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(54) **An openable window with a lock**

Öffenbares Fenster mit einem Schloss

Fenêtre ouvrable avec verrou

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## Description

**[0001]** The present invention relates to an openable window, such as a pivot or bottom hung roof window, comprising a window frame and a sash that can be moved between a closed position and open positions.

## BACKGROUND ART

**[0002]** Conventional windows of this type are provided with a locking mechanism operated by a handle for locking the sash in a closed position. Often, the possibility to lock the sash in a ventilation position is also provided.

**[0003]** There exist commercially available additional locking means for improving burglar resistance that can be mounted after the installation of the window in an easily accessible facade. EP 1 537 285 and DE-43 28 330 disclose such a locking device for a pivot or bottom hung window. The locking device comprises a bushing mounted in the window frame and an axially movable cylindrical locking member which is mounted onto the front of the sash. The movable locking member is received in the bushing when moved to an extended active position from a retracted inactive position. The movable cylindrical locking member is formed by a key-operated locking cylinder. In its active position the locking cylinder obstructs the opening movement of the sash, typically limiting the movement of the sash between a closed position and a ventilation position engaging the latch. This type of lock provides excellent burglar resistance, but is cumbersome to use as the user needs to have the key available for locking and unlocking.

**[0004]** The document AU 409 366 B2 discloses a sliding window including a locking mechanism for two window sashes placed on rails in a freely sliding manner. The locking mechanism comprises a cylinder, which is fixed with screws in a bore of the vertical frame of the inner sash. The cylinder comprises a bolt slidably and rotatably received in the cylinder. The bolt is provided at one end with an engagement head. The cylinder has a first end and an opposite second end, the second end of the cylinder faces the vertical frame of the outer sash when the sashes are in the closed position. A keep is fixed with screws to the vertical frame of the outer sash at a position where a front side of the keep faces the second end of the cylinder when both sashes are in the closed position. The front side of the keep is provided with a slot, and the keep is provided with a recess behind the slot. The bolt is movable inside the cylinder between a retracted position wherein the bolt does not prevent movement of the sashes and an extended locking position wherein the engagement head projects through the slot and into the recess when the bolt is in the extended position and when the sashes are in the closed position. The bolt thereby, after a turning movement of the bolt, prevents movement of the sashes.

**[0005]** Due to increased burglar resistance requirements it is desirable to provide improved locks for these

type of windows. However, increased burglar resistance requirements are in contradiction with other requirements such as a large as possible window pane area for maximum light intake, which leads to thin sash members and frame members and heat insulation requirements which also take up space that otherwise could be used for using thicker and stronger sash members and frame members.

## 10 DISCLOSURE OF THE INVENTION

**[0006]** On this background, it is an object to provide an openable window with improved burglar resistance without sacrificing light intake and insulation capacity.

**[0007]** This object is achieved by providing an openable window comprising a window frame comprising elongated, preferably wooden or wooden core frame members, a sash comprising elongated, preferably wooden or wooden core sash members, the sash being pivotally hung to the window frame so that the sash can be rotated relative to the frame between a closed position and open positions, a bolt slidably and rotatably received in a cylinder, the bolt being provided at one end with an engagement head, the cylinder having a first end and an opposite second end, the cylinder being fixed in a through-going bore in one of the sash members with said second end of the cylinder facing a frame member when the sash is in its closed position, a keep secured to a first side of a frame member at a position where a front side of the keep faces the second end of the cylinder when the sash is in said closed position, the front side of the keep being provided with a slot, the keep being provided with a recess behind the slot, and an anchoring member that connects the keep to a second side of said frame member that is opposite to the first side of the frame member, the bolt being movable inside the cylinder between a retracted position wherein the bolt does not prevent movement of the sash and an extended locking position wherein the engagement head projects through the slot and into the recess when the bolt is in its extended position and when said sash is in its closed position, the bolt thereby preventing movement of the sash.

**[0008]** By providing a keep on one side of a frame member and anchoring the keep to the opposite side of the frame member the resistance of the window to burglar attempts with e.g. a crowbar is significantly improved.

**[0009]** In an embodiment a first end of the cylinder is at least partially open and accessible to an operator, so that movement of said bolt is controllable from said first end of said cylinder preferably using a key or tool.

**[0010]** In an embodiment the keep further comprises a rear wall behind the recess.

**[0011]** By providing a rear wall behind the keep the resistance of the window to burglar attempts with e.g. a crowbar is further improved.

**[0012]** In another embodiment the rear wall encloses the recess so that the recess only opens to the slot.

**[0013]** By providing a recess in the keep that only

opens to the slot the resistance of the window to burglar attempts with e.g. a crowbar is further improved.

**[0014]** In another embodiment the keep is embedded in the frame member with the front face of the keep substantially flush with the surface of the frame member.

**[0015]** In another embodiment the anchoring member includes at least one screw or bolt that is in threaded engagement with a nut or a plate-like element that engages the side of the frame member opposing the side of the frame member where the keep is located.

**[0016]** In another embodiment the anchoring members include screws or bolts and nuts or a plate-like element that engage the opposite second side of the frame member.

**[0017]** In another embodiment the frame has two parallel spaced elongated frame side members connected to one another by a parallel spaced top elongated frame member and bottom elongated frame member having two parallel spaced elongated sash side members connected to one another by a parallel spaced top elongated sash member and bottom elongated sash member has a length equal to or slightly larger than the width.

**[0018]** In another embodiment the bolt is resiliently biased towards the retracted position.

**[0019]** In another embodiment the cylinder includes a guiding mechanism configured for guiding the movement of the bolt between the retracted position and the extended locking position, or the keep includes a guiding mechanism configured for guiding the movement of the bolt between the retracted position and the extended locking position.

**[0020]** In another embodiment the sash includes a glass pane, with the cylinder being on the building interior side of the glass pane.

**[0021]** In another embodiment the first end of the cylinder is provided with a flange abutting against a surface of the sash member.

**[0022]** In another embodiment the end portion of the bolt is provided with a maneuvering face engageable from the second opening of the cylinder to and from the locking position, or the end portion being provided with an engagement member for moving the bolt to and from the locking position, the engagement member preferably being made from a material with good thermal insulation properties.

**[0023]** Further objects, features, advantages and properties of the pivot or bottom hung window and the locking device according to the invention will become apparent from the detailed description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0024]** In the following detailed portion of the present description, the invention will be explained in more detail with reference to the preferred embodiments shown in the drawings, in which

Fig. 1a shows schematically an openable window

according to an example embodiment, with the sash in an open and closed position in a sectional view, Fig. 1b shows schematically an openable window according to an example embodiment, with the sash a closed position in an elevated view,

Fig. 2a and 2b show a sectional schematic view through a member of the sash and a member of the frame, including parts of a lock assembly, in an unlocked and locked state, respectively,

Fig. 2c shows another elevated sectional view through a member of the sash and a member of the frame, including parts of a lock assembly, in a locked state,

Fig. 3 is a front perspective view of a lock according to an example embodiment, in the engaged position, Fig. 4 is a rear perspective view of the lock shown in Fig. 3, in a disengaged position,

Fig. 5 is a rear perspective view of the lock shown in Fig. 3, in an engaged position,

Fig. 6 is a front perspective view of the lock shown in Fig. 3, in an engaged position,

Fig. 7 is another elevated view of the lock shown in Fig. 3, in a disengaged position,

Fig. 8 is an elevated view on another example embodiment of a lock with a key,

Fig. 9 is a semi-transparent view of the lock of Fig. 8, Fig. 10 is an elevated view on several inner parts of the lock shown in Fig. 8,

Fig. 11 is a an elevated view of a key of the lock shown in Fig. 8,

Fig. 12 is another elevated view on several inner parts of the lock shown in Fig. 8,

Fig. 13 is an elevated rear view of the lock in Fig. 8, Fig. 14 is an elevated view on another example embodiment of a lock assembly,

Fig. 15 is a sectional view of the lock shown in Fig. 14, Fig. 16 is another sectional view of the lock shown in Fig. 14.

#### DETAILED DESCRIPTION

**[0025]** Fig. 1 shows schematically an example embodiment of an openable window structure with a window frame 2 and a window sash 1 pivotally journalled or hung in the frame 2 by means of pivotal hinges H, with an axis of rotation parallel with a top horizontal sash member 1' and a bottom horizontal sash member 1", the axis of rotation preferably being located halfway between the top and the bottom horizontal sash members 1', 1". Fig. 1 illustrates the window structure as mounted in a roof; however, the invention can be equally applied also to bottom- or top-hung window structures.

**[0026]** The window frame 2 is made from elongated frame members or profiles (2', 2'', 2''', 2''''). The sash is made from elongated sash members or profiles (1', 1'', 1''', 1''''). The sash 1 is pivotally hung to the window frame 2 so that the sash 1 can be rotated relative to the frame 2 between a closed position and a range of open

positions. The window frame 2 has two parallel spaced frame side members 2<sup>''</sup>, 2<sup>'''</sup> connected to one another by a parallel spaced top frame member 2' and bottom frame member 2". The sash 2 has two parallel spaced sash side members 1<sup>''</sup>, 1<sup>'''</sup> connected to one another by a parallel spaced top sash member 1' and bottom elongated sash member (1"). Preferably, the frame members 2', 2<sup>''</sup>, 2<sup>'''</sup>, 2<sup>''''</sup> and sash members 1', 1<sup>''</sup>, 1<sup>'''</sup>, 1<sup>''''</sup> are completely wooden profiles or the major part of the profiles is wooden such as wooden core members that have a wooden core embedded in a plastic material such as e. g. polyurethane (PUR). It is however also possible to use metal profiles, molded plastic profiles or glass fiber profiles.

**[0027]** The sash 1 includes a glass window pane P with an inner face adapted to face the inside I of the building in which the window structure is mounted. In the closed position (one of the open position is illustrated by the interrupted lines), the sash 1 is oriented substantially parallel with the window frame 2 as shown in fig. 1, 2a and 2b.

**[0028]** A bolt 38 of a lock L is arranged in a cylinder 30 that is fixed in a through-going bore or passage 5 of a sash member; the bolt 38 is configured to engage, as discussed below, a keep that is arranged in an adjacent window frame 2 member, to securely lock the window sash 1 in the closed position. The keep is in an embodiment a recess 4 in the frame member B covered by a (preferably steel) keep plate 10.

**[0029]** Preferably, the through-going passage 5 extends through the part of the sash 1 inside the building such that locking and unlocking of the lock L can take place from the inside I of the building.

**[0030]** The lock L is preferably arranged in a position close to one of the horizontal sash members, such as the bottom horizontal sash member 1<sup>''</sup>, and preferably in addition to the lock L there is a conventional lock, such as a lock of the type disclosed in European patent application no. 2 281 984, arranged at another position, such as at the upper horizontal sash member 1' to automatically lock the sash to the frame.

**[0031]** Figs. 2a and 2c show a sectional schematic view through adjacent upright members 1<sup>''</sup>, 1<sup>'''</sup>, 2<sup>''</sup>, 2<sup>'''</sup> of the sash 1 and of the frame 2 that connect the horizontal members 1', 1<sup>''</sup>, 2', 2<sup>''</sup> of the sash 1 and the frame 2, respectively. Fig. 2b illustrates with letter A a first peripheral side of the frame 2 defining generally the inner perimeter or contour of the frame 2 and a second peripheral side B defining generally the outer perimeter or contour of the frame 2. Letter C represents a first peripheral side of the sash which faces the first side A of the frame and which defines generally the outer perimeter or contour of the sash while letter D represents a second peripheral side of the sash opposite the first sash side C and which defines generally the inner perimeter or contour of the sash. A window pane P illustrated only schematically will normally be mounted to the second side D of the sash 1. The lock L to be discussed below is accessible from the inside I of the building in which the window structure

is mounted, the pane P being mounted on the side of the lock L closer to the building outside.

