



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.06.2012 Bulletin 2012/24

(51) Int Cl.:
E05B 15/10 ^(2006.01) **E05C 1/12** ^(2006.01)
E05B 63/04 ^(2006.01)

(21) Application number: **11190069.2**

(22) Date of filing: **22.11.2011**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME

(71) Applicant: **Abloy Oy**
80100 Joensuu (FI)

(72) Inventor: **Tiainen, Marko**
81100 Kontiolahti (FI)

(74) Representative: **Gustafsson, Aulis Valdemar et al**
AWEK Industrial Patents Ltd Oy
P.O. Box 230
00101 Helsinki (FI)

(30) Priority: **08.12.2010 FI 20106297**

(54) **Bolt arrangement for a lock body**

(57) The invention relates to a bolt arrangement for a lock body. The bolt arrangement comprises a frame (8), whose ends (25, 26) are open. On the sides of the frame, there are ridges (9) and slots (10) located between

them. The bolt (4) of the bolt arrangement has corresponding shapes (9, 10). The bolt can be turned to change the orientation of the lock body. The bolt and the frame prevent manipulation of the lock body.

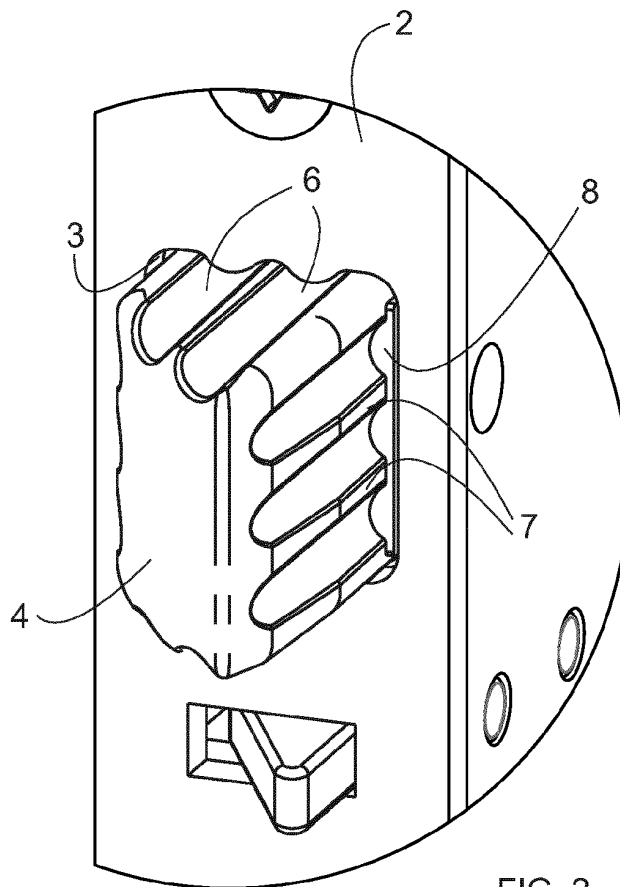


FIG. 2

Description

Technical field

[0001] This invention relates to a bolt arrangement, which is installed in a lock body. The lock body is, in turn, to be installed in a door, hatch or corresponding installation site.

Prior art

[0002] Attempts have been made to open locks without a suitable key such that no marks are left in the lock, such as different types of damage. This activity is called lock picking. Lock picking is aimed at the lock cylinder. Attempts have also been made to open the locking of a door or hatch in a manner corresponding to lock picking through the body of the lock without leaving marks. This is called manipulating the lock body. In manipulating the lock body are used, for example, different types of wires and strips, which are used in an attempt to push them inside the lock body, and to open the locking by using them. The holes and gaps of the lock body are utilized to push the wires and strips inside the lock body.

