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Description:

The invention relates to a door, especially a quick-action door or a roll-up door, comprising a door leaf and two side boundaries, wherein the side boundaries each contain a profile section and the profile sections define a door leaf plane. At least one side boundary comprises a light grid strip, wherein the light grid strip is arranged in a recess of the profile section. The recess comprises two side walls lying opposite one another and a rear wall, wherein the light grid strip is arranged between the door leaf located in the closed position and the rear wall. Furthermore, the invention relates to a method for assembling said door.

Such doors are known in principle from practice, see in this regard patent application EP 0 902 157 A2. The light grid strip is first inserted into a housing and the remaining hollow spaces in the housing are filled in with a casting resin in order to fix the light grid strip in the housing. In a second step, the housing is fastened to the rear wall of the profile section by means of screws or angle brackets at the assembly site of the door, so that a clamping force directed parallel to the door leaf plane is acting. The housing is optionally also aligned by means of spacers, for example on a runner rail. For this purpose, the spacers are also fastened by means of screws to the rear wall of the side boundary profile section.

A drawback with these doors known from practice is that the light grid strip first has to be inserted into the specially produced housing in the factory and then also fixed in the housing with a casting resin. Furthermore, at least two screws are required per angle bracket and at least one screw per spacer, so that a double-digit number of screws has to be reckoned with over the entire height of a light grid strip. Moreover, the housing and the angle bracket and, as the case may be, also the spacer have to be

fixed simultaneously with a screw connection, so that these components possibly require two fitters for each screw connection until a sufficient torque of the screw connection has been achieved. Consequently, a not
5 inconsiderable outlay is incurred on the fixing of the light grid strip.

The problem underlying the invention, therefore, is to reduce the outlay on the production and/or the assembly of
10 the door. In particular, the problem underlying the invention is to reduce the outlay incurred in respect of the light grid strips during production in the factory and/or in the assembly.

15 To solve to this problem, the invention teaches a door, especially a quick-action door or a roll-up door, comprising a door leaf and two side boundaries, wherein the side boundaries each contain a profile section, wherein the profile sections define a door leaf plane, wherein at least
20 one side boundary comprises a light grid strip, wherein the light grid strip is arranged in a recess of the profile section, wherein the recess comprises two side walls lying opposite one another and a rear wall, wherein the light grid strip is arranged between the door leaf located in the
25 closed position and the rear wall, wherein at least one clamping part fixes the light grid strip between the side walls of the recess by means of a clamping force and wherein the side walls of the recess take up the clamping force.

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The invention is based on the knowledge that the light grid strip can be fixed directly in the profile section of the side boundary by means of the clamping part or clamping parts without an additional housing. Thus, on the one hand
35 the production of a housing for the light grid strips is not required and on the other hand there is no need for the process step of the fixing by means of a casting resin. The

production cost in respect of the light grid strips is thus reduced. On account of the clamping force, which is taken up by the side walls of the recess, the light grid strip can moreover be fitted particularly easily in the recess of the profile section. Embodiments are sometimes possible which manage without any screws and in which the clamping parts are fixed merely by being pressed into the recess on account of the clamping force. Moreover, the light grid strip can also be clamped in a fixing manner merely by being pressed in, so that only one fitter is required and the latter does not even have to resort to a tool for this purpose. Moreover, such clamping parts also lie within the scope of the invention, which by means of screws generate an additional clamping force and therefore a particularly stable fixing of the light grid strip. In any case, however, the outlay on the assembly of the light grid strips is reduced considerably by the clamping force taken up by the side walls.

On account of the mechanical action principle *actio = reactio*, the clamping force is preferably also taken up by the light grid strip or by the clamping part. In particular, the clamping force due to the *actio = reactio* principle acts for example on a side wall of the recess and therefore at the same time also away from the side wall. The clamping part preferably comprises a plastic and is also preferably an injection moulded part or a section of an extruded plastic element. The profile section of the side boundary preferably comprises a metal and in particular aluminium. A plurality of clamping parts and also preferably two, three, four or five clamping parts are advantageously arranged in the recess, in particular for the purpose of aligning and/or fixing the light grid strip.

