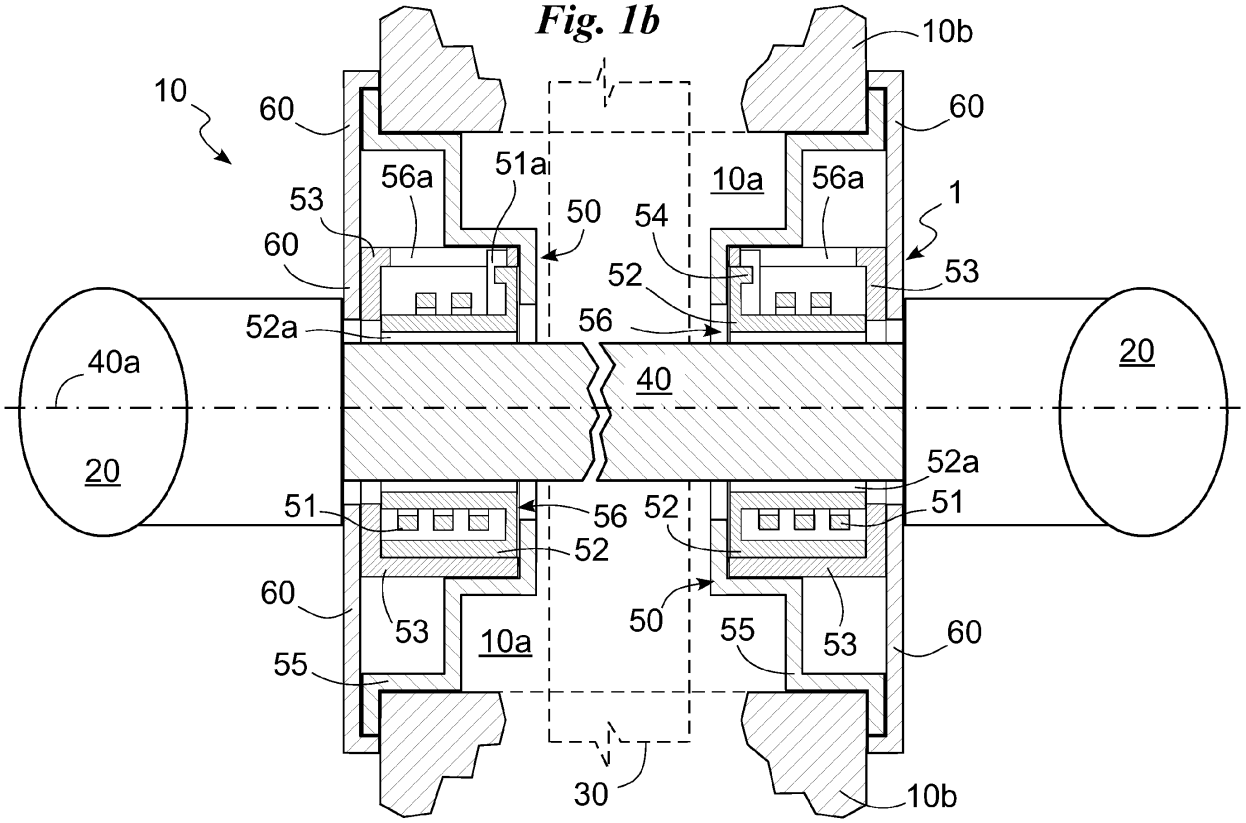
(54) **Handle closing device for door or window**

(57) It is provided a handle closing device (1) for fastenings (10) provided with a housing hole (10a) and comprising a supporting apparatus (50) having a first casing (52) suitable for engagement with the handle (20) so as to be moved thereby; a return mechanism (51) adapted to exert a return force against the motion of the first casing (51); and a second casing (53) suitable for engagement in a motion-admitting manner with the first casing (52) thus creating a box-shaped element (56) internally housing the return mechanism (51); the supporting apparatus (50) being further provided with a hooking body (55) adapted to be rigidly secured to the second casing (53) and the fastenings (10), so as to position the box-shaped element (56) at least partly inside the housing hole (10a).

Fig. 1b



EP 2 631 397 A1

Description

[0001] The present invention relates to a handle closing device for fastenings of the type pointed out in the preamble of the first claim.