**[0032]** Shown in Fig. 2a and 2b is a recess 4 in the frame member as well as first and second through-going passages 5 and 3 prepared in the sash member and in the frame member, respectively. In one embodiment, to accommodate for the lock L the recessed portion 4 is formed with a depth D measured from the first side (A) surface of the frame member; two opposite through-going second passages 3 are drilled or otherwise formed so as to extend from the recess 4 to the second side B. Conveniently, the recessed portion 4 is circular with a diameter of about 3-6 cm. Each second passage 3 may have a diameter in the order of 5-10 mm, to accommodate for anchoring members, as explained below. A first passage 5 is drilled or otherwise formed in the sash 1 member, preferably to extend with a uniform cross-wise dimension from the first sash side C to the second sash side D. Fig. 2a shows the lock L in an unlocked state while Fig. 2b shows the lock L in the locked state.

**[0033]** As best shown in Figs. 3 to 7, the lock L comprises a keep 10 to be mounted over the recess 4, and a cylinder 30 to be mounted (immovably) in the through-going second bore 5 of the sash member. The cylinder 30 has a first end 34 and an opposite second end 36. The second end 36 of the cylinder 30 faces a frame member when the sash 1 is in its closed position.

**[0034]** As best shown in fig. 5, in an example embodiment the keep 10 includes a flat metal disc with a slot 11 adapted to receive an engagement head 40, preferably in the form of an enlarged head 40, of the bolt 38 movable in the cylinder 30, along the longitudinal extent of the second passage 5. The keep 10 has a thickness smaller than the aforementioned depth D of the recessed portion 4, to provide for a space between the bottom surface of the recess 4 and the keep 10 for receiving the enlarged head 40 of bolt 38 introduced through the slot 11 in the keep, as shown in fig. 2b. A 90° turning movement of the bolt 38 will then lock the engagement head 40 to the lock member 10. The lock member 10 may alternatively be formed as a hollow metal casing fitted into the recess, with a front wall including the slot 11 and a rear wall bearing against the bottom of the recess 4.

**[0035]** The cylinder 30 has a peripheral wall 32, a first end 34 and a second end 36, the peripheral wall 32 preferably being in fractional engagement with the inside surface of the first passage 5 to secure the cylinder against movement relative to the sash member. The first end 34 of the lock housing 30 has a flange 35 abutting against the second side D of the said sash 1 member.

**[0036]** Shown best in fig. 4 is a release mechanism including a spring 37, preferably a helical wire spring arranged between a bottom wall 33 of the cylinder 30 and the bolt 38. The spring 37 normally urges the bolt 38 to retracted position partially in the cylinder and away from the keep 10. Opposite the engagement head 40 the bolt 38 is provided with an end portion 39 engaging the spring 37 and having on the opposite side a maneuvering face

which may be in the form of a recess having a peripheral wall 39", which may be serrated or grooved for improved frictional contact with a person's finger.

**[0037]** A radially outwardly protruding pin 38' of a guiding mechanism 50 is fixed to bolt 38, as best seen in Fig. 5. The pin 38' extends into a U-shaped groove or recess 31 formed in the cylinder 30. When a person manually presses the bolt 38 to move away from the flange 35 the pin 38' will slide along the groove 31, until reaching a bottom surface 31' of the groove. When striking the bottom surface 31' the enlarged head 40 will also have entered the slot 11 of the keep 10. Through a rotation by the operator of the bolt 38 in this advanced position the pin 38' moves within a tangential groove part, retaining the bolt 38 in this advanced position where the engagement member 40 is also engaged with the keep 10, as shown in Fig. 5.

**[0038]** As it is difficult to reach the bolt 38 from the outside this arrangement offers proper burglar protection.

**[0039]** As shown in Fig. 2-7 and discussed briefly above the keep 10 includes at least one anchoring member 15 in the form of a threaded bolt configured with a first portion 16 for anchoring an anchoring member 15 in the form of a specially adapted nut to the frame 2 and a second portion 17 connected with or configured for connection with the keep 10. The nut 16 of the anchoring member is in threaded engaging with the bolt 15 thus allowing the bolt to be tensioned the nut 16 may include teeth 18 driven into the wooden frame 2 when the bolt 15 is tensioned, e.g. via the bolt head 17. Instead of two bolts 15 with a nut 16 each, an arrangement (not shown) with two or more bolts can be used that includes a plate member provided with a number of threaded holes corresponding to the number of nuts and each of the bolts being in threaded engagement with said plate. The plate that is disposed on the side of the frame member opposite to the keep 10 can thus spread the force applied by the bolts over a larger area of the frame member, thereby improving the strength of the lock.

**[0040]** For mounting the keep 10 the bolt 15 includes an elongated rod or bar configured to engage the anchoring member 16 already secured to the frame 2, such as through a screw-thread, using a screwdriver acting on a head portion 17 of the bolt 15 which extends through a corresponding mounting hole in the keep 10.

**[0041]** Fig. 8 shows an elevated view of another example embodiment of the lock with a key.

**[0042]** From the above it will be understood that the locked state illustrated in Fig. 2b requires first a translational movement of the bolt 38 by an operator pressing the bolt 38 into the cylinder 30 against the action of the spring 37, and further into the recess 4 whereby the enlarged head 40 passes the slot 11. The operator then rotates the bolt 38 approximately 90 deg. to bring the enlarged head 40 into engagement with the rear side of the keep 10.

**[0043]** Figs. 9 to 12 show other views of the exemplary

embodiment of the lock shown in Fig. 8.

**[0044]** The lock according to this embodiment is installed in a roof window in essentially the same way as shown for the embodiment shown in figures 1 to 8. In this embodiment the lock is provided with a key 60 to operate the locking mechanism, to lock the bolt 38 in the extended locking position and eventually also to move bolt 38 back to the retracted position. The key 60 can be made of a plastic or other polymer material. The key 60 is provided with a hook 61 at its proximate end, and a shaft 62 extending from the hook 61 to a bit 63 at the distal end of the key 60. The hook 61 is in an embodiment shaped and sized to snap fit on a handlebar or other element for operating another lock and/or ventilation arrangement of the window. The engagement head 40 at the distal end of the bolt 38 is in this embodiment formed by a rod or cross pin 40 extending through the distal portion of the bolt 38 and the rod 40 projects from the distal end of bolt 38 in two opposite directions and at a substantially right angle.

**[0045]** The bolt 38 is provided with a cylindrical shaft, preferably a metal shaft, forming the main part of the bolt 38. An engagement member 65 is connected to the proximate end of the metal shaft. The engagement member 65 serves to engage the bit 63 at the distal end of the key 60. Hereto, the engagement member 65 is provided with a slot 66 that is complementary with- and engages the bit 63. The bit 63 and the slot 66 are formed such that the key 60 can be used to pull the bolt 38 towards the retracted position if it should get stuck and the force of the spring 37 is insufficient for returning the bolt 38 to its retracted position. The engagement member 65 is made from a thermal insulation material such as plastic or other polymer material so that the engagement member 65 serves as a thermal barrier.

**[0046]** A helical wire spring 37 is placed over the metal shaft and extends between the engagement member 65 and an end wall of the lock housing 30 and urges the bolt 38 to a retracted position. The hollow cylinder 30 is at its first end provided with a flange 35 for abutting with the first surface D of the upper sash member 1' and the bolt 38 is slidably and rotatably received in the cylinder 30.

**[0047]** In this embodiment the cylinder 30 is not provided with a guiding mechanism and bolt 38 is not provided with a radially outwardly protruding pin. The guiding and retaining function (preventing the bolt from returning to its retracted position) is taken over by the enlarged head cross-pin 40 through interaction with guide projections 71,72 and slots 73 formed on the rear side of the keep plate 10 (on the side facing the hole or recess 4 in the frame member B).

**[0048]** The two highest projections 71 are diametrically oppositely placed and each provide one side surface for the slots 73 and an end stop surface for abutment with the rod 40. The highest projections 71 are provided with threaded holes 76 that allow for the keep plate 10 to be secured to the frame member B by bolts that engage from the opposite side of the frame member B.

**[0049]** The two less high projections 72 each provide one side surface of the slots 73 and one guide surface 75 with an axially-directed normal vector. Thus, two guide surfaces 75 are formed for guiding the two projections of the rod 40' when it is turned.

**[0050]** In operation a user inserts the key 60 into the lock and engages the slot 66 in the engagement member 65 with the bit 63. In order to activate the lock the user pushes the bolt 38 against the force of the spring 37 with the key 60 until the enlarged head 40 passes through the slot 11 and beyond the guide surfaces 75, i.e. to the extended position. Then, the user starts an approximately 180 degrees turn until the rod 40' abuts with the end stop surfaces of the higher projections 71. This is the position shown in figures 10 to 14. Next, the user can disengage the key and the force of the spring 37 will ensure that the rod 40' abuts with guide surfaces 72. During the turn the user does not need to push the key/movable member since the return force of the spring 37 can be countered by the rod 40' being guided by the guide surfaces 75.

**[0051]** For releasing the lock the user inserts the key 60 again and engages the engagement member 65, turns the movable member 180 degrees back and allows the spring to urge the movable member back to the retracted position.

**[0052]** Figs. 14 to 17 illustrate another exemplary embodiment of the lock and the openable window. The lock according to this embodiment is installed in an openable window in essentially the same way as shown for the embodiments shown in Figs. 1a,1b,2a,2b2c and 3 to 13, and for some of the elements of this embodiment reference is made to Figs. 1a,1b,2a,2b2c and 3 to 13. In this embodiment the openable window has a window frame 2 including elongated, preferably wooden or wooden frame members 2',2'',2''',2'''''. The sash 1 includes elongated, preferably wooden or wooden sash members 1',1'',1''',1'''''. The sash 1 is pivotally hung to the window frame 2 so that the sash 1 can be rotated relative to the frame 2 between a closed position and open positions.

**[0053]** The lock arrangement associated with the window frame 2 and with the sash 1 includes a bolt 38 slidably and rotatably received in a cylinder 30. The bolt 38 is provided at one end with an engagement head 40. The engagement head includes a cross pin 40 that is used to engage a keep 10 that is provided in a frame member.

**[0054]** The cylinder 30 has a first end 34 and an opposite second end 36. The cylinder 30 is fixed in a through-going bore 5 that is provided in one of the sash members with the second end 36 of the cylinder 30 facing a frame member when the sash 1 is in its closed position. The sash member has a substantial thickness and in an embodiment the cylinder 30 has a length roughly equal to the thickness of the sash member. The cylinder is at its second end 36 provided with a disk or flange 31. The disk 31 rests on recess in collar 91 that is secured to the surface C of the sash member. The collar 91 surrounds and protects the engagement head portion and cross pin 41. 12. The first end 34 of cylinder 30 is provided with a

flange 35 abutting against a surface of said sash member, and thus the cylinder 30 is secured against displacement from both ends.

**[0055]** A keep 10 is secured to a first side of a frame member at a position where a front side of the keep 10 faces the second end of the cylinder 30 when the sash 1 is in the closed position. The keep 10 is embedded in the frame member and snugly fits into a recess that is provided in the frame member for receiving the keep 10. The keep is embedded in the frame member with the front face of the keep 10 substantially flush with the surface of said frame member.

**[0056]** The front side of the keep 10 is provided with a slot 11. The keep is provided with a recess 4 behind the slot 11 and with a rear wall 39 behind the recess 4 for enclosing the recess 4. Thus, the recess 4 only opens to the slot 11 and can only be accessed from via the slot (unless the keep is forced open in another way). In order to achieve enclosing of the recess 4 the keep 10 in this embodiment also includes a side wall (in this embodiment a cylindrical side wall). However, other shapes for the keep 10 that enclose the recess so that it only opens to the slot 11 are also possible, such as e.g. a dome shaped rear wall.