[0003] It is known that an attempt is made to design the openings and gaps of the lock body to be as small as possible and to situate them such that they could not be used in manipulating the lock body. There is always a gap between the bolt and the bolt hole of the front plate of a lock body. In manipulation, an attempt is made to use this gap. To prevent manipulation, it is known that the bolt has a projection/threshold behind the front plate inside the lock body. GB 597949 presents a solution of this type. The solution presented in the GB publication is well suited for dead bolts, but is not, however, suitable for use with latch bolts, if it is desired that changing the orientation of the lock body be possible without opening the lock body. When the orientation of a lock body is changed, the latch bolt must be turned 180 degrees. The known method is to loosen the attachment screw between the latch bolt and the bolt body and pull the latch bolt out from the lock body through the bolt hole of the front plate. The latch bolt is turned 180 degrees, pushed back inside the lock body and attached with the attachment screw to the bolt body. Thus, the orientation of the lock body can be changed without opening the lock body.

Brief description of the invention

[0004] The object of the invention is to provide a bolt arrangement that is well capable of resisting manipulation of the lock body and which is suitable for use in latch bolt solutions such that the orientation of the lock body can be changed without opening the lock body. The object is achieved in the manner presented in the independent claim. The dependent claims present various embodiments of the invention.

[0005] The idea of the invention is that the gap between

the bolt hole of the front plate and the latch bolt is not suitable for manipulation of the lock body such that, through it, it is difficult or even impossible to push a wire or strip inside the lock body. The inventive solution uses a separate frame behind the front plate inside the lock body to prevent and complicate the pushing of wires or strips inside the lock body. The frame and the latch bolt are formed to fit together.

[0006] A bolt arrangement according to the invention comprises a latch bolt 4, which is to be attached to the bolt body 21 of a lock body in a left-handed or right-handed orientation, i.e. its orientation can be changed. Each side of the latch bolt, i.e. the inner surfaces between the ends of the bolt, comprises grooves 6 and ridges 7 located between them. The grooves expand towards the bevelled end 17 of the latch bolt and the ridges widen towards the bottom end 18 of the latch bolt.

[0007] In addition, the bolt arrangement comprises a frame 8, the ends of which, the outer end 25 and the inner end 26, are open. The inner surfaces of the sides 8A comprise ridges 9 of the frame and slots 10 of the frame located between them. The ridges of the frame widen towards the outer end 25 of the frame and the slots expand towards the inner end 26 of the frame. The latch bolt is arranged to fit in a sliding manner inside the frame such that the play between the sides of the latch bolt and the inner surfaces of the sides of the frame is at its minimum, when the bottom end 18 of the latch bolt is at the head of the outer end 25 of the frame. The play increases, when the latch bolt is moved towards the inner end 26 of the frame.

List of figures

[0008] In the following, the invention is described in more detail by means of the accompanying figures, in which

Fig. 1 shows an example of an latch bolt arrangement according to the invention, which is installed in a lock body,

Fig. 2 shows a part of Fig. 1 in more detail,

Fig. 3 shows an example of an inventive frame of a bolt arrangement,

Fig. 4 shows the frame of Fig. 3 as viewed from the side,

Fig. 5 shows the frame of Fig. 3 as viewed from the front,

Fig. 6 shows an example of an latch bolt according to the invention,

Fig. 7 shows the latch bolt of Fig. 6 as viewed from another angle,

Fig. 8 shows an example of an latch bolt when pushed inside the lock body, and

Fig. 9 shows an example of an latch bolt when extended outward from the lock body.

Description of the invention

[0009] Fig. 1 shows a lock body 1, in which is installed an latch bolt arrangement according to the invention. Fig. 2 shows the latch bolt arrangement in more detail. The latch bolt 4 comprises, on each of its sides, grooves 6 and ridges 7 located between them. The grooves are formed such that they expand in the direction of the diagonal end of the latch bolt. The ridges are formed such that they widen in the direction of the bottom end of the latch bolt. From the example of the figures, it can be seen, how the bolt hole 3 of the front plate 2 of the lock body 1 is shaped according to the ridges 7 and grooves 6 of the bolt at the upper and lower edges of the hole. In this example, the side edges of the bolt hole are straight. On the side edges of the bolt hole, there is visible a part of the frame 8 according to the invention. In addition, in the figure, there is visible the control wedge 5, which is used to indicate the position of the door in relation to the door opening. It is also possible that the bolt hole 3 is shaped differently depending on the shape of the latch bolt 4 and on how the frame is implemented. All the sides of the bolt hole can, for example, follow the shapes of the grooves and ridges of the sides of the latch bolt.