The clamping part is advantageously constituted such that at least a first flank surface of the clamping part abuts against a first flank of the light grid strip, wherein at

least a first profile surface of the clamping part abuts against the side wall of the recess of the profile section that is assigned to the first flank of the light grid strip. The expression "flanks" means in particular the surfaces of the light grid strip facing the side walls of the recess. The expression "front side of the light grid strip" is preferably understood as the side of the light grid strip that is facing the door leaf in the closed position. The expression "rear side of the light grid strip" means in particular a side of the light grid strip facing away from the door leaf located in the closed position. In particular, the flanks of the light grid strip connect the front side and the rear side of the light grid strip together. The clamping part is preferably constituted such that a second flank surface of the clamping part abuts against a second flank of the light grid strip, wherein a second profile surface of the clamping part abuts against the side wall of the recess of the profile section that faces the second flank of the light grid strip.

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According to a particularly preferred embodiment, the clamping part clamps the light grid strip firmly in the recess, in such a way that the direction of the clamping force intersects the door leaf plane. The clamping force preferably acts in the direction of the side walls of the recess. The side walls of the recess are expediently parallel with one another. It lies within the scope of the invention that at least one and preferably both side walls of the recess lie parallel to the door leaf plane. The term "door leaf plane" means in particular the plane which is spanned by the door leaf in the closed position. In particular, the door leaf plane is not limited to the door leaf. The door leaf plane is ideally a plane in the mathematical sense, wherein the door leaf plane runs in the middle of the two surfaces of the door leaf that cover the door and wherein the door leaf plane is particularly preferably arranged in parallel between these two surfaces.

35

The door leaf plane is preferably arranged approximately parallel to the surrounding wall surfaces. According to a very particularly preferred embodiment, the direction of the clamping force is orientated perpendicular or essentially perpendicular to the door leaf plane.

It is very preferable for the clamping part or a bottom of the clamping part to be constituted such that the clamping part or the bottom corresponds in terms of its width to the distance between the side walls of the recess, so that the clamping part or the bottom can be inserted into the recess and preferably experiences a press fit between the side walls of the recess and is held in the recess by this press fit. The expression "press fit" means for example a frictional connection or a force fit. According to a first embodiment, the bottom is arranged between the rear wall of the recess and the rear side of the light grid strip. The bottom expediently abuts against the rear wall of the recess and preferably also against the rear side of the light grid strip. According to another embodiment, the bottom is arranged between the front side of the light grid strip and the door leaf located in the closed position, and preferably the bottom also abuts against the front side of the light grid strip.

It is very advantageous if the clamping part or the clamping part and a side wall of the recess define a groove, wherein the width of the groove corresponds to the width of the light grid strip, so that the light grid strip can be inserted into the groove, wherein the light grid strip preferably experiences a force fit in the groove and is preferably held in the recess by this force fit. The expression "force fit" means in particular a frictional connection or a press fit. The clamping part can for example be U-shaped, L-shaped, wedge-shaped or cuboid-shaped. The light grid strip very preferably abuts only against one or a plurality of surfaces of the clamping

part. According to another embodiment, the light grid strip abuts both against at least one surface of the clamping part and also against one of the side walls of the recess.

5 It lies in particular within the scope of the invention if the clamping part comprises a splaying part, which splaying part exerts the clamping force or an additional clamping force. The expression "clamping force" preferably means that only the splaying part exerts the clamping force. The
10 expression "an additional clamping force" preferably means that, aside from the clamping force generated by the splaying part, yet another clamping force acts. The other clamping force can for example have been generated by a press fit of the clamping part in the recess. The splaying
15 part preferably splays a first and a second side surface of the clamping part. The at least one leg of the clamping part is preferably splayed by the splaying part in the clamping force direction. An imaginary extension of a longitudinal axis of the splaying part preferably
20 intersects the rear wall of the recess and particularly preferably stands perpendicular or essentially perpendicular to the rear wall of the recess. The splaying part is preferably a screw, which is expediently screwed into the clamping part for the splaying. The splaying part
25 can however also be, for example, a wedge or a nail. According to an embodiment, the clamping part comprises an indentation for receiving the splaying part, which indentation is groove-shaped according to a preferred embodiment. According to another embodiment, the
30 indentation is a hole or a bore.

Advantageously, at least one of the side walls or the side walls of the recess is or are roughened on their side facing towards the light grid strip. It is preferable for
35 at least one of the side walls or the side walls to comprise fluting, wherein the fluting or flutings expediently runs or run parallel to the longitudinal

direction of the profile section of the side boundary. The fluting or flutings preferably also runs or run along the entire length of the profile section of the side boundary or the side boundaries.