**[0057]** The bolt 38 is movable inside the cylinder 30 between a retracted position wherein the bolt 38 does not prevent movement of the sash 1 and an extended locking position wherein the engagement head 40 projects through the slot 11 and into the recess 4 when the bolt 38 is in its extended position and when the sash (1) is in its closed position, the bolt 36 thereby preventing movement of the sash 1.

**[0058]** Movement of the bolt is guided by an inner tube 37 that is secured to the second end of the cylinder 30 and the inner tube 30 projects inwardly therefrom. A helical wire spring 37 surrounds the bolt 38 and the inner tube. One end of the helical wire, spring 37 rests on the second end of the cylinder whilst the opposite end of the helical wire spring 37 engages an enlarged diameter section at the proximate end of the bolt 37. The force of the helical wire spring 37 urges the bolt to its retracted position.

**[0059]** The first end 34 of the cylinder (30) is at least partially open and accessible to an operator, so that movement of the bolt 30 is controllable from the first end 34 of the cylinder 30, preferably using a key 61 as shown in Figs. 10 and 11 or another tool.

**[0060]** An anchoring member 15 connects the keep 10 to a second side of the frame member that is opposite to the first side of said frame member. The anchoring member (15) includes at least one screw or bolt 15 that is in threaded engagement with a nut 16 or a plate-like element that engages the side of said frame member that is opposite to the side of the frame member where the keep is located. The bolt or bolts 15 extend through passages that are provided for this purpose in the frame member. In an embodiment these passages extend from the recess in which the keep 10 is received to the opposite

side of the frame member.

**[0061]** In an embodiment the bolts are in threaded engagement with corresponding threaded holes in a plate-like element that engages the opposite second side (B) of the frame member and distributes any force applied to the bolts over a large area on the frame member.

**[0062]** As described for the previous embodiment with reference to Figs. 8 to 13, the keep 10 is provided with guide projections 71,72 and slots 73 formed on the inner side of the keep plate 10 (on the side facing the hole or recess 4 in the frame keep 10) for guiding and retaining the cross-pin 40 and the bolt 30 in the same manner as in the embodiment of Figs. 8 to 13.

**[0063]** An engagement member 65 for moving the bolt 38 to and from its locking position is connected to the proximate end of the bolt 30. The engagement member 65 is preferably made from a material with good thermal insulation properties so that it can act as a thermal barrier.

**[0064]** Although not shown in detail, the present disclosure also covers a bolt 38 provided with a push to release mechanism. This mechanism is configured to let the bolt 38 assume the engaged position after one press/pushing activity by a user on the bolt 38 and to let the bolt 38 return to the retracted position upon the next press/pushing activity of an operator.

**[0065]** In an embodiment (not shown) the keep plate 10 is connected with another part of the structure for improving its strength. The connection could be an extension, preferably in the form of a bracket of the keep so that it can be attached, preferably by screws, to another side of the profiles of the frame, or the extension can be configured such that a (bracket) portion of the keep can be directly secured (preferably by screws) to the building (roof) structure where the roof window is installed. The extension can be an integral part/bracket of the keep or it can be a preferably plate metal bracket that can be connected to the keep.

**[0066]** In an embodiment a lid (not shown) of thermally insulating material (plastic) covering the flange 35 lid it fitted to the opening 34 for avoiding the lock to form a thermal bridge and to avoid problems with condensation. Alternatively a plug of thermally insulating material (plastic) can be inserted into the lock housing 30 avoiding the lock to form a thermal bridge and to avoid problems with condensation. Such a prop fulfills a similar function to the engagement member 65.

**[0067]** Although the present invention has been described in detail for purpose of illustration, it is understood that such detail is solely for that purpose, and variations and combinations can be made therein by those skilled in the art without departing from the scope of the appended claims. For example a roof window with one frame and one sash has been shown, but it is clear that a single window frame can be provided with several sashes.

## Claims

### 1. An openable window comprising:

5 a window frame (2) comprising elongated, preferably wooden or wooden core frame members (2',2'',2''',2''''),

a sash (1) comprising elongated, preferably wooden or wooden core sash members (1',1'',1''',1''''),

10 said sash (1) being pivotally hung to the window frame (2) so that the sash (1) can be rotated relative to the frame (2) between a closed position and open positions,

15 a bolt (38) slidably and rotatably received in a cylinder (30), said bolt (38) being provided at one end with an engagement head (40), said cylinder (30) having a first end (34) and an opposite second end (36),

20 said cylinder (30) being fixed in a through-going bore in one of the sash members (1',1'',1''',1'''' with said second end (36) of the cylinder (30) facing a frame member (2',2'',2''',2'''' when the sash (1) is in said closed position,

25 a keep (10) secured to a first side of said frame member (2',2'',2''',2'''' at a position where a front side of the keep (10) faces said second end (36) of said cylinder (30) when the sash (1) is in said closed position,

30 said front side of said keep (10) being provided with a slot (11),

said keep (10) being provided with a recess (4) behind said slot (11), and

35 an anchoring member (15) that connects the keep (10) to a second side of said frame member (2',2'',2''',2'''' that opposes said first side of said frame member (2',2'',2''',2''''),

40 said bolt (38) being movable inside said cylinder (30) between a retracted position wherein said bolt (38) does not prevent movement of said sash (1) and an extended locking position wherein said engagement head (40) projects through said slot (11) and into said recess (4) when said bolt (38) is in said extended position and when said sash (1) is in said closed position, said bolt (36) thereby preventing movement of said sash (1).

50 2. An openable window according to claim 1, wherein said first end (34) of the cylinder (30) is at least partially open and accessible to an operator, so that movement of said bolt (30) is controllable from said first end (34) of said cylinder (30), preferably using a key (61) or tool.

55 3. An openable window according to claim 1, said keep (10) further comprising a rear wall (39) behind said recess (4).

4. An openable window according to claim 3, wherein said rear wall (39) encloses said recess (4) so that said recess (4) only opens to said slot (11).
5. An openable window according to any one of claims 1 to 4, wherein said keep (10) is embedded in said frame member with the front face of said keep (10) substantially flush with the surface of said frame member.
6. An openable window according to any one of the preceding claims, wherein said anchoring member (15) includes at least one screw or bolt (15) that is in threaded engagement with a nut (16) or a plate-like element that engages the side of said frame member that opposes the side of the frame member where the keep (10) is located.
7. An openable window according to the preceding claim, wherein said anchoring members include screws or bolts and nuts or a plate-like element that engage the opposite second side (B) of said frame member.
8. An openable window according to any one of the preceding claims, wherein said window frame (2) has two parallel spaced elongated frame side members (2'', 2''') connected to one another by a parallel spaced top elongated frame member (2') and bottom elongated frame member (2''), and the sash (2) having two parallel spaced elongated sash side members (1'', 1''') connected to one another by a parallel spaced top elongated sash member (1') and bottom elongated sash member (1'').
9. An openable window according to any one of the preceding claims, wherein the sash members have a substantial width or thickness, and wherein said cylinder (30) has a length equal to or slightly larger than said width.
10. An openable window according to any one of the preceding claims, wherein said bolt (38) is resiliently biased towards said retracted position.
11. An openable window according to any one of the preceding claims, wherein said bolt (38) has an engagement head (40), said keep (10) having an engagement portion (12, 71, 72) configured to engage with said engagement head (40) in said locking position, such as after a turning movement of said bolt (38).
12. An openable window according to any one of the preceding claims, wherein said cylinder (30) includes a guiding mechanism (50) configured for guiding the movement of said bolt (38) between said retracted position and said extended locking posi-

tion, or said keep (10) includes a guiding mechanism (71, 72, 73, 75) configured for guiding the movement of said bolt (38) between said retracted position and said extended locking position.

13. An openable window according to any one of the preceding claims, wherein said sash (1) includes a glass pane, with said cylinder (30) being on the building interior side of said glass pane.
14. An openable window according to any one of the preceding claims, wherein said first end (34) of cylinder (30) is provided with a flange (35) abutting against a surface of said sash member.
15. An openable window according to any one of the preceding claims, wherein an end portion (39) of said bolt (38) is provided with a maneuvering face (39', 39'') engageable from said second opening of said cylinder (30), for moving said bolt (38) to and from said locking position, or said end portion (39) being provided with an engagement member (65) for moving said bolt (38) to and from said locking position, said engagement member (65) preferably being made from a material with good thermal insulation properties.

#### Patentansprüche

1. Sich öffnen lassendes Fenster, das Folgendes umfasst:

einen Fensterrahmen (2), der längliche Rahmenelemente (2', 2'', 2''', 2''') vorzugsweise aus Holz oder mit einem Holzkern umfasst, einen Schiebefensterrahmen (1), der längliche Schiebefensterrahmenelemente (1', 1'', 1''', 1''') vorzugsweise aus Holz oder mit einem Holzkern umfasst, wobei der Schiebefensterrahmen (1) schwenkbar an dem Fensterrahmen (2) aufgehängt ist, so dass der Schiebefensterrahmen (1) in Bezug auf den Rahmen (2) zwischen einer geschlossenen Position und offenen Positionen gedreht werden kann, einen Bolzen (38), der gleitbar und drehbar in einem Zylinder (30) aufgenommen wird, wobei der Bolzen (38) an einem Ende mit einem Ineingriffnahmekopf (40) versehen ist, wobei der Zylinder (30) ein erstes Ende (34) und ein gegenüberliegendes zweites Ende (36) aufweist, wobei der Zylinder (30) in einer Durchgangsbohrung in einem der Schiebefensterrahmenelemente (1', 1'', 1''', 1''') befestigt ist, wobei das zweite Ende (36) des Zylinders (30) einem Rahmenelement (2', 2'', 2''', 2''') zugewandt ist, wenn

