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(54) **Panel assembly**

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Ensemble panneau

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## Description

**[0001]** The invention relates to a panel assembly comprising a panel and a frame, which panel can be hinged between an open and a closed position with respect to the frame, which panel assembly comprises means for automatically releasing the panel from the closed position when a predetermined force is exerted on the panel. In practice such a panel is also called an "explosion vent" or an explosion relief panel. It is explicitly noted that within the framework of the invention the term "panel" is understood to include also a door, a window or the like, so that the invention is not limited to a panel, but also extends to doors, windows and the like. For the sake of convenience, only the term "panel" will be used hereinafter so as not to make the description unnecessarily complicated.

**[0002]** Such a panel assembly is generally known. The known panel assembly, which is configured as an "explosion vent", is in particular used for directly diverting any explosive forces to which the structure of a building is exposed via the panel so as to spare the building. The risk of injury to persons present in the building and/or of damage to machines/equipment in the building is thus reduced as much as possible. The panel acts more or less as a "valve", therefore, via which a pressure build up is diverted from the building to the outside. In this way the risk of damage to (parts of) the building is minimized. The means for automatically releasing the known panel from the closed position in the event of an explosion are made up of a locking pin. The forces that occur during an explosion will cause said locking pin to break, thereby releasing the panel.

**[0003]** A drawback of the known panel assembly is the use of the so called locking pin. It has become apparent in practice that replacing a broken locking pin is a complicated and time consuming activity, whilst the locking pin may also break (unintentionally) due to causes other than an explosion.

**[0004]** US patent No. 4,181,338 (Sterling) describes a door assembly comprising a door and a frame provided with means for releasing the door from the closed position when a predetermined force is exerted on the door, wherein the assembly further comprises a stop member on a frame, which can be pivoted about a pivot pin between a first and a second position, in which the stop member releases a catch bolt when a predetermined force is exerted on the panel, the stop member being biased to the first position by a spring, and forming part of a lock of the panel assembly, wherein the catch bolt cooperates with a handle. However, this known assembly does not function in the locked position of the dead bolt, so that the door will not be released in the event of an elevated pressure when the door is double-locked. Moreover, the pressure at which the door of said door assembly will be released cannot be set with a reasonable degree of precision.

**[0005]** The object of the invention is to improve the

known panel assembly, overcoming abovementioned drawbacks.

**[0006]** In order to accomplish that object, a panel assembly according to claim 1 is provided. The means for releasing the closed panel can be mounted to any panel comprising one or more bolts, whilst no parts need to be replaced when the panel has been released from its closed position. Said pivoting/tilting of the stop member makes it possible to realize a compact construction of the means for releasing the closed hatch. Said predetermined force can be accurately determined by said coil spring.

**[0007]** The spacing between said point of engagement and the central axis of the pivot pin is preferably 10-15 mm, in particular 11-13, more in particular about 11 for a so-called surface-mounted version (figure 1) and about 12.5 mm for a so-called built-in version (figure 3). This makes it possible to use a smaller spring having a spring tension that corresponds to the aforesaid predetermined (explosion) force. Another advantage of using selecting the point of engagement of the coil spring near the pivot pin is that a compact construction of the means for releasing the closed panel is obtained. In practice said lock will usually be a cylinder lock, wherein the stop member forms part of that part of the cylinder lock which receives the bolt(s). Usually, said part is located on the frame of the panel assembly.

**[0008]** The invention will now be explained in more detail with reference to figures illustrated in a drawing, in which figures 1-3 are schematic, perspective views, each of a different variant of a construction of a stop member according to the invention, and in which figures 4-6 are schematic cross-sectional views of the construction is shown in figures 1-3 in the mounted condition thereof.

