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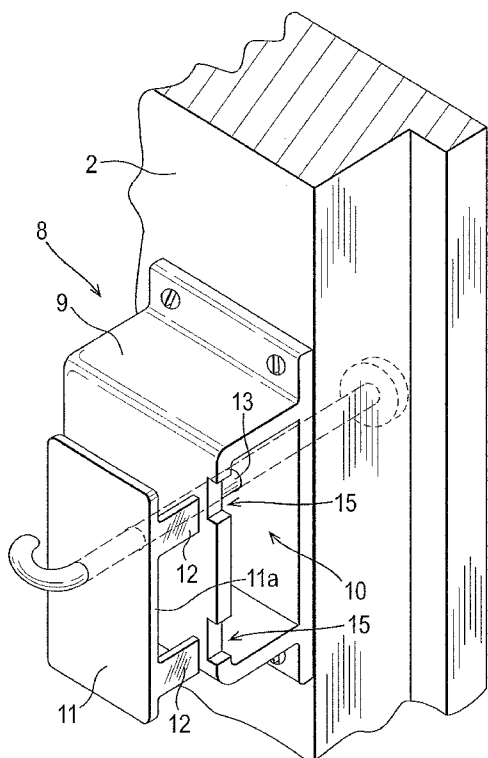
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(54) Title: ANTI-LOCKOUT DOOR LATCH AND RECEIVER



(57) Abstract: There is described a door latching arrangement in which latching is controllable from outside the door after door closure. A striker, mountable to a door frame and comprising a recess for receiving an end of a bolt mounted to a door and engageable with the striker to retain the door in a closed position, has a blocking member movable between a first position in which the blocking member at least partially obstructs the recess to prevent entry of the bolt therein and a second position in which the recess is unobstructed, the blocking member being movable from its first position to its second position by a control means operable from the outside of the door when the door is in the closed position. A second aspect provides a door lock comprising a bolt having a retracted and an extended position and resilient biasing means to urge the bolt toward the extended position, the lock having an "out" side from which the lock is only operable by a key-operated mechanism to move the bolt from the extended to the retracted position, and an "in" side from which the lock is operable by an operating handle to move the bolt from the extended to the retracted position, the lock further comprising blocking means operable to retain the bolt in its retracted position, and control means operable from the "out" side of the lock to release the blocking means.

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Anti-Lockout Door Latch and Receiver

The present invention relates to latching devices, and is particularly concerned with latching devices for doors.

Many domestic and business premises have doors which are equipped with key-operated latches, the latch being operable to secure the door in a closed position by a bolt entering a recess in a striker when the door is closed. The bolt is resiliently urged towards an extended position by a spring or the like, and a cam surface on the end of the bolt cooperates with a surface on the striker to retract the bolt as the door nears the closed position. When the door is in the closed position, the bolt comes into alignment with a recess in the striker, and the spring then shoots the bolt to its extended position with its end in the recess to secure the door in the closed position.

The lock is generally provided with an operating handle on one side (the "inside") of the door, and a keyhole on the other side of the door (the "outside"). To open the door from the "inside", a user grasps the handle and either turns or slides it to retract the

bolt out of the recess in the striker, and the user then pulls the door open.

To open the door from the "outside", the user inserts
5 a key into the keyhole and turns it to operate a mechanism to retract the bolt. The user then pushes the door open.

In the above description, "inside" is used to identify
10 that side of the door towards which the door swings in an opening movement. The lock is conventionally also provided with holding means, selectively operable from the "inside" of the door, which can be engaged to fix the bolt in its extended or in its retracted position.
15 When the bolt is fixed in the retracted position, the door may be opened and closed freely. When the bolt is fixed in the extended position and engaged in the striker, the door can only be opened by releasing the holding means from the "inside" of the door. When the
20 bolt is fixed in the extended position but not engaged in the striker, the door can be swung freely, but the extended bolt will prevent full closure of the door.

Such a latch mechanism is common, for example, for use
25 on the main entrance door or "front door" of a

dwelling. The latch mechanism is convenient in that the user does not need to engage the latch when leaving the dwelling, but simply pulls the door closed and the latch engages. While this arrangement is usually convenient, it is not uncommon for a user to leave the dwelling but forget to take a key for re-entry, and once at the door has been pulled shut the user is then locked out. In order to gain re-entry, considerable inconvenience and expense are caused because a locksmith generally has to be called to open the door.