[0010] Figs. 3 — 5 show a frame 8 of the invention. The outer end 25 and inner end of the frame are open. The outer end is arranged to be installed against the rear surface 24 of the front plate 2 (Figs. 8 and 9). The inner surfaces of the sides 8A of the frame comprise ridges 9 and slots 10 located between them. The ridges widen in the direction of the outer end 25 of the frame. The slots 10 of the frame expand in the direction of the inner end 26. On the outer surfaces of the long sides of the embodiment of the figures, there are also projections 12, 13 facing away from the plane of the surfaces. During installation, they set themselves against the rear surface 24 of the front plate 2. On the outer surface of the other short side, there is also a projection 13, which is integrated into the projection of the other long side over the corner 14 of the housing 8. The frame can also be implemented without said projections, but it is advantageous for installation of the frame that there is a projection on at least one side. In this embodiment, the corners 11 of the inner surfaces of the frame 8 are curved, but they can also be angular.

[0011] In addition, the embodiment of Figs. 3 - 5 comprises extended projections 15 at the outer end 25 of the frame. They form extensions to the slots 10 and ridges 9 of the inner surfaces. During installation, the extended projections set themselves into the bolt hole 3 of the front plate 2, as is shown in Fig. 2. There is an extended projection on at least one side, but extended projections on,

for example, two sides is a more preferred embodiment in terms of symmetry. The extended projections can also be left out completely. On the long sides, there is also a hole 16. There can also be other holes on the sides. The inner end 26 can be shaped in the desired manner. The frame is preferably made of plastic, but some other material suitable for the purpose can also come into question, such as some metal alloy.

[0012] Figs. 6 and 7 show an embodiment of an inventive latch bolt 4. The diagonal end 17 of the installed latch bolt is facing away from the lock body 1. The inner end 18 is facing towards the bolt body 21 (Figs. 8 and 9). From Fig. 7 it can be seen that there is a hole 27 in the latch bolt for the bolt body and another hole 19 for attaching the latch bolt to the bolt body 21. In this embodiment, the corners 20 between the sides of the latch bolt are curved, but they can also be angular. In addition, it is possible that the grooves and ridges of the bolt are located differently than is shown in Figs. 6 and 7 such that the corners 20 do not form ridges, rather grooves instead. The bolt is produced in a known manner from metal.

[0013] Figs. 8 and 9 illustrate, how the shapes of the ridges and grooves/slots of the latch bolt 4 and the frame 8 keep the play between the parts (frame/front plate and latch bolt) as small as possible, when the bolt 4 is outside the lock body (Fig. 9). The figures show a cross-section at the site of the bottom of a groove of the latch bolt. When the bolt is inside the lock body (Fig. 8), the play 22 between the frame and the latch bolt is at its maximum. In this case, the play 23 between the latch bolt 4 and the edge of the bolt hole 3 of the front plate 2 is also at its maximum due to the shapes of the grooves/ridges of the latch bolt. When the latch bolt moves away from the lock body, the play 22 between the frame 8 and the latch bolt 4 decreases and is at its minimum, when the bolt is fully extended outward (Fig. 9). In this case, there is not necessarily much play at all, but nonetheless the orientation of the latch bolt can be changed in the known manner. It can be said that, as the latch bolt moves outward, it wedges towards the frame. As is already stated above, the ridges 9 of the frame widen in the direction of the outer end 25 of the frame, and the slots 10 of the frame expand in the direction of the inner end 26 of the frame. Correspondingly, the grooves 6 of the latch bolt expand in the direction of the diagonal end 17 of the latch bolt, and the ridges widen in the direction of the bottom end 18 of the latch bolt. Thus, said wedging is possible, when the latch bolt slides inside the frame outwards from the lock body. In addition, from Figs. 8 and 9 can be seen, how the frame is arranged to be installed behind the front plate 2 of the lock body at the site of the bolt hole.

