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(54) **SPRING BOLT ARRANGEMENT**

(57) Spring bolt arrangement (1, 1') comprising an axially displaceable spring bolt (10, 10') with a bolt latch (20) and a blocking device. The spring bolt is fixed to the bolt latch, rotatably about a rotational axis which is substantially perpendicular to the direction of axial displacement of the spring bolt and bolt latch. The blocking device is switchable between a blocking state, in which the position of the spring bolt relative to the bolt latch is fixed and a releasing state, in which rotation of the spring bolt is allowed. The blocking device comprises an actuator (30) which is arranged linearly displaceable between a first axial position and a second axial position, inside of and relative to the bolt latch (20). At least one blocking member (40a, 40b), is linearly displaceable relative to

the actuator, the bolt latch and the spring bolt, in a direction which is essentially perpendicular to the displacement direction of the actuator. A first blocking recess (41a, 41b) arranged in the spring bolt (10), and a second blocking recess (42a, 42b) arranged in the bolt latch (20). The actuator (30) is arranged to, in the first axial position, maintain the blocking member (40a, 40b) in simultaneous engagement with the first blocking recess (41a, 41b) and the second blocking recess (42a, 42b), thereby maintaining the blocking device in the blocking state and to, in the second axial position, allow the blocking member to be brought out of engagement from at least one of the first and second blocking recesses, thereby setting the blocking device in the releasing state.

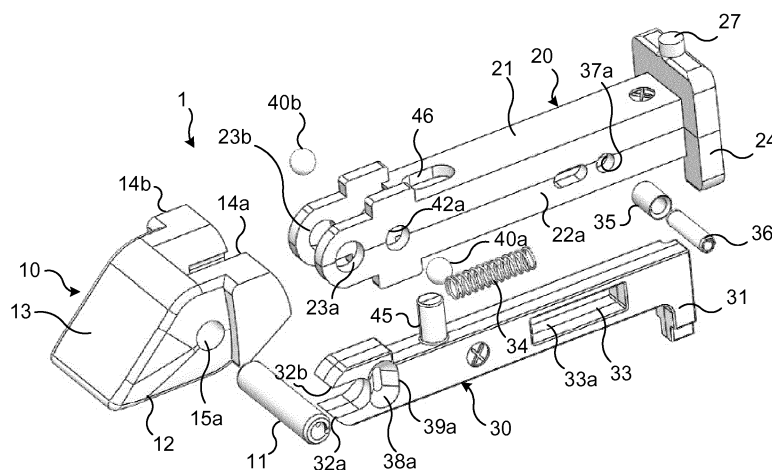


Fig. 1

Description

Technical field

[0001] The invention relates to a spring bolt arrangement comprising an axially displaceable spring bolt with a bolt latch. The invention also relates to a lock comprising such an arrangement. The spring bolt arrangement and the lock may particularly be used at emergency or evacuation doors.

Background

[0002] Emergency and evacuation doors are often equipped with so-called emergency or panic evacuation fittings or accessories. Such fittings are disposed on the inner side of the door to allow quick and easy operation of the lock from the inner side of the door, from which evacuation through the door shall be allowed. The emergency doors are opened outwards and the fittings are configured and coupled to the bolts of the lock to allow the door to be opened with a simple thrust on a handle or a panic opening bar.

[0003] In panic situations, for example, where crowding occurs by the emergency door, it can happen that the crowd is pressed against the door before this has been opened. The spring bolt of the lock is thus pressed against the striking plate so that a friction force arises between them. A greater force is hence needed to be applied to the fitting in order to withdraw the spring bolt from its engagement with the striking plate. In order to prevent the need for excessively large forces to operate the fitting, there are safety regulations which specify how large a maximum force on the operating members of the fitting may be required to open the door when a certain pressure force is applied to the inner side of the door leaf. According to European safety regulations, for example, the necessary force upon a panic fitting to operate the lock must not exceed 220 N if a pressure force of 1000 N is applied centrally to the inner side of the door leaf.

Prior art

[0004] In order to reduce the forces which need to be applied to the fitting in panic situations, it is previously known to configure the spring bolt such that it is rotatable relative to the bolt latch, about a rotation axis which is perpendicular to the direction of axial displacement of the spring bolt and of the bolt latch. In order to prevent the door from possibly opening from the outside, the rotational motion of the spring bolt can selectively be blocked and allowed by means of a blocking device operated with the emergency or panic evacuation fitting. When the door is pressed outwards and the fitting is activated, the blocking device of the spring bolt is released, so that the spring bolt can be rotated in the direction away from the striking plate, whereupon the friction between them decreases. The force which is required to release

the spring bolt from engagement with the striking plate is thereby reduced. Such rotatable spring bolts are sometimes referred to as collapsible spring bolts.

[0005] DE 102 07 630 A1 describes a lock having a latch bolt which is axially displaceable together with a latch carrier and is rotatable relative to the latch carrier. The lock also comprises an electrically operable blocking device, with which the rotational motion of the latch relative to the latch carrier can be blocked or allowed. The construction shown in DE 102 07 630 A1 comprises a number of lever arms, which makes it relatively complicated and bulky. The device which is described therein additionally entails that the whole or a relatively large part of the force with which the striking plate is pressed against the spring bolt is transmitted to that part of the blocking device at which the release of the rotational motion of the latch shall be achieved. There is hence a risk that a relatively large force, transmitted from the striking plate, will cause a high friction between the parts of the blocking device, whereby the force required to release the blocking device is high.

[0006] EP 1 291 478 A1 describes another lock having a spring bolt which is axially displaceable together with a bolt latch and is rotatable in relation to the latter. A blocking device for selectively releasing and blocking the rotational motion of the spring bolt comprises a contact roller which is disposed on a rocker arm and which, in contact with two different surfaces on a linearly displaceable part of the blocking device, can selectively allow and prevent linear displacement of this part so as thereby to allow or prevent rotation of the spring bolt. This device, too, is relatively bulky and complicated. Though the use of a rotating roller helps to reduce the friction in the blocking device, it simultaneously increases the spatial requirement, as well as the complexity of the device and the material and production costs.

[0007] WO 2009/096892 discloses a lock comprising a spring bolt with a bolt latch and a blocking device which is switchable between a release position in which the spring bolt may rotate relative to the bolt latch and a blocking position, in which the spring bolt is fixed relative to the bolt latch. The blocking device comprises a first and a second linearly displaceable element and at least two pairs of sliding surfaces arranged on the spring bolt, the first element and the second element and interacting in pairs. The displaceable elements are connected one after the other in series with the spring bolt via the pairs of sliding surfaces.

Summary of the invention

[0008] It is an object of the present invention to provide an enhanced collapsible spring bolt.

[0009] It is another object to provide such a spring bolt arrangement which is simple in construction and which comprises only a comparatively low number of movable parts.

[0010] A further object is to provide such an arrange-

ment which is reliable in use.

[0011] A still further object is to provide such a spring bolt arrangement which requires only a limited space when mounted in a lock casing or the like.

[0012] Yet another object is to provide such a spring bolt arrangement which easy to mount.