One solution to the problem of a user locking him or herself out of a dwelling has been proposed in UK patent application GB 2338984, in which a barrier strip is inserted across the recess in the striker to prevent the bolt from entering. The barrier strip may be placed in an operative position in which it prevents engagement of the door latch, or an inoperative position in which the bolt operates normally. However, the user must remember to place the barrier strip in position before closing the door, and can only move the barrier strip from the operative to the inoperative position when the door is open and the striker recess is exposed.

The present invention seeks to provide an alternative solution to problem of users locking themselves out, by providing a door latching arrangement in which a bolt is resiliently urged into a recess in a striker to retain a door in a closed position, and the latching arrangement further includes blocking means for preventing the bolt from entering the recess in the striker, and release means operable from the "outside" when the door is closed to release the blocking means and permit the bolt to enter the recess.

A first aspect of the invention provides a striker for use with a conventional door latch which is key-operated from the outside, and operable by a handle from the inside, and has a bolt resiliently urged to an extended position. The striker is mountable to one side of a door frame and comprises a recess for receiving an end of the bolt, a blocking member movable between a first position in which the blocking member at least partially obstructs the recess to prevent entry of the bolt therein and a second position in which the recess is unobstructed, the blocking member being movable from its first position

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to its second position by a control means operable from the outside of the door. In an advantageous embodiment the blocking member is arranged so that, when the recess of the striker receives the bolt, movement of the blocking means from its second position to its first position is prevented by the bolt.

The blocking member may be resiliently urged from its second position toward its first position.

The blocking member may move from its second position to its first position by a linear movement, or by a pivoting movement. The blocking member may have a third, inoperative, position in which the recess is unobstructed.

The control means may comprise a mechanical element such as a control rod extending through an opening in the door frame, and movable in an advancing axial direction to push the blocking member from its first position to its second position. The control rod may be resiliently urged in a retreating axial direction, to bias the blocking means towards its first position. The blocking member may be mounted to the end of the

control rod, the arrangement being such that when the blocking member is in its second position a rotation of the control rod followed by a retreating axial movement of the control rod brings the blocking member to the third (inoperative) position. The control rod may be arranged so that when the blocking member is in its second position, the end of the control rod lies flush with the outside of the door frame.

10 Alternatively, the control means may comprise a motorised actuator operated by a control circuit provided with a user input device positionable to the outside of the door frame and arranged so that an input from the user causes the actuator to move the blocking member from its first to its second position. In an advantageous embodiment, a resilient biasing means urges the blocking member from its second to its first position, and the actuator operates against the biasing force. The actuator may be a linear or rotary actuator such as a solenoid or a linear or rotary electric motor. The user input device may be a switch or other control button mounted to the door or door frame, or may be a portable remote control unit. A bell push linked to an existing doorbell may be used as a user input device for the control circuit.

The control circuit may also include detector means to detect closing of the door with the blocking means in its first position, and means to provide a visible
5 and/or audible alarm to a user to indicate the unlatched condition of the door.

The control circuit may also include a timer, and may be arranged to release the blocking means (i.e. move
10 the blocking means from the first to the second position) after a predetermined interval has elapsed from detection of the closing of the door with the blocking means in its first position.

15 In a second aspect of the invention, there is provided a door lock comprising a bolt having a retracted and an extended position and resilient biasing means to urge the bolt toward the extended position, the lock having an "out" side from which the lock is operable
20 by a key-operated mechanism to move the bolt from the extended to the retracted position, blocking means operable to retain the bolt in its retracted position, and control means operable from the "out" side of the lock to release the blocking means. The blocking
25 means is preferably manually releasable from the "in"

side of the lock, against a resilient biasing element which urges the blocking means into engagement with the bolt to retain the bolt in its retracted position.

5 The blocking means may comprise a movable catch having a first position in which the catch is engageable with a detent on the bolt to retain the bolt in its retracted position, and a second position in which the catch is released from the detent. The catch may be
10 resiliently biased towards its first position.

The control means may comprise a mechanical element such as a push rod extending through the door and engageable with the catch to move the catch from its
15 first position to its second position. The push rod may be linked to an item of door furniture such as a doorknocker, so that lifting of the doorknocker causes the push rod to release the catch.

20 The catch may be mechanically interlinked with the key-operated mechanism so that, for example when a householder enters the dwelling, when a key is used to retract the latch and open the door, the bolt is not held in its retracted position and the door may be
25 closed and automatically latched, and for example when

the householder leaves, and the door is opened from the "in" side by the conventional operating handle, the catch engages the bolt and retains it in its retracted position, preventing the door from automatically latching when closed again.

