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(54) **Connector with a housing lock**

Verbinder mit einer Gehäusesperrvorrichtung

Connecteur avec un verrouillage dans le couvercle

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**GB-A- 2 343 062 US-A- 5 749 747**  
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## Description

**[0001]** The present invention concerns a connector with a housing lock, according to the preamble clause of patent Claim 1. Such a connector is known from EP 1 047 154 A1.

**[0002]** Such connectors are used when it is important to ensure without fail that the two connector parts are completely inserted into one another and do not remain stuck a short distance before their end position, for example through jamming.

**[0003]** A connector with a housing lock is for example known from DE 197 14 459 A1. This connector provides for the two connector parts which are to be inserted into one another, to be forced away from one another by the force of a spring before they have become securely locked into their final position. This is achieved by means of a securing slide, whose front side opposes, by means of the force of a spring, the introduction of a locking component arranged on a first housing part, into a second locking component arranged on a second housing part, until the said components are securely locked into one another and which, acting as a secondary lock, then locks the locking elements into their final locked position. This type of housing lock has the drawback that in order to loosen the link, the securing slide must be withdrawn over its entire length against the force of a spring which is pushing it forward, in order to loosen the secondary lock brought about by the securing slide and make possible the release of the locking components. This requires a high operating force and can, in the case of difficulty accessible parts of the connector, lead to problems of operation.

**[0004]** DE 196 54 293 A1 describes a connector-loosening device, where the lock is released during the process of separation by pressing down an elastic locking component in the shape of a bridge. An unintentional loosening of the connector link by pressing the actuating projection is not impossible.

**[0005]** DE 196 54 287 A1 describes a connector system, which is to a large extent similar to that described in DE 196 54 293 A1. The difference resides in the place of pressure actuation, at which the elastic locking component is actuated, in order to release the connector link. In this case, this is located immediately on the bridge-shaped locking component, but it can also be unintentionally pressed, releasing the connector link.

**[0006]** EP 1 047 154 A1 discloses a connector with a housing lock, with a first locking component 1 on a first housing part, a second locking component on a second housing part and a securing slide whose front side resists, by means of the force of a spring, the insertion of the first locking component into the second locking component and after reaching the locked position, locks the first and second locking components, wherein the first locking component releases the pre-tensioned securing slide after reaching the locked position by springing back into its starting position; in that position, the securing slide press-

es with its front side the first locking component into the second locking component.

**[0007]** The present invention has the object of improving a connector according to the preamble clause of patent Claim 1, in such a way that a loosening of the securing slide can be implemented by means of a short movement, without the application of a great deal of force.

**[0008]** This object is solved according to the Claim 1. The subsidiary Claims characterise some preferred forms of embodiment of the present invention.

**[0009]** The present invention starts from the basic idea of releasing the locked position of the locking elements through the securing slide, by means of giving the said securing slide, following its withdrawal from its end position, the possibility of moving out of the way vertically to the direction of insertion by a short distance, which only accounts for a small fraction of the total travel of the spring components, in order to release the locked locking components. The securing slide need therefore not be moved back over the entire length of the locking arms, but in an actual case of a connector which is somewhat larger than a matchbox, by 1 to 3 mm.

**[0010]** The invention is explained more fully below, with the help of the description of an embodiment example and by reference to the diagrams.

Fig. 1 shows a perspective view of the two housing parts of the connector according to the Invention,

Fig. 2 shows the connector from Fig 1 in the first locked position,

Fig. 3 shows the connector from Fig 2 in the second locked position,

Fig. 4 shows the connector in a perfect locked position and

Fig. 5 shows the connector during the process of loosening of the connector link.

**[0011]** Fig. 1 shows on the left side a first housing part 2 with a first locking component 1, which projects from the interior of the insertion face in the direction of insertion. In this embodiment, the insertion blades have not yet been inserted into the chambers provided for that purpose beneath the locking component.