[0002] In particular, the invention relates to a closing device that is adapted to be operated by a handle and that enables or prevents movement of the fastenings, preferably door frames, thus allowing or preventing passage of a person or an object between two adjacent environments.

[0003] It is known that presently closing devices mainly comprise a lock assembly operating a bolt, two handles operating a spring latch and a pin disposed inside a hole formed in the fastenings. The pin enables the handles to be constrained to each other and is connected to the spring latch.

[0004] In addition, the devices are usually provided with supporting structures, suitably disposed at said hole, which enable the handles to be arranged in the right position and to regulate movements thereof.

[0005] Each supporting structure comprises a return spring adapted to bring the handle back to the right position after use, an attachment support disposed on the through hole and secured to the fastenings through screws, and a covering plate placed externally of the fastenings so as to conceal the return spring and the support to the sight, as well as the pin and the elements connected thereto.

[0006] The known art described above has some important drawbacks.

[0007] A first important drawback can be found in that, due to the necessity to carry out complicated and accurate mounting operations, there are high cost for manpower at the installation or replacement of the fastenings and, in particular, of known closing devices.

[0008] This problem is due to the fact that the holes in the fastenings and the supporting structures have various and diversified sizes that therefore make it compulsory to carry out milling operations or other similar operations for achieving correct positioning of the structures themselves into the holes. Another important problem arises from the fact that the covering plate, due to the return spring and the attachment support, protrudes from the surface of the fastenings by a great amount in thickness.

[0009] Due to this aspect, the covering plate constitutes a possible hindering element and therefore a possible source of accident for a passer-by that is not careful. Above all the high protruding thickness of the covering plate gives an aspect of poor quality to the fastenings.

[0010] This problem of the high protruding thickness has been substantially solved by adopting closing devices for fastenings according to patent PE 2264262 A1 owner of which is the same Applicant.

[0011] However, there is still the problem that, due above all to the return spring, particularly large through holes are always necessary.

[0012] The technical solution of patent EP 2264262 A1 therefore cannot be used in the presence of standard through holes and further working is required to increase the sizes of said through holes.

[0013] In conclusion, installation of these handle closing devices is particularly complicated and therefore particularly expensive.

[0014] This drawback is greatly increased by the fact that through holes have different sizes from State to State and in some cases even from region to region and consequently the producers are obliged to project handle closing devices of different sizes so as to adapt them to various national/regional standards; otherwise adaptation operations different from each other are necessary. Under this situation, the technical task underlying the present invention is to conceive a handle closing device for fastenings capable of substantially obviating the mentioned drawbacks.

[0015] Within the scope of this technical task, it is an important aim of the invention to provide a handle closing device characterised by reduced thickness protruding from the fastenings surface.

[0016] Another important aim of the invention is to produce a handle closing device that can be easily mounted on any fastenings, irrespective of the sizes of the through hole.

[0017] The technical task and the aims specified are achieved by a handle closing device for fastenings as claimed in the appended claim 1. Preferred embodiments are highlighted in the sub-claims.

[0018] The features and advantages of the invention are hereinafter clarified by the detailed description of a preferred embodiment of the invention, with reference to the accompanying drawings, in which:

Fig. 1a shows a handle closing device in section for fastenings according to the invention;

Fig. 1b reproduces a second handle closing device in section, according to the invention;

Fig. 2 is a sectional view taken along line II-II in Fig. 1a of the closing device; and

Fig. 3 shows an overall view of the handle closing device for fastenings according to the invention.

[0019] With reference to the mentioned drawings, the handle closing device for fastenings according to the invention is generally denoted at **1.**

[0020] It is adapted to be firmly fixed to fastenings **10** such as a door, car door, vehicle hatchback window or other similar elements (in the following also referred to as door 10) to enable passage of persons and/or objects between two adjacent environments or spaces. In particular, the closing device 1 is suitable to be placed in register with a housing hole **10a** formed in 10 and, preferably, is at least partly disposed inside the housing hole 10a.

[0021] The closing device 1 comprises at least one handle **20** disposed at an outer surface **10b** of a door 10 and adapted to enable an operator to actuate device 1,

a lock **30** enabling or preventing fastenings 10 from being moved; at least one transmission rod **40** for transmitting motion between the handle 20 and lock 30; and at least one supporting apparatus 50 adapted to support handle 20 and to be at least partly housed in hole 10a.