- der Schiebefensterrahmen (1) sich in der geschlossenen Position befindet, einen Aufsatz (10), der an einer ersten Seite des Rahmenelements (2', 2'', 2''', 2''''') an einer Position befestigt ist, an der eine Vorderseite des Aufsatzes (10) dem zweiten Ende (36) des Zylinders (30) zugewandt ist, wenn der Schiebefensterrahmen (1) sich in der geschlossenen Position befindet, wobei die Vorderseite des Aufsatzes (10) mit einem Schlitz (11) versehen ist, wobei der Aufsatz (10) mit einer Ausnehmung (4) hinter dem Schlitz (11) versehen ist, und ein Verankerungsglied (15), das den Aufsatz (10) mit einer zweiten Seite des Rahmenelements (2', 2'', 2''', 2''''') verbindet, die der ersten Seite des Rahmenelements (2', 2'', 2''', 2''''') gegenüberliegt, wobei der Bolzen (38) innerhalb des Zylinders (30) zwischen einer eingezogenen Position, in der der Bolzen (38) eine Bewegung des Schiebefensterrahmens (1) nicht verhindert, und einer ausgezogenen Verriegelungsposition bewegt werden kann, wobei der Ineingriffnahmekopf (40) durch den Schlitz (11) und in die Ausnehmung (4) hervorragt, wenn der Bolzen (38) sich in der ausgezogenen Position befindet und wenn der Schiebefensterrahmen (1) sich in der geschlossenen Position befindet, wobei der Bolzen (38) dadurch die Bewegung des Schiebefensterrahmens (1) verhindert.
2. Sich öffnen lassendes Fenster nach Anspruch 1, wobei das erste Ende (34) des Zylinders (30) mindestens teilweise offen und für einen Bediener zugänglich ist, so dass eine Bewegung des Bolzens (38) von dem ersten Ende (34) des Zylinders (30) steuerbar ist, vorzugsweise unter Verwendung eines Schlüssels (61) oder eines Werkzeugs.
  3. Sich öffnen lassendes Fenster nach Anspruch 1, wobei der Aufsatz (10) ferner eine Rückwand (39) hinter der Ausnehmung (4) umfasst.
  4. Sich öffnen lassendes Fenster nach Anspruch 3, wobei die Rückwand (39) die Ausnehmung (4) umgibt, so dass die Ausnehmung (4) nur zu dem Schlitz (11) hin offen ist.
  5. Sich öffnen lassendes Fenster nach einem der Ansprüche 1 bis 4, wobei der Aufsatz (10) in dem Rahmenelement so eingebettet ist, dass die Vorderseite des Aufsatzes (10) mit der Oberfläche des Rahmenelements im Wesentlichen bündig ist.
  6. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei das Verankerungsglied (15) mindestens eine Schraube oder einen Bolzen (15) umfasst, die bzw. der mit einer Mutter (16) oder einem plattenähnlichen Element in verschraubtem Eingriff steht, die bzw. das die Seite des Rahmenelements in Eingriff nimmt, die der Seite des Rahmenelements gegenüberliegt, an der sich der Aufsatz (10) befindet.
  7. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei die Verankerungsglieder Schrauben oder Bolzen und Muttern oder plattenähnliche Elemente enthalten, die die gegenüberliegende zweite Seite (B) des Rahmenelements in Eingriff nehmen.
  8. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei der Fensterrahmen (2) zwei parallel beabstandete längliche Rahmen-seitenelemente (2''', 2''''') aufweist, die durch ein oberes längliches Rahmenelement (2') und ein unteres längliches Rahmenelement (2''), die parallel zueinander beabstandet sind, miteinander verbunden sind, und wobei der Schiebefensterrahmen (1) zwei parallel beabstandete längliche Schiebefensterrahmenseitenelemente (1''', 1''''') aufweist, die durch ein oberes längliches Schiebefensterrahmenelement (1') und ein unteres längliches Schiebefensterrahmenelement (1''), die parallel zueinander beabstandet sind, miteinander verbunden sind.
  9. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei die Schiebefenster-rahmenelemente eine erhebliche Breite oder Dicke aufweisen, und wobei der Zylinder (30) eine Länge gleich oder etwas größer als die Breite aufweist.
  10. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei der Bolzen (38) spannkraftig in Richtung der eingezogenen Position vorgespannt ist.
  11. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei der Bolzen (38) einen Ineingriffnahmekopf (40) aufweist, der Aufsatz (10) einen Ineingriffnahmeabschnitt (12, 71, 72) aufweist, der dazu ausgelegt ist, mit dem Ineingriffnahmekopf (40) in der Verriegelungsposition, wie nach einer Drehbewegung des Bolzens (38), in Eingriff zu gelangen.
  12. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei der Zylinder (30) einen Führungsmechanismus (50) enthält, der dazu ausgelegt ist, die Bewegung des Bolzens (38) zwischen der eingezogenen Position und der ausgezogenen Verriegelungsposition zu führen, oder wobei der Aufsatz (10) einen Führungsmechanismus (71, 72, 73, 75) enthält, der dazu ausgelegt ist, die Bewegung des Bolzens (38) zwischen der eingezoge-

nen Position und der ausgezogenen Verriegelungsposition zu führen.

13. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei der Schiebefensterterrahmen (1) eine Glasscheibe enthält, wobei der Zylinder (30) auf der Gebäudeinnenseite der Glasscheibe angeordnet ist. 5
14. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei das erste Ende (34) des Zylinders (30) mit einem Flansch (35) versehen ist, der gegen eine Oberfläche des Schiebefensterterrahmenelements anstößt. 10
15. Sich öffnen lassendes Fenster nach einem der vorhergehenden Ansprüche, wobei ein Endabschnitt (39) des Bolzens (38) mit einer Manövriertseite (39', 39'') versehen ist, die von der zweiten Öffnung des Zylinders (30) in Eingriff genommen werden kann, um den Bolzen (38) in die und aus der Verriegelungsposition zu bewegen, oder wobei der Endabschnitt (39) mit einem Ineingriffnahmelement (65) versehen ist, um den Bolzen (38) in die und aus der Verriegelungsposition zu bewegen, wobei das Ineingriffnahmelement (65) vorzugsweise aus einem Material hergestellt ist, das gute thermische Isolationseigenschaften aufweist. 20 25

## Revendications

### 1. Fenêtre ouvrable comprenant :

un cadre (2) de fenêtre comprenant des éléments de cadre allongés de préférence en bois ou à noyau en bois (2', 2'', 2''', 2'''), un châssis mobile (1) comprenant des éléments de châssis mobile allongés de préférence en bois ou à noyau en bois (1', 1'', 1''', 1'''), ledit châssis mobile (1) étant suspendu de façon pivotante par rapport au cadre de fenêtre (2) de manière à ce que le châssis mobile (1) puisse pivoter par rapport au cadre (2) entre une position fermée et des positions ouvertes, un goujon(38) reçu de manière coulissante et rotative dans un cylindre (30), ledit goujon(38) étant muni d'une tête de mise en prise (40) à une extrémité, ledit cylindre (30) ayant une première extrémité (34) et une deuxième extrémité opposée (36), ledit cylindre (30) étant fixé dans un alésage traversant dans l'un des éléments de châssis mobile (1', 1'', 1''', 1''') avec ladite deuxième extrémité (36) du cylindre (30) faisant face à un élément de cadre (2', 2'', 2''', 2''') lorsque le châssis mobile (1) est dans ladite position fermée, un maintien (10) fixé à un premier côté dudit

élément de cadre (2', 2'', 2''', 2''') dans une position où un côté frontal du maintien (10) fait face à ladite deuxième extrémité (36) dudit cylindre (30) lorsque le châssis mobile (1) est dans ladite position fermée, ledit côté frontal dudit maintien (10) étant muni d'une fente (11), ledit maintien (10) étant muni d'un creux (4) derrière ladite fente (11), et un élément d'ancrage (15) qui relie le maintien (10) à un deuxième côté dudit élément de cadre (2', 2'', 2''', 2''') qui est opposé audit premier côté dudit élément de cadre (2', 2'', 2''', 2'''), ledit goujon(38) étant mobile à l'intérieur dudit cylindre (30) entre une position rétractée où ledit goujon (38) n'empêche pas le mouvement dudit châssis mobile (1) et une position de verrouillage d'extension où ladite tête de mise en prise (40) se projette à travers ladite fente (11) et à l'intérieur dudit creux (4) lorsque ledit goujon (38) est dans ladite position d'extension et lorsque ledit châssis mobile (1) est dans ladite position fermée, ledit goujon (36) empêchant de la sorte un mouvement dudit châssis mobile (1).

2. Fenêtre ouvrable selon la revendication 1, dans laquelle ladite première extrémité du cylindre (30) est au moins partiellement ouverte et accessible pour un opérateur de manière à ce que le mouvement dudit goujon (38) puisse être contrôlé par ladite première extrémité (34) dudit cylindre (30) en utilisant de préférence une clé (61) ou un outil. 30
3. Fenêtre ouvrable selon la revendication 1, ledit maintien (10) comprenant en outre une paroi arrière (39) derrière ledit creux (4). 35
4. Fenêtre ouvrable selon la revendication 3, dans laquelle ladite paroi arrière (39) enferme ledit creux (4) de manière à ce que ledit creux (4) s'ouvre seulement vers ladite fente (11). 40
5. Fenêtre ouvrable selon l'une quelconque des revendications 1 à 4, dans laquelle ledit maintien (10) est encastré dans ledit élément de cadre avec la face frontale dudit maintien (10) sensiblement en affleurement avec la surface dudit élément de cadre. 45
6. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle ledit élément d'ancrage (15) comprend au moins une vis ou goujon (15) qui est en prise de manière fileté avec un écrou (16) ou un élément semblable à une plaque se mettant en prise avec le côté dudit élément de cadre qui est opposé au côté de l'élément de cadre où se situe le maintien (10). 50 55
7. Fenêtre ouvrable selon la revendication précédente,

dans laquelle lesdits éléments d'ancrage comprennent des vis ou goujons et des écrous ou un élément semblable à une plaque se mettant en prise avec le deuxième côté opposé (B) dudit élément de cadre.

8. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle ledit cadre de fenêtre (2) a deux éléments latéraux de cadre allongés (2', 2'', 2''', 2''''') parallèles espacés reliés l'un à l'autre par un élément de cadre allongé supérieur (2') parallèle espacé et un élément de cadre allongé inférieur (2''), et le châssis mobile (2) ayant deux éléments latéraux de châssis mobile allongés (1'', 1''''') parallèles espacés reliés l'un à l'autre par un élément de châssis mobile allongé supérieur (1') parallèle espacé et un élément de châssis mobile allongé inférieur (1'').
9. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle les éléments de châssis mobile ont une largeur ou épaisseur substantielle, et dans laquelle ledit cylindre (30) a une longueur égale ou légèrement supérieure à ladite largeur.
10. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle ledit goujon (38) est sollicité élastiquement vers ladite position rétractée.
11. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle ledit goujon (38) à une tête de mise en prise (40), ledit maintien (10) ayant une partie de mise en prise (12, 71, 72) configurée pour se mettre en prise avec ladite tête de mise en prise (40) dans ladite position de verrouillage, comme après un mouvement de rotation dudit goujon (38).
12. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle ledit cylindre (30) comprend un mécanisme de guidage (50) configuré pour guider le mouvement dudit goujon (38) entre ladite position rétractée et ladite position de verrouillage d'extension, ou ledit maintien (10) comprenant un mécanisme de guidage (71, 72, 73, 75) configuré pour guider le mouvement dudit goujon (38) entre ladite position rétractée et ladite position de verrouillage d'extension.
13. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle ledit châssis mobile (1) comprend un panneau en verre avec ledit cylindre (30) se trouvant sur le côté vers l'intérieur du bâtiment dudit panneau en verre.
14. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle ladite première

extrémité (34) dudit cylindre (30) est munie d'une collerette (35) butant contre une surface dudit élément de châssis mobile.

- 5 15. Fenêtre ouvrable selon l'une quelconque des revendications précédentes, dans laquelle une partie d'extrémité (39) dudit goujon (38) est munie d'une face de manoeuvre (39', 39'') pouvant être mise en prise à partir de ladite deuxième ouverture dudit cylindre (30) pour faire aller et venir ledit goujon (38) par rapport à ladite position de verrouillage, ou ladite partie d'extrémité (39) étant munie d'un élément de mise en prise (65) pour faire aller et venir ledit goujon (38) par rapport à ladite position de verrouillage, ledit élément de mise en prise (65) étant de préférence formé par un matériau avec de bonnes propriétés d'isolation thermique.