Alternatively, the control means may comprise a motorised actuator such as a solenoid for moving the catch from its first to its second position, the actuator being operated by a control circuit including a user input device mounted to the "out" side of the door, or a portable remote control device.

The control circuit may also include detector means to detect closing of the door with the catch engaged with the detent of the bolt, and means to provide a visible and/or audible alarm to a user to indicate the unlatched condition of the door.

The control circuit may also include a timer, and may be arranged to release the catch from the detent after a predetermined interval has elapsed from detection of the closing of the door with the catch engaged with the detent of the bolt.

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In a further aspect, the invention provides a door and frame installation in a building and including a latching arrangement having the striker or the door lock as described above. The door and frame installation preferably includes a door closer, which urges the door towards its closed position and retains it in that position. The door closer may be any of the conventional types of door closer, for example a hydraulically-damped spring-powered unit.

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While the latch and striker will be described in relation to a domestic access door, it is to be understood that the latching arrangement may be employed in relation to doors, drawers, cupboards or other components in furniture, and may be used in access doors of goods vehicles, or in other situations where self-latching closures are commonly used.

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Embodiments of the invention will now be described in detail with reference to the accompanying drawings, in which:

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Figure 1 is a perspective view of a door and door frame;

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Figure 2 is a view of the striker according to a first embodiment of the invention, seen in the direction of arrow A of Figure 1;

5 Figure 3 is a view of the striker and door in the closed position, with the blocking member preventing latching;

10 Figure 4 is a perspective view of the striker with the blocking member in the released position;

Figure 5 is a horizontal sectional view in plane V-V of Figure 3;

15 Figure 6 is a view similar to Figure 5, with the blocking member in its second position;

Figure 7 is a horizontal sectional view showing the blocking member in its third, inoperative, position;

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Figure 8 is a horizontal schematic sectional view of a striker according to a second embodiment of the invention;

25 Figure 9 is a perspective schematic view of a striker

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according to a third embodiment of the invention;

Figure 10 is a perspective view of a striker according to a fourth embodiment of the invention; and

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Figure 11 is a schematic sectional view of a lock according to the second aspect of the invention.

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Referring now to the figures, Figure 1 shows a door 1 mounted in a door frame 2 which surrounds a door opening in a wall 3. The door 1 is seen from the "inside". The door 1 has a latch mechanism 4 comprising a housing 5 and a bolt 6. The bolt is urged towards an extended position (shown in figure 1) by resilient means (not shown) within the housing 5, and may be moved to a retracted position from the "inside" by rotation of a handle 7. To retract the bolt 6 from the "outside" a user inserts a key into a keyhole (not shown) on the outside of the door, and rotates the key. As the door is swung shut from the position shown in Figure 1, an angled end face of the bolt 6 engages a striker 8 mounted on the door frame 2 to urge the bolt towards its retracted position against the resilient bias.

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The striker 8 comprises a casing 9 with an open side 10 facing towards the door 1. A blocking plate 11, with a set of the blocking tines 12 is mounted to an operating rod 13 which passes through the casing 9 and the door frame 2, as shown in Figures 4 to 6. The operating rod 13 is urged by a spring 14 toward the position shown in Figure 5. In this position, the blocking plate 11 lies adjacent the casing 9, and the blocking tines 12 extend across the open side 10 of the casing 9. In the embodiment shown, the casing 9 has a pair of cutouts 15 to receive the tines 12, so that the edge 11a of the blocking plate 11 and the edge of the casing 9 bounding the open side 10 are flush.

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In operation, starting with the door 1 in the position shown in Figure 1, and with the striker positioned as shown in Figure 5, the user steps outside and pulls the door closed behind him. As the door closes, the angled end face 6a of the bolt 6 engages the edge 11a of the blocking plate 11, and the bolt 6 is retracted into the housing 5 of the latch 4. As closing movement continues, the bolt 6 is held in its retracted position by the engagement of the end of the bolt with the tines 12 which extend across the open

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side 10 of the striker casing 9.

If the user now realises that he has no key for re-
entry, he can simply push the door open since the bolt
5 6 has not engaged with the striker 8.

When the user has verified that he has a key for re-
entry, the user pushes the operating rod 13 from
outside the door, against the bias of spring 14. The
10 operating rod 13 moves to the position shown in Figure
6, retracting the tines 12 from the open side 10 of
the casing 9, to allow the bolt 6 to be extended and
enter the casing. It is appreciated that, in this
position, the tines 12 are prevented from moving back
15 to their original position by the bolt 6. The door is
now latched and secure.

