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(54) **BOLT DEVICE**

RIEGEL

VERROU

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Description

[0001] The invention relates to a bolt device for a door, window, hatch or the like structural part according to patent claim 1.

[0002] For locking of hinged double doors and with a traveller equipped doors, windows, hatches or the like structural parts a quick-bolt is usually used, in which the operating mechanism for the bolt device is usually at the height of about 1,5 m. One typical application of use for the quick-bolt is the less frequently opened door leaf of a double door. In a mortised quick-bolt striking rods or locking rods are inside the door and extend to counterparts located in an upper frame and in a sill or correspondingly in a floor, when the door is closed and at the same time locked. A door construction made of metal profile is often used, including a so called heat insulating construction especially in case of outer doors of a building. In this case the door profile is commonly divided with a partition wall, the distance of which from the edge surface or assembling surface of the door changes with different profiles. Therefore it is often impossible to install a quick-bolt with its striking rods to this kind of door without a special spacer plate or other special arrangement.

[0003] The purpose of the invention is to achieve a quick-bolt, which fits to most doors, windows, hatches or the like structural parts, and the installation of which can happen simply without special arrangements regardless of the fact that the location of the striking rod measured from the assembling surface of the door can vary. The purpose of the invention is further to provide a quick-bolt, which suits to doors, which are manufactured of rather a thin door profile, even from a profile the thickness of which is clearly under 40mm. A further purpose is, that the quick-bolt meets the requirements set for a 1-class safety lock as for its strength and other qualities both in wooden doors and in metallic doors. In connection with a quick-bolt according to the invention one should also be able to use conventional accessory parts meant for quick-bolts, such as a cap for an emergency exit, a padlock accessory part, a striking rod accessory part, a subframe for handle operation etc.

[0004] FR 2688821 and DE 723898 both describe bolt devices according to the preamble of claim 1.

[0005] The purpose of the invention is achieved as is disclosed in claim 1 and in the other claims. According to the invention the locking rod is arranged to be coupled to the bolt frame so, that the coupling head of the locking rod is movable relative to the bolt frame in a transverse direction with regard to the direction of movement of the locking rod. When the distance of the locking rod from the surface of installation in the door or the like can be changed, the locking rod can be correspondingly arranged to such a depth from the surface of installation in question, that i.a. the mentioned heat insulation of the profile can remain in position. Hereby the insulation capability of the door profile in question is maintained elsewhere except at the position of the frame of the quick-bolt itself. No spacer plates or the like accessory parts are needed.

[0006] In an advantageous practical embodiment the coupling means for the locking rod located in the bolt frame comprise a sliding unit movable with the operating device, and including an elongated guiding opening, which extends in a transverse direction with regard to the direction of movement of the locking rod. Additionally the mentioned coupling head of the locking rod is formed so, that the locking rod can move in the mentioned guiding opening and gets its guidance from the edges of the guiding opening. Hereby one can change the depth and the distance of the locking rod from the surface of installation stepless and without need for any separate adjustment measures at the installation.

[0007] If the coupling head of the locking rod is formed like a T-piece and arranged to be coupled to the mentioned guiding opening by turning the locking rod about 90°, one gets a very simple and quickly installed fastening solution, whereupon there is no need at all for example for easily damaged thread joints difficult to manufacture. A solution advantageous from the viewpoint of space requirements is obtained, if the bolt frame and the sliding unit are casing-like as to their structure so, that the coupling head of the locking rod is placed inside the construction.

[0008] The mentioned guiding opening is with advantage dimensioned so, that it allows stepless variation of distance of the coupling head of the locking rod, measured from central axis at least in the range 11 ... 18 mm, from the assembling surface of the bolt frame. This is sufficient for most of the heat insulating profiles. Smaller depth is not in practice much needed, since the locking rod must be strong enough, so that no buckling or tearing off effects may occur.

[0009] It is recommended, that although the locking rod is allowed to be located at different depths from the surface of installation, its location at the position of an end guide remains constant. The placing of the end guide and the counterpart defines the position of the door or the like with regard to the frame and affects thereby essentially to the tightness of the door/frame-combination and to the functionality in all. On the other hand in other parts than at the position of the end guide the location of the locking rod is in practice almost of no consequence, but in practice it is enough, that there is only space for the locking rod to be located at some depth in the depth region allowed.

[0010] Turning movement of an installed locking rod can advantageously be prevented so, that the end guide to be fastened to the door, window, hatch or the like and the locking rod are designed to be mutually compatible so, that the locking rod cannot turn in the end guide. Hereby an operationally very reliable and simple construction is obtained.

[0011] A spindle hole in the bolt frame arranged for the spindle of the operating device is with advantage formed so, that at least either a turning lever of the quick-bolt

type or a door handle or the like can be used as an operating device. Thereby the same bolt frame can be utilised for diverse locking needs in different places of application in the building.

[0012] If the bolt frame is placed, when using a handle, to a subframe, which includes at least a front plate and cover plates, the construction can easily be made firm and neat, since the structure bears then resemblance with a normal mortise lock. In this case similar lever handles can be chosen as for other doors of the building.

[0013] If the movement of the locking rod is at least 20 mm, the bolt device meets in this respect the qualification provided for 1-class locking.