[0013] These and other object are achieved by a spring bolt arrangement of the type specified in the preamble of claim 1 and exhibiting the special technical features set out in the characterizing portion of the claim. The inventive spring bolt arrangement comprises an axially displaceable spring bolt with a bolt latch and a blocking device. The spring bolt is fixed to the bolt latch, rotatably about a rotational axis which is substantially perpendicular to the direction of axial displacement of the spring bolt and bolt latch. The blocking device is switchable between a blocking state, in which the position of the spring bolt relative to the bolt latch is fixed and a releasing state, in which rotation of the spring bolt is allowed. The blocking device comprises an actuator which is arranged linearly displaceable between a first axial position and a second axial position, inside of and relative to the bolt latch. At least one blocking member is linearly displaceable relative to the actuator, the bolt latch and the spring bolt, in a direction which is essentially perpendicular to the displacement direction of the actuator. A first blocking recess is arranged in the spring bolt and a second blocking recess is arranged in the bolt latch. The actuator is arranged to, in the first axial position, maintain the blocking member in simultaneous engagement with the first blocking recess and the second blocking recess, thereby maintaining the blocking device in the blocking state and to, in the second axial position, allow the blocking member to be brought out of engagement from at least one of the first and second blocking recesses, thereby setting the blocking device in the releasing state.

[0014] The invention thus provides a spring bolt arrangement which requires only a low number of constituent parts and especially a low number of movable parts. Hereby, a very reliable arrangement is achieved. The low number of parts also reduces the manufacturing costs and facilitates assembly of the arrangement and the mounting of it to a lock or the like.

[0015] The actuator may be arranged to drive the blocking member into simultaneous engagement with the first and second blocking recess, during displacement from the second to the first axial position.

[0016] The actuator may exhibit a release recess which is arranged to receive the blocking member when the actuator has assumed its second axial position.

[0017] The first blocking recess may have a cross sectional geometry which corresponds to the geometry of the blocking member, such that a recess wall of the first blocking recess, in contact with the blocking member, urges the blocking member out of engagement with the first blocking recess, when the actuator has assumed its second axial position and a rotational force is applied to the spring bolt.

[0018] The release recess may have a cross sectional geometry which corresponds to the geometry of the blocking member, such that a release recess wall of the release recess, in contact with the blocking member, urges the blocking member into engagement with the first blocking recess, when the actuator is moved from the second to the first axial position.

[0019] The blocking member may exhibit a curved periphery.

[0020] The blocking member may be a ball.

[0021] The first blocking recess may be an elongated groove having a semi circular cross section.

[0022] The spring bolt arrangement may preferably comprise two blocking members, a pair of first blocking recesses and a pair of second blocking recesses.

[0023] The at least one blocking member may be displaceable in a direction which is parallel with the rotational axis of the spring bolt.

[0024] A spring arrangement may be arranged to bias the actuator towards the first axial position.

[0025] The invention also concerns a lock comprising a lock mechanism and such a spring bolt arrangement as well as a door comprising such a lock.

[0026] Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the element, apparatus, component, means, step, etc." are to be interpreted openly as referring to at least one instance of the element, apparatus, component, means, step, etc., unless explicitly stated otherwise. The steps of any method disclosed herein do not have to be performed in the exact order disclosed, unless explicitly stated.

Brief description of the drawings

[0027] The invention is now described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is an exploded perspective view of a spring bolt arrangement according to an embodiment of the invention.

Fig. 2 is a perspective view illustrating the arrangement shown in fig. 1 when assembled and when the blocking device is in the blocking state.

Fig. 3 is a perspective view corresponding to fig. 2 illustrating the arrangement when the blocking device is in the releasing state.

Figs. 4 and 5 are longitudinal sections in perspective view corresponding to figs. 2 and 3 respectively.

Figs. 6 and 7 are cross sections in perspective view corresponding to figs. 4 and 5 respectively.

Figs. 8-10 are perspective views illustrating a lock provided with two spring lock arrangements according to the invention and showing the lock arrangements in different states and positions.

Detailed description of embodiments

[0028] The invention will now be described more fully hereinafter with reference to the drawings illustrating exemplifying embodiments of the invention. The description should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided by way of example so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout the description.

[0029] Figs. 1-7 show a spring bolt arrangement 1 according to a first embodiment of the invention. The spring bolt arrangement 1 comprises a spring bolt 10 and a bolt latch 20.

[0030] The spring bolt 10 is rotationally connected to the bolt latch 20 by means of a shaft pivot 11 which in the example shown has the form of a radially compressible pin sleeve exhibiting a longitudinal slot. The shaft pivot may however be formed in many different ways. The spring bolt may be rotated between a locking position (shown in figs. 2, 4 and 6) and a collapsed position (shown in figs. 3, 5, and 7). As common for spring bolts, it exhibits a stop side 12 which is intended to be in engagement with a striker plate (not shown) for keeping a door (not shown) closed. In the locking rotational position of the spring bolt 10, the stop surface is arranged generally in parallel with the longitudinal direction of the bolt latch. An angled side 13 is arranged opposite to the stop side 12. When shutting the door, the angled side 13 makes contact with the striker plate and forces the spring bolt 10 and the bolt latch 20 to be retracted into the lock case 50 (see figs. 8-10). It is possible to adapt the spring bolt arrangement 1 for left and right hand doors by rotating the spring bolt 10 about the longitudinal axis of the bolt latch 20 to a corresponding rotational orientation. The spring bolt 10 further comprises a bolt neck which is formed by two flanges 14a, 14b protruding in the direction towards the bolt latch 20. Both flanges are provided with a through hole 15a, 15b for receiving the shaft pivot 11.

[0031] The bolt latch 20 has a generally U-shaped cross section, formed by a top wall 21 and two mutually opposed side walls 22a, 22b. The top 21 and side 22a, 22b walls thus define a downwardly (as seen in fig. 1) open channel 25. At a forward end of the bolt latch 20, proximal to the spring bolt 10, each side wall 22a, 22b is provided with a through hole 23a, 23b which receives the shaft pivot 11. At the rear end, distal to the spring bolt 10, the bolt latch 20 exhibits a radially protruding manoeuvring collar 24. The manoeuvring collar exhibits a slot 26, which is aligned with the channel 25. A guiding peg 27 is arranged at the upper edge of the manoeuvring collar 24 and is intended to be received in a guiding slot

(not shown) of the top or bottom wall of a lock case 50.