When the user wishes to re-enter, the bolt 6 is
retracted by a key from the outside of the door, and
20 as the bolt 6 is retracted out of the striker 8 the
door may be pushed open. As the bolt 6 is a
retracted past the ends of the tines 12, the spring 14
urges the operating rod 13 to return the tines to the
position shown in figure 5. This will prevent
25 automatic latching of the door when it is re-closed

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after the user has entered. To re-latch the door after re-entry, the user pulls the curved end 13a of the operating rod 13 to withdraw the tines 12 and allow the bolt 6 to engage with the striker 8.

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Figure 7 shows the blocking device in an inoperative position. In this position, the striker 8 operates as a conventional striker, with the door automatically latching whenever it is closed. To place the blocking device in this position, the operating rod is lifted (as shown in the figure) by pulling the curved end 13a, rotating the operating rod 13 about its axis through 180°, and then releasing the rod 13 so that the spring 14 brings the blocking plate 11 into engagement with the casing 9. The blocking device is returned to normal operation by reversing these movements.

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Figure 8 shows a schematic sectional view of a second embodiment of the striker. In this embodiment, a blocking plate 11 is pivotally mounted to the casing 9 at pivot 20. The blocking plate 11 is in the form of a V, with the blocking tines 12 mounted to a part of the plate extending to the right of the pivot 20, as seen in the Figure. The part 11b of the plate

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extending to the left of the pivot 20 is positioned so as to be rotatable anticlockwise into engagement with an electromagnet 21 mounted to the casing 9. A spring 22 urges the blocking plate 11 to rotate clockwise (as seen in the figure) so that the blocking tines 12 extend across the open side 10 of the striker casing 9. When the electromagnet 21 is energised, the attraction between the electromagnet 21 and the part 11b overcomes the bias of the spring 22, and the blocking plate 11 is rotated to withdraw the blocking tines 12 from the open side 10. The electromagnet 21 is powered from a power source 21a, which may be battery or mains power, a switch 23 preferably of the "bell-push" type being provided to allow the user to connect the power source 21a to the electromagnet 21.

The operation of the striker of figure 8 is similar to that described above. When the user leaves, he pulls the door closed behind him, at the blocking tines 12 prevent the bolt 6 from engaging the striker casing 9. The switch 23 is provided outside the door, so that the user can operate the switch 23 to energise the electromagnet 21 to retract the tines 12 and allow the door to be secured by the bolt 6 extending into the

striker casing 9.

When the user re-enters, withdraw of the bolt 6 by the operation of the user's key allows the blocking plate 11 to rotate clockwise under the action of the spring 22 as the door is opened. When the user re-closes the door, if the door is to be latched then a second switch 24 provided inside is operated, to rock the blocking plate 11 and withdraw the tines 12 to allow the bolt 6 to extend into the striker casing 9. Alternatively, the switch 24 may be omitted and the user may simply press on part 11b of the blocking plate to withdraw the tines.

Figure 9 shows a Tech perspective here of a further embodiment of the striker, similar to that shown in figure 8. In the embodiment shown in figure 9, switches 23 and 24 are replaced by a control circuit comprising a transmitter 30 and a receiver 31. In use, instead operating a fixed switch after leaving and closing the door, the user operates the transmitter 30 to signal a control circuit 32 to apply power from batteries of 33 to the electromagnet 21. The other parts of the striker of Figure 9 correspond to those described in relation to the striker of

Figure 8.

Figure 10 shows a further alternative embodiment of the striker. In this embodiment, entry of the bolt 6 into the casing of the striker 9 is prevented by means of a sector-shaped plate 40 mounted adjacent in the opening of the striker, and pivoting about its centre on an axis substantially perpendicular to the plane of the open side 10 of the casing 9. Operating rod 13 extends through the door frame 2 and terminates in a knob 41. A spring 14 urges the plate 40 toward the position shown in Figure 10. By pulling the knob 41, the plate 40 is rotated (clockwise as seen in figure 10) so that the open side 10 of the casing 9 is constructed and the bolt 6 can enter the casing to latch the door closed. When the bolt is in position, a side surface of the bolt will prevent the plate 40 from rotating back to the position shown in Figure 10. It will be appreciated that, instead of the operating rod 13 and knob 41, the plate 40 may be rotated by an electromagnet or solenoid, rolled either remotely or by a hard-wired circuit.