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Particularly preferably, the clamping part comprises a bottom and at least one leg and preferably two legs. It is advantageous if the clamping part is formed approximately U-shaped. According to another embodiment, the clamping
10 part is formed approximately L-shaped and typically comprises a bottom and a leg. The leg or legs expediently lies or lie against one of the flanks or the flanks of the light grid strip. It lies within the scope of the invention that the leg or the legs abut against one of the two side
15 walls or against one side wall of the recess.

According to a preferred embodiment, the bottom of the clamping part is located between the light grid strip and the rear wall of the recess. The bottom, in relation to the
20 leg or the legs, is preferably facing away from the door leaf located in a closed position. The bottom expediently abuts against the rear side of the light grid strip and the bottom preferably abuts against the rear wall of the recess. The splaying part advantageously exerts an
25 additional clamping force on the light grid strip and the leg or the legs of the clamping part. One clamping part is preferably arranged respectively at least in an upper and at least in a lower half of the light grid strip.

30 According to a preferred embodiment, the bottom of the clamping part is arranged between the light grid strip and the door leaf located in the closed position. It lies within the scope of the invention if the bottom, in relation to the leg or the legs, is facing the door leaf.
35 It is preferable if the bottom abuts against the front side of the light grid strip. The splaying part preferably exerts the clamping force or an additional clamping force

and particularly preferably only on the bottom of the clamping part. The clamping part is very preferably arranged at an upper and/or at a lower end of the light grid strip, wherein preferably at least one further
5 clamping part is located in between. The at least one further clamping part is expediently constituted such that the bottom of the at least one further clamping part is located between the light grid strip and the rear wall of the recess.

10

To solve the technical problem, the invention teaches a method for assembling a door, preferably a rapid-action door or a roll-up door, preferably according to the invention, wherein the door comprises a door leaf and two
15 side boundaries, wherein the side boundaries each contain a profile section, wherein the profile sections define a door leaf plane, wherein at least one profile section comprises a recess, wherein the recess comprises two side walls lying opposite one another and a rear wall, wherein the light
20 grid strip is located between the door leaf located in a closed position and the rear wall, and wherein a light grid strip is arranged in the recess of the at least one profile section, in which at least one clamping part is introduced into the recess, in such a way that the clamping part fixes
25 the light grid strip between the side walls of the recess by means of a clamping force, wherein the side walls of the recess take up the clamping force.

30

It is very preferable if the clamping part or the clamping parts are first introduced into the recess, wherein the clamping part or the clamping parts advantageously experience a press fit in the recess. The light grid strip is then preferably inserted into the clamping part or into the clamping parts, wherein the light grid strip preferably
35 experiences a force fit in a groove of the clamping part or in grooves of the clamping parts and wherein the light grid

strip is particularly preferably held by the force fit in the recess.

According to another embodiment of the clamping part, the
5 light grid strip is first inserted, preferably by means of a force fit, into the clamping part or into the clamping parts and is then preferably introduced together with the clamping parts into the recess. The clamping part or the clamping parts or the light grid strip preferably
10 experience the clamping force in the recess.

Finally, according to a very particularly preferred embodiment, the clamping part or the clamping parts are provided with one or more splaying parts, in order to exert
15 the clamping force or in order to exert the additional clamping force on the light grid strip or the clamping part or the clamping parts or the side walls.

The invention is explained in greater detail below with the
20 aid of a drawing representing an example of embodiment. In the figures, in a diagrammatic representation:

Fig. 1 shows a perspective view of a door according to the invention with a door leaf and two side
25 boundaries,

Fig. 2 shows a cross-sectional detail of one of the two side boundaries from fig. 1 with a first clamping part according to the invention,
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Fig. 3 shows a perspective view of the clamping part from fig. 2,

Fig. 4 shows a cross-sectional detail of one of the two side boundaries from fig. 1 with a second clamping part according to the invention and
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Fig. 5 shows a perspective representation of the clamping part from fig. 4.

Fig. 1 shows a quick-action door with a door leaf 1 and two side boundaries 2. Side boundaries 2 each comprise a profile section 3, which profile section is produced from aluminium in this example of embodiment. Door leaf 1 is made of a flexible material, preferably comprises one or more windows and is rolled up into a roller box arranged above side boundaries 2. A light grid is installed between side boundaries 2 and comprises a plurality of light beams not visible, which light beams extend in the horizontal direction between side boundaries 2. The travel path of door leaf 1 is monitored with the aid of the light grid.