[0014] In the embodiment shown in the figures, the shape of the grooves 6 of the latch bolt is curved and the upper surfaces of the ridges 7 of the latch bolt are planar, and the ridges 9 of the frame are respectively curved and the bottoms of the slots 10 planar. It is also possible that the grooves/slots and ridges are also formed in another

manner. Another embodiment is that the shape of the grooves 6 as well as the upper surfaces of the ridges 7 of the latch bolt are curved, and the ridges 9 and slots 10 of the frame are respectively curved. It is also possible that the inner surfaces and bottoms of the grooves 6 of the latch bolt are planar, and the upper surfaces of the ridges 7 of the latch bolt are also planar. In this case, the side surfaces and upper surfaces of the ridges 9 of the frame as well as the bottoms of the slots 10 are respectively planar.

[0015] The figures show that there are two grooves on the short sides 4 and three grooves on the long sides of the latch bolt, and, respectively, three ridges on the long inner surfaces and two ridges on the short sides of the frame 8. The number of grooves and ridges can also be something other than in the embodiment of the figures.

[0016] In the light of the examples presented above it is obvious that an embodiment according to the invention can be provided in various ways. It is also obvious that the invention is not limited only to said examples in this text, rather it can be implemented in many different embodiments within the scope of the claims.

Claims

1. A bolt arrangement for a lock body comprising a latch bolt (4), which latch bolt is to be attached to a bolt body (21) of the lock body in a left-handed or right-handed orientation, **characterized in that** each side of the latch bolt comprises grooves (6) and ridges (7) located between them, which grooves expand towards the bevelled end (17) of the latch bolt and ridges widen towards the bottom end (18) of the latch bolt, which bolt arrangement further comprises a frame (8), the ends of which, the outer end (25) and the inner end (26), are open and the inner surfaces of the sides (8A) comprise ridges (9) of the frame and slots (10) of the frame located between them, which ridges of the frame widen towards the outer end (25) of the frame and which slots (10) of the frame expand towards the inner end (26) of the frame, which latch bolt is arranged to fit in a sliding manner inside the frame such that the play between the sides of the latch bolt and the inner surfaces of the sides of the frame is at its minimum, when the bottom end (18) of the latch bolt is at the head of the outer end (25) of the frame, and the play increases, when the latch bolt is moved towards the inner end (26) of the frame.
2. A bolt arrangement according to claim 1, **characterized in that** the frame (8) has, on the outer surface of at least one side, a projection (12) at the end on the side of the outer end (25) to be installed against the rear surface (24) of the front plate (2) of the lock body (1), which frame is arranged to be installed be-

hind the front plate of the lock body at the site of the bolt hole.

3. A bolt arrangement according to claim 2, **characterized in that** the outer end (25) of the frame comprises, on at least one side, an extended projection (15), which extended projection forms extensions to the ridges (9) and slots (10) of the inner surface of the side in question.
4. A bolt arrangement according to any one of claims 2 - 3, **characterized in that** the shape of the grooves (6) of the latch bolt is curved and the upper surfaces of the ridges (7) of the latch bolt are planar, and the ridges (9) of the frame are respectively curved and the bottoms of the slots (10) planar.
5. A bolt arrangement according to any one of claims 2 - 3, **characterized in that** the shape of the grooves (6) of the latch bolt is curved and the upper surfaces of the ridges (7) of the latch bolt are curved, and the ridges (9) of the frame are respectively curved and the bottoms of the slots (10) curved.
6. A bolt arrangement according to any one of claims 2 - 3, **characterized in that** the side surfaces and bottoms of the grooves (6) of the latch bolt are planar and the upper surfaces of the ridges (7) of the latch bolt are planar, and the side surfaces and upper surfaces of the ridges (9) of the frame are respectively planar and the bottoms of the slots (10) planar.
7. A bolt arrangement according to any one of claims 2 - 6, **characterized in that** there are two grooves (6) on the short sides and three grooves (6) on the long sides of the latch bolt (4), and, respectively, there are three ridges (9) on the inner surfaces of the long sides and two ridges (9) on the inner surfaces of the short sides of the frame (8).
8. A bolt arrangement according to any one of claims 2 - 7, **characterized in that** the frame (8) is made of plastic.