[0014] In the following the invention is described by way of example with reference to the attached drawings, in which

- Fig. 1 shows as a view of principle a bolt device according to the invention installed to a wooden door while striking rods are in locking position in counterparts in an upper frame and in a door sill,
- Fig. 2 shows the bolt device according to figure 1 seen from above before installation to a door,
- Fig. 3 shows a section III - III of the bolt device according to figure 2 the bolt device in locking position seen from aside,
- Fig. 4 shows the bolt device according to figure 3 in non-locking position,
- Fig. 5 shows a locking or striking rod of a bolt device according to the invention as a side view,
- Fig. 6 shows the locking or striking rod of figure 5 as another side view,
- Fig. 7 shows a section VII - VII of the bolt device of figure 2,
- Fig. 8 shows a side view of a subframe to be used according to need in connection with a bolt device according to the invention,
- Fig. 9 shows a bolt device according to the invention mounted to the subframe according to figure 8 and provided with a lever handle, and
- Fig. 10 shows a section X - X of the bolt device of figure 9 without a lever handle and its spindle.

[0015] In figure 1 a bolt device 1 is installed to a door 2 and a striking or locking rod 3a extends to a counterpart 5 located in an upper frame 4 and a striking or locking rod 3b extends to a counterpart 5 located in a sill 6. A frame of the bolt device 1 is mortised in the door and it includes a front plate 7 supported to a surface of the door 2 and through an opening of which a turning handle 8 can affect a spindle 10 situated in a fulcrum 9 of the bolt device 1. The front plate 7 is fastened with cylindrical pins 11 to the bolt device 1. The bolt device 1 is together with the front panel 7 fastened to the door 2 with screws (not shown, cf. figure 7).

[0016] In figure 2 the locking rod 3a is seen, the location of which with respect to the bolt device can vary within specified limits. The locking rod disclosed here is square formed in its cross-section, but with some measures other cross-sectional forms are possible as well. The purpose is, that when an end guide 33 located in the upper and bottom edge of the door or the like is designed in a corresponding way, the locking rod is not able to turn after it is installed to the end guide 33. Since the installation of the locking rods 3a and 3b to force transmitting connection with the frame of the bolt device 1 requires turning movement of the locking rods, as later on is in more detail described, in practice the installation of the end guides 33 takes place last after the installation of the locking rods.

[0017] Figure 3 discloses the construction of the bolt device 1 partly in section. Intermediate arms 13 are by means of stub shafts 12 turnably journalled to the fulcrum 9 and affect sliding parts 14. When the fulcrum 9 is turned with the spindle 10 in the figure counter-clockwise, the sliding parts 14 move at the same time towards the upper end or the lower end of the bolt device 1. The turning movement in the figure clockwise accomplishes correspondingly movement of the sliding parts 14 towards the fulcrum 9. The supporting points of the intermediate arms 13 or the location of the stub shafts 12 in the fulcrum 9 and on the other hand the supporting point in the sliding parts 14 are chosen so, that the fulcrum 9 turns a little beyond the so called dead centre. Hereby the bolt device 1 can be dead-locked and it cannot be affected in view of burglary through the locking rods 3a or 3b so, that it and at the same time the whole door would be opened.

[0018] The fulcrum 9 includes two concentric square holes for the spindle 10. One is used in connection with the turning handle 8, the other in the lever handle use (cf. the lever handle 31 in figure 9). The fulcrum 9 is affected by a spring 15, which brakes with its friction force the turning movement of the fulcrum 9 when needed. The sliding part 14 has a guiding opening 16, which is formed and dimensioned so, that the head 17 of the locking rod 3a or 3b can move in the opening 16 a distance required by the surface of installation (cf. 2a in figure 1) of the bolt device in each case. In figure 3 the locking rods 3a and 3b are placed nearest to the surface of installation in the not-shown door (cf. 2a in figure 1). Since the head 17 of the locking rods 3a and 3b is shaped like a T-piece, the installation of the locking rods 3a and 3b is accomplished by turning them 90°, when their head 17 is located at the position of the opening 16. Hereby a firm joint between the locking rod 3a and 3b and the frame of the bolt device 1 is achieved allowing movement in the longitudinal direction of the opening 16. The frame plates of the bolt device 1 include elongated holes 18a, 18b, 18c to guide transfer movements of the sliding parts 14.

[0019] Figure 4 shows the bolt device of figure 3 in a non-locked position. The turning handle 8 has turned the fulcrum 9 to its other extreme position, whereby the intermediate arms 13 have pulled the sliding parts 14 towards the fulcrum 9 more close to each other and at the same time also the striking rods 3a and 3b away from the counterparts 5. In this case the door or the like can

be opened. According to figure 4 the striking rods 3a, 3b are shown so, that they are located as far away as possible from the surface of installation of the not-shown door (cf. 2a in figure 1).

[0020] Figures 5 and 6 show the striking rod 3a, 3b from two different directions. The striking rods 3a, 3b include a T-shaped head 17 to be located in the opening 16 and a thinner, usually lathed neck part 19, which ends to a bevelled point 20. In order that the square-like rod 3a, 3b would be turnable inside the bolt device 1 for installation, the striking rod 3a, 3b is formed with cuts 21. The other head 22 of the striking rod 3a, 3b forms a conventional dead bolt.