The light grid is typically produced by two light grid strips 5, wherein one light grid strip is arranged respectively at one of the two side boundaries 2. A first light grid strip 5 expediently comprises a series of light sources preferably in the form of light-emitting diodes. First light grid strip 5 is aligned such that the light beams strike second light grid strip 5, where the light beams are detected by means of suitable detectors.

The inventive arrangement of light grid strips 5 in this example of embodiment is illustrated in fig. 2. Profile section 3 comprises a recess 6, the opening whereof, with respect to light grid strip 5, is facing door leaf 1 not represented in fig. 2. Light grid strip 5 expediently lies in a door leaf plane 4, which door leaf plane 4 is defined through door leaf 1 in the closed position. Recess 6 comprises two side walls 7 lying opposite one another and a rear wall 8. A first clamping part 10 according to the invention sits friction-locked by a press fit in recess 6, which clamping part is preferably formed U-shaped and expediently comprises a bottom 13 and two legs 14. Bottom 13 and legs 14 are preferably made of plastic and define a

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groove 11, in which groove 11 light grid strip 5 is arranged in a friction-locked manner.

Clamping part 10 is expediently first inserted into recess
5 6 during assembly, as a result of which it experiences a press fit and therefore also a frictional connection on account of corresponding dimensioning, as a result of which the clamping force acts on side walls 7. Clamping part 10 is held in recess 6 due to the frictional connection and/or
10 the press fit and/or the clamping force. Further clamping parts are then preferably also introduced into recess 6 along the height of side boundary 2. In a further step, light grid strip 5 is then inserted into grooves 11 of clamping parts 10, wherein light grid strip 5 is held in
15 grooves 11 on account of a force fit. Side walls 7 preferably each comprise fluting 9 at their side facing the light grid strip. These flutings 9 support the frictional connection or the press fit.

20 Fig. 3 represents clamping part 10 from fig. 2 in a perspective view and, in addition, also with a splaying element 12 in the form of a screw. Splaying element 12 engages in indentation 15 in the form of a slot groove, so that an additional clamping force acts on side walls 7 or
25 on light grid strip 5. Splaying part 12 enables a durable fixing of light grid strip 5 in recess 6. Clamping part 10 is used in particular in regions of light grid strip 5 where light sources or detectors are located.

30 Fig. 4 illustrates a second clamping part 20 according to the invention. Clamping part 20 comprises a bottom 23 and two legs 24, as a result of which a groove 21 is formed. Furthermore, clamping part 20 comprises an indentation 25 in the form of a slot groove, into which a splaying element
35 22 in the form of a screw is screwed. Bottom 23 and legs 24 in particular comprise a plastic. Clamping part 20 is preferably dimensioned such that when it is introduced into

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recess 6 it enters into a press fit with recess 6, so that a clamping force acts on side walls 7. Light grid strip 5 thus also simultaneously experiences a clamping force. The clamping force is further reinforced by splaying element 22, so that clamping part 20 is fixed durably in recess 6. Bottom 23 preferably abuts against light grid strip 5.

Fig. 5 shows clamping part 20 in a perspective representation. In the first place, it can be seen from this representation that clamping part 20 is arranged at a lower end of light grid strip 5 and therefore also at a lower end of profile section 3 and thus forms a termination. In this example of embodiment, a clamping part 20 is also located at an upper end (not represented) of light grid strip 5. Clamping part 10 or clamping parts 10 is or are arranged uniformly distributed between the two clamping parts 20.

The alignment of light grid strips 5 is greatly simplified in particular by the use of two or more clamping parts 10, 20. Clamping parts 10, 20, by means of their legs 14, 24, ensure an arrangement of light grid strip 5 running parallel to side walls 7. In contrast, bottoms 14, 24 of clamping parts 10, 20 preferably bring about a parallel alignment in the relation to rear wall 8. The cost of assembly of the light grid strips is thus markedly reduced. Moreover, clamping parts 10, 20 permit very great flexibility with regard to the types of light grid strips used, so that a single profile section 3 is compatible with an arbitrarily large number of types of light grid strip; it requires only an adaptation of inexpensive clamping parts 10, 20 to the respective cross-section of the type of light grid strip used.