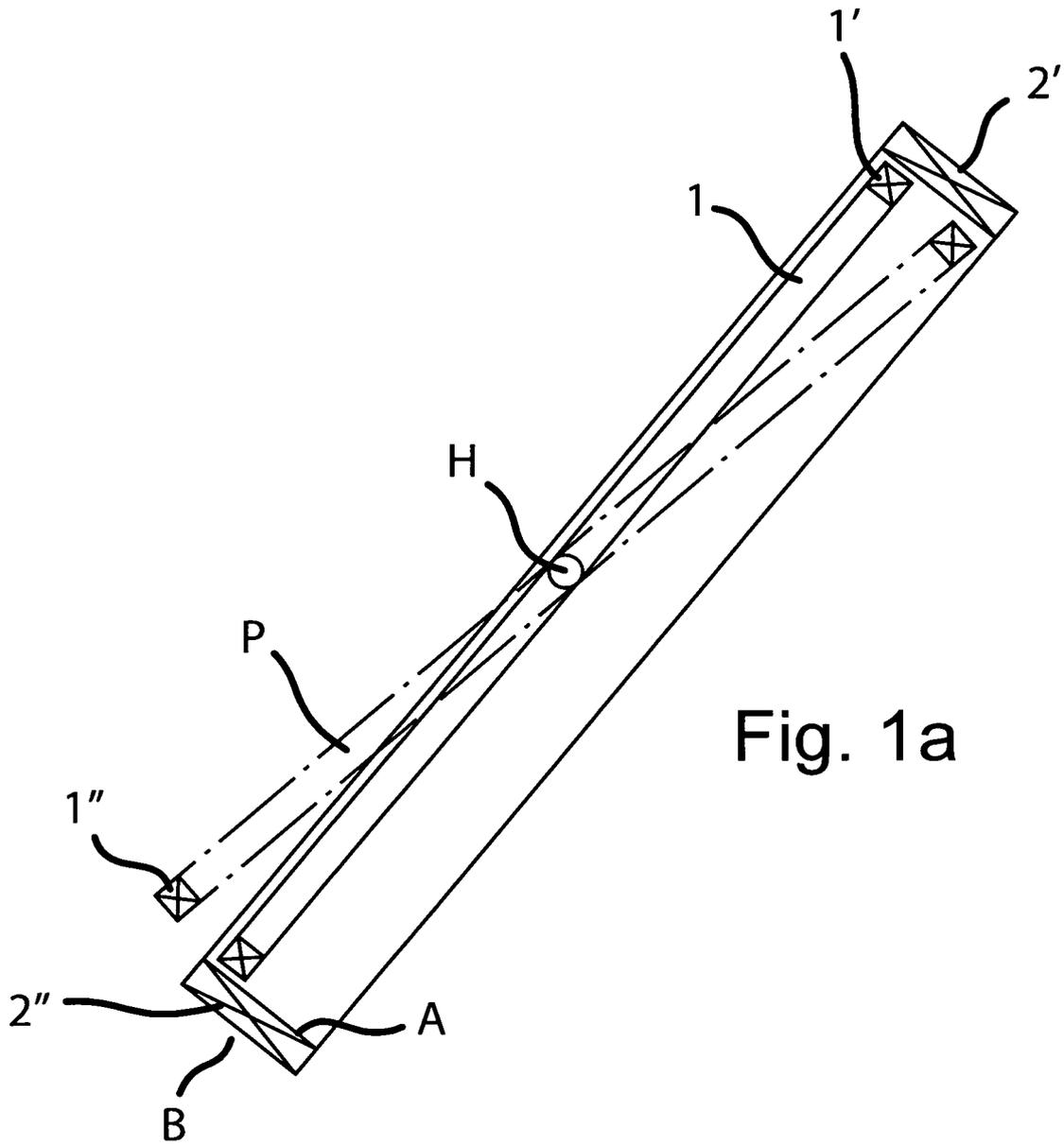


Fig. 1a

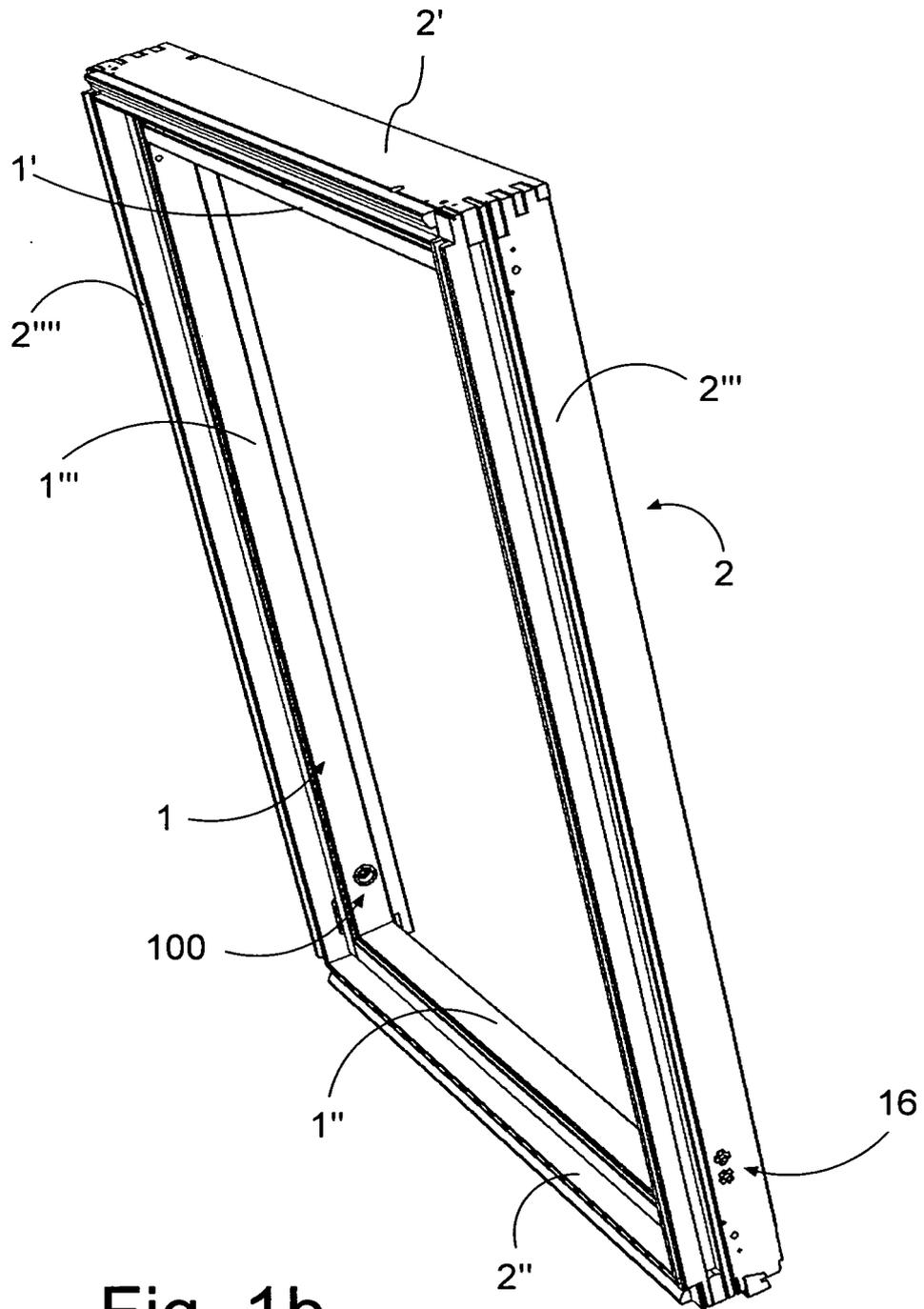


Fig. 1b

Fig. 2a

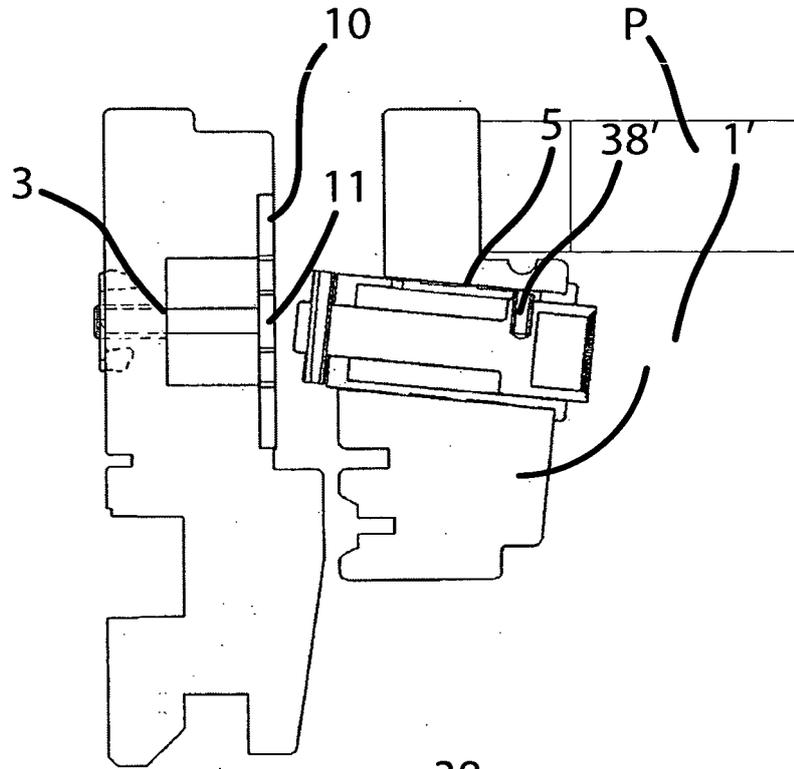


Fig. 2b