In a further development of the electrically-operated striker, the electromagnet 21 may be linked to a

conventional doorbell circuit so that when the doorbell is operated, power is supplied to the electromagnet 21. In this implementation, the user will simply leave the house and after closing the door will press his own doorbell to actuate the electromagnet and permit the door to latch closed.

Figure 11 is a schematic horizontal section of a lock embodying the second aspect of the invention. In figure 11, a door 1 and a door frame 2 are seen in section, with the "outside" of the door being lowermost in the figure. On the inside of door 1 is mounted a lock 4, and on the frame 2 a striker 8 is mounted.

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The lock 4 comprises a housing 50, within which a bolt 51 is mounted for sliding movement. A spring 52 urges the bolt towards the extended position shown in solid line in the figure. An operating handle 53 is accessible from the inside of the door to retract the bolt 51 when the user wishes to exit. A key-operated mechanism (not shown) is provided, with a keyhole on the outside of the door, so that a user wishing to enter can retract the bolt 51 using a key.

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The bolt 51 is provided at its right-hand end (as seen in the figure) with a recess 54. A catch 55 is pivotally mounted to the lock housing 50 at the pivot 56. The catch 55 includes a hook end 57 and a handle end 58. A spring 57a urges the hook end 57 upwardly as seen in the figure. A push rod 59 extends through an opening 60 in the door 1, and is engagable with the handle end 58 of the catch 55.

10 When the user grasps the operating handle 53 and moves it to the right (as seen in the figure), the bolt of 51 is retracted out of the striker 8 and the door may be opened. As the bolt is moved to the right, the hook end 57 of the catch 55 engages with the recess
15 54, under the urging of spring 57a, and retains the bolt 51 in the retracted position.

The user exits, and pulls the door closed behind him, with the bolt 51 in its retracted position, held by
20 the catch 55. To engage the bolt 51 with the striker 8, the user pushes the push rod 59 from outside the door. This lifts the handle end 58 of the catch 55, depressing the hook end 57 and releasing its engagement from the recess 54. Spring 52 then drives
25 the bolt 51 to its extended position, in engagement

with the striker 8.

When the user re-enters, the bolt 51 is retracted by use of a key-operated mechanism from the outside of the door, and hook end 57 again engages the bolt 51 to retain it in the retracted position. When the user has entered and closed the door, the user pulls the handle end 58 of the catch 55 to release the engagement of the hook end 57 from the recess 54, allowing the bolt 51 to be driven into the striker 8 by the spring 52.

In further embodiments of the lock, the catch 55 may be operated by a solenoid arrangement similar to that disclosed above in relation to the striker. The solenoid arrangement may be controlled by means of a switch mounted to the outside of the door, or by means of a remote control transmitter.

The push rod 59 may be incorporated in, and operated by, an item of door furniture such as a doorknocker, so that on exit, the user simply lifts the doorknocker in order to push the rod 59 and release the catch 55 from the bolt 51.

Claims:

1. A striker mountable to a door frame and comprising a recess for receiving an end of a bolt mounted to a door and engageable with the striker to retain the door in a closed position, a blocking member movable between a first position in which the blocking member at least partially obstructs the recess to prevent entry of the bolt therein and a second position in which the recess is unobstructed, the blocking member being movable from its first position to its second position by a control means operable from the outside of the door when the door is in the closed position.
2. A striker according to Claim 1, wherein the blocking member is movable from its first position to its second position by the control means operable from the inside of the door when the door is in the closed position.
3. A striker according to Claim 1 or Claim 2, wherein when the recess of the striker receives a bolt, movement of the blocking means from its second

position to its first position is prevented by the bolt.

4. A striker according to any of Claims 1 to 3,
5 wherein the blocking member is resiliently urged from its second position toward its first position.

5. A striker according to any of Claims 1 to 3,
wherein the blocking member moves from its second
10 position to its first position by a linear movement.

6. A striker according to any preceding claim,
wherein the blocking member moves from its second
position to its first position by a pivoting movement.

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7. A striker according to any preceding claim,
wherein the blocking member is movable to a third,
inoperative, position in which the recess is
unobstructed.

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8. A striker according to any preceding claim,
wherein the control means comprises a control rod
movable to push the blocking member from its first
position to its second position.

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9. A striker according to Claim 8, wherein the control rod is resiliently biased, to urge the blocking means towards its first position.