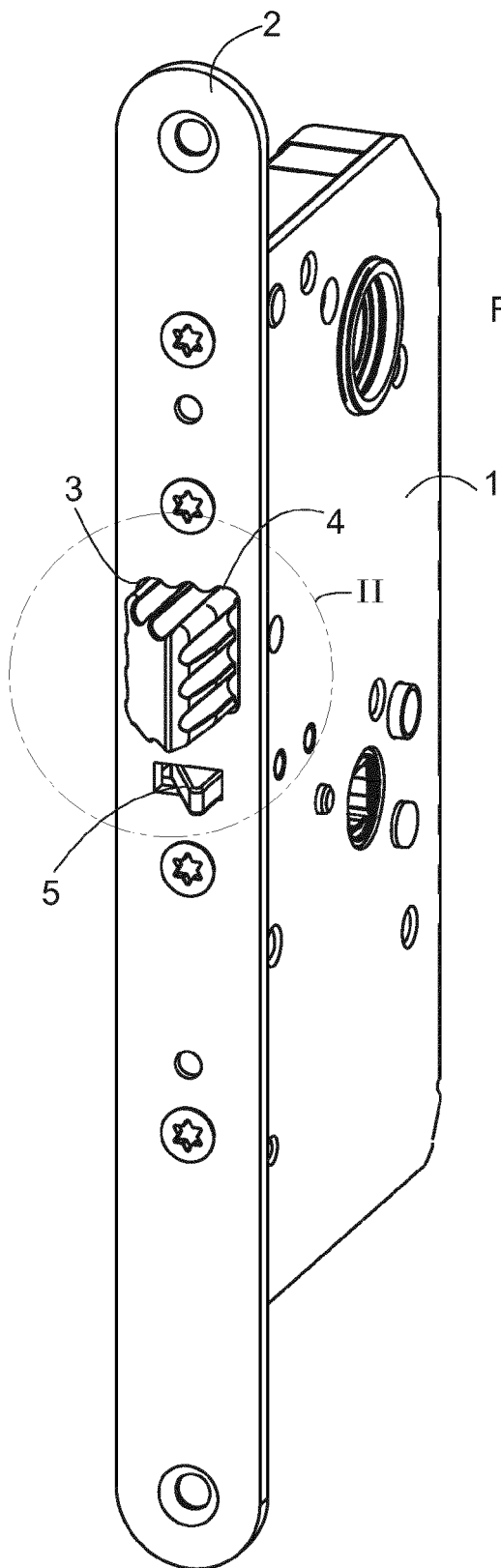


FIG. 1

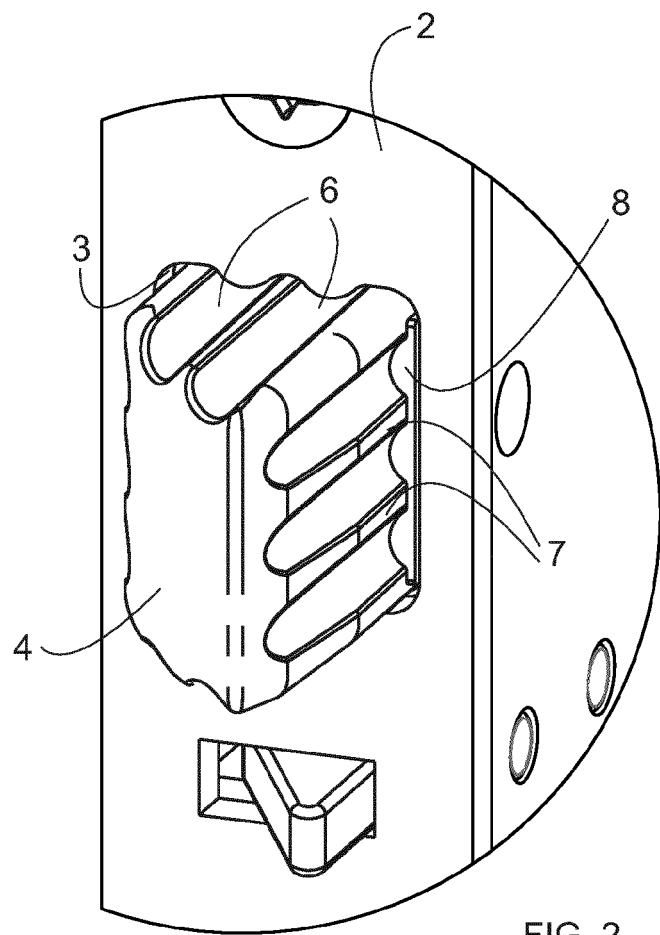
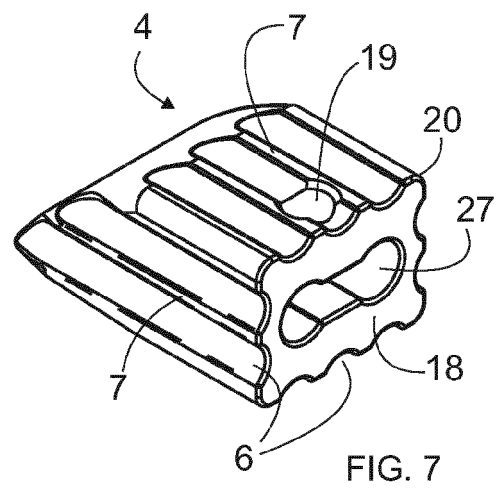
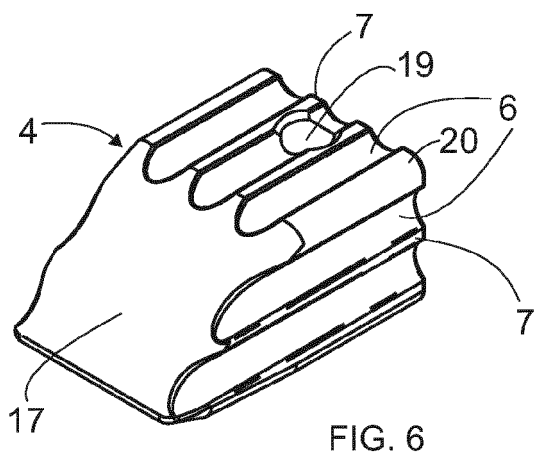