Patentkrav

- 5 1. Port, omfattende et portblad (1) og to sidebegrænsninger (2), hvor sidebegrænsningerne (2) indeholder hver deres profil (3), hvor profilerne (3) definerer et portbladsplan (4), hvor mindst en sidebegrænsning (2) har en lysgitterliste (5), hvor lysgitterlisten (5) er anbragt i en udsparring (6) af profilet (3), hvor udsparringen (6) omfatter to over for hinanden liggende sidevægge (7) samt en bagvæg (8), hvor lysgitterlisten (5) er anbragt mellem portbladet (1), der befinder sig i lukket position, og bagvæggen (8), **kendetegnet ved, at** mindst en 10 klemmedel (10, 20) fastgør lysgitterlisten (5) mellem udsparringens (6) sidevægge (7) ved hjælp af en klemmekraft, og at udsparringens (6) sidevægge (7) optager klemmekraften.
- 15 2. Port ifølge krav 1, hvor klemmedelen (10, 20) fastklemmer lysgitterlisten (5) i udsparringen (6) på en sådan måde, at klemmekraftretningen krydser portbladsplanet (4).
- 20 3. Port ifølge et af kravene 1 eller 2, hvor klemmedelen (10, 20) er udformet således, at klemmedelen (10, 20) ud fra sin bredde svarer til afstanden mellem udsparringens (6) sidevægge (7), således at klemmedelen (10, 20) kan indsættes i udsparringen (6) og fortrinsvis oplever en pressepasning mellem udsparringens (6) sidevægge (7) og fastholdes i udsparringen (6) af denne pressepasning.
- 25 4. Port ifølge et af kravene 1 til 3, hvor klemmedelen (10, 20) eller klemmedelen og en sidevæg (7) af udsparringen (6) definerer en not (11, 21), hvor notens (11, 21) bredde svarer til lysgitterlistens (5) bredde, således at lysgitterlisten (5) kan indsættes i noten (11, 21), hvor fortrinsvis lysgitterlisten (5) oplever en klemmasning i noten (11, 21) og foretrukket fastholdes i udsparringen (6) af 30 denne klemmasning.
- 35 5. Port ifølge et af kravene 1 til 4, hvor klemmedelen (10, 20) har en ekspansionsdel (12, 22), hvilken ekspansionsdel (12, 22) udøver klemmekraften eller en yderligere klemmekraft, hvor foretrukket klemmedelen (10, 20) omfatter en fordybning (15, 25) til optagelse af ekspansionsdelen (12, 22).

6. Port ifølge et af kravene 1 til 5, hvor mindst en af sidevæggene (7) hhv. sidevæggene (7) af udsparingen (6) er gjort ru på den side, der vender mod lysgitterlisten (5), hvor fortrinsvis mindst en af sidevæggene (7) hhv. sidevæggene (7) har en rifling (9).

5

7. Port ifølge et af kravene 1 til 6, hvor klemmedelen (10, 20) har en bund (13, 23) og mindst et ben og fortrinsvis to ben (14, 24).

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8. Port ifølge krav 7, hvor klemmedelens (10) bund (13) befinder sig mellem lysgitterlisten (5) og udsparingens (6) bagvæg (8).

9. Port ifølge krav 7, hvor klemmedelens (20) bund (23) befinder sig mellem lysgitterlisten (5) og portbladet (1), der befinder sig i lukket position.

15

10. Fremgangsmåde til montering af en port, fortrinsvis en port ifølge et af kravene 1 til 9, hvor porten omfatter et portblad (1) og to sidebegrænsninger (2), hvor sidebegrænsningerne (2) hver især indeholder et profil (3), hvor profilerne (3) definerer et portbladsplan (4), hvor mindst et profil (3) har en udsparing (6), hvor udsparingen (6) omfatter to over for hinanden liggende sidevægge (7) samt en bagvæg (8), hvor lysgitterlisten (5) er anbragt mellem portbladet (1), der befinder sig i lukket position, og bagvæggen (8), og hvor en lysgitterliste (5) anbringes i det mindst ene profils (3) udsparing (6), idet mindst en klemmedel (19, 20) indføres i udsparingen (6) på en sådan måde, at klemmedelen (10, 20) fastgør lysgitterlisten (5) mellem udsparingens (6) sidevægge (7) ved hjælp af en klemmekraft, og hvor udsparingens (6) sidevægge (7) optager klemmekraften.