[0021] Figure 7 shows more closely details of the bolt device 1 and parts attached to it. The bolt device 1 is here shown in locked position. The front plate 7 and at the same time the whole assembly is fastened to the door or the like by means of wood screws to be located in holes 23. There are advantageously two pairs of intermediate arms 13, whereby a firm construction in view of strength is obtained. The fulcrum 9, the sliding part 14 and the bolt frame 1 can also with advantage be made of two plate pieces. Since these all are pieces punched from steel plate without any special forms like bends etc., the manufacturing costs of the bolt device 1 can be kept considerably low in comparison with many other solutions.

[0022] Figure 8 shows a subframe 24, inside of which the bolt device 1 is placed, when one desires to use the bolt device with a door handle. The subframe 24 resembles an ordinary mortice lock and it is a piece conventionally welded from a steel plate. The subframe 24 includes a front plate 25 and two side plates 26, between which the bolt device 1 is placed so, that the centre of the spindle of the fulcrum 9 is in the middle of the hole 27. The pair of holes 28 or 29 are used to fasten the lever handle and the pair of holes 30 to fasten the bolt device 1 to the subframe 24 for example with pins.

[0023] In figure 9 the bolt device 1 is placed to the subrame 24 and also the striking bars 3a and 3b are placed to their position. The lever handle 31 is shown here without the shield.

[0024] Figure 10 shows the bolt device 1 viewed from behind and installed to the subframe 24. The pairs of holes 32 are used to fasten the whole assembly to a door or the like. The fastening occurs normally preferably with screws. In metal profile doors the fastening can also be accomplished for example by riveted threaded sleeves and screws suitable to them.

[0025] The invention is not limited to the embodiments shown above, but several modifications are feasible within the scope of the attached claims.

Claims

1. A bolt device for a door, window, hatch or the like (2), which device includes a mortised bolt frame (1), to which can be connected at least one, preferably two locking rods (3a,3b), which are movable by making use of a sliding unit (14) from a free position to a locking position, in which they are supported to a frame (4), a sill (6) or the like, the device further including coupling means for coupling the locking rod (3a,3b) to the bolt frame (1) so that a coupling head (17) of the locking rod (3a,3b) is movable relative to the bolt frame (1) in a transverse direction with regard to the direction of movement of the locking rod (3a,3b), **characterised in that** the locking rods (3a, 3b) are movable with an operating device (8, 31), **in that** the coupling means comprise an elongated guiding opening (16) arranged in the sliding unit (14), said guiding opening (16) extending in a transverse direction with regard to the direction of movement of the locking rod (3a,3b) and being arranged to cooperate with the coupling head (17) of the locking rod so that the locking rod (3a,3b) can move in the mentioned guiding opening (16) and gets its guidance from the edges of the guiding opening (16), and **in that** the coupling head (17) of the locking rod is formed like a T-piece and arranged to be coupled to the mentioned guiding opening (16) by turning the locking rod (3a,3b) about 90°.

2. A bolt device according to claim 1, **characterised in that** the bolt frame (1) and the sliding unit (14) form a casing by their structure so, that the coupling head (17) of the locking rod is placed inside the construction.

3. A bolt device according to any one of the preceding claims, said bolt device being installed on an assembling surface (2a) in a door, window, hatch or the like (2), **characterised in that** the mentioned guiding opening (16) is dimensioned so that it allows stepless variation of distance of the coupling head (17) of the locking rod, measured from the central axis at least in the range 11 ... 18 mm, from the assembling surface (2a) of the bolt frame (1).

4. A bolt device according to any one of the preceding claims, said bolt device being installed on a door, window, hatch or the like (2) so that the locking rod (3a,3b) is guided by an end guide (33) installed at the edge of the door, window, hatch or the like (2), **characterised in that** the location of the locking rod (3a,3b) at the position of said end guide (33) remains constant by virtue of said end guide (33).

5. A bolt device according to any one of the preceding claims, **characterised in that** turning movement of an installed locking rod (3a,3b) is prevented by forming the end guide (33) to be fastened to the door, window, hatch or the like and the locking rod (3a,3b) to be mutually compatible so that the locking rod (3a,3b) cannot turn in the end guide (33).

6. A bolt device according to any one of the preceding claims, **characterised in that** a spindle hole in the bolt frame (1) arranged for the spindle (10) of the operating device (8,31) is formed to include two concentric square holes so that at least either a turning lever (8) of the quick-bolt type or a door handle (31) or the like can be used as an operating device.

7. A bolt device according to any one of the preceding claims, **characterised in that** when a handle (31) is used the bolt frame (1) is placed in a subframe (24), which includes at least a front plate and cover plates.