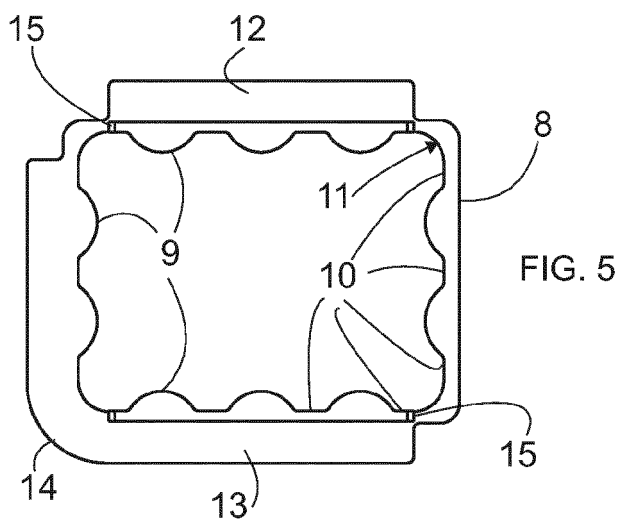
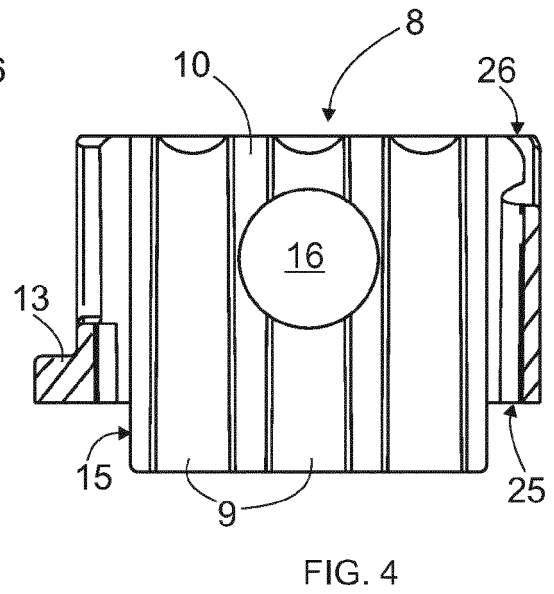
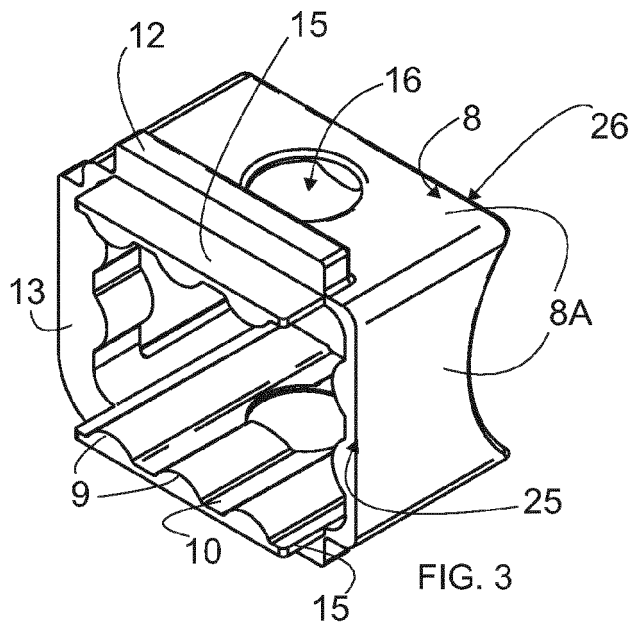