5 10. A striker according to Claim 8 or claim 9, wherein the blocking member is mounted to one end of the control rod, the arrangement being such that when the blocking member is in its second position a rotation of the control rod followed by an axial
10 movement of the control rod brings the blocking member to the third (inoperative) position.

11. A striker according to any of claims 1 to 7, wherein the control means comprises an actuator
15 operated by a control circuit provided with a user input device positionable to the outside of the door frame and arranged so that an input from the user causes the actuator to move the blocking member from its first to its second position.

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12. A striker according to claim 11, further comprising a resilient biasing means adapted to urge the blocking member from its second to its first position, and wherein the actuator operates against
25 the biasing force.

13. A striker according to claim 12, wherein the actuator is a linear or rotary actuator such as a solenoid or a linear or rotary electric motor.

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14. A striker according to any of claims 11 to 13, wherein the user input device comprises a switch.

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15. A striker according to claim 14 wherein the switch is a bell push linked to a doorbell.

16. A striker according to any of claims 11 to 13, wherein the user input device comprises a portable remote control unit.

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17. A striker according to any of claims 11 to 16, wherein the control circuit includes detector means to detect closing of the door with the blocking means in its first position, and means to provide a visible and/or audible alarm to a user to indicate the unlatched condition of the door.

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18. A striker according to any of claim 17, wherein the control circuit includes a timer and is adapted to move the blocking means from the first to the second

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position after a predetermined interval has elapsed from detection of the closing of the door with the blocking means in its first position.

5 19. A door lock comprising a bolt having a retracted and an extended position and resilient biasing means to urge the bolt toward the extended position, the lock having an "out" side from which the lock is only operable by a key-operated mechanism to move the bolt
10 from the extended to the retracted position, and an "in" side from which the lock is operable by an operating handle to move the bolt from the extended to the retracted position, the lock further comprising blocking means operable to retain the bolt in its
15 retracted position, and control means operable from the "out" side of the lock to release the blocking means.

20 20. A lock according to claim 19, wherein the blocking means is manually releasable from the "in" side of the lock.

25 21. A lock according to claim 19 or claim 20, wherein the blocking means comprises a movable catch having a first position in which the catch is engageable with a

detent on the bolt to retain the bolt in its retracted position, and a second position in which the catch is released from the detent.

5 22. A lock according to claim 21, further comprising a resilient biasing element adapted to urge the catch into engagement with the bolt to retain the bolt in its retracted position.

10 23. A lock according to any of claims 19 to 22, wherein the control means comprises a push rod engageable with the blocking means to move the blocking means from its first position to its second position.

15 24. A lock according to claim 23, wherein the push rod is linked to a doorknocker, so that lifting of the doorknocker causes the push rod to release the blocking means.

20 25. A lock according to any of claims 19 to 24, wherein the blocking means is mechanically interlinked with the key-operated mechanism so that when a key is used to retract the bolt, the bolt is not held in its
25 retracted position, and when the bolt is retracted by

means of the operating handle, the blocking means engages the bolt and retains it in its retracted position.

5 26. A lock according to any of claims 19 to 25, wherein the control means comprises an actuator for moving the blocking means from its first to its second position, the actuator being operated by a control circuit including a user input device mountable on the
10 "out" side of the door.

27. A lock according to claim 26, wherein the user input device is a portable remote control device.

15 28. A lock according to claim 26 or claim 27, wherein the control circuit further includes detector means to detect closing of the door with the blocking means engaged with the detent of the bolt, and means to provide a visible and/or audible alarm to a user
20 outside the door to indicate the unlatched condition of the door.

29. A lock according to claim 28, wherein the control circuit further includes a timer, and is arranged to
25 release the blocking means from the detent after a

predetermined interval has elapsed from detection of the closing of the door with the blocking means engaged with the detent of the bolt.

5 30. A door and frame installation in a building and including a latching arrangement having the striker of any of claims 1 to 18.

10 31. A door and frame installation comprising a door frame having a striker according to Claim 9, wherein the control rod is arranged so that when the blocking member is in its second position, the other end of the control rod lies flush with the outside of the door frame.

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32. A door and frame installation in a building and including a latching arrangement having the door lock of any of claims 19 to 29.