**[0012]** The right side of Fig. 1 shows a second housing part 4 with a securing slide 5, which is arranged on the housing part 4 in a sliding manner over guide grooves and guide ribs and supports itself on the cable side end of the second housing part 4 via the springs 7. The securing slide 5 has at its back end a manipulation handle 15, by means of which it can be pulled with one finger in the opposite direction against the force of the spring. The securing slide 5 has a tongue with a free front side, which is framed by the sides and the front edge of the securing

slide 5.

**[0013]** Fig. 2 shows both the housing parts 2 and 4 in a first phase of the process of insertion. The first housing part has a skirt which protects the insertion blade (not shown) and into which the second housing part 4 shown in Fig 2 is inserted. Inside the skirt protrudes the first locking component in the direction opposite to that of insertion. The channel 12 in the second insertion housing 4 has at its opening a ramp 13, over which the front side 11 of the locking component 1 is lifted when the second housing component 4 is inserted further. When the second housing 4 continues to be inserted, the front side 11 of the first locking element 1 slides to the underside of the channel 12. At the same time, the front side 11 pushes against the front side 6 of the tongue of the securing slide 5 and presses the latter against the force of the spring 7 in the direction opposite to the direction of insertion in relation to the housing part 4, until it clicks into the locking recess 10 formed in the second locking element 3 (Fig. 4.). This is the final position of the fully inserted connector, in which the securing slide 5 driven by the force of a spring 7, rapidly moves with the front side 6 of the tongue, over the first locking component 1 in the direction of insertion. The front side 6 of the tongue of the securing slide 5 presses down the first locking component 1, thus bringing about a secondary locking. A separation of the two housing parts 2 and 4 is no longer possible without the actuation of the securing slide 5. The connector link is thus in a perfect condition and can no longer be loosened by any unintentional external action.

**[0014]** If, in the said position, the manipulation handle 15 of the securing slide 5 is pulled back in the direction opposite that of insertion, then, after sliding a short distance, its front side 6 will lie opposite a recess 9 in the inner wall 8 of the first housing part 2. The front side 6 of the securing slide 5 can move out of the way into the said recess, so that the first locking component can move upwards and can slide out over the ramp-shaped sidewall of the locking recess. By pulling in the manipulation handle 15, a force is also exerted on the second housing part 4 in the direction opposite to that of insertion via the spring 7, so that it will become loosened from the first housing part 2 and the front side 11 of the first locking component 1 will slide over the floor of channel 12, until the connector link has become loosened.

**[0015]** In this way, the withdrawal of the securing slide 5 over only a very short distance, makes possible the release of the secondary locking function of the securing slide and hence the loosening of the connector link. The release takes place vertically to the direction of insertion so that it is not necessary to pull the retaining slide back over the entire length of the locking component in order to release the latter.

**[0016]** The above description of an embodiment example of the present invention is only an illustration of the said invention and is not to be understood as being limiting. Rather, it embraces all the variants which are defined in the protection Claims

## Claims

1. A connector with a housing lock, with a first locking component (1) on a first housing part (2), a second locking component (3) on a second housing part (4) and a securing slide (5) whose front side (6) resists, by means of the force of a spring (7), the insertion of the first locking component (1) into the second locking component (3) and, after reaching the locked position, locks the first and second locking components (1, 3), the first locking component (1) releases the pre-tensioned securing slide after reaching the locked position by springing back into its starting position; in that position, the securing slide (5) presses with its front side (6) the first locking component (1) into the second locking component (3)

### characterised in that

in so doing the securing slide (5) supports itself against an inner wall (8) of the first housing part (2) and by exerting a pull against the force of the spring in the direction opposite to that of the direction of insertion, on the securing slide (5), its front side (6) becomes lying opposite a recess (9) in the inner wall (8) of the first housing part (2), into which the securing slide (5) escapes and releases the lock with the second locking component (3).