[0032] The spring bolt arrangement 1 further comprises a blocking device, which is arranged to selectively allow and prevent rotation of the spring bolt 10 about its rotational axis defined by the shaft pivot 11. The blocking device comprises an actuator 30 which is arranged linearly displaceable in the channel 25, along the longitudinal axis of the bolt latch 20. The actuator has a generally rectangular cross section. A manoeuvring peg 31 is arranged at the rear end of the actuator 30. The manoeuvring peg 31 protrudes downwards, such that it may be received in the slot 26 and aligned with the manoeuvring flange 24 when the actuator assumes a rearwardly displaced position. The front end of the actuator is formed as a fork with two forwardly protruding tines 32a, 32b arranged one above the other. The tines 32a, 32b both have curved tips which taper in the forward direction. The shaft pivot 11 is received between the two tines 32a, 32b, such that the actuator 30 is guided by the shaft pivot 11, during axial displacement. A rectangular through opening 33 is arranged somewhat behind the middle of the actuator 30 and extends in the longitudinal direction of the actuator 30. A helical compression spring 34 is arranged in the through opening 33. The forward end of the spring 34 bears against a front wall 33a of the through opening 33. The rear end of the spring bears against a cylindrical support sleeve 35 which is threaded onto a fixation pin 36, which in turn is fixed in fixation holes 37a, 37b arranged in the side walls 22a, 22b of the bolt latch 20. By this means the actuator 30 is pretensioned or biased forwardly towards a first axial position. When a force greater than the spring force is applied to the actuator in the rearward direction, the actuator 30 is displaced rearwardly to a second axial position, under compression of the spring 34.

[0033] The actuator 30 further exhibits two release recesses 38a, 38b arranged in opposing lateral side surfaces of the actuator, just behind the tines 32a, 32b. The release recesses 38a, 38b tappers inwardly. An area arranged on each lateral side of the actuator 30, just behind a respective release recess 38a, 38b forms a blocking surface 39a, 39b of the blocking device. The release recesses 38a, 38b are arranged to receive a respective blocking member 40a, 40b. In the shown embodiments the blocking members are formed as balls.

[0034] The spring bolt 10 exhibits two first blocking recesses 41a, 41b, which are arranged on the inside of a respective flange 14a, 14b, just behind the shaft pivot receiving through holes 15a, 15b. In the shown example the first blocking recesses are formed as longitudinal grooves, extending in parallel with the longitudinal axis of the bolt latch 20 when the spring bolt 10 assumes its locking rotational position. The first blocking recesses 41a, 41b extend rearwardly all the way to the rear end of the respective flange 14a, 14b. The cross section of the blocking recesses 41a, 41b is semi circular with a radius that corresponds to the radius of the blocking members 40a, 40b. When the blocking members are con-

stituted by balls, the first blocking recesses may also be formed semi spherical. The first blocking recesses are positioned such that they are aligned with the blocking surfaces when the spring bolt 10 is in the locking rotational position and the actuator 20 is in the first axial position.

[0035] Two second blocking recesses 42a, 42b are arranged, one in each side wall 22a, 22b. The second blocking recesses 42a, 42b are formed as cylindrical through holes having a radius which is essentially the same as the radius of the blocking members 40a, 40b. The second blocking recesses are positioned such that they are aligned with the blocking surfaces 39a, 39b when the actuator is in the first axial position and with the release recesses when the actuator is in the second axial position.

[0036] The actuator 30 is further provided with a resetting pin 45 which projects upwardly from the upper side of the actuator 30 and extends through an elongated opening 46 arranged through the top wall 21 of the bolt latch 20.

[0037] With reference to figs 2-7 the functioning of the spring bolt arrangement will now be explained. Figs 2, 4, and 6 illustrate the arrangement 1 in a first operational mode. In these figures the spring bolt 10 is in its locking rotational position such that the stop surface may engage a striker plate (not shown) to thereby keep the door closed. The actuator 30 is biased forwardly, by means of the spring 34, to the first axial position. In this axial position the blocking surfaces 39a, 39b of the actuator 30 are aligned with the first 41a, 41b and second 42a, 42b blocking recesses. By this means, the blocking members 40a, 40b are maintained in an outwardly displaced position. In this position, the blocking members 40a, 40b each simultaneously engages both a first 41a, 41b and a second 42a, 42b blocking recess. Thereby, the spring bolt 10 is prevented from rotating from the locking to the collapsed rotational position. If a force is applied to the spring bolt 10 in the rotational direction toward the collapsed position, the curved recess walls of the first blocking recesses 41a, 41b will urge the blocking members 40a, 40b inwardly, toward the actuator 30. However, since the blocking members 40a, 40b are supported by the flat blocking surfaces 39a, 39b, which are arranged perpendicular to the radial displacement direction of the blocking members, no force in the axial direction of the actuator 30 will be transmitted to the actuator. Thereby the blocking members 40a, 40b are securely maintained in simultaneous engagement with both the spring bolt 10 and the bolt latch 20, such that the spring bolt 10 is prevented from collapsing.

[0038] When evacuation through the door provided with the spring bolt arrangement is to be allowed, a coupling arm or the like arranged in the lock case and connected e.g. to an evacuation handle or panic bar acts on the manoeuvring peg 31 of the actuator 30. The manoeuvring peg 31 is pushed backwards, against the spring force exerted by the spring 34, such that the actuator 30

is displaced axially to its second axial position. Hereby, the release recesses 38a, 38b are brought into alignment with the first 41a, 41b and second 42a, 42b blocking recesses. The blocking members 40a, 40b are thus allowed to be displaced inwardly such that they are received in the release recesses 38a, 38b. As soon as any force is applied to the spring bolt in the rotational direction towards collapsed position this force will be transmitted by means of the curved recess walls of the first blocking recesses 41a, 41b, to the blocking members 40a, 40b. The blocking members 40a, 40b are thus pushed into the release recesses 38a, 38b such that they are brought out of engagement with the first blocking recesses 41a, 41b. Thereby, the spring bolt 10 is allowed to rotate, and the force applied by the striker plate will cause the spring bolt to assume its collapsed position. The spring bolt arrangement has then assumed the operational mode and position illustrated in figs. 3, 5 and 7. At the collapsed position, the stop surface 12 is arranged at an angle to the striker plate such that the force applied by the striker plate is transferred to an axial force on the spring bolt 10. This axial force thus contributes to displace the spring bolt 10 together with the bolt latch 20 and the actuator 30 rearwardly, into the lock case, such that the spring bolt 10 is brought completely out of engagement with the striker plate and the door may be opened.

[0039] It should be noted that the geometry of the first blocking recesses and the blocking members provides for that the force is transmitted from the spring bolt via the blocking member to the actuator under a certain gear ratio. It is thus possible to choose how great force that is needed to be applied to the spring bolt for collapsing the bolt by designing the relative angles between the walls of the first blocking recesses and the corresponding surface of the blocking members.