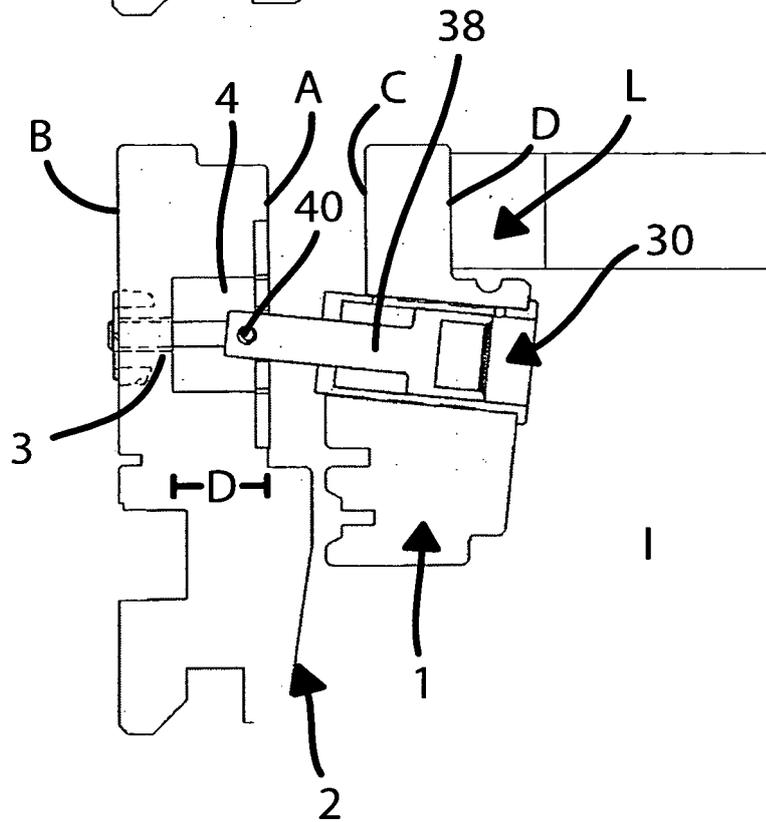


Fig. 3

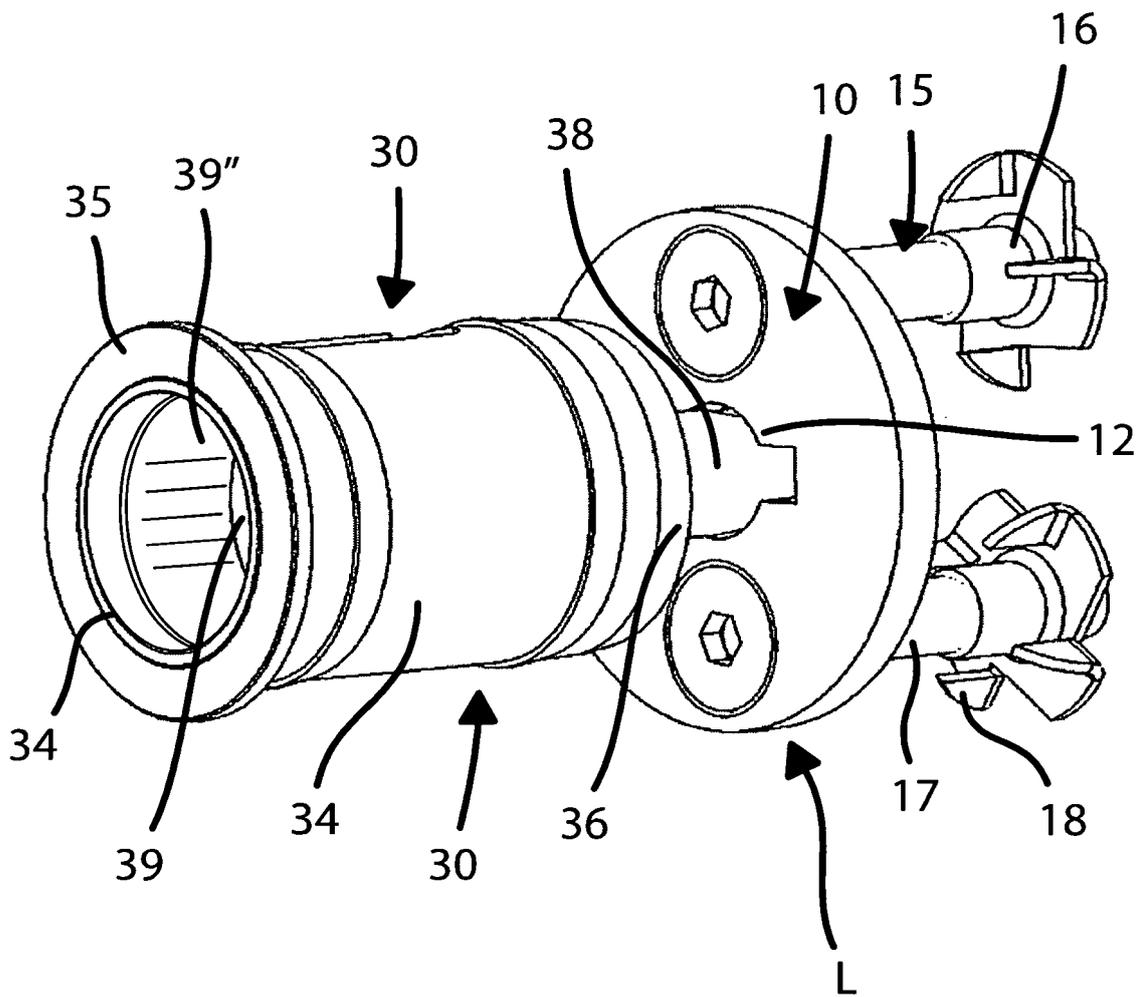


Fig. 4

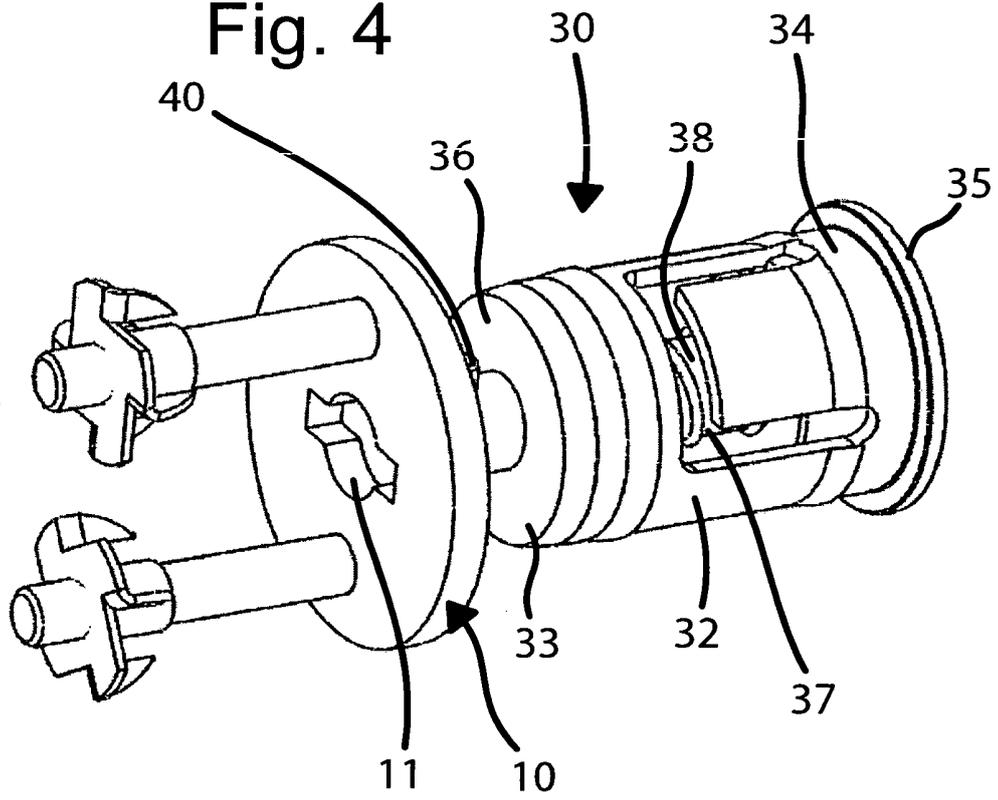


Fig. 5

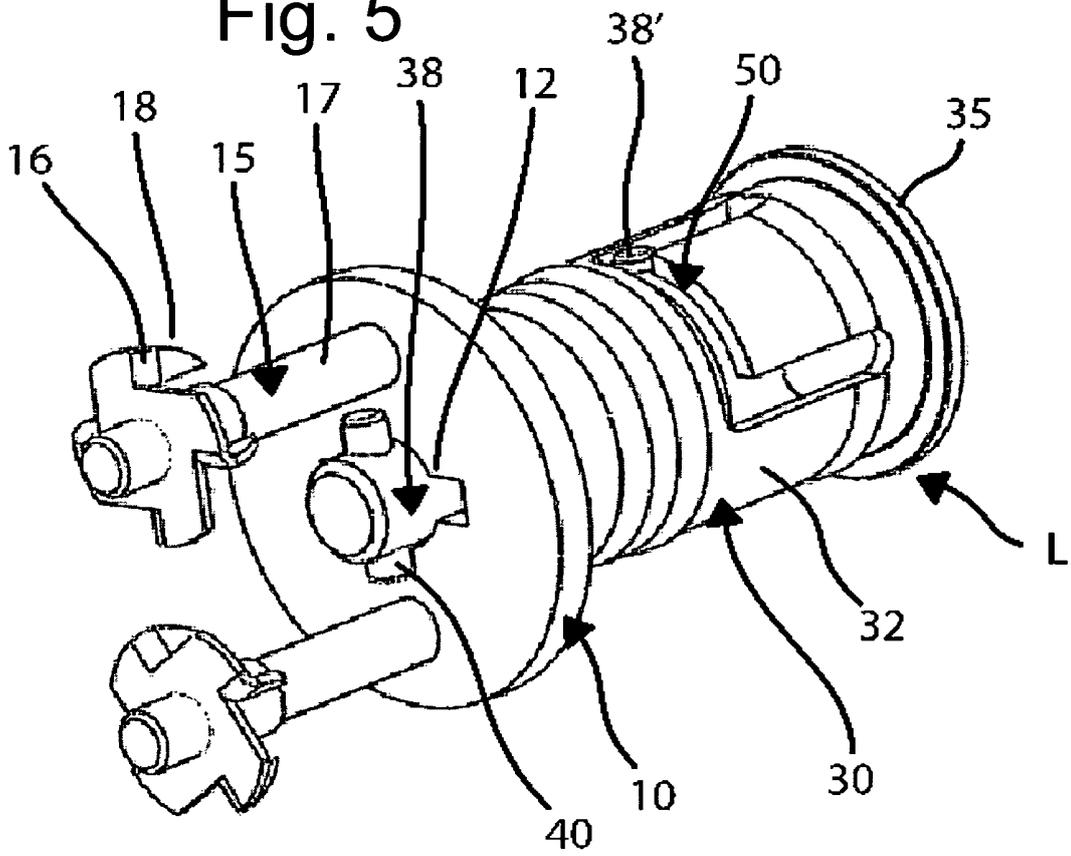


Fig. 6'