Patentansprüche

1. Riegelvorrichtung für eine Tür, ein Fenster, eine Luke o. Ä. (2), die einen eingestemmten Riegelrahmen (1) aufweist, der mit mindestens einem, vorzugsweise zwei Verriegelungsstäben (3a, 3b) verbunden werden kann, die unter Verwendung einer Schiebeeinheit (14) aus einer freien Position in eine Verriegelungsposition bewegt werden können, in der sie an einem Rahmen (4), einer Schwelle/Fensterbank (6) o. Ä. gestützt sind, wobei die Vorrichtung ferner Koppelmittel zum Koppeln der Verriegelungsstange (3a, 3b) an den Riegelrahmen (1) aufweist, so dass ein Koppelkopf (17) der Verriegelungsstange (3a, 3b) bezüglich des Riegelrahmens (1) in einer quer zur Bewegungsrichtung der Verriegelungsstange (3a, 3b) verlaufenden Richtung bewegt werden kann, **dadurch gekennzeichnet, dass** die Verriegelungsstangen (3a, 3b) mit einer Betätigungsvorrichtung (8, 31) bewegt werden können, dass die Koppelmittel eine längliche Führungsöffnung (16) aufweisen, die in der Schiebeeinheit (14) angeordnet ist, sich in einer quer zur Bewegungsrichtung der Verriegelungsstange (3a, 3b) verlaufenden Richtung erstreckt und so angeordnet ist, dass sie mit dem Koppelkopf (17) der Verriegelungsstange zusammenwirkt, so dass die Verriegelungsstange (3a, 3b) sich in der Führungsöffnung (16) bewegen kann und durch die Ränder der Führungsöffnung (16) geführt wird, und dass der Koppelkopf (17) der Verriegelungsstange wie ein T-Stück ausgebildet und so angeordnet ist, dass er durch Drehung der Verriegelungsstange (3a, 3b) um 90° in die Führungsöffnung (16) gekoppelt wird.

2. Riegelvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Riegelrahmen (1) und die Schiebeeinheit (14) durch ihre Struktur ein Gehäuse bilden, so dass der Koppelkopf (17) der Verriegelungsstange in der Konstruktion positioniert ist.

3. Riegelvorrichtung nach einem der vorhergehenden Ansprüche, die auf einer Montagefläche (2a) einer Tür, eines Fensters, einer Luke o. Ä. (2) installiert wird, **dadurch gekennzeichnet, dass** die Führungsöffnung (16) so bemessen ist, dass sie eine stufenlose Änderung des Abstands zwischen dem Koppelkopf (17) der Verriegelungsstange und der Montagefläche (2a) des Riegelrahmens (1) von mindestens 11 bis 18 mm, gemessen von der mittleren Achse, gestattet.

4. Riegelvorrichtung nach einem der vorhergehenden Ansprüche, die an einer Tür, einem Fenster, einer Luke o. Ä. (2) installiert wird, so dass die Verriegelungsstange (3a, 3b) von einer am Rand der Tür, des Fensters, der Luke o. Ä. (2) installierten Endführung (33) geführt wird, **dadurch gekennzeichnet, dass** der Ort der Verriegelungsstange (3a, 3b) an der Position der Endführung (33) dank dieser Endführung (33) konstant bleibt.

5. Riegelvorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** eine Drehbewegung einer installierten Verriegelungsstange (3a, 3b) verhindert wird, indem die an der Tür, dem Fenster, der Luke o. Ä. zu befestigende Endführung (33) und die Verriegelungsstange (3a, 3b) so ausgebildet sind, dass sie gegenseitig kompatibel sind, so dass die Verriegelungsstange (3a, 3b) sich nicht in der Endführung (33) drehen kann.

6. Riegelvorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** ein für die Spindel (10) der Betätigungsvorrichtung (8, 31) im Riegelrahmen (1) angeordnetes Spindelloch so ausgebildet ist, dass es zwei konzentrische quadratische Löcher aufweist, so dass mindestens entweder ein Drehhebel (8) der Schnellriegel-Art oder eine Türklinke (31) als Betätigungsvorrichtung verwendet werden kann.

7. Riegelvorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Riegelrahmen (1) bei Verwendung einer Klinke (31) in einem Zwischenrahmen (24) positioniert ist, der mindestens eine Vorderplatte und Abdeckungsplatten aufweist.

Revendications

1. Verrou pour porte, fenêtre, trappe ou analogue (2), ledit verrou comprenant un cadre de verrou encastré (1), auquel au moins une, et de préférence deux tiges de verrouillage (3a, 3b) peuvent être connectées, lesdites tiges étant mobiles par l'utilisation d'une unité coulissante (14) entre une position libre et une position de verrouillage, dans laquelle elles sont supportées sur un cadre (4), une base (6) ou analogue, le verrou comprenant en outre des moyens de cou-

plage pour coupler la tige de verrouillage (3a, 3b) au cadre de verrou (1) de telle sorte qu'une tête de couplage (17) de la tige de verrouillage (3a, 3b) soit mobile par rapport au cadre de verrou (1) dans une direction transversale par rapport à la direction de déplacement de la tige de verrouillage (3a, 3b), **caractérisé en ce que** les tiges de verrouillage (3a, 3b) sont mobiles via un dispositif d'actionnement (8, 31), **en ce que** les moyens de couplage comprennent une ouverture de guidage allongée (16) prévue dans l'unité coulissante (14), ladite ouverture de guidage (16) s'étendant dans une direction transversale par rapport à la direction de déplacement de la tige de verrouillage (3a, 3b) et étant agencée pour coopérer avec la tête de couplage (17) de la tige de verrouillage de telle sorte que la tige de verrouillage (3a, 3b) puisse se déplacer dans l'ouverture de guidage mentionnée (16) en étant guidée par les bords de l'ouverture de guidage (16), et **en ce que** la tête de couplage (17) de la tige de verrouillage se présente sous la forme d'une pièce en T et est arrangée pour être couplée à l'ouverture de guidage mentionnée (16) en faisant tourner la tige de verrouillage (3a, 3b) d'environ 90°.