Figure 1 shows a part 1 of a cylinder lock which is to be mounted to the frame of a panel assembly and which is to receive the catch bolt and the dead bolt of the part of the cylinder lock that is mounted to the panel of a panel assembly. As already noted before, the catch bolt usually forms part of a handle on the panel, whilst the dead bolt forms part of the actual lock of the cylinder lock. The part 1 is provided with holes 2, into which holes bolts can be screwed for mounting the part 1 to the frame of a panel assembly. The part 1 is provided with a stop member 3, which can be pivoted through approximately 75 degrees about a pivot pin 4 between a first position, in which the catch bolt and the dead bolt abut against the stop member 3 (see figure 1A), and the second position, in which the stop member 3 releases both bolts (see figure 1B). As figure 1B shows, the stop member 3 comprises an elevated portion 5 for the dead bolt and a lower portion 6 for the catch bolt, so that both bolts abut against the stop member 3 in the position of the stop member that is shown in figure 1A. The stop member 3 is biased to the first position by two coil springs 7,8. The two coil springs 7,8 engage a

shaft 9 near the pivot pin 4 with one end, whilst they engage a shaft 10 extending parallel to the shaft 9 with their other end. The shaft 9 is welded to the part 1, whilst the shaft 10 is passed through coaxial holes 11 in the part 1. The stop member 3 will release the catch bolt and the dead bolt when a predetermined force, for example of 1000 N, is exerted on the panel, so as to make it possible to divert explosive forces being exerted on the structure of a building directly via the panel. Said predetermined force, for example of 1000 N, is determined by the spring force of the coil springs 7,8. The predetermined force can be increased by using thicker coil springs 7,8 of the same length and/or by using more coil springs. After all, the spring force of the coil springs 7,8 to be overcome is increased in this manner. The coil springs 7,8 have a wire thickness of about 2 mm, a diameter of about 8 mm, and a length in untensioned condition of about 32 mm, whilst the spring constant C amounts to approximately 32 N/mm.

Figure 2 shows a part 1 of a cylinder lock which is to be mounted to the frame of a window and which is to receive the catch bolt and the dead bolt of the part of the cylinder lock that is mounted to the leaf of a window assembly. Parts that correspond to parts shown in figure 1 are indicated by the same numerals.

Figure 3, to conclude, shows a part 1 of a cylinder lock which is to be mounted to the frame of a door and which is to receive the catch bolt and the dead bolt of the part of the cylinder lock that is mounted to the door of a door assembly. Parts that correspond to parts shown in figure 1 are indicated by the same numerals in this figure, too.

Figure 4 is a schematic cross-sectional view of the construction of figure 1 in the mounted condition thereof, in which parts that correspond to parts shown in figure 1 are indicated by the same numerals. The part 1 shown in figure 1 is now mounted to the frame 12 of the panel assembly 13, whilst the part 14 of the cylinder lock comprising the catch bolt 15 is mounted to the panel 16 of the panel assembly 13. The part 14 comprises a handle 17, which cooperates with the catch bolt 15.

Figure 5 and 6 correspond to figure 4, and parts that correspond to parts shown in figure 1 are indicated by the same numerals. Figure 5, however, does not show a panel assembly comprising a frame and a panel, but a window assembly 13 comprising a frame 12 and a leaf 16. Similarly, figure 6 relates to a door assembly 13 comprising a frame 12 and a door 16.

**[0009]** The spacing between the bolts and the centre of the pivot pin 4 is preferably less than 0.5 times the

spacing between the point of engagement of the coil springs 6,7 and the centre of the pivot pin 4.

## 5 Claims

1. A panel assembly (13) comprising a panel (16) and a frame (12), which panel (16) can be hinged between an open and a closed position with respect to the frame (12), which panel assembly (13) comprises means for automatically releasing the panel (16) from the closed position when a predetermined force is exerted on the panel (16), wherein said means comprise a stop member (3) on the frame (12), which cooperates with a catch bolt (15) and a dead bolt on the panel (16), wherein the stop member (3) can be pivoted about a pivot pin (4) between a first position, in which the bolts abut against the stop member (3), and a second position, in which the stop member (3) releases the bolts when the predetermined force is exerted on the panel (16), wherein the stop member (3) is biased to said first position by at least one coil spring (7, 8), which engages near the pivot pin (4) with one end, wherein said stop member (3) forms part of a lock of the panel assembly (13), and wherein said catch bolt (15) cooperates with a handle (17) of the panes (16) and said dead bolt cooperates with a lock of the panel (16).