2. A connector according to Claim 1, **characterised in that** the first locking component (1) is a locking arm which projects within the insertion face of the first housing part (2) in the direction of insertion and the second locking component (3) is a channel (12) within the second housing part (4), which receives the locking arm during the process of insertion and which has a locking recess (10) into which the front side (11) of the locking arm locks, when it is in its final position.
3. A connector according to Claim 2, **characterised in that** the opening of the channel (12) has, in the second housing part on the same inside wall in which the locking recess (10) is located, a ramp (13), over which the locking arm is led under tension into the channel (12), during which process the said tension presses the locking arm in final end position, into the locking recess (10)
4. A connector according to Claims 1 to 3, **characterised in that** the distance of the front side (6) of the securing slide (5) in its final position from the front edge (14) of the recess (9), is a small fraction of the depth of insertion of the second housing part (4) into the first housing part (2).
5. A connector according to one of the preceding Claims, **characterised in that** the securing slide (5) is fastened in a sliding manner on the second housing part by means of guide grooves and guide ribs

and supports itself at the cable end of the second housing part by two pressure springs extending to both sides of the channel (12).

6. A connector according to one of the preceding Claims, **characterised in that** the securing slide (5) has on the cable side a manipulation handle (15) for pulling against the force of the spring.
7. A connector according to one of the preceding Claims, **characterised in that** the securing slide (5) has a tongue which is framed by the front end and the sides of the securing slide (5) and whose free end points in the direction of insertion and carries the front side (6).
8. A connector according to one of the preceding Claims, **characterised in that** in its inserted position, the recess (9) in the inner housing wall (8), extends as far as a few millimeters in front of the front side (6) of the securing slide (5).

#### Patentansprüche

1. Steckverbinder mit einer Gehäuseverriegelung mit einem ersten Verrastelement (1) an einem ersten Gehäuseteil (2), einem zweiten Verrastelement (3) an einem zweiten Gehäuseteil (4) und einem Sicherungsschieber (5), der sich mit seiner Stirnseite (6) durch Federkraft (7) dem Einführen des ersten Verrastelements (1) in das zweite Verrastelement (3) widersetzt und der nach Erreichen der Verriegelungsstellung die ersten und zweiten Verrastelemente (1, 3) sperrt, wobei das erste Verrastelement (1) nach Erreichen der Verriegelungsstellung den durch Federkraft vorgespannten Sicherungsschieber freigibt, um wieder in seine Ausgangsstellung zurückzufedern, der Sicherungsschieber (5) in dieser Stellung das erste Verriegelungselement (1) mit seiner Stirnseite (6) in das zweite Verriegelungselement (3) presst, **dadurch gekennzeichnet, dass** sich der Verriegelungsschieber (5) gegen eine Innenwand (8) des ersten Gehäuseteils (2) presst und durch Ziehen am Sicherungsschieber (5) in Gegenstückrichtung gegen die Federkraft dessen Stirnseite (6) gegenüber einer Aussparung (9) in der Innenwand (8) des ersten Gehäuseteils (2) zu liegen kommt, in welche der Sicherungsschieber (5) ausweicht und die Verriegelung löst.
2. Steckverbinder nach Anspruch 1, **dadurch gekennzeichnet, dass** das erste Verrastelement (1) ein innerhalb des Steckgesichts des ersten Gehäuseteils (2) in Steckrichtung ragender Rastarm ist, und das zweite Verrastelement (3) ein Kanal (12), innerhalb des zweiten Gehäuseteils (4) ist, der den Rastarm

während des Steckvorgangs aufnimmt und einer Rastvertiefung (10), in der die Stirnseite (11) des Rastarms in Endstellung einrastet.