2. Verrou selon la revendication 1, **caractérisé en ce que** le cadre de verrou (1) et l'unité coulissante (14) forment un coffre par leur structure, de telle sorte que la tête de couplage (17) de la tige de verrouillage soit placée à l'intérieur de la structure.

3. Verrou selon l'une quelconque des revendications précédentes, dans lequel ledit verrou est installé sur une surface d'assemblage (2a) dans une porte, une fenêtre, une trappe ou analogue (2), **caractérisé en ce que** l'ouverture de guidage mentionnée (16) est dimensionnée de manière à permettre une variation continue de la distance entre la tête de couplage (17) de la tige de verrouillage et la surface d'assemblage (2a) du cadre de verrou (1), mesurée à partir de l'axe central au moins dans la gamme de 11 à 18 mm.

4. Verrou selon l'une quelconque des revendications précédentes, dans lequel ledit verrou est installé sur une porte, une fenêtre, une trappe ou analogue (2), de telle sorte que la tige de verrouillage (3a, 3b) soit guidée par un guide d'extrémité (33) installé au bord de la porte, fenêtre, trappe ou analogue (2), **caractérisé en ce que** la localisation de la tige de verrouillage (3a, 3b) à la position dudit guide d'extrémité (33) reste constante sous l'action dudit guide d'extrémité (33).

5. Verrou selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le mouvement tournant d'une tige de verrouillage installée (3a, 3b) est empêché en formant le guide d'extrémité (33) à fixer à la porte, la fenêtre, la trappe ou analogue, et que la tige de verrouillage (3a, 3b) de façon mutuellement compatible de telle sorte que la tige de verrouillage (3a, 3b) ne puisse pas tourner dans le guide d'extrémité (33).

6. Verrou selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**un trou de broche dans le cadre de verrou (1) prévu pour la broche (10) du dispositif d'actionnement (8, 31) est formé pour comprendre deux trous carrés concentriques, de telle sorte qu'au moins soit un levier pivotant (8) du type à verrouillage rapide, soit une poignée de porte (31) ou analogue puisse être utilisé(e) comme dispositif d'actionnement.

7. Verrou selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lorsqu'on utilise une poignée (31), le cadre de verrou (1) est placé dans un sous-cadre (24) comprenant au moins une plaque avant et des plaques de recouvrement.