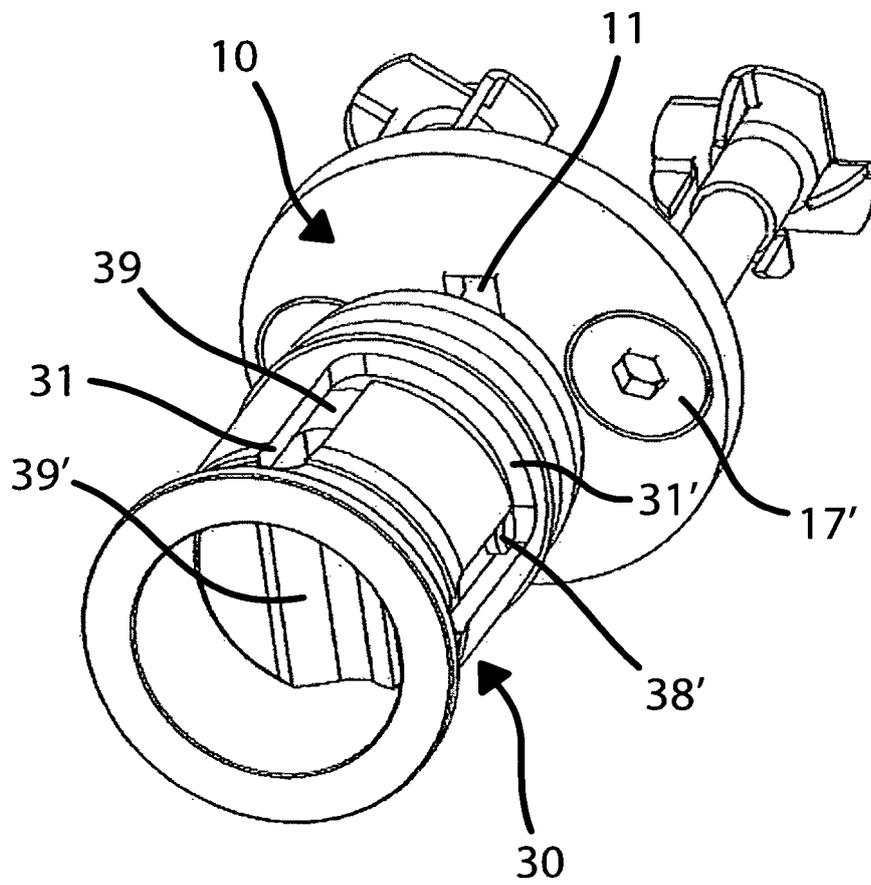
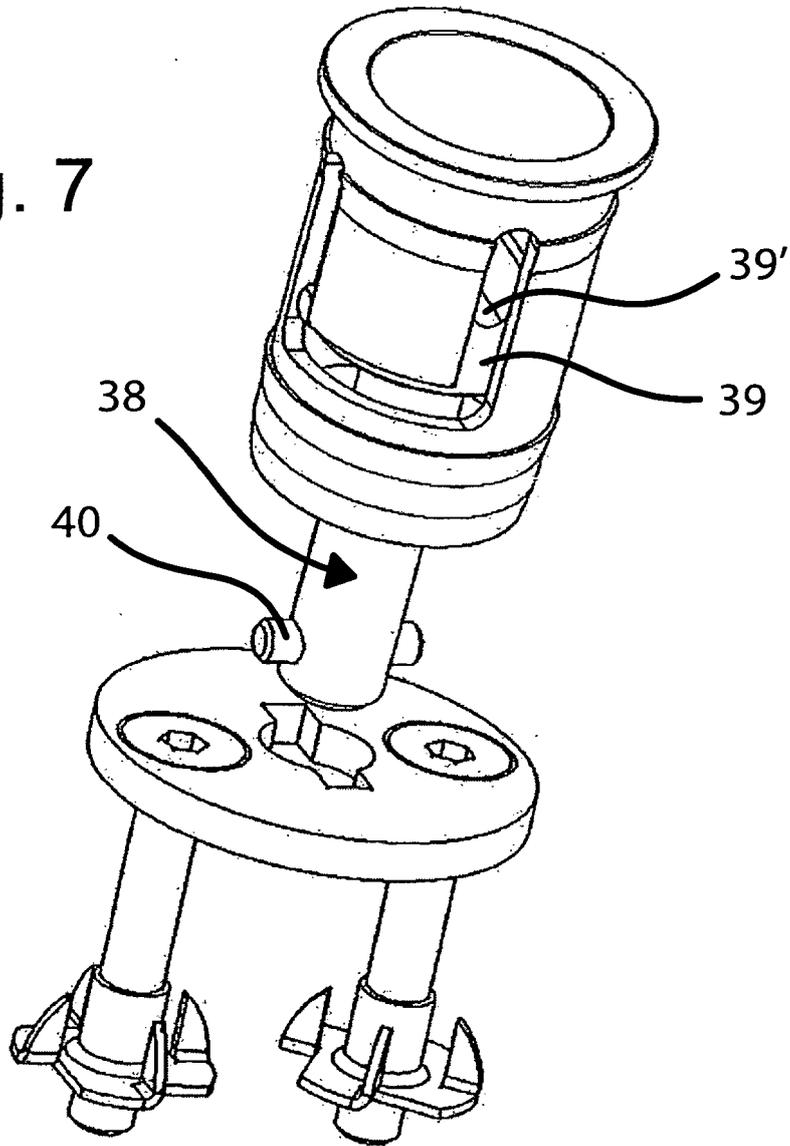
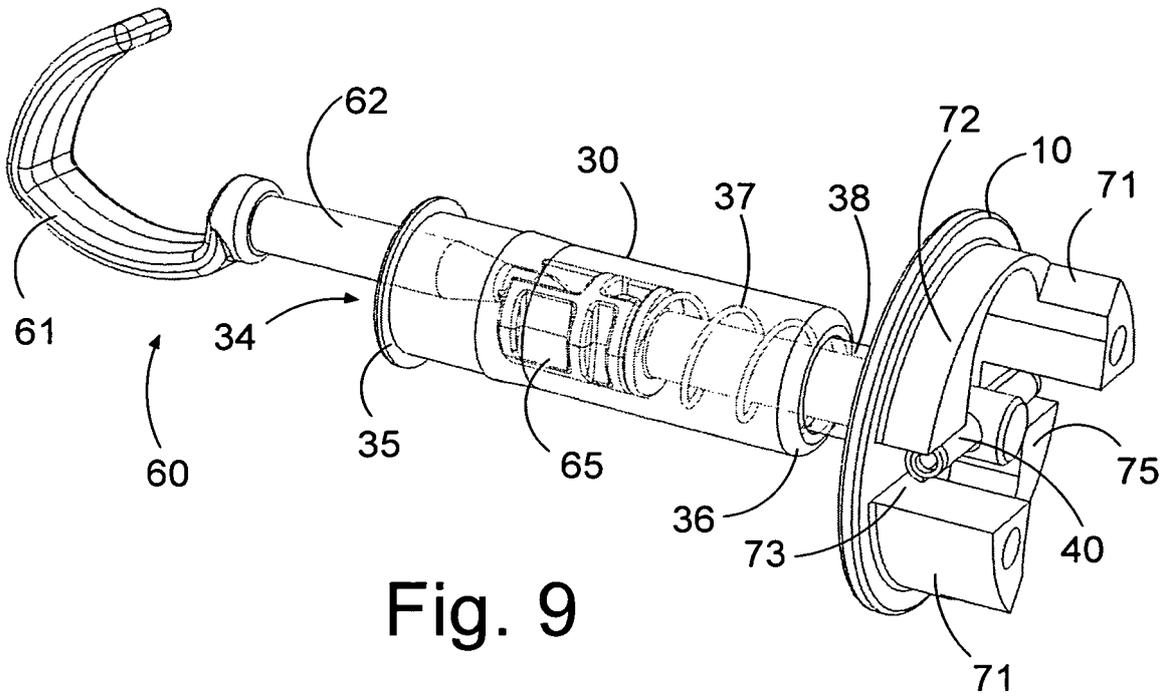
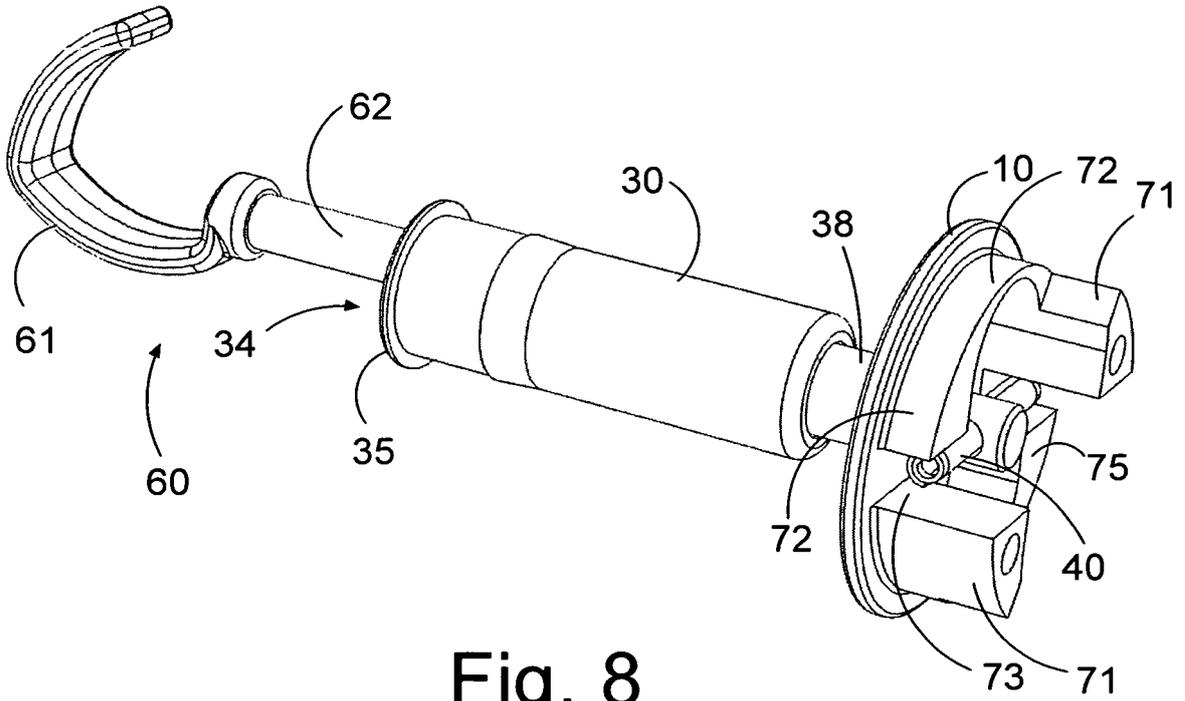