[0040] For bringing the spring bolt arrangement back to the first operational mode illustrated in figs. 2, 4 and 6, a latch bolt spring (not shown) acts on the resetting pin 45 and pushes the resetting pin 45 in the forward direction. By this means the actuator 30 is urged forwardly. However, since the first blocking recesses 41a, 41b have been brought out of alignment with the second blocking recesses 42a, 42b, the blocking members 40a, 40b can not move radially outwards. Thereby, the blocking members 40a, 40b, in contact with the release recesses 38a, 38b and the second blocking recesses 42a, 42b will drive the bolt latch 20 and the spring bolt 10 to be displaced forwardly together with the actuator. During this initial forward displacement, an outer surface of the spring bolt 10 makes contact with the edge of a spring bolt opening 51 (fig. 8-10) arranged in the forend 51 of a lock case 50 and forces the spring bolt 10 to be rotated back to its locking rotational position. Thereby, the blocking recesses 41a, 41b are again aligned with the second blocking recesses 42a, 42b and the blocking members are allowed to be displaced radially outwardly into the first blocking recesses 41a, 41b. The actuator may then be pushed forwardly relative to the bolt latch 20, such

that it again assumes its first axial position. During this displacement of the actuator relative to the bolt latch 20, the tapering walls of the release recesses 38a, 38b, drives the contact members radially outwards into simultaneous engagement with the first 41a, 41b and second, 42a, 42b blocking recesses. At this position the resetting pin 45 also makes contact with the front edge of the elongated through opening 46, such that continued forward movement of the resetting pin 45 brings about simultaneous forward axial displacement of the actuator 30, the bolt latch 20 and the spring bolt. The spring lock arrangement then reassumes its position and state as shown in figs. 2, 4 and 6.

[0041] Fig. 8-10 illustrates an example of how the spring bolt arrangement 1 illustrated in figs. 1-7 may be mounted in a lock 50. The lock 50 also comprises a second spring bolt arrangement 1' which functions essentially in the same way as the spring bolt arrangement 1, but which is shorter than the spring bolt arrangement 1 illustrated in figs 1-7.

[0042] The lock 50 comprises a lock case 52 and a forend 53. The spring bolt arrangements 1, 1' are arranged linearly displaceable in the lock case 52 such that the spring bolts 10, 10' may be displaced outwardly and inwardly through a respective spring bolt opening 51, 51' arranged in the forend 53 of the lock case.

[0043] The lock 50 further comprises a lock mechanism arranged in the lock case. The lock mechanism transfers movements from followers (not shown) to the spring bolt arrangements 1, 1' for manoeuvring as described above. The followers may be connected to evacuation handles, panic bars (not shown) and other fittings for allowing fast and reliable emergency exit through a door provided with the lock 50.

[0044] Fig. 8 shows the lock 50 when the spring bolts 10, 10' and the bolt latches have been displaced axially outwardly, the spring bolts are in the locking rotational positions and the actuators are in the first axial positions. Fig. 9 shows the lock when the spring bolts 10, 10' and the bolt latches have been displaced outwardly, the actuators have assumed the second axial positions and the spring bolts have rotated to the collapsed position. Fig. 10 shows the lock in the same state as in fig 9, but where the spring bolts 10, 10' have been axially displaced inwardly to their respective retracted positions.

[0045] The invention has mainly been described above with reference to a few embodiments. However, as is readily appreciated by a person skilled in the art, other embodiments than the ones disclosed above are equally possible within the scope of the invention, as defined by the appended patent claims. For example, the blocking members need not be formed as balls, but can assume many other shapes such as cylindrical. However, the geometry of the blocking member should correspond to the geometry of the first and second blocking recesses, such that the blocking member may be brought into simultaneous engagement with both the first and the second blocking recesses. Preferably the geometry of the block-

ing members, should also correspond to the first blocking recesses such that a rotational force and motion applied to the spring bolt may be transferred to a linear force and motion of the blocking member. In the shown embodiment the arrangement is provided with two blocking members. However it is also possible to provide the arrangement with only one or a larger number of blocking members and a corresponding number of first and second blocking recesses. The inventive spring lock arrangement may also be applied at other locks than locks for emergency or evacuation doors, e.g. in other locks and doors where it is desirable to reduce the forces needed to open the door.

Claims

1. Spring bolt arrangement (1, 1') comprising an axially displaceable spring bolt (10, 10') with a bolt latch (20) and a blocking device, wherein;

- the spring bolt is fixed to the bolt latch, rotatably about a rotational axis which is substantially perpendicular to the direction of axial displacement of the spring bolt and bolt latch,

- the blocking device is switchable between a blocking state, in which the position of the spring bolt relative to the bolt latch is fixed and a releasing state, in which rotation of the spring bolt is allowed, **characterized in that** the blocking device comprises;

- an actuator (30) which is arranged linearly displaceable between a first axial position and a second axial position, inside of and relative to the bolt latch (20),

- at least one blocking member (40a, 40b), which is linearly displaceable relative to the actuator, the bolt latch and the spring bolt, in a direction which is essentially perpendicular to the displacement direction of the actuator,

- a first blocking recess (41a, 41b) arranged in the spring bolt (10), and

- a second blocking recess (42a, 42b) arranged in the bolt latch (20) **and in that**

- the actuator (30) is arranged to, in the first axial position, maintain the blocking member (40a, 40b) in simultaneous engagement with the first blocking recess (41a, 41b) and the second blocking recess (42a, 42b), thereby maintaining the blocking device in the blocking state and to, in the second axial position, allow the blocking member to be brought out of engagement from at least one of the first and second blocking recesses, thereby setting the blocking device in the releasing state.

2. Spring bolt arrangement according to claim 1, wherein the actuator (30) is arranged to drive the blocking

- member (40a, 40b) into simultaneous engagement with the first (41a, 41b) and second (42a, 42b) blocking recess, during displacement from the second to the first axial position.
3. Spring bolt arrangement according to claim 1 or 2, wherein the actuator (30) exhibits a release recess (38a, 38b) which is arranged to receive the blocking member (40a, 40b) when the actuator has assumed its second axial position. 10
 4. Spring bolt arrangement according to any one of claims 1-3, wherein the first blocking recess (41a, 41b) has a cross sectional geometry which corresponds to the geometry of the blocking member (40a, 40b), such that a recess wall of the first blocking recess, in contact with the blocking member, urges the blocking member out of engagement with the second blocking recess, when the actuator (30) has assumed its second axial position and a rotational force is applied to the spring bolt (10). 15 20
 5. Spring bolt arrangement according claim 3 or 4, wherein the release recess (38a, 38b) has a cross sectional geometry which corresponds to the geometry of the blocking member (40a, 40b), such that a release recess wall of the release recess, in contact with the blocking member, urges the blocking member into engagement with the first blocking recess (41a, 41b), when the actuator is moved from the second to the first axial position. 25 30
 6. Spring bolt arrangement according to any one of claims 1-5, wherein the blocking member (40a, 40b) exhibits a curved periphery. 35
 7. Spring bolt arrangement according to claim 6, wherein the blocking member (40a, 40b) is a ball.
 8. Spring bolt arrangement according to claim 7, wherein the first blocking recess (41a, 41b) is an elongated groove having a semi circular cross section. 40
 9. Spring bolt arrangement according to any one of claims 1-8, comprising two blocking members (40a, 40b), a pair of first blocking recesses (41a, 41b) and a pair of second blocking recesses (42a, 42b). 45
 10. Spring bolt arrangement according to any one of claims 1-9, wherein the at least one blocking member (40a, 40b) is displaceable in a direction which is parallel with the rotational axis of the spring bolt (10). 50
 11. Spring bolt arrangement according to any one of claims 1-10, comprising a spring arrangement (34) which is arranged to bias the actuator (30) towards the first axial position. 55
 12. A lock comprising a lock case, a lock mechanism and a spring bolt arrangement according to any of claims 1-11.
 - 5 13. A door comprising a lock according to claim 12.
 14. A door according to claim 13, wherein the door is an emergency or evacuation door and further comprises emergency or evacuation fittings and/or accessories.