## Patentansprüche

1. Plattenanordnung (13) mit einer Platte (16) und einem Rahmen (12), wobei die Platte (16) zwischen einer offenen und einer geschlossenen Position in Bezug auf den Rahmen (12) gelenkig bewegt werden kann, wobei die Plattenanordnung (13) ein Mittel zum automatischen Freigeben der Platte (16) aus der geschlossenen Position, wenn eine vorbestimmte Kraft auf die Platte (16) ausgeübt wird, umfasst, wobei das genannte Mittel ein Anschlagelement (3) auf dem Rahmen (12) umfasst, das mit einem Fallenriegel (15) und mit einem stehenden Riegel auf der Platte (16) zusammenwirkt, wobei das Anschlagelement (3) um einen Schwenkzapfen (4) zwischen einer ersten Position, in der die Bolzen gegen das Anschlagelement (3) anliegen, und einer zweiten Position, in der das Anschlagelement (3) die Bolzen freigibt, wenn die vorbestimmte Kraft auf die Platte (16) aufgebracht wird, verschwenkt werden kann, wobei das Anschlagelement (3) in Richtung auf die erste Position vorgespannt ist, durch zumindest eine Spiralfeder (7, 8), die in der Nähe des Schwenkzapfens (4) mit einem Ende eingreift, wobei das genannte Anschlagelement (3) einen Teil eines Schlosses der Plattenanordnung (13) bildet, und wobei der genannte Fallenbolzen (15) mit einem Handgriff (17) der Platte (16) zusammenwirkt und der genannte

stehende Riegelbolzen mit einem Schloss der Platte (16) zusammenwirkt.

## Revendications

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1. Ensemble à panneau (13) comprenant un panneau (16) et un cadre (12), lequel panneau (16) peut être articulé entre une position ouverte et une position fermée par rapport au cadre (12), lequel ensemble à panneau (13) comprend des moyens pour libérer automatiquement le panneau (16) de la position fermée lorsqu'une force prédéterminée est exercée sur le panneau (16), lesdits moyens comprenant un élément de butée (3) sur le cadre (12), qui coopère avec un pêne demi-tour (15) et un pêne dormant sur le panneau (16), l'élément de butée (3) pouvant être pivoté autour d'un pivot (4) entre une première position, dans laquelle les pênes butent contre l'élément de butée (3), et une seconde position, dans laquelle l'élément de butée (3) libère les pênes lorsque la force prédéterminée est exercée sur le panneau (16), l'élément de butée (3) étant poussé vers ladite première position par au moins un ressort hélicoïdal (7, 8), qui s'engage près du pivot (4) avec une extrémité, ledit élément de butée (3) formant une partie d'un verrou de l'ensemble à panneau (13), et ledit pêne demi-tour (15) coopérant avec une poignée (17) du panneau (16) et ledit pêne dormant coopérant avec un verrou du panneau (16).