[0022] In particular, the closing device 1, as shown in Fig. 1, can have one lock 30, two handgrips or handles 20 disposed on opposite outer surfaces 10b of fastenings 10, two supporting apparatus 50, each of which is adapted to support one of handles 20 and a single transmission rod 40 adapted to mutually connect said components so as to enable an operator to actuate lock 30 with each of handles 20. Alternatively, device 1 contemplates one lock 30, one handgrip 20, one supporting apparatus 50, and one transmission rod 40 adapted to connect such components with each other.

[0023] The term "handle" is used to identify any element defining a handgrip through which the operator is able to easily actuate lock 30 such as a lever handgrip, or a knob, for example.

[0024] Lock 30 is defined by a mechanism of the mechanical or electronic type, preferably of the mechanical type that, based on handle 20, defines a closed configuration and an open configuration. In detail, in the closed configuration lock 30 creates a constraint between fastenings 10 and a wall, door-case, or other similar structure; in the open configuration lock 30 does not create such a constraint.

[0025] Lock 30 preferably consists of a spring latch lock, i.e. it has an element that can be moved by handle 20 in such a manner that, when lock 30 is in the closed configuration, it protrudes from fastenings 10 and engages with said structure while, when lock 30 is in the open configuration it is almost fully housed in fastenings 10 enabling movement of the latter. Alternatively, lock 30 is a spring latch bolt lock.

[0026] Interposed for operation between handle 20 and lock 30, the closing device 1 has the transmission rod 40 suitably fixed to the handle 20, the supporting apparatus 50 and the lock 30 by means of friction fits, screws or other similar solutions so that passage of motion between these components is allowed. The transmission rod 40 consists of a body defining a substantially straight major extension direction **40a** preferably having a polygonal section and, more preferably, a substantially square section.

[0027] The supporting apparatus 50 comprises a return mechanism **51** adapted to exert a return force against the motion of handle 20; a first casing **52** adapted to be secured to the transmission rod 40 and therefore to handle 20; a second casing **53** suitable for engagement in a motion-admitting manner with the first casing 52 so as to enable relative motion between them; a stop limit **54** defining an abutment for limiting the relative motion between casings 52 and 53; and a hooking body **55** adapted to be rigidly secured to both the second casing 53 and fastenings 10.

[0028] The two casings 52 and 53 are adapted to be mutually connected, by friction fit for example, thus creating a box-shaped element **56** defining an inner chamber inside which the return mechanism 51 is housed. In particular, casings 52 and 53 are adapted to be secured in such a manner that they can be mutually moved and preferably in such a manner that they can be mutually rotated about an axis substantially coincident with the major extension direction 40a. Housed inside the inner chamber is the return mechanism 51 that, working against the action of handle 20, is able to store and release energy by exploiting rotation of the first casing 52 operated by handle 20 through the transmission rod 40. In particular, lock 30 moves to the open configuration, the return mechanism 51 bucks the motion of the transmission rod 40 and therefore of handle 20 and stores energy, while when lock 30 goes back to the closed configuration, the return mechanism 51 releases this energy bringing the rod 40 and handle 20 back to the starting position.

[0029] Therefore, the return mechanism 51 comprises a spring or other similar element adapted to store energy based on displacement of the first casing 52 relative to the second casing 53. In particular, it comprises a spring, preferably a torsion spring and, more preferably a torsion spring with at least three coils, adapted to store and release energy based on rotation of the first casing 52 substantially around the major extension direction 40a.

[0030] In order to enable mechanism 51 to perform this function, casings 52 and 53 have two openings that at the moment the box-shaped element 56 is formed overlap each other defining a slot **56a** in which the ends **51a** of the torsion spring are placed so that, as better described in the following, rotation of the first casing 52 relative to the second one 53 brings about mutual rotation of the ends 51 a of the torsion spring and therefore actuation of the return mechanism 51.

[0031] For obtaining said rotation of the first casing 52 relative to the second casing 53, the first casing 52 is secured to the transmission rod 40 so that it is moved by handle 20, while the second casing 53 is rigidly fixed to fastenings 10 through the hooking body 55 so that it remains substantially stationary during rotation of handle 20.

[0032] The first casing 52 is secured to the transmission rod 40 by friction fit and therefore has a through cavity **52a** at least partly conforming to the shape of rod 40 so that said friction fit can take place.