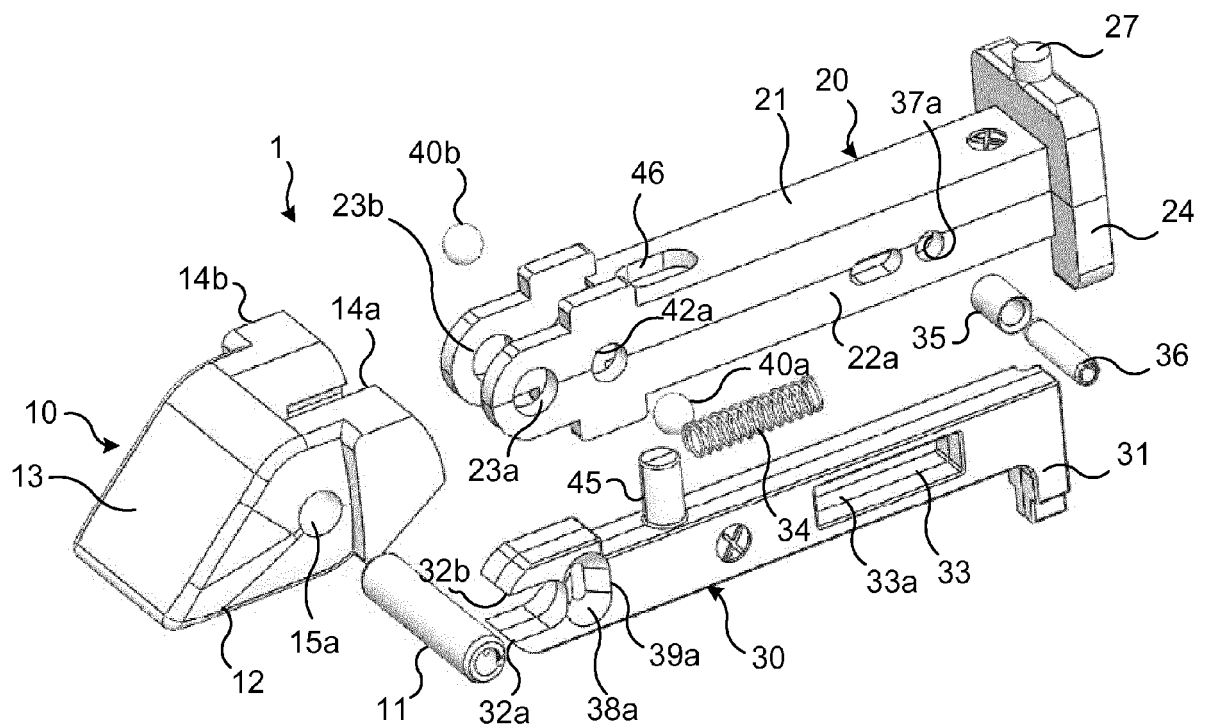


Fig. 1

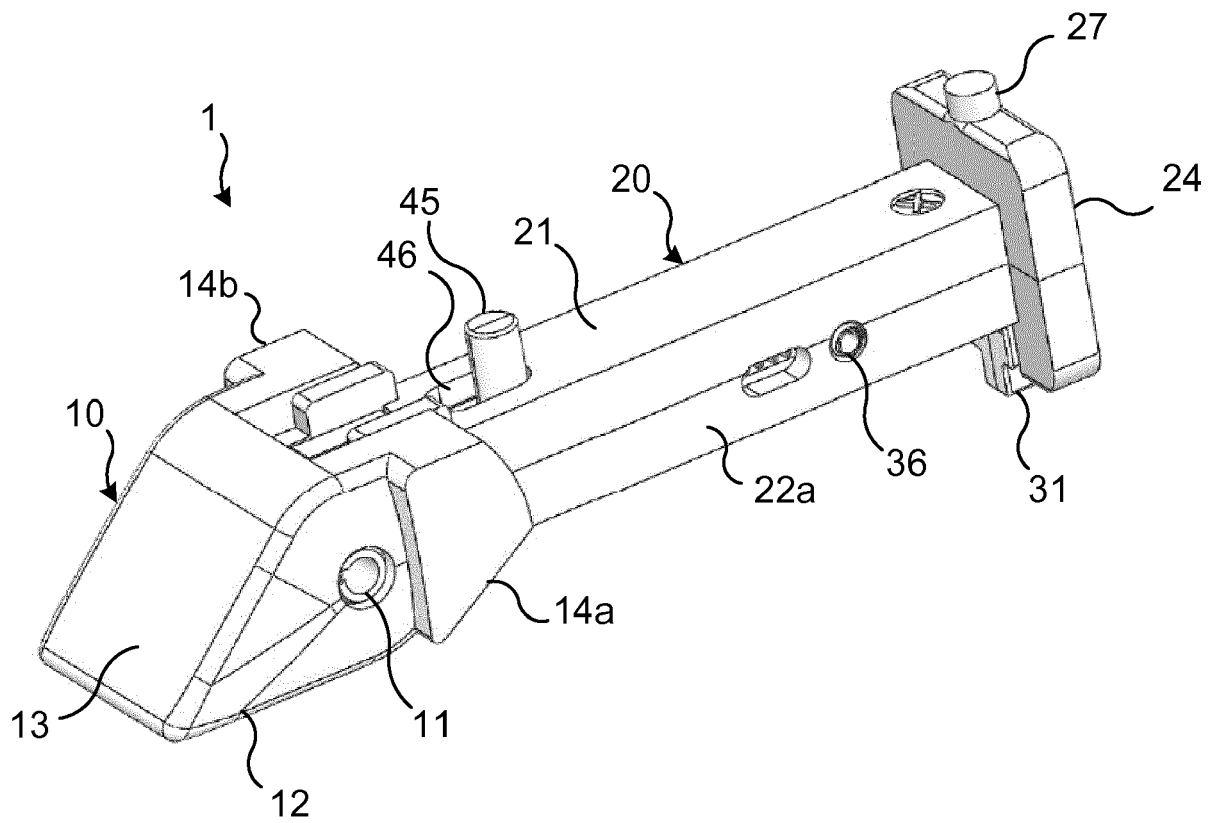


Fig. 2

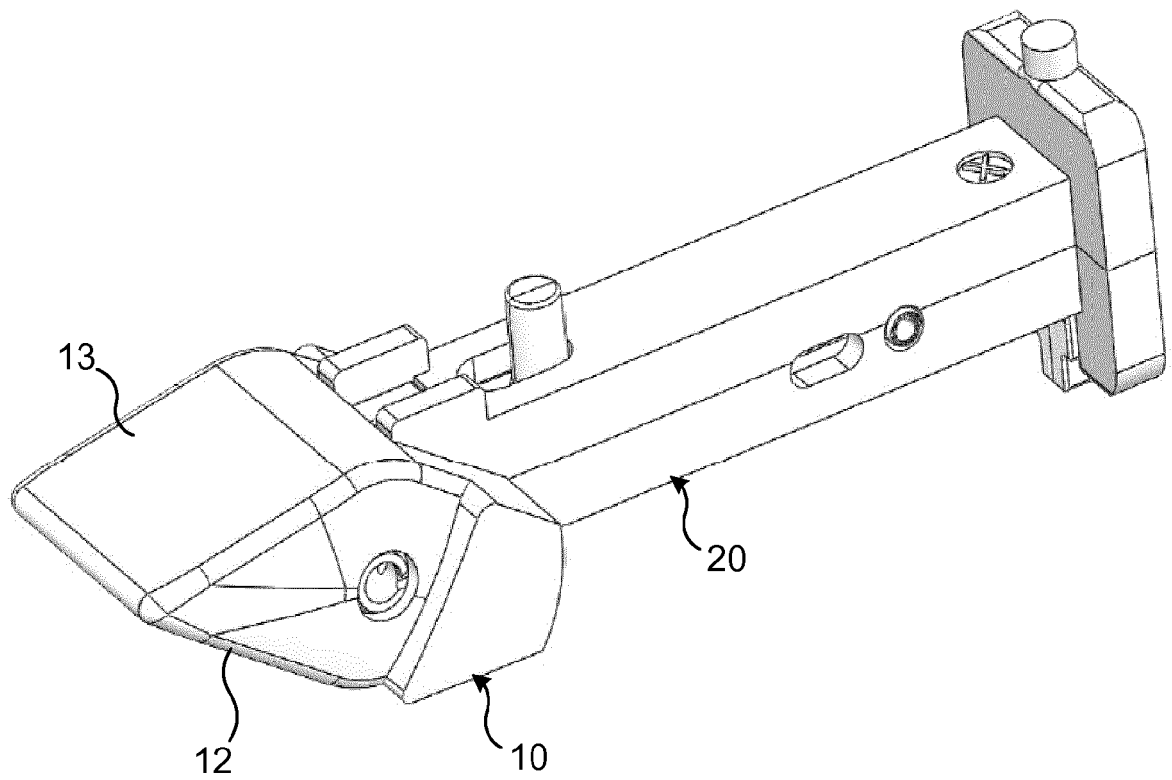


Fig. 3