20

25

Fig. 1

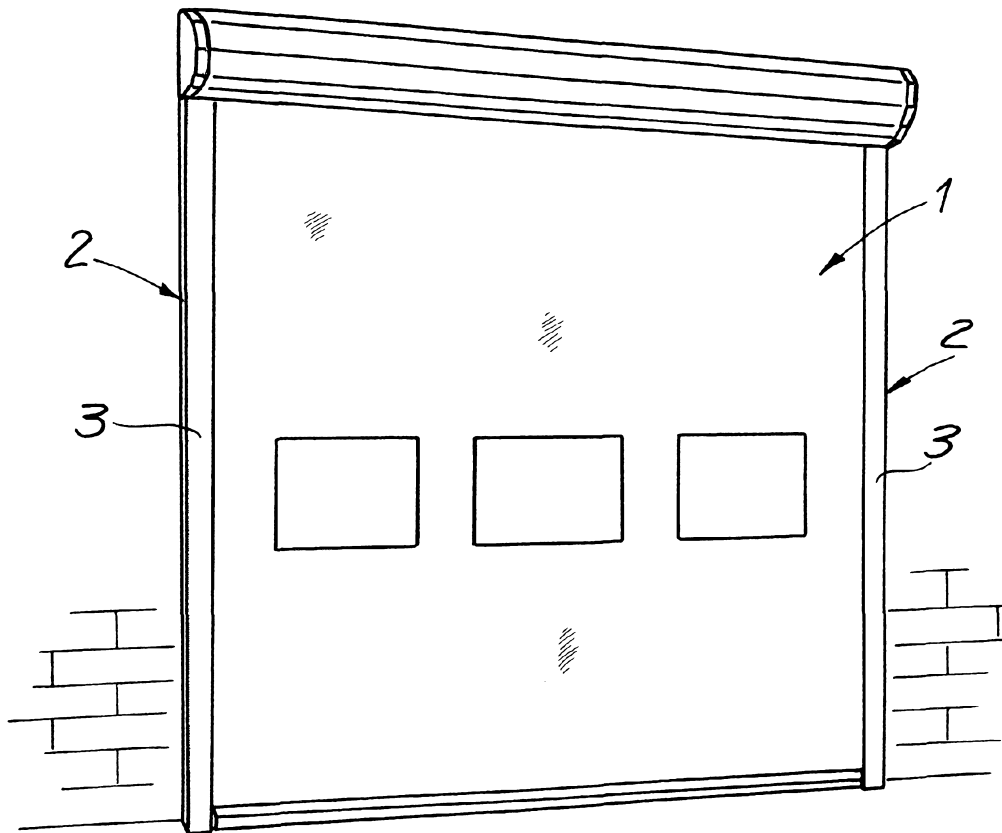


Fig. 2