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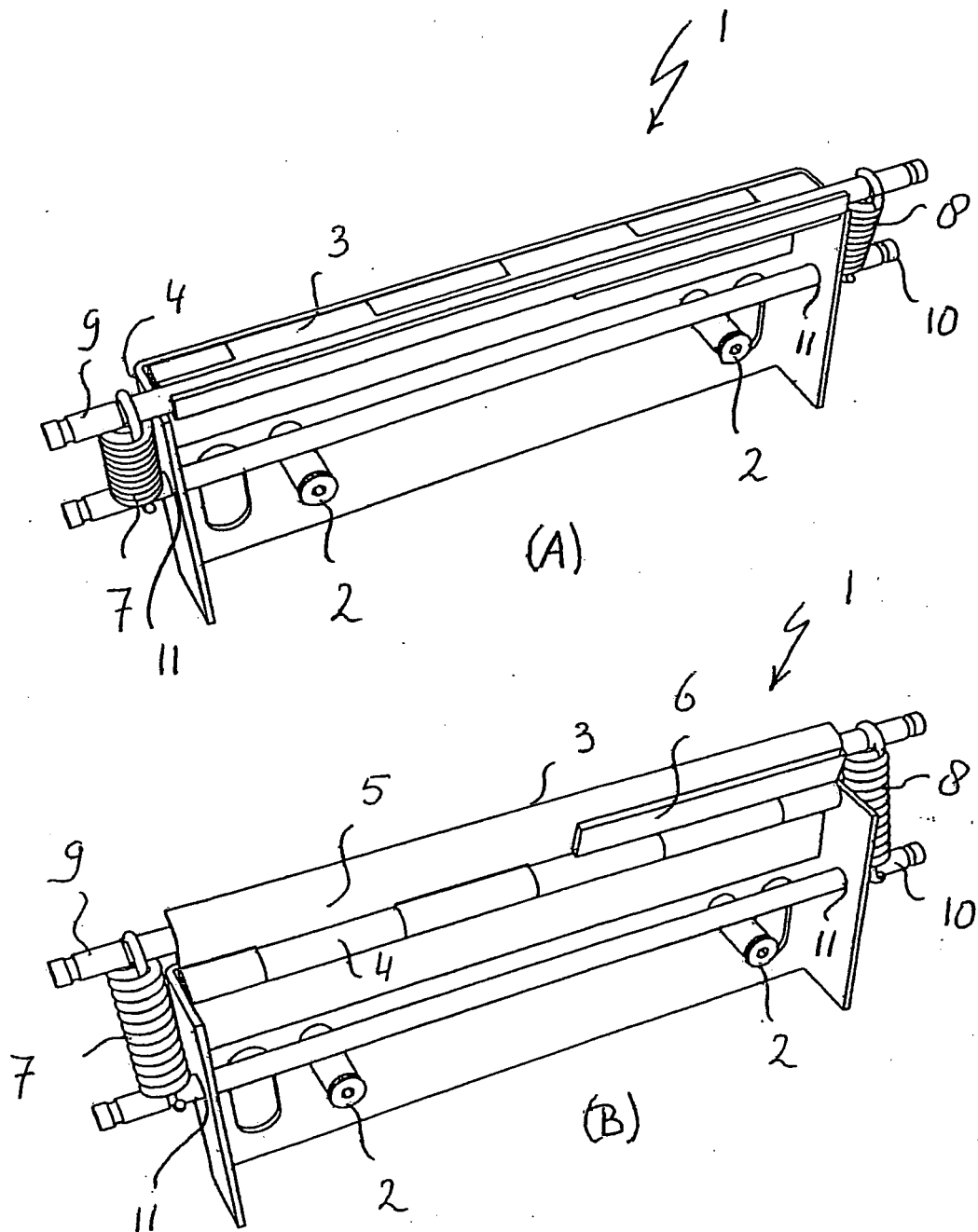