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FIG. 1

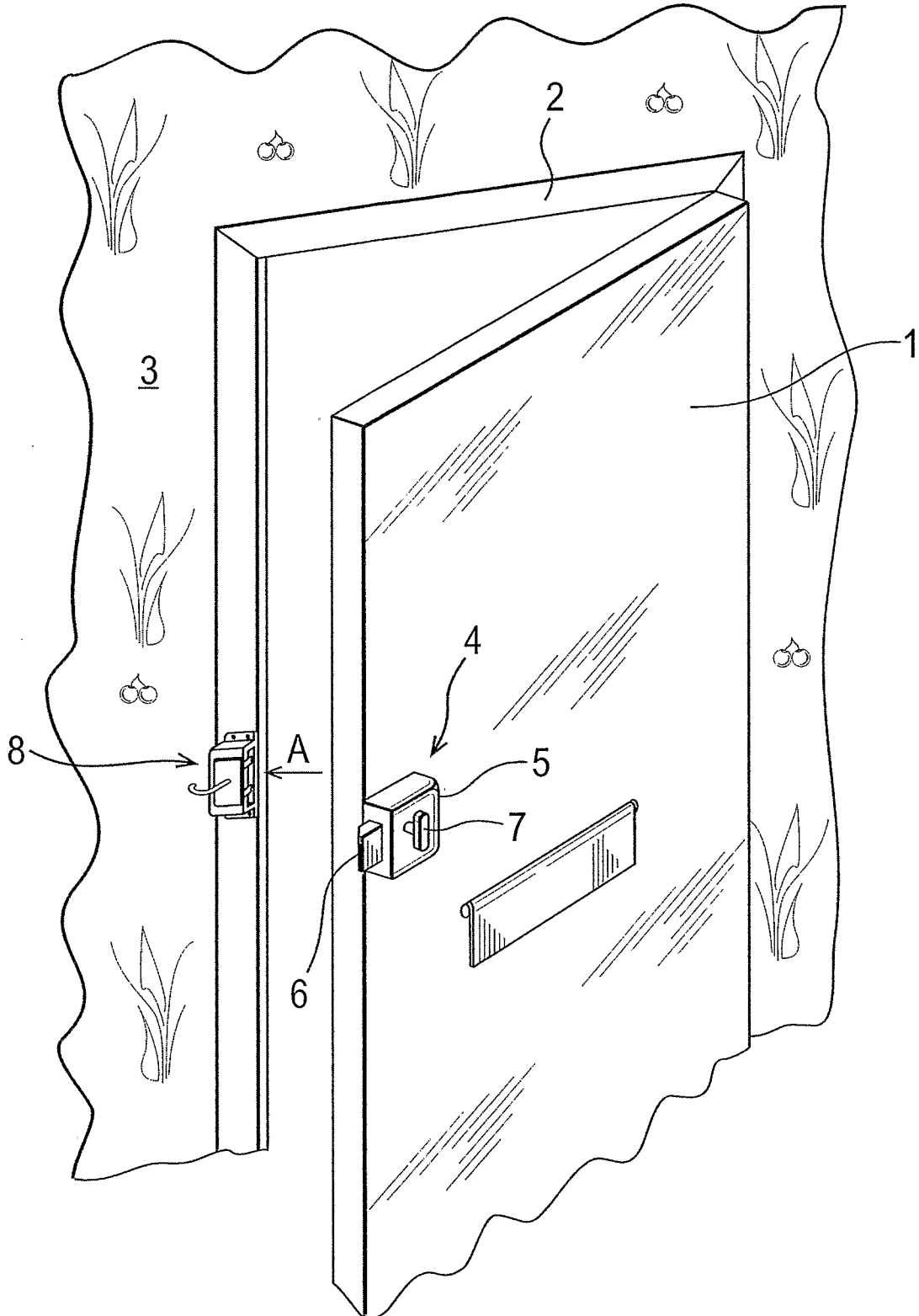