[0033] In particular, the through cavity 52a has a substantially circular section provided with cuts for engagement, by friction fit, with the transmission rod 40. In greater detail, the through cavity 52a has a circular section of diameter substantially coincident with the side of the square section of the transmission rod 40 and at the vertices having cuts suitable for engagement, by friction fit, with the edges of said square section, as shown in Fig. 2.

[0034] Constraint of the second casing 53 to the hooking body 55 is carried out by friction fits and therefore the second casing can be provided with ridges 53a, ribs or

other similar elements that, protruding from the second casing 53 allow it to be secured to the hooking body 55.

[0035] The hooking body 55 comprises an outer portion **55a** adapted to be rigidly secured to the outer surface 10b at the housing hole 10a; and an inner portion **55b** suitable for rigid engagement with the second casing 53 and characterised by lower bulkiness than the outer portion 55a, so that it can be at least partly arranged in the housing hole 10a.

[0036] The outer portion 55a and the inner one 55b substantially define two lying planes distinct from each other. In particular, portions 55a and 55b define two distinct planes substantially parallel to each other so as to enable the outer portion 55a to be substantially arranged at the outer surface 10b and the inner portion 55b to be substantially arranged inside the housing hole 10a, so that the box-shaped element 56 can be at least partly and preferably fully placed inside hole 10a.

[0037] The outer portion 55a and the inner one 55b are secured to the fastenings 10 and the second casing 53 by friction fits, screws, glues or other similar connecting means adapted to create a rigid and fixed constraint. In detail, the inner portion 55b is secured to the second casing 53 by friction fits, while the outer portion 55a is secured to the fastenings 10 by screws.

[0038] In addition to the above components, the closing device 1 for fastenings can comprise one or more coatings **60** each of which is adapted to cover a supporting apparatus 50 and in particular to be fixed to the hooking body 55 on the opposite side relative to fastenings 10 so as to conceal apparatus 50 to the sight, as shown in Figs. 1 a and 1 b.

[0039] Coating 60 can consist of a suitably shaped plate adapted to be fixed to body 55 at the outer portion 55b through friction fit, screws, glues or other similar solutions. Preferably, coating 60 is adapted to be fixed to the outer portion 55b by friction fit.

[0040] The invention also concerns a type of fastenings 10, preferably consisting of a door, comprising the previously described closing device 1.

[0041] Operation of a handle closing device 1 for fastenings described above as regards its structure, and consequently of fastenings 10 provided with device 1 is the following.

[0042] First, the closing device 1 is mounted on fastenings 10. At the beginning of this operation, the operator disposes the return mechanism 51 between casings 52 and 53 and therefore forms the box-shaped element 56 securing casings 52 and 53 to each other in a motion-admitting manner.

[0043] In detail, during this operation the operator disposes the spring ends 51 a into the slot 56a defined by casings 52 and 53 so that, during operation of the closing element 1, mechanism 51 is able to oppose the mutual motion between casings 52 and 53 and therefore, the motion of handle 20, as hereinafter described.

[0044] Then the operator rigidly fixes the hooking body 55 to fastenings 10 causing the outer portion 55a to be disposed on the outer surface 10b and the inner one 55b to be housed inside hole 10a.

[0045] When fixing of body 55 has been completed, the operator fits the box-shaped element 56 to the hooking body 55 and in particular fits the hooking body 55 to the second casing 53 rigidly connecting the second casing 53 to the hooking body and therefore to fastenings 10.

[0046] Finally, the operator, through a suitable inlet present in fastenings 10 introduces the lock 30 in register with hole 10a, engages the transmission rod 40 with lock 30 and the first casing 52 and then terminates mounting of device 1 by engaging the coating 60 by friction fit with the hooking body 55 at the outer portion 55a and by locking handle 20 to the transmission rod 40.

[0047] At the moment of use, the operator rotates handle 20 and therefore the transmission rod 40 relative to the major extension direction 40a making lock 30 pass to the open configuration.

[0048] Simultaneously with said action, handle 20 that is linked to the first casing 52 through the transmission rod 40, causes rotation of the first casing 52 relative to the second casing 53.

[0049] This mutual rotation between casings 52 and 53 gives rise to narrowing of slot 56a defined by said casings and, as a result, makes the ends 51 a of the torsion spring move close to each other causing loading of the spring and therefore energy storage.

[0050] When the first casing 52 abuts against the stop limit 54 and handle 20 stops its rotation, lock 30 has reached the open configuration and therefore the operator is able to move the fastenings 10.