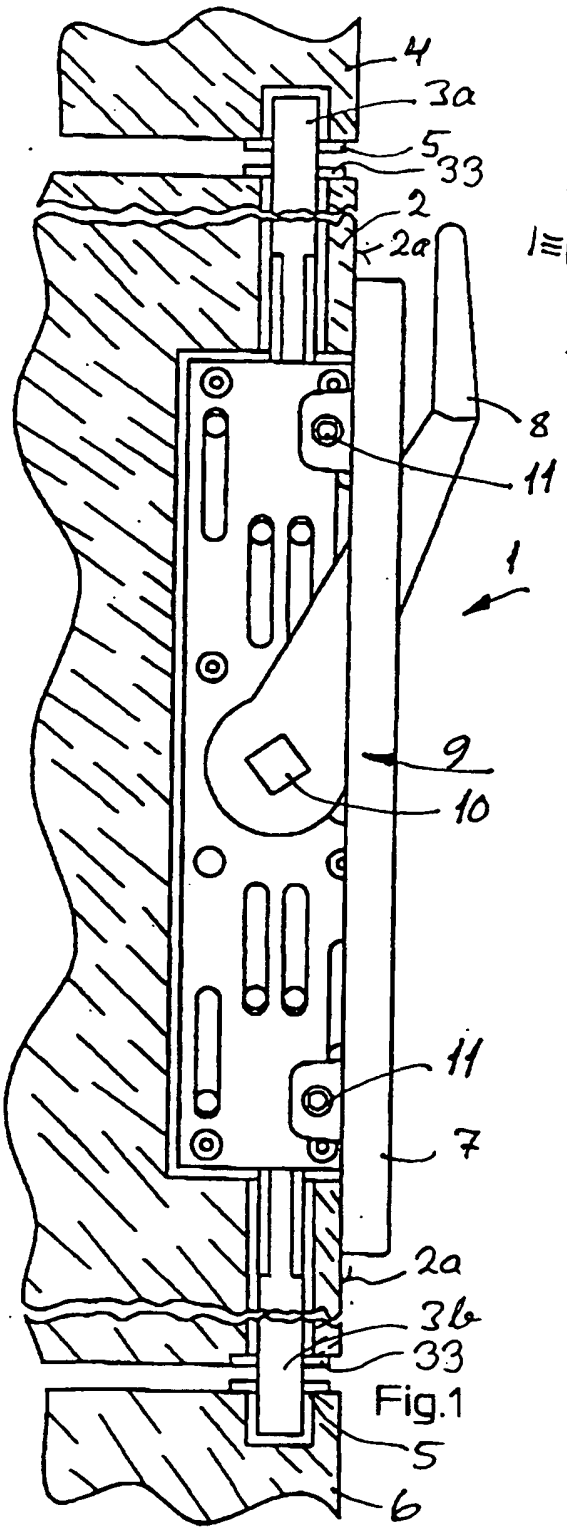

Fig.1

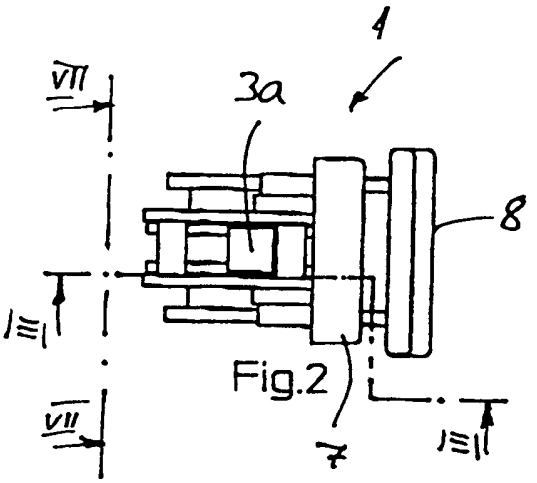

Fig.2

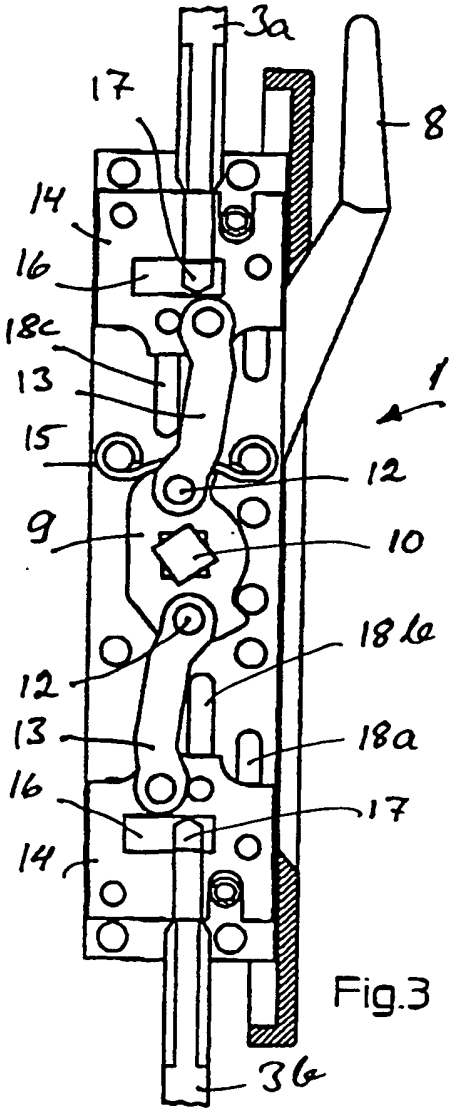

Fig.3

III - III