3. Steckverbinder nach Anspruch 2, **dadurch gekennzeichnet, dass** die Öffnung des Kanals (12) im zweiten Gehäuseteil an derselben Innenwand, in der sich die Rastvertiefung (10) befindet, eine Rampe (13) aufweist, über die der Rastarm unter Spannung in den Kanal (12) geführt wird, wobei diese Spannung den Rastarm in Endstellung in die Rastvertiefung (10) presst.
4. Steckverbinder nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** der Abstand der Stirnseite (6) des Sicherungsschiebers (5) in Endstellung von der Vorderkante (14) der Aussparung (9) einen kleinen Bruchteil der Einstecktiefe des zweiten Gehäuseteils (4) in das erste Gehäuseteil (2) beträgt.
5. Steckverbinder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der Sicherungsschieber (5) über in Steckrichtung verlaufende Führungsnuten und Führungsrippen am zweiten Gehäuseteil gleitend befestigt ist und sich am kableseitigen Ende des zweiten Gehäuseteils (4) über zwei zu beiden Seiten des Kanals (12) verlaufende Druckfedern abstützt.
6. Steckverbinder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der Sicherungsschieber (5) kableseitig einen Handhabungsgriff (15) zum Zurückziehen gegen die Federkraft aufweist.
7. Steckverbinder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der Sicherungsschieber (5) eine Zunge aufweist, die von dem Vorderende und den Seitenflanken des Sicherungsschiebers (5) umrahmt ist und deren freies Ende in Steckrichtung zeigt und die Stirnseite (6) trägt.
8. Steckverbinder nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Aussparung (9) in der Gehäuseinnenwand (8) in zusammengesteckter Stellung einige Millimeter vor die Stirnseite (6) des Sicherungsschiebers (5) reicht.

#### Revendications

1. Connecteur avec un verrouillage de logement, avec un premier composant de verrouillage (1) sur une première partie de logement (2), un deuxième composant de verrouillage (3) sur une deuxième partie de logement (4) et une glissière d'assujettissement (5) dont le côté avant (6) s'oppose, au moyen de la

force d'un ressort (7), à l'insertion du premier composant de verrouillage (1) dans le deuxième composant de verrouillage (3) et, après avoir atteint la position verrouillée, verrouille les premier et deuxième composants de verrouillage (1, 3), le premier composant de verrouillage (1) libérant la glissière d'assujettissement pré-tensionnée après avoir atteint la position verrouillée en revenant élastiquement à sa position de départ ; à cette position, la glissière d'assujettissement (5) presse avec son côté avant (6) le premier composant de verrouillage (1) dans le deuxième composant de verrouillage (3),

**caractérisé en ce que**

en faisant cela, la glissière d'assujettissement (5) se supporte elle-même contre une paroi intérieure (8) de la première partie de logement (2) et en exerçant une traction contre la force du ressort dans la direction opposée à la direction d'insertion, sur la glissière d'assujettissement (5), son côté avant (6) se retrouve à l'opposé d'un évidement (9) pratiqué dans la paroi intérieure (8) de la première partie de logement (2), dans lequel la glissière d'assujettissement (5) s'échappe et libère le verrouillage avec le deuxième composant de verrouillage (3).

2. Connecteur selon la revendication 1, **caractérisé en ce que** le premier composant de verrouillage (1) est un bras de verrouillage qui se projette à l'intérieur de la face d'insertion de la première partie de logement (2) dans la direction d'insertion et le deuxième composant de verrouillage (3) est un canal (12) situé à l'intérieur de la deuxième partie de logement (4), qui reçoit le bras de verrouillage durant le processus d'insertion et qui comporte un évidement de verrouillage (10) dans lequel le côté avant (11) du bras de verrouillage se verrouille, lorsqu'il se trouve dans sa position finale.
3. Connecteur selon la revendication 2, **caractérisé en ce que** l'ouverture du canal (12) comporte, dans la deuxième partie de logement, sur la même paroi intérieure que celle sur laquelle l'évidement de verrouillage (10) est situé, une rampe (13) sur laquelle le bras de verrouillage est mis en tension dans le canal (12), processus au cours duquel ladite tension presse le bras de verrouillage vers sa position d'extrémité finale, dans l'évidement de verrouillage (10).
4. Connecteur selon les revendications 1 à 3, **caractérisé en ce que** la distance du côté avant (6) de la glissière d'assujettissement (5) dans sa position finale par rapport au bord avant (14) de l'évidement (9) est une petite fraction de la profondeur d'insertion de la deuxième partie de logement (4) dans la première partie de logement (2).
5. Connecteur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la glissière

de d'assujettissement (5) est attachée de façon coulissante à la deuxième partie de logement au moyen de rainures de guidage et de nervures de guidage et se supporte elle-même à l'extrémité côté câble de la deuxième partie de logement grâce à deux ressorts de pression s'étendant vers les deux côtés du canal (12).