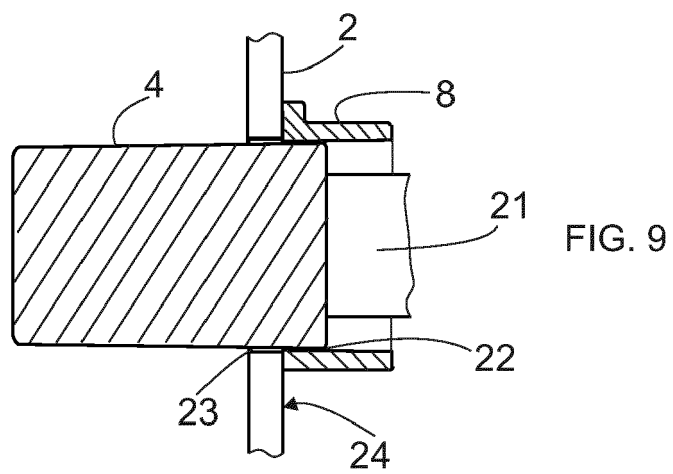
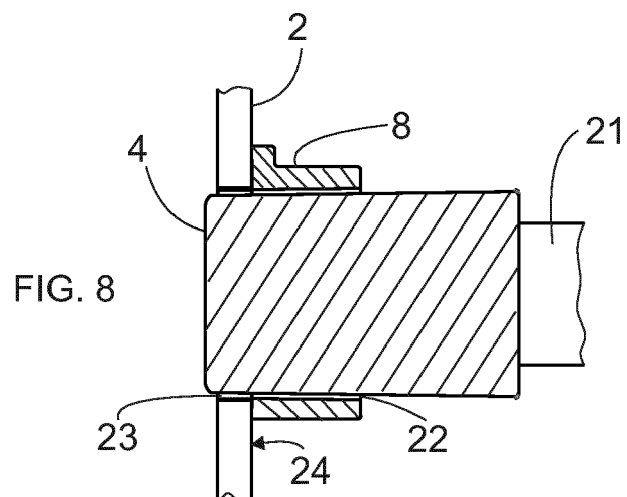


FIG. 2





REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 597949 A [0003]