[0051] When movement of the fastenings 10 has been completed, the operator releases handle 20 causing return of lock 30 to the closed configuration.

[0052] In particular, when the operator's action on handle 20 stops, the return means 51 releases the stored energy making the first casing 51, transmission rod 40, and handle 20 rotate relative to the second casing 52, around the direction 40a causing return of lock 30 to the closed configuration.

[0053] The invention achieves important advantages.

[0054] A first important advantage resides in that the closing device 1 can be easily mounted on any type of fastenings irrespective of the size of the hole.

[0055] In fact, due to accomplishment of a box-shaped element 56 and constraint of this box-shaped element 56 to fastenings 10 through a suitable hooking body 54, the sizes of the supporting apparatus 50 can be adapted to those of the housing hole 10a. In detail, this possibility is obtained by exclusively varying the sizes of the hooking body 54 and leaving the box-shaped element 56 and the rest of device 1 unchanged.

[0056] In conclusion, the closing device 1 can be adjusted in a simple and quick manner to any fastenings 1 without complicated and expensive replanning of the supporting apparatus 50 being required.

[0057] In addition, this aspect is further advantageously ensured by the conformation of the box-shaped ele-

ment 56 that not only enables said element to be secured to a hooking body 54 of any size, but is also characterised by very reduced sizes and therefore reduced bulkiness so that the element can be easily introduced into any hole 10a.

[0058] This aspect has been obtained both using, as the return mechanism 51, a torsion spring characterised by three or more coils and due to the particular shape of the through cavity 52a allowing a friction fit connection to be created between the first casing 52 and the transmission rod 40 where the first casing advantageously is of reduced sizes.

[0059] Another important advantage resides in that, since the box-shaped element 56 can be almost fully housed inside hole 10a, the obtained device 1 is characterised by a very reduced portion protruding from the outer surface 10b, which gives the device a high aesthetic quality.

Claims

1. A handle closing device (1) for fastenings (10) provided with a housing hole (10a) and comprising at least one supporting apparatus (50) for the handle (20) having a first casing (52) suitable for engagement with said handle (20) so as to be moved by the handle (20) itself; a return mechanism (51) adapted to exert a return force against the motion of said first casing (51); a second casing (53) suitable for engagement in a motion-admitting manner with said first casing (52); and **characterised in that** said first casing (52) and second casing (53) create a box-shaped element (56) internally housing said return mechanism (51) and **in that** said at least one supporting apparatus (50) comprises a hooking body (55) adapted to be rigidly secured to said second casing (53) and said fastenings (10) so as to position said box-shaped element (56) at least partly inside said housing hole (10a).

2. A closing device (1) as claimed in claim 1, wherein said handle (20) engages a transmission rod (40), and wherein said first casing (52) has a through cavity (52a) suitable for engagement by friction fit with said transmission rod (40).

3. A closing device (1) as claimed in the preceding claim, wherein said transmission rod (40) has a polygonal section; and wherein said through cavity (52a) has a substantially circular section provided with cuts suitable for engagement by friction fit with said transmission rod (40).

4. A closing device (1) as claimed in the preceding claim, wherein said transmission rod (40) substantially has a square section; wherein said through cavity (52a) has a substantially circular section of a diameter substantially coincident with the side of said square section of said transmission rod (40); and wherein said cuts of said through cavity (52a) are suitable for engagement by friction fit with the edges of said square section of said transmission rod (40).

5. A closing device (1) as claimed in one or more of the preceding claims, wherein said return mechanism (51) is a torsion spring and wherein said first casing (52) and second casing (53) are susceptible of mutual engagement in a manner adapted to define a slot (56a) designed to receive the ends (51 a) of said torsion spring.

6. A closing device (1) as claimed in the preceding claim, wherein said casings (52, 53) are mutually movable in a manner adapted to vary the extension of said slot.

7. A closing device (1) as claimed in one or more of the preceding claims, comprising at least one coating (60) that can be fixed in register with said housing hole (10a) so as to substantially overlap said at least one supporting apparatus (50).

8. A closing device (1) as claimed in one or more of the preceding claims, comprising two of said at least one supporting apparatus (20), adapted to be disposed on opposite outer surfaces (10b) of said fastenings (10).