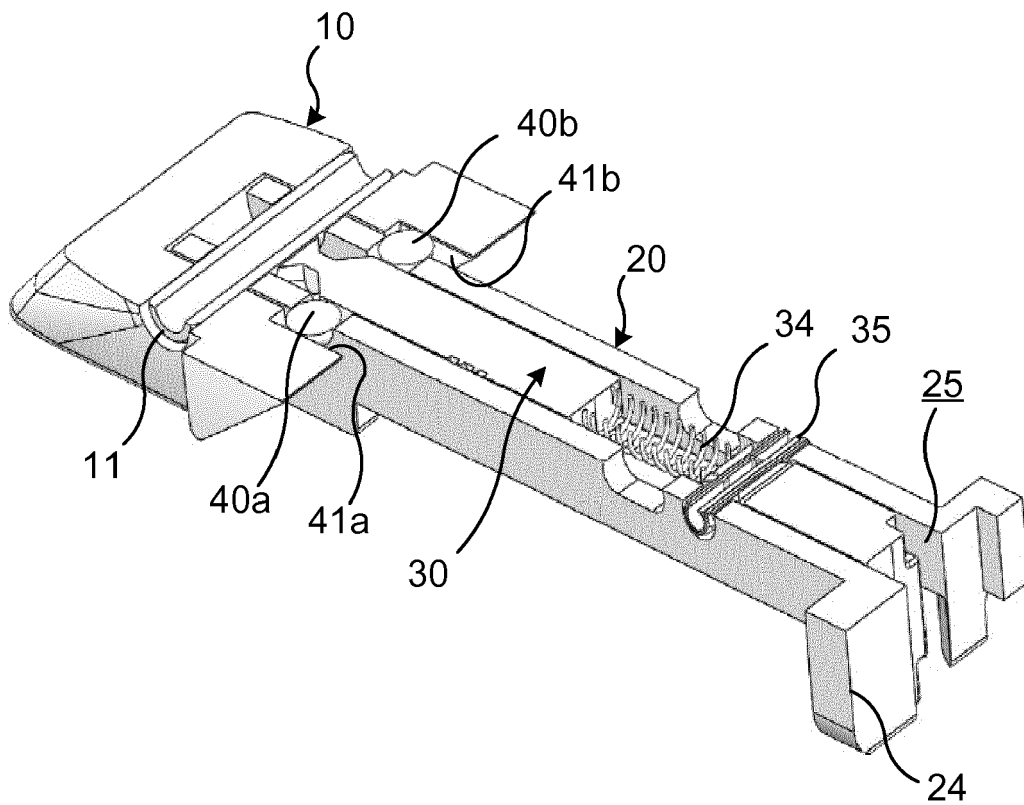


Fig. 4

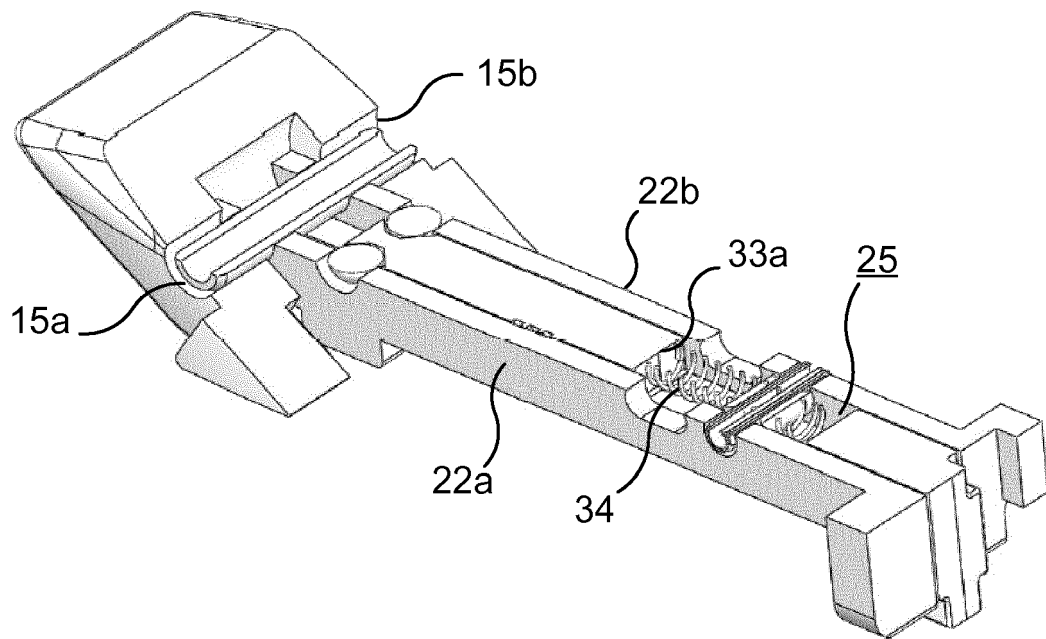


Fig. 5

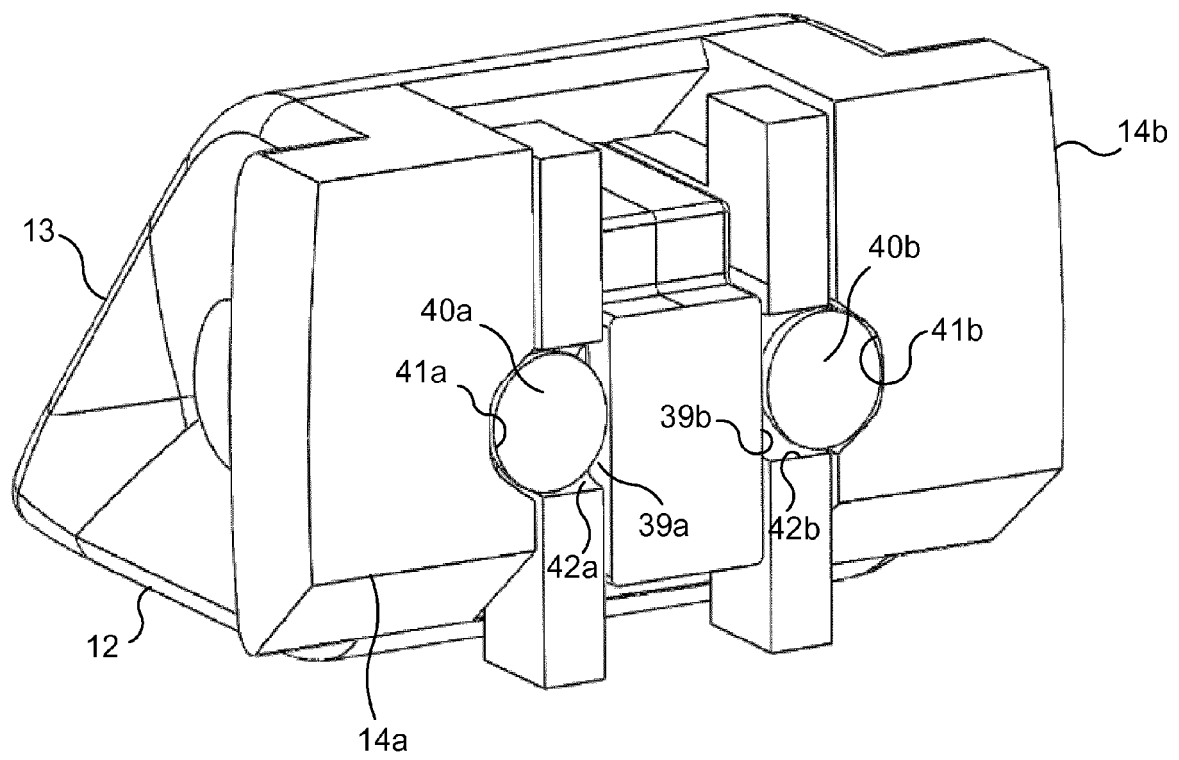


Fig. 6