FIG. 1

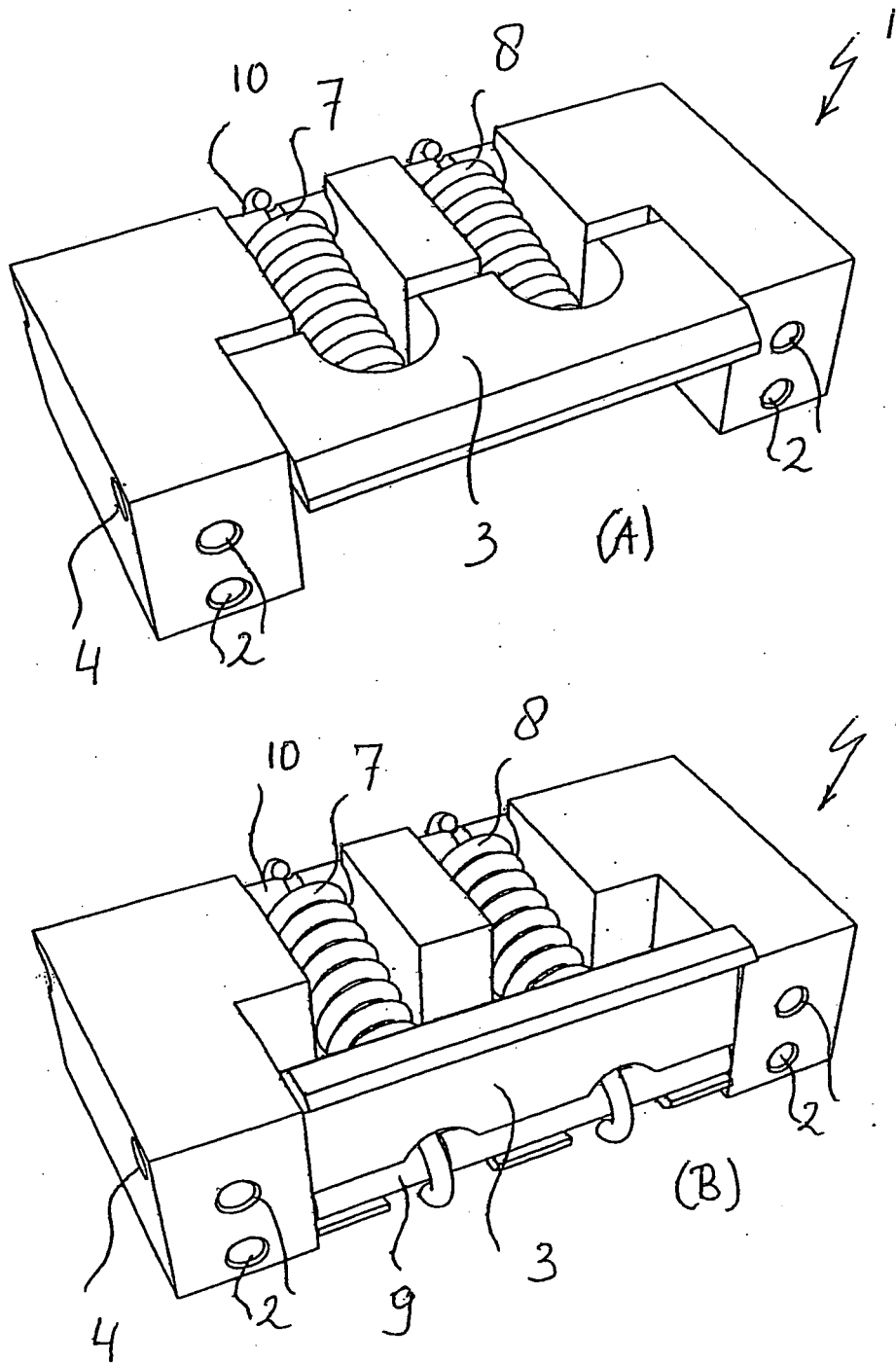


FIG. 2

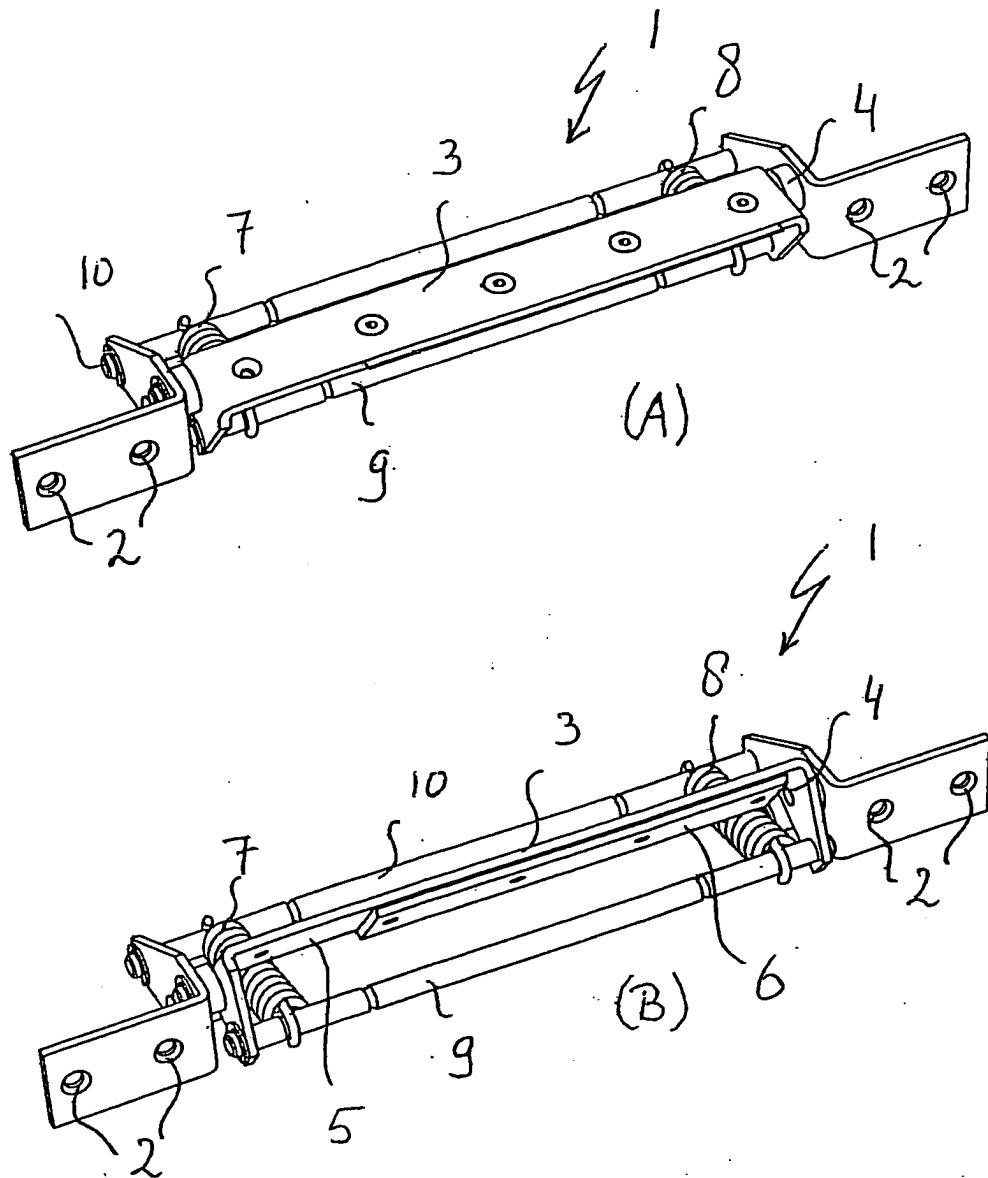


FIG. 3