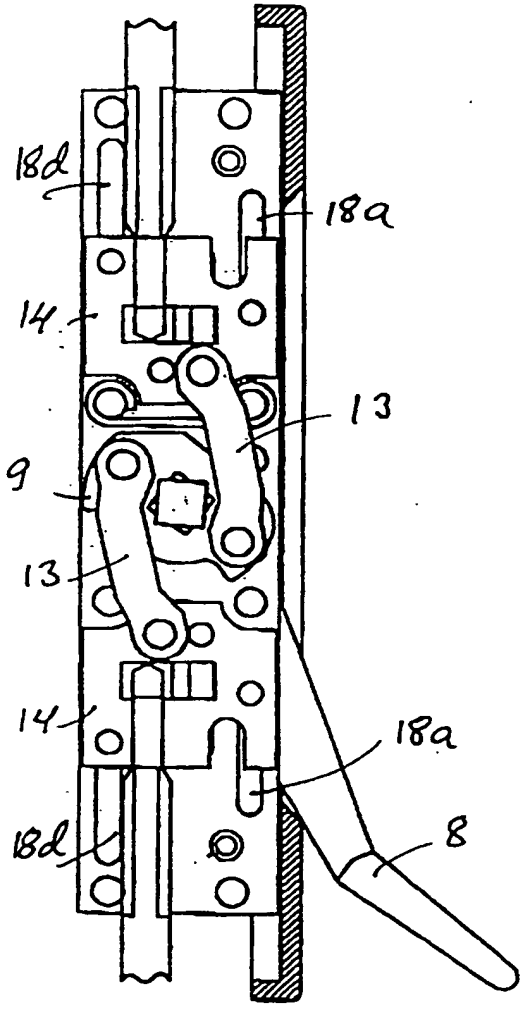

Fig.4

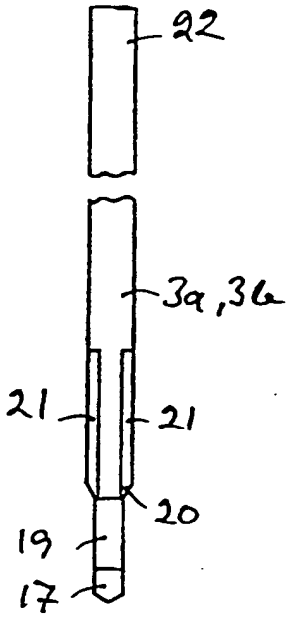

Fig.5

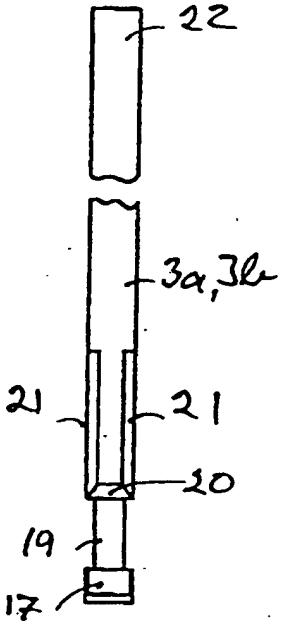

Fig.6

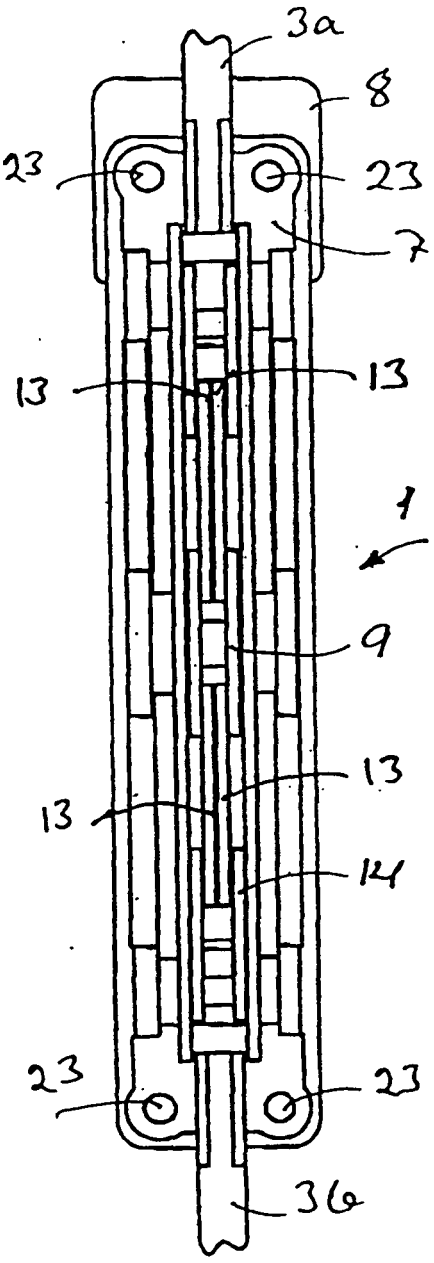