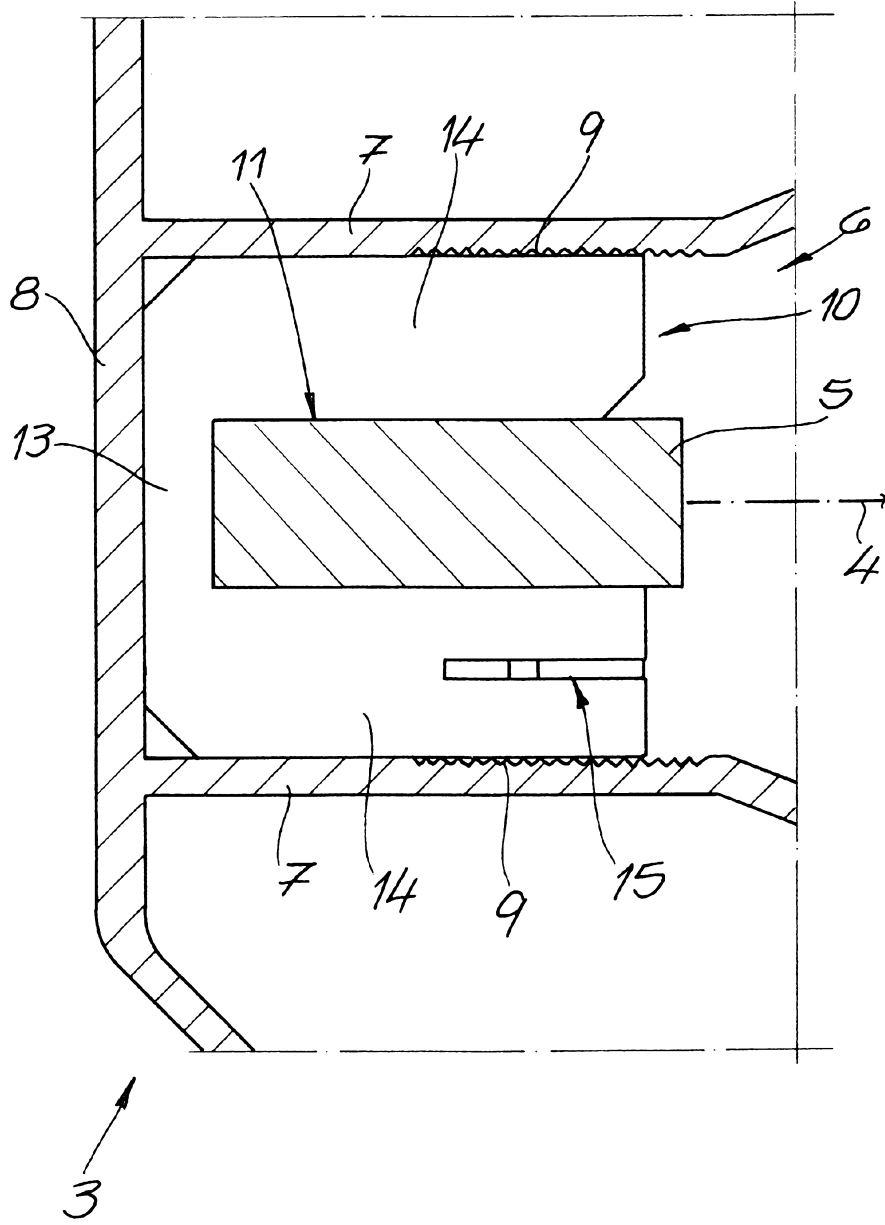


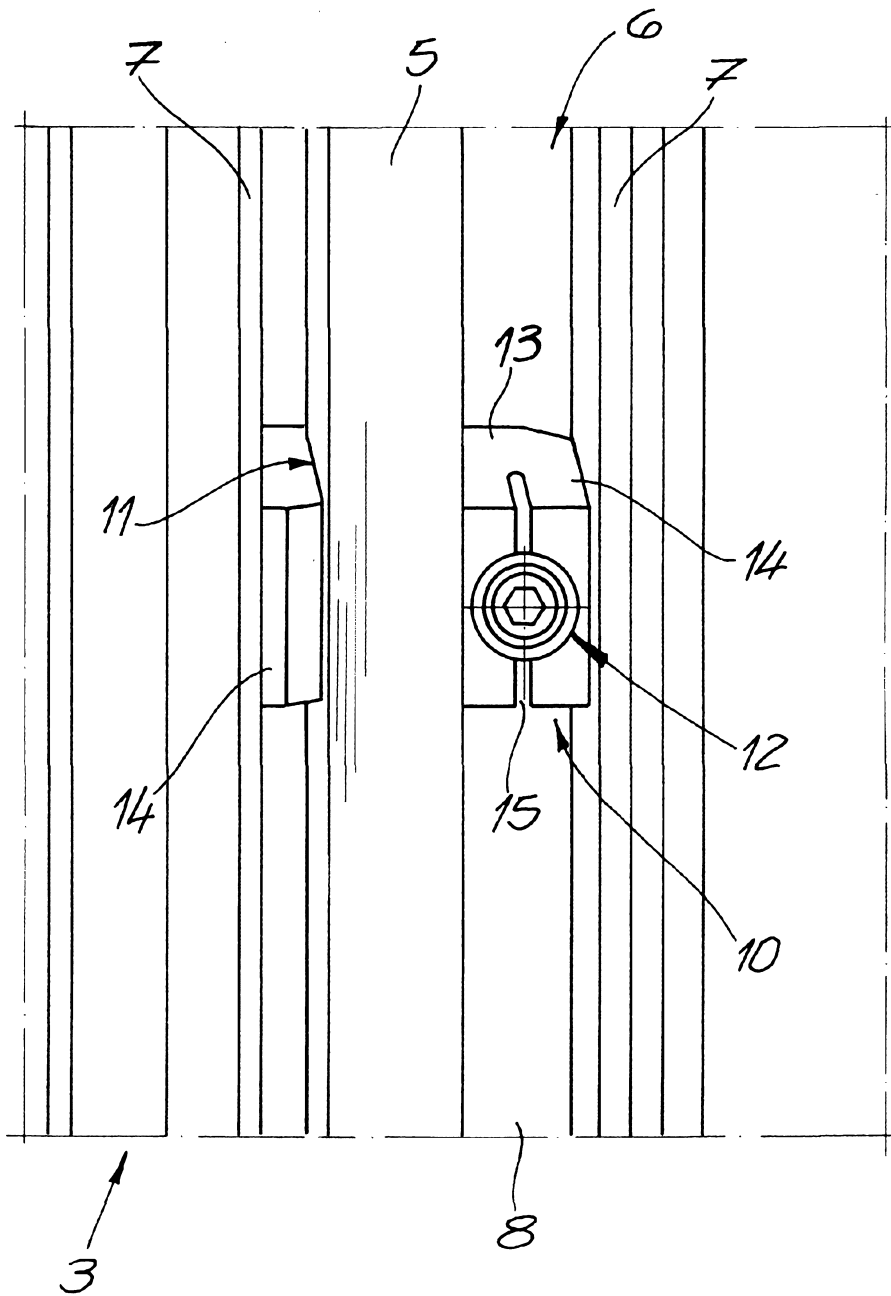