FIG. 2

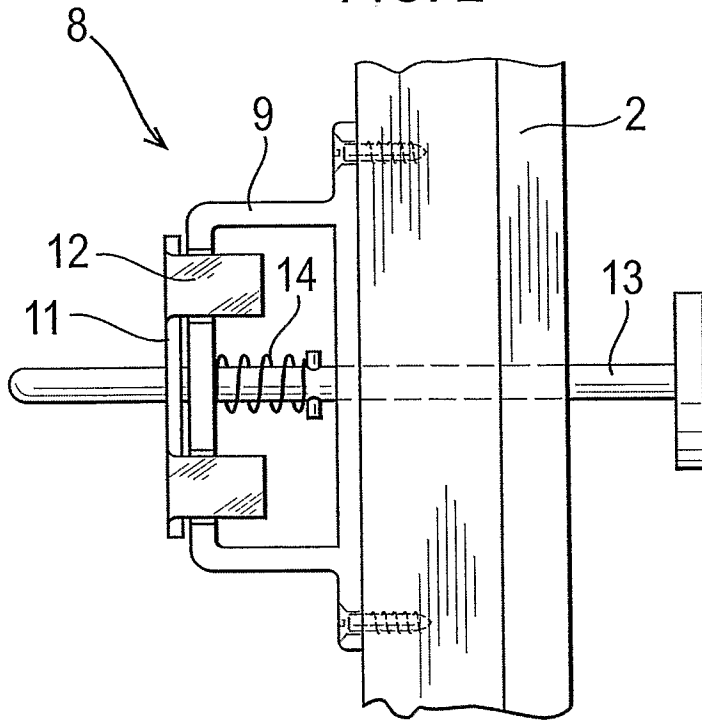


FIG. 3

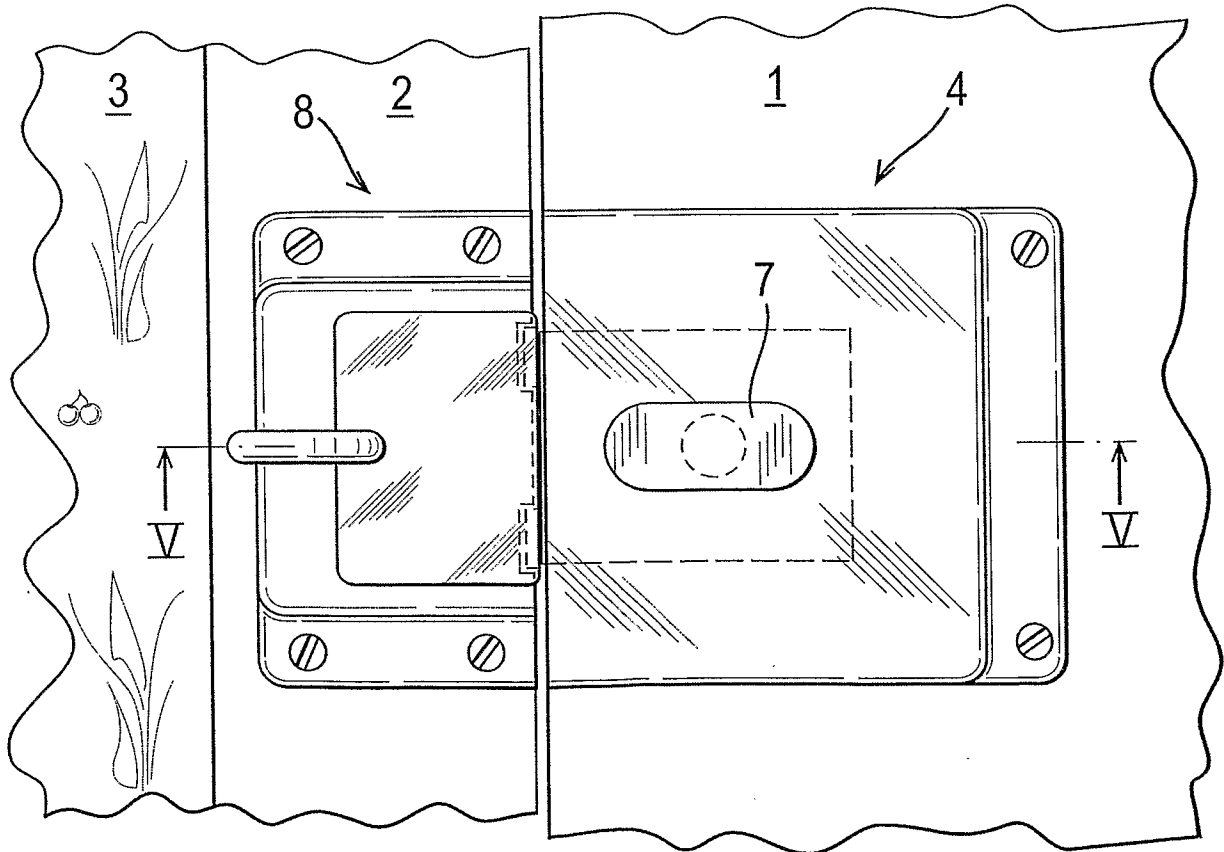


FIG. 4