Fig.7

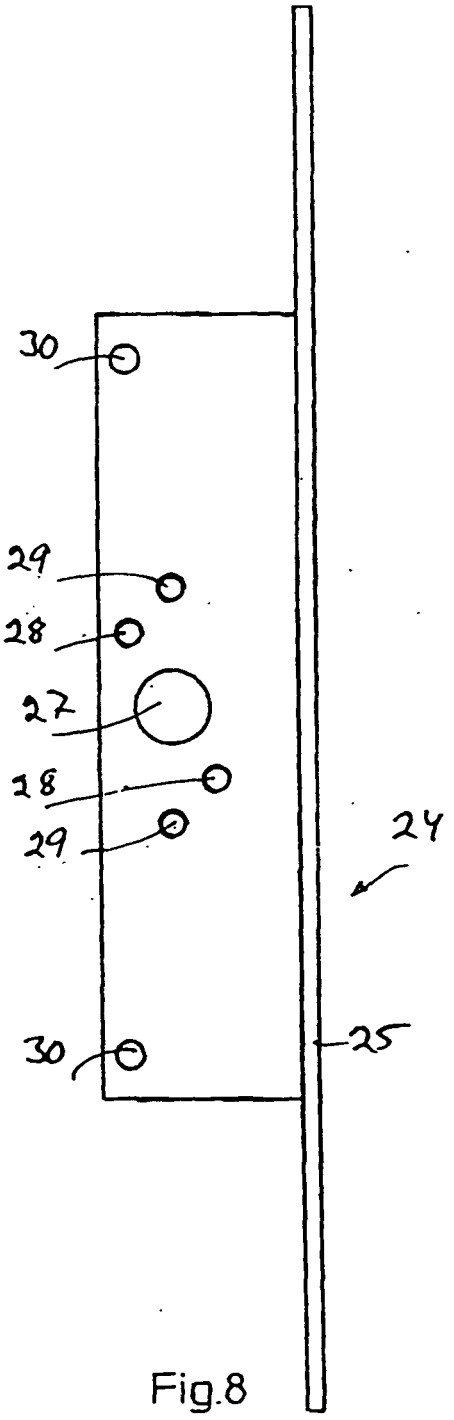

Fig.8

VII - VII

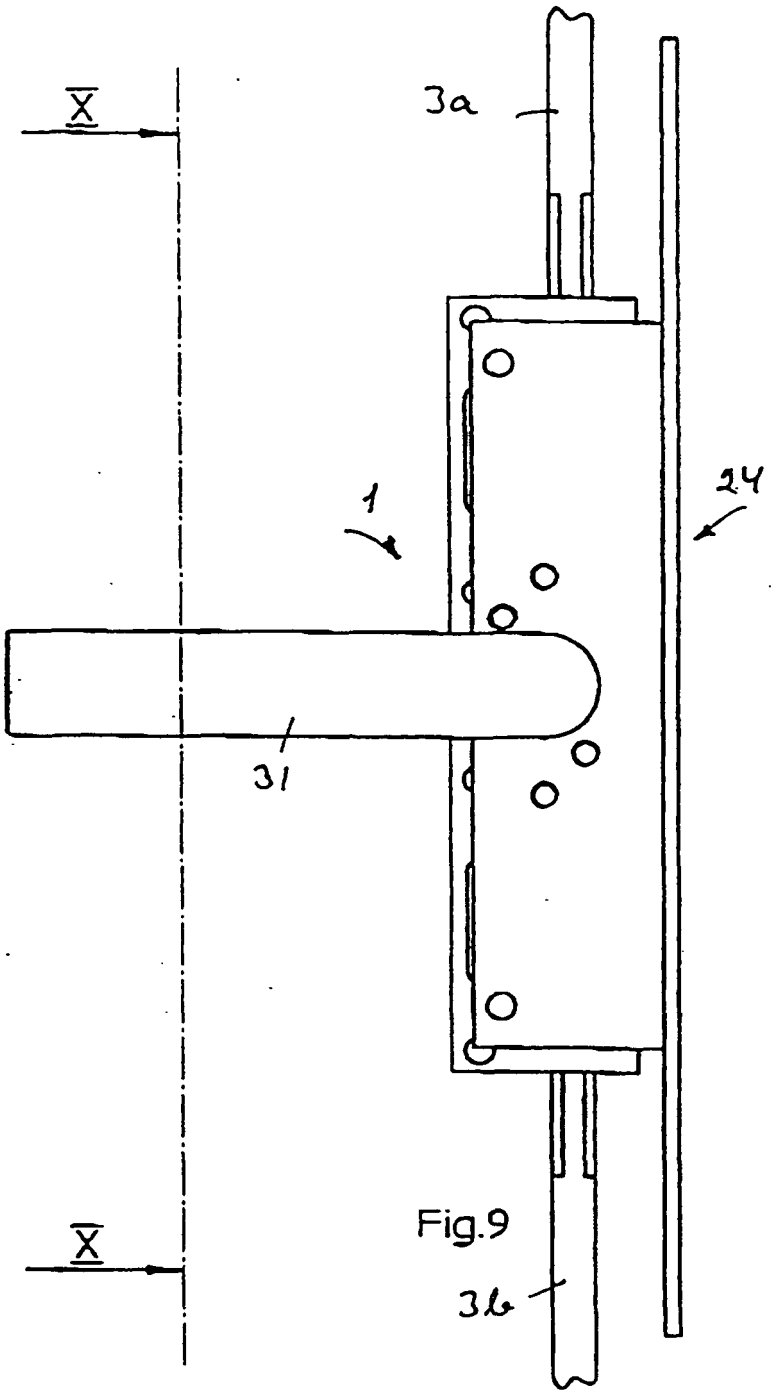

Fig.9

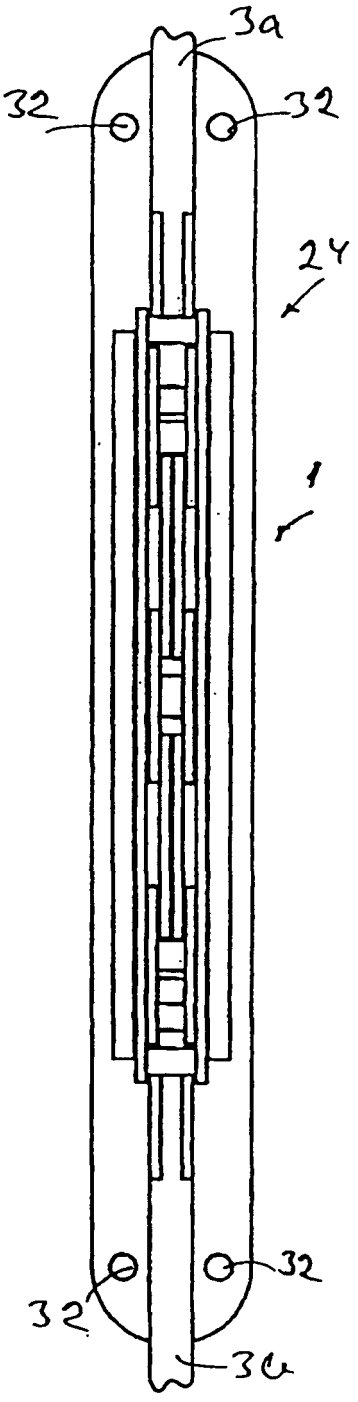

Fig.10

X - X