Fig. 3

Fig. 4

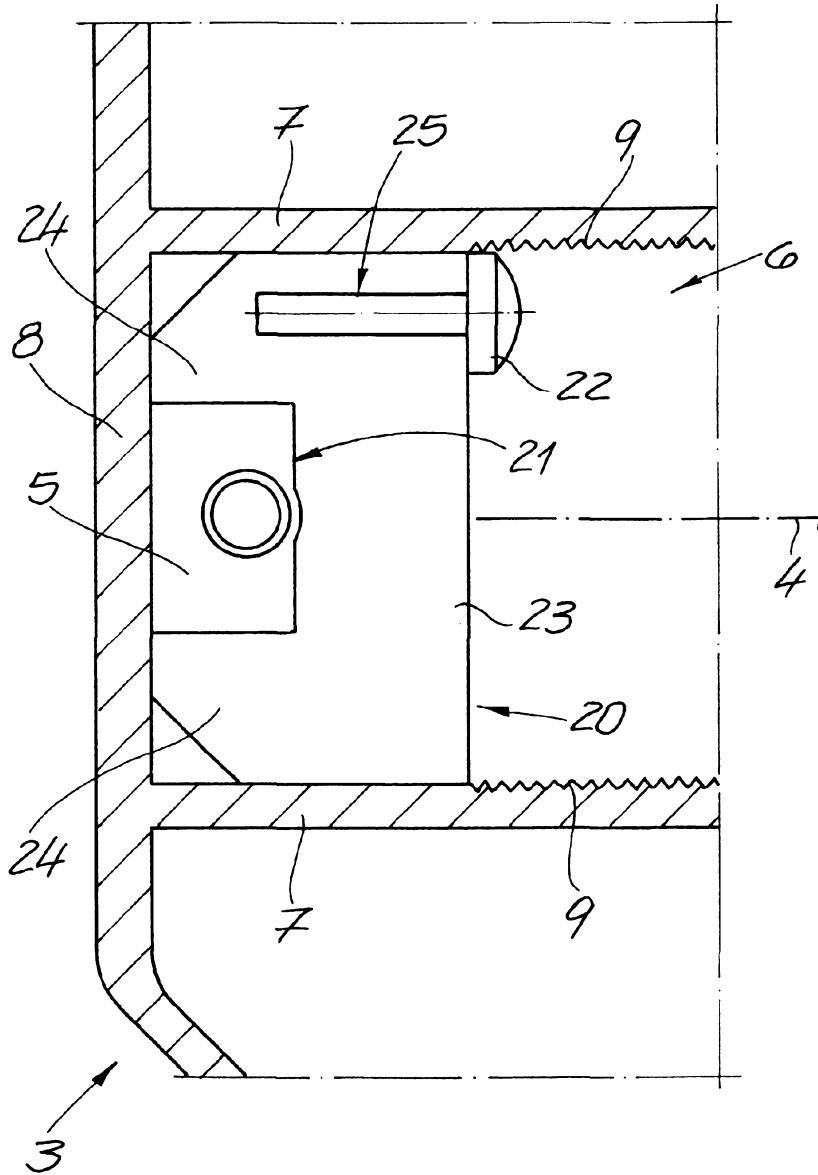


Fig. 5