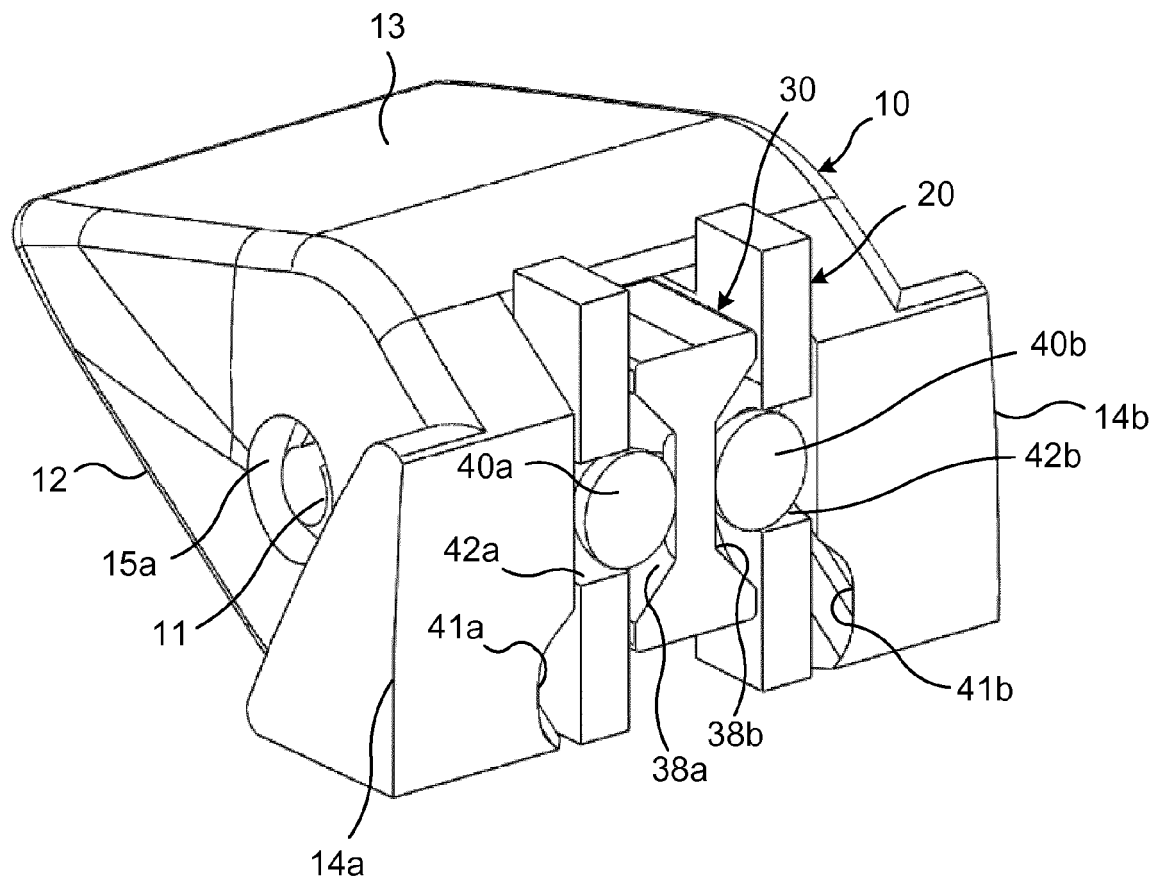


Fig. 7

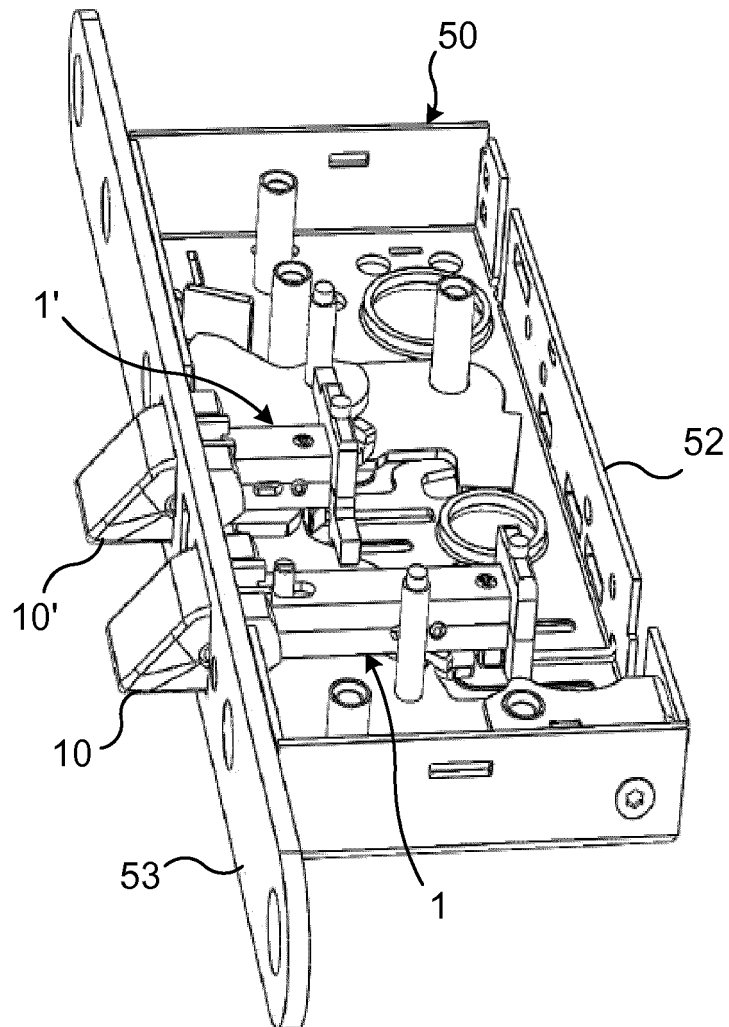


Fig. 8

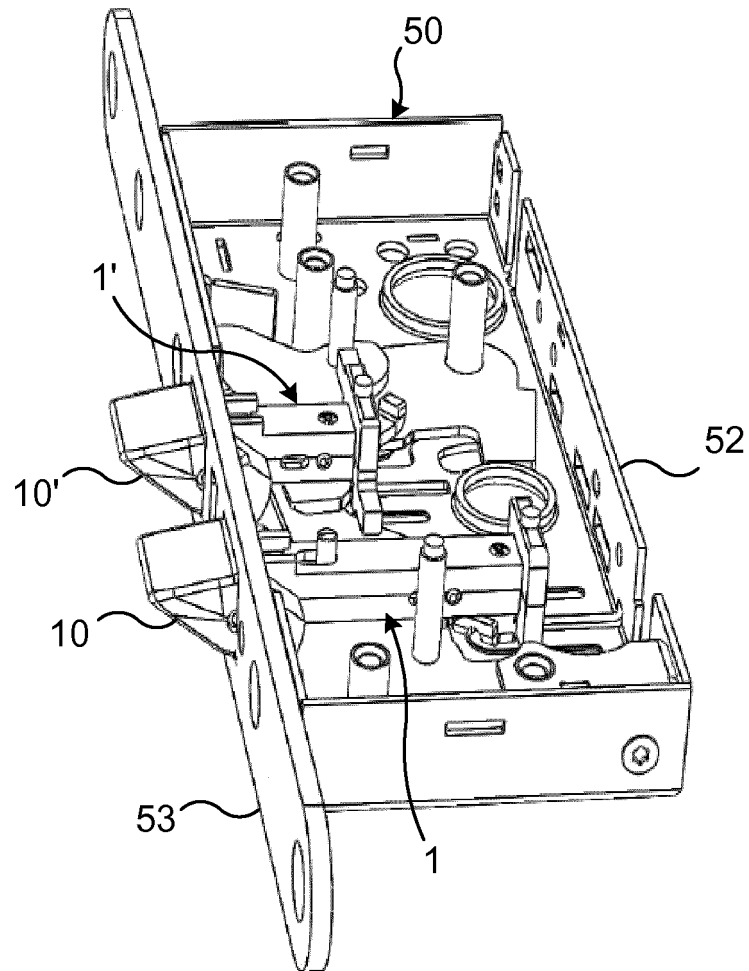


Fig. 9