9. Fastenings (10) comprising a closing device (1) as claimed in one or more of the preceding claims.

10. Fastenings (10) as claimed in the preceding claim, having a housing hole (10a) and wherein said closing device (1) is partly housed in said housing hole (10a).

11. Fastenings (10) as claimed in the preceding claim, wherein said return mechanism (51) is at least partly disposed inside said housing hole (10a).

12. Fastenings (10) as claimed in the preceding claim, wherein said return mechanism (51) is fully disposed inside said housing hole (10a).

13. Fastenings (10) as claimed in the preceding claim, wherein said box-shaped element (56) is fully disposed inside said housing hole (10a).

14. Fastenings (10) as claimed in one or more of claims 9-12, defining two outer surfaces (10b) opposite to each other and comprising two handles (10), each of which is adapted to be disposed close to one of said opposite surfaces (10b) and two of said at least one supporting apparatus (50), each of which is disposed at said opposite surfaces (10b).

15. Fastenings (10) as claimed in the preceding claim, comprising a transmission rod (40) adapted to mutually connect said two handles (20) and said two supporting apparatus (50).

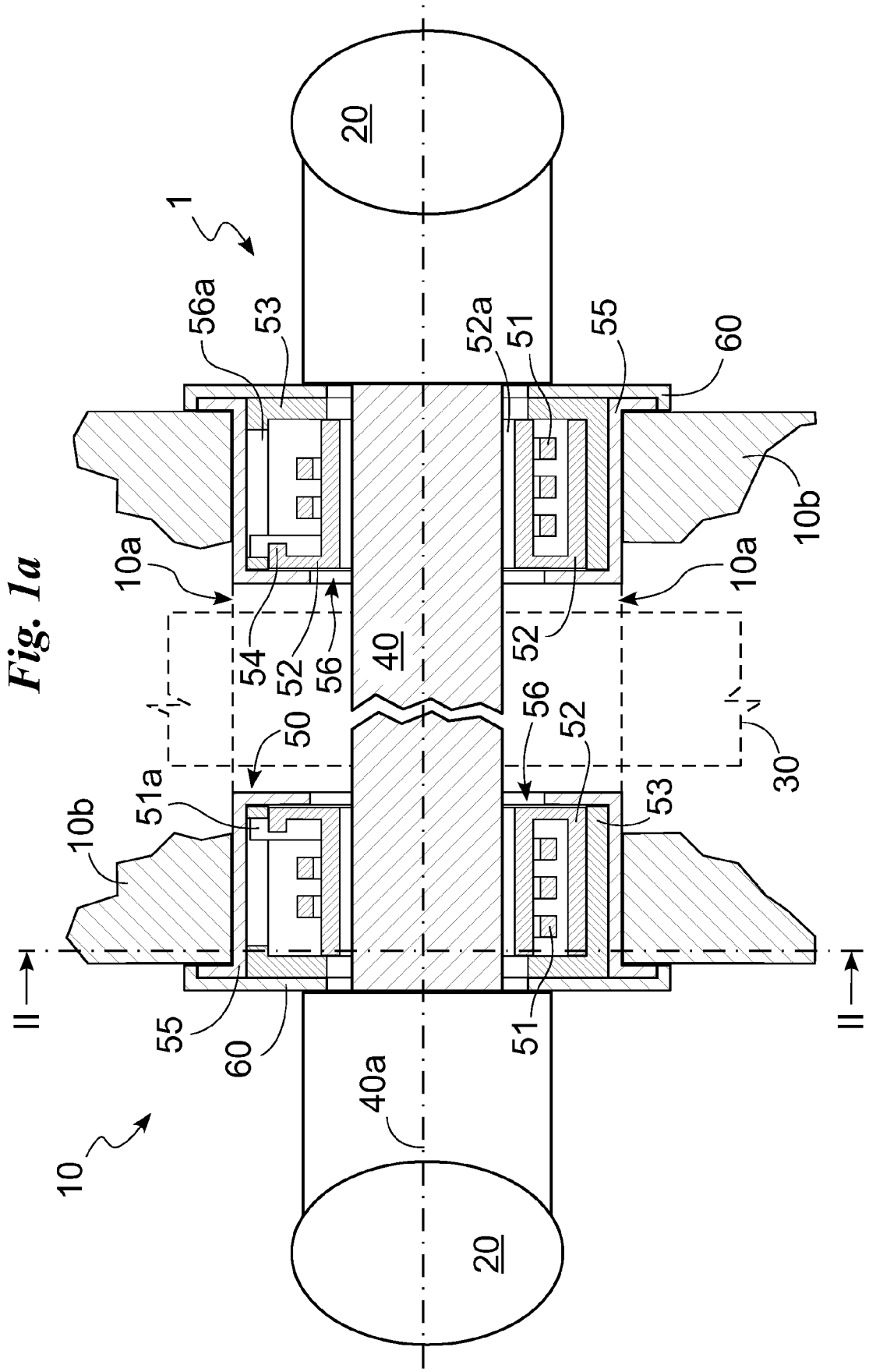

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Fig. 1a

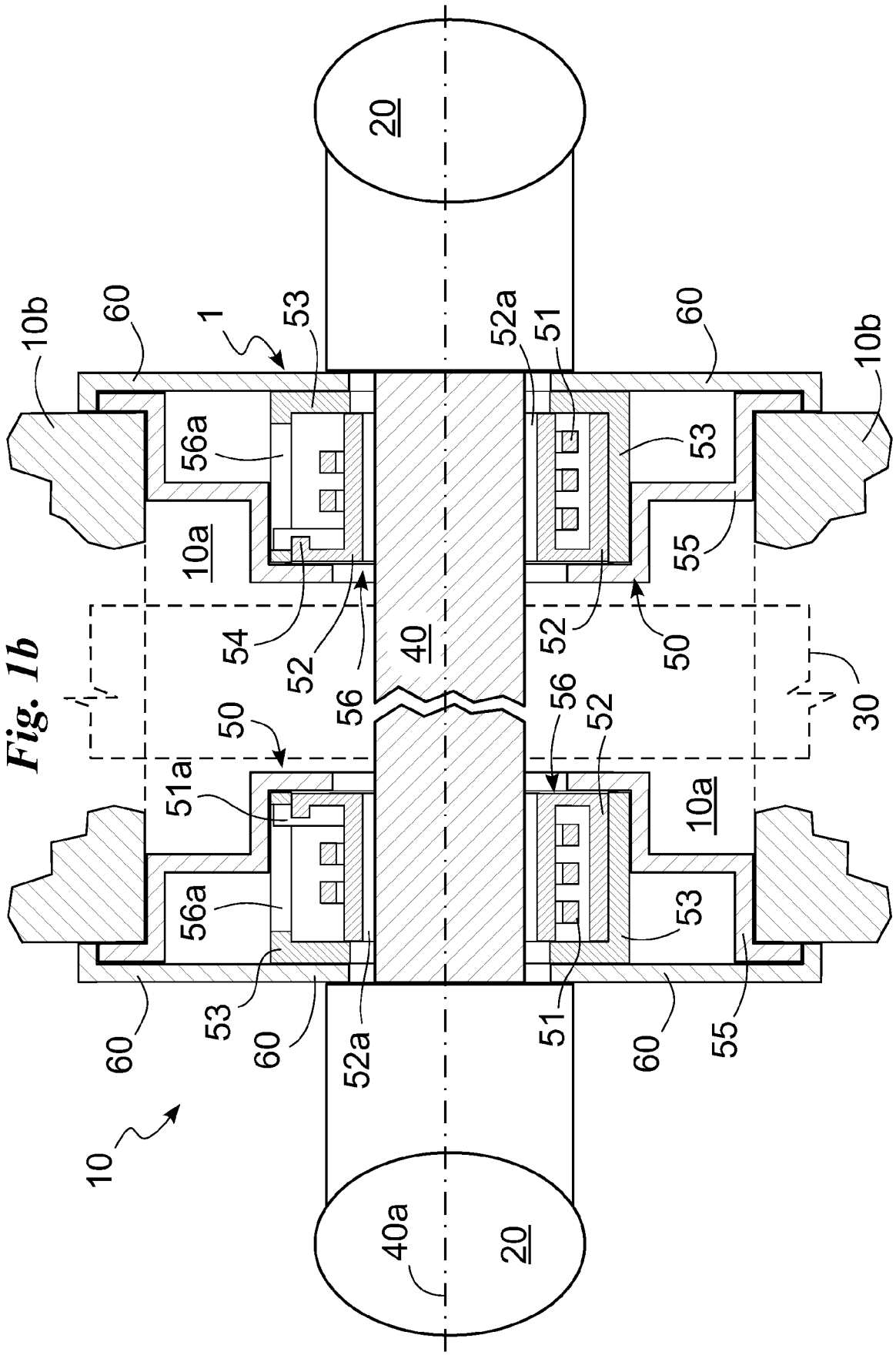
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Fig. 1b