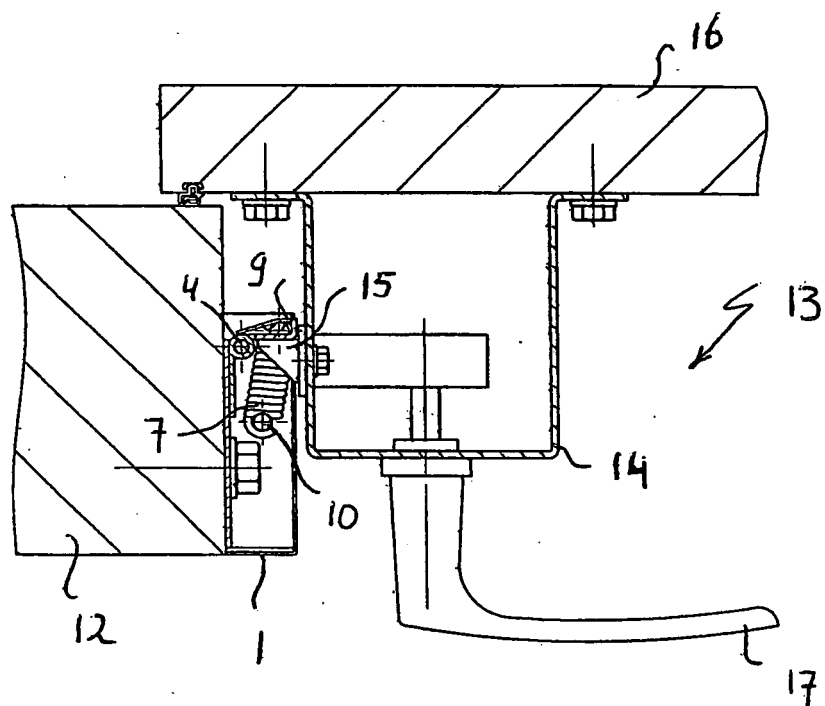


FIG. 4

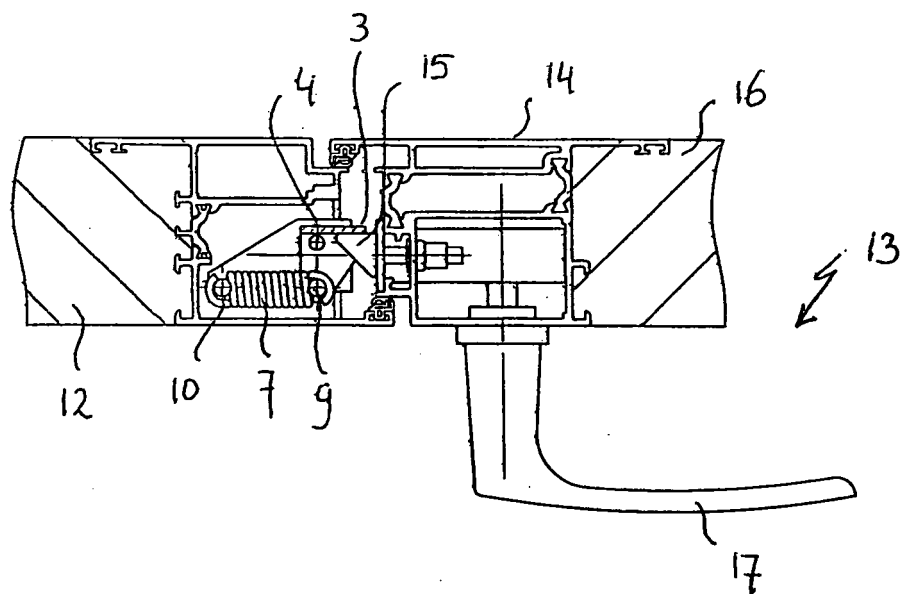


FIG. 5

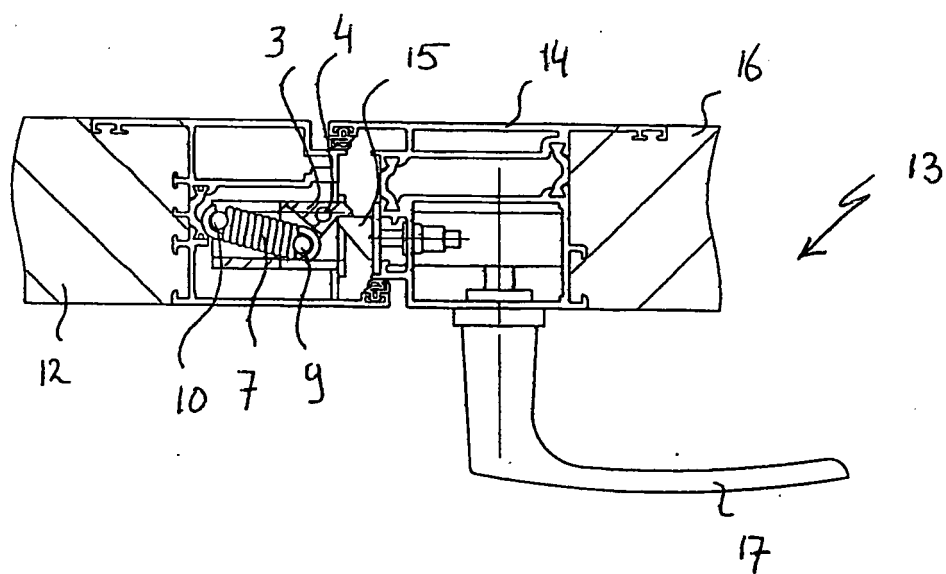


FIG. 6

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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