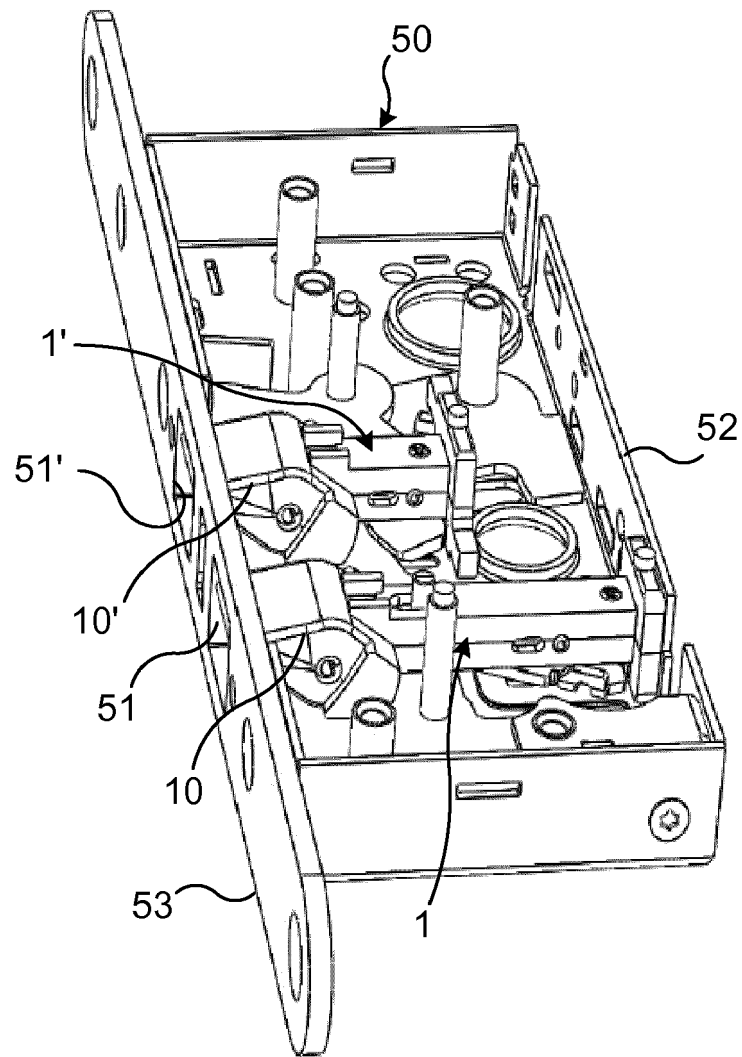


Fig. 10



EUROPEAN SEARCH REPORT

Application Number
EP 15 17 6319

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