Fig. 2

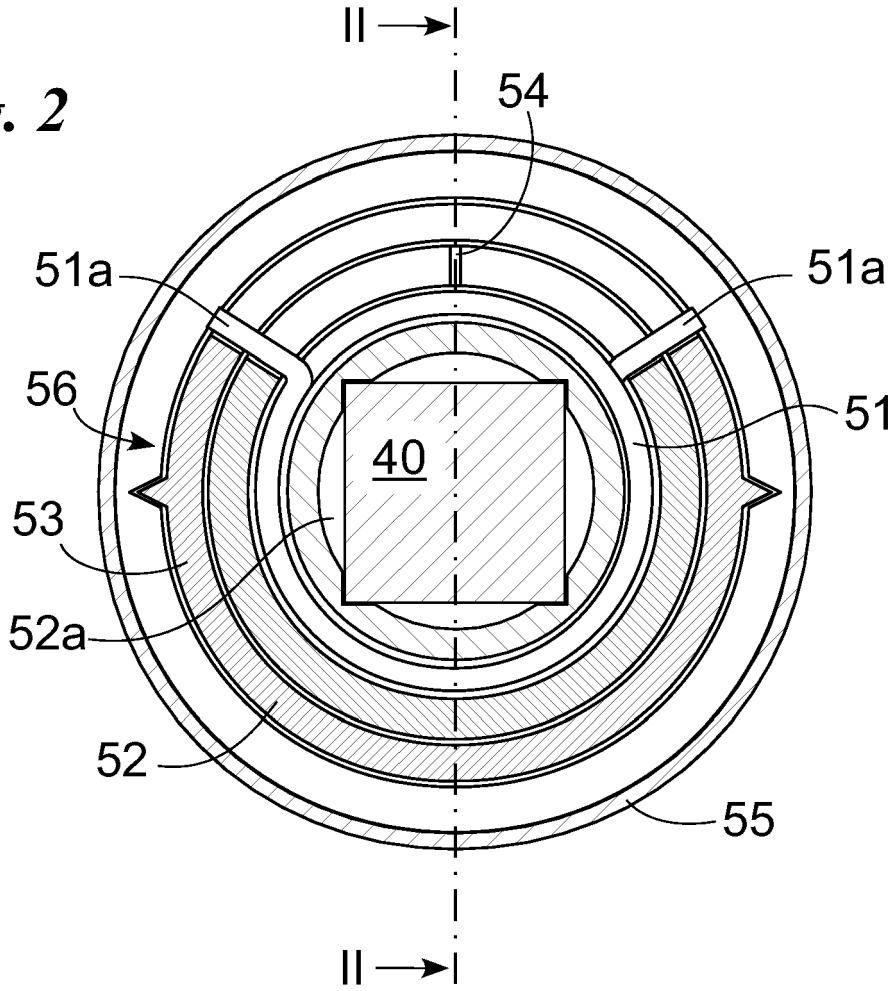
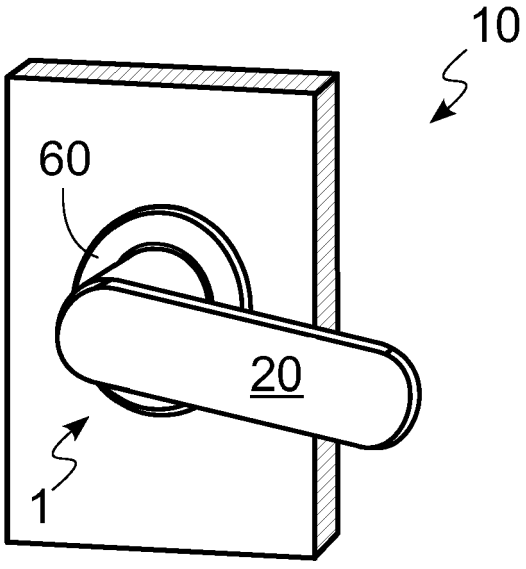


Fig. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 12 15 6368

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 September 2012	Van Beurden, Jason

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12-09-2012

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