6. Connecteur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la glissière d'assujettissement (5) comporte du côté du câble une poignée de manipulation (15) permettant de tirer contre la force du ressort.
7. Connecteur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la glissière d'assujettissement (5) comporte une languette qui est encadrée par l'extrémité avant et les côtés de la glissière d'assujettissement (5) et dont l'extrémité libre pointe dans la direction d'insertion et porte le côté avant (6).
8. Connecteur selon l'une quelconque des revendications précédentes, **caractérisé en ce que** dans sa position insérée, l'évidement (9) pratiqué dans la paroi intérieure (8) s'étend sur une distance pouvant atteindre quelques millimètres devant le côté avant (6) de la glissière d'assujettissement (5).

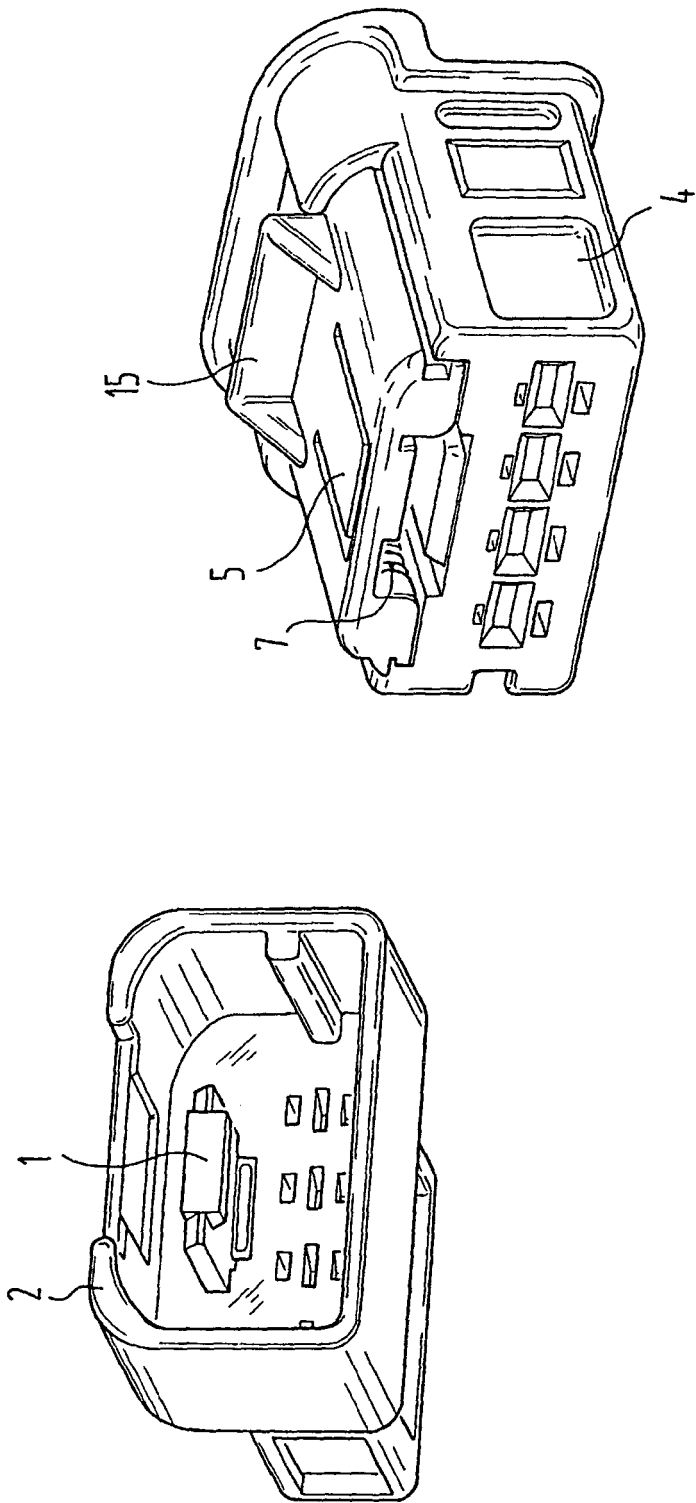


FIG.1

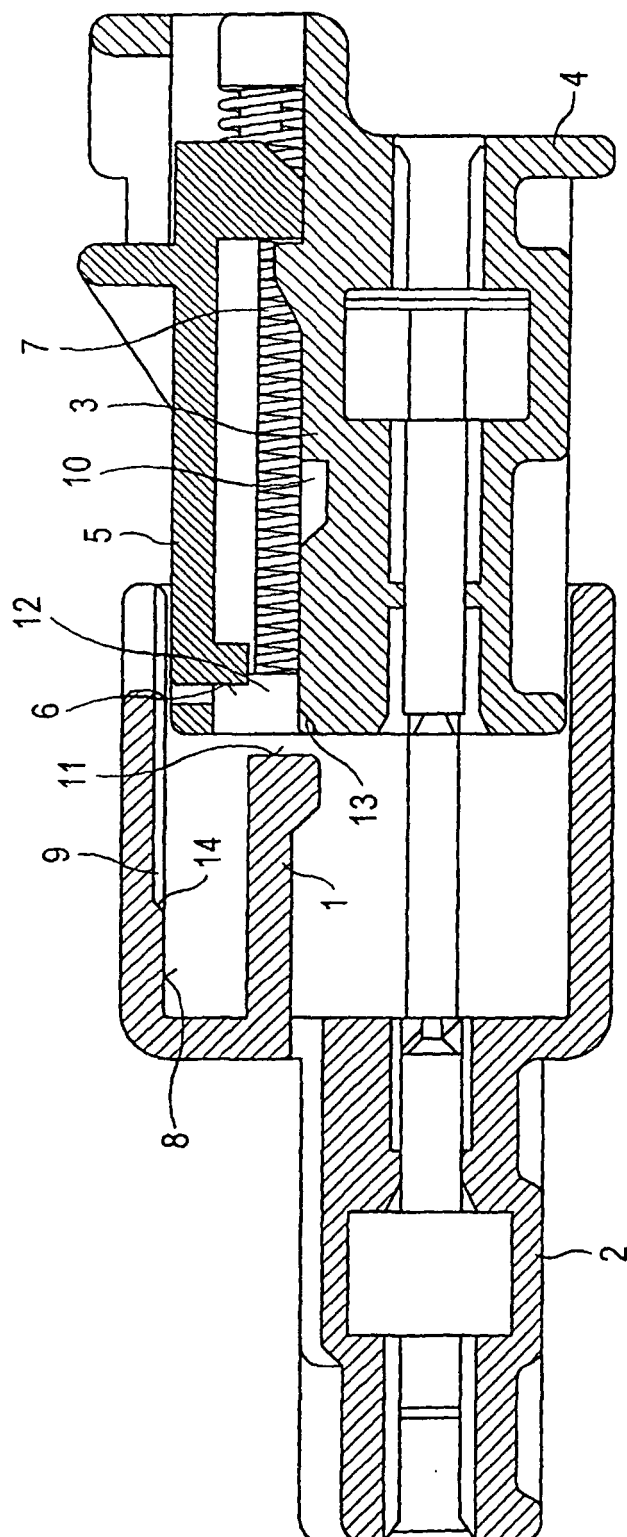


FIG.2

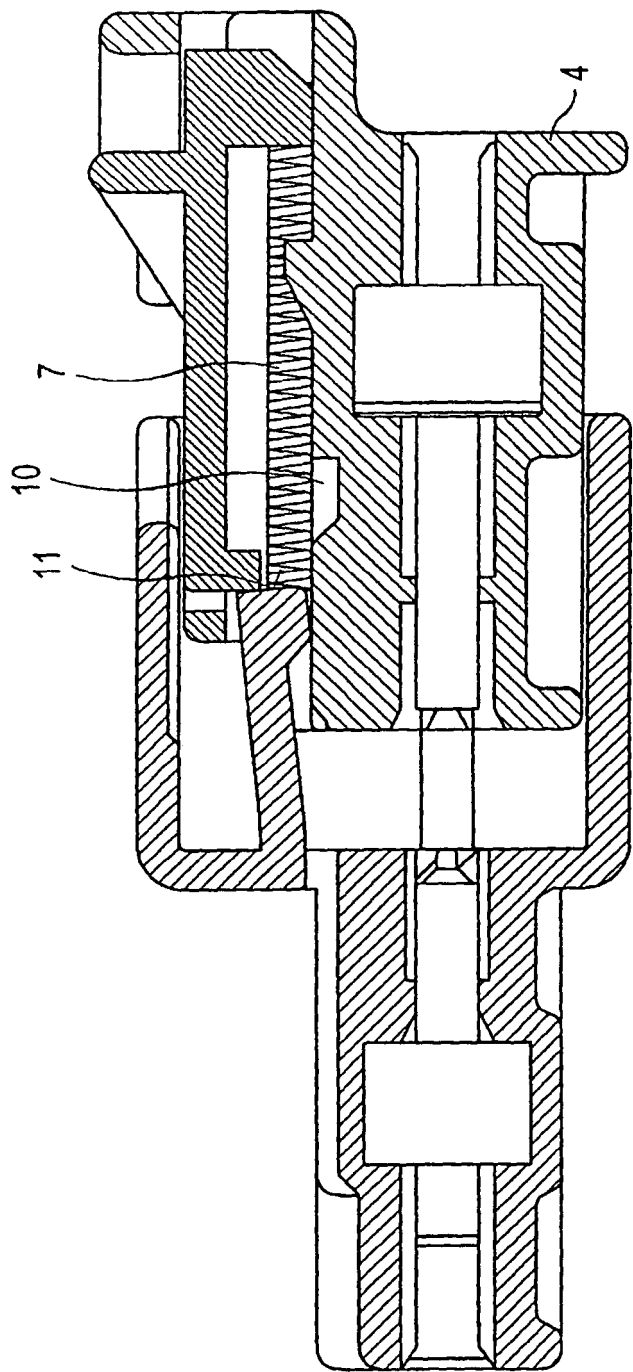


FIG.3



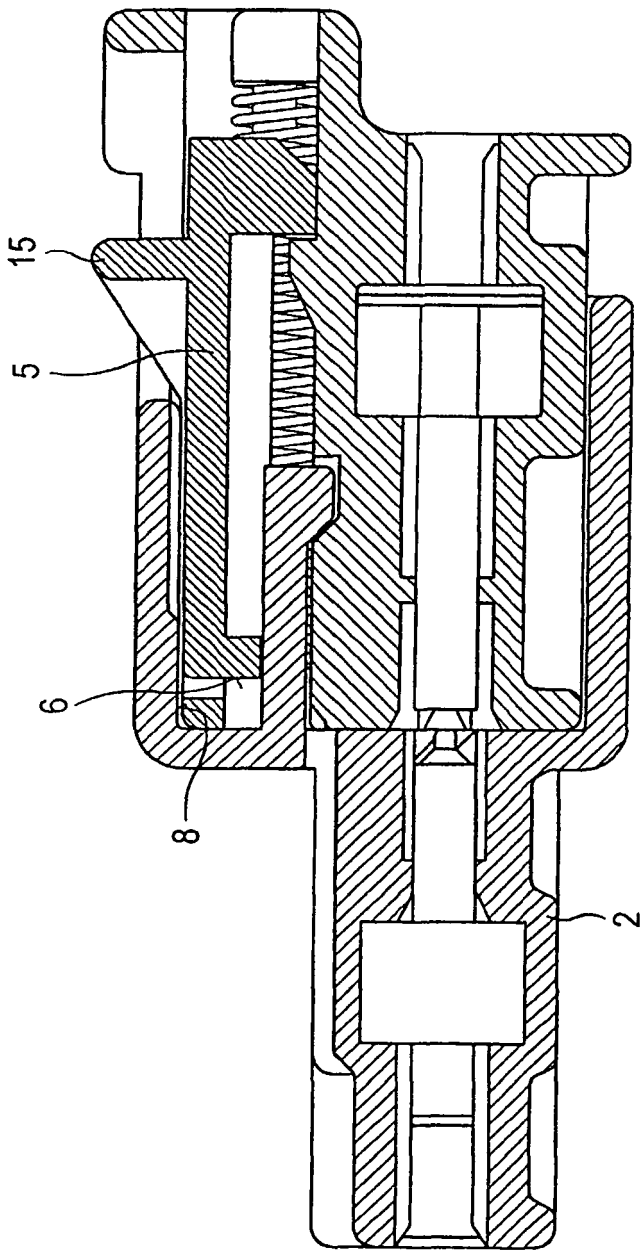


FIG.4

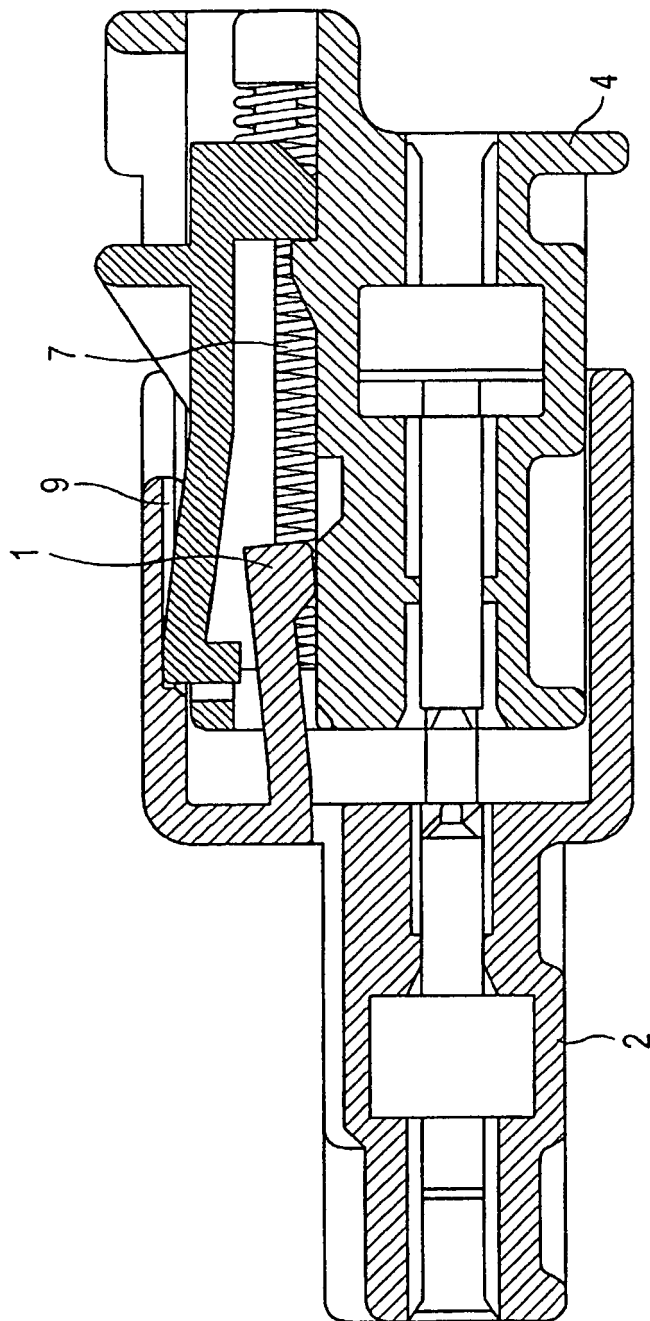


FIG.5