Fig. 7





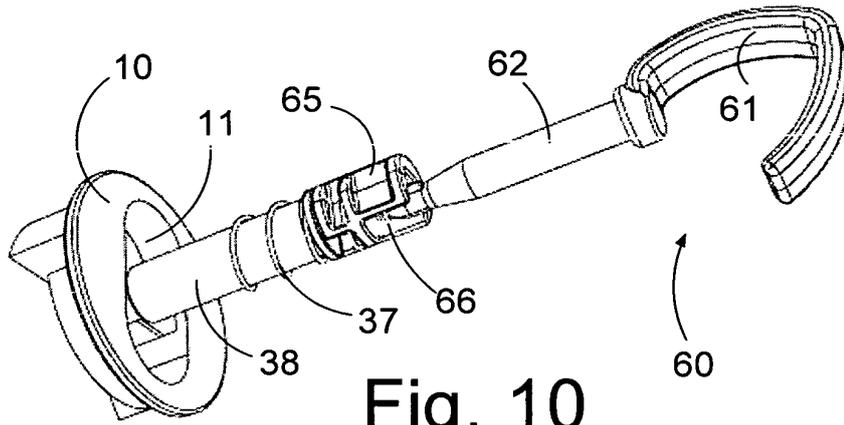


Fig. 10

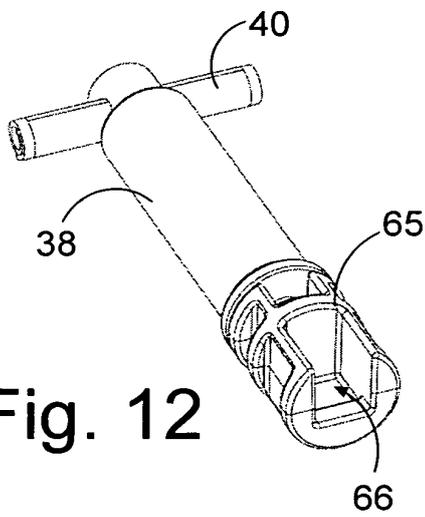


Fig. 12

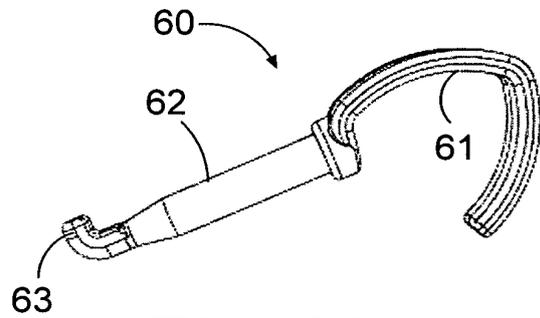


Fig. 11

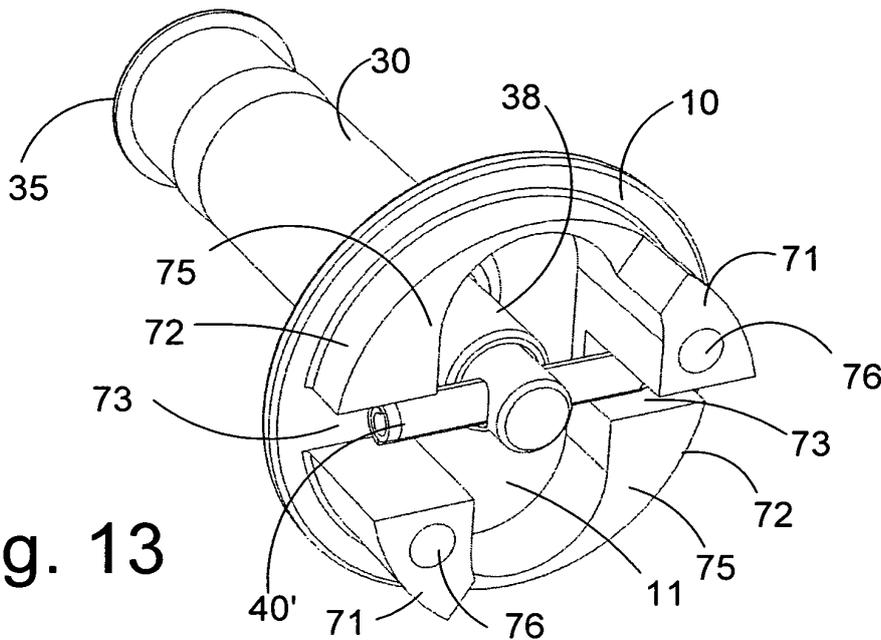


Fig. 13

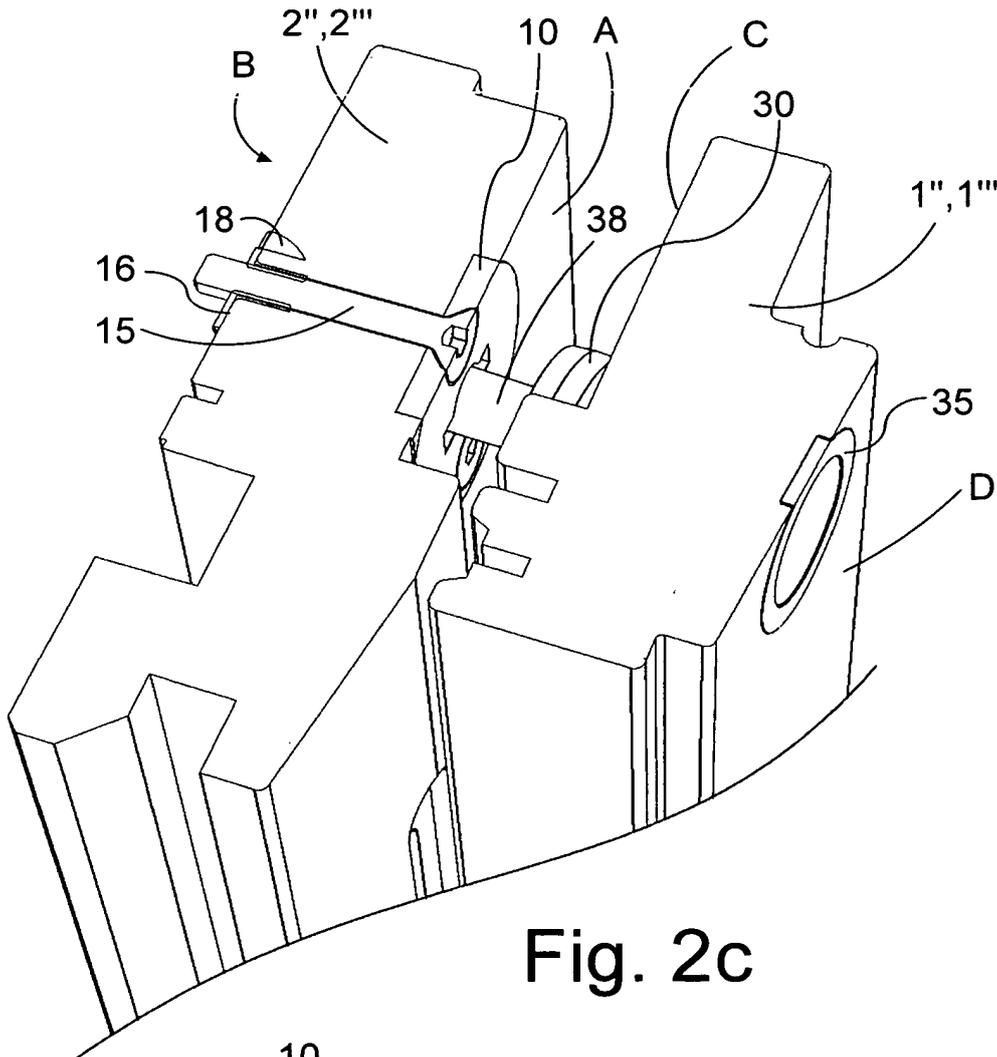


Fig. 2c

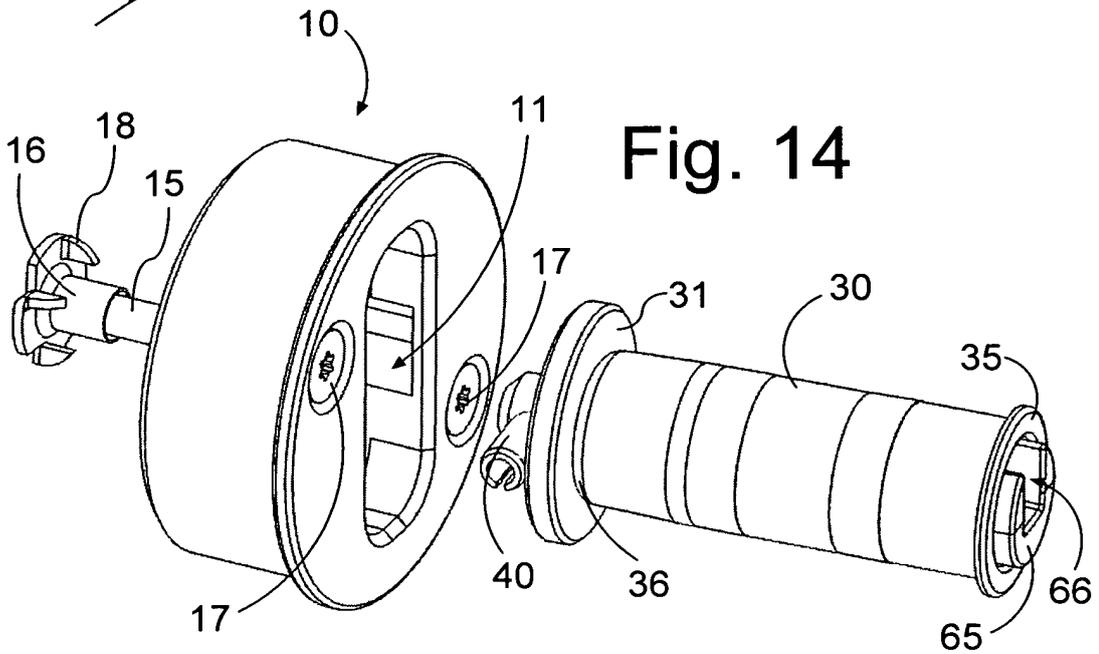


Fig. 14

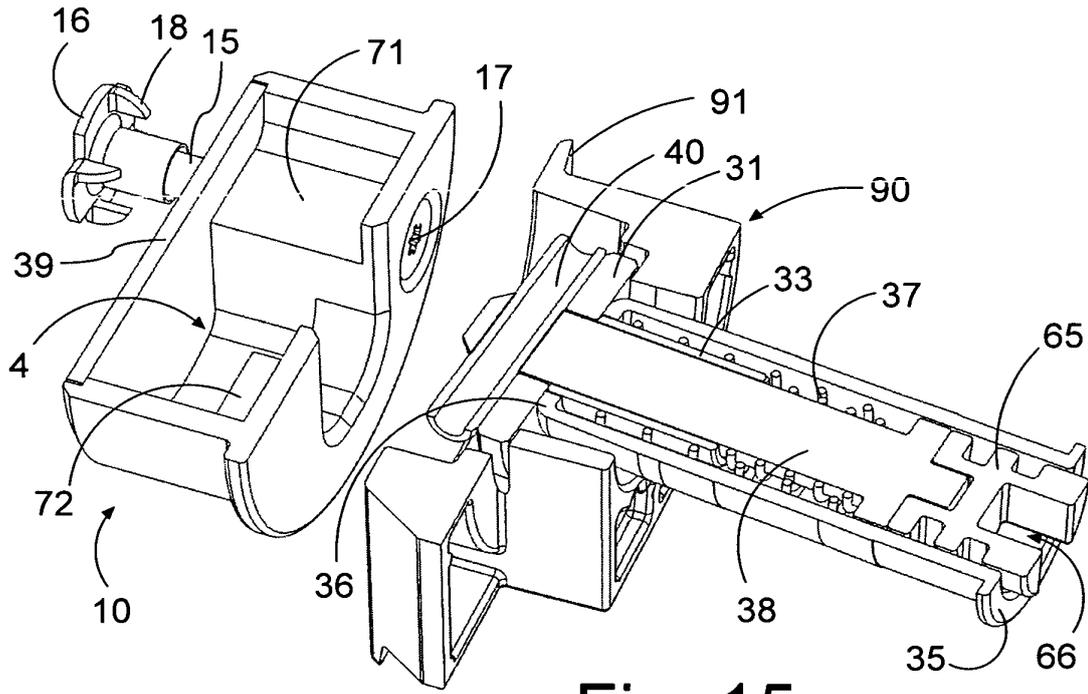


Fig. 15

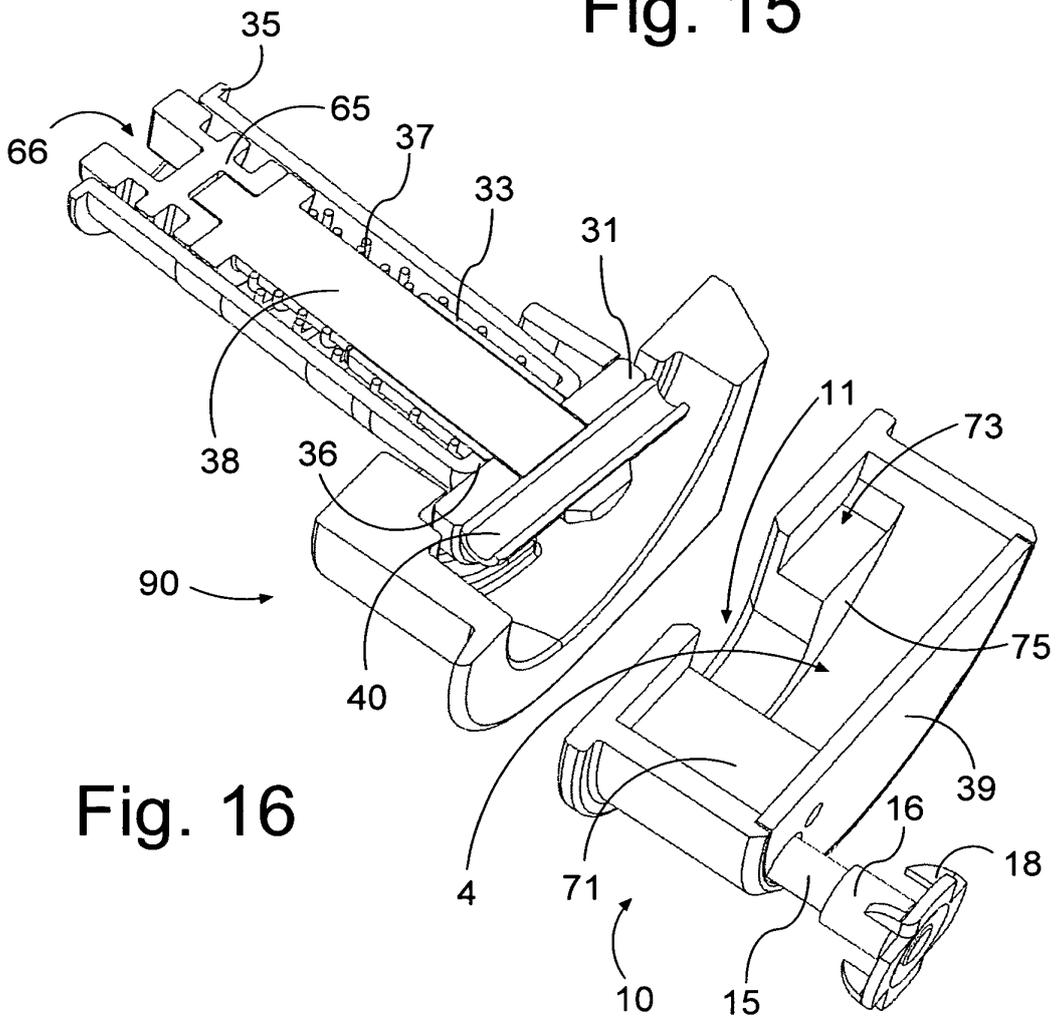


Fig. 16

**REFERENCES CITED IN THE DESCRIPTION**

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- EP 2281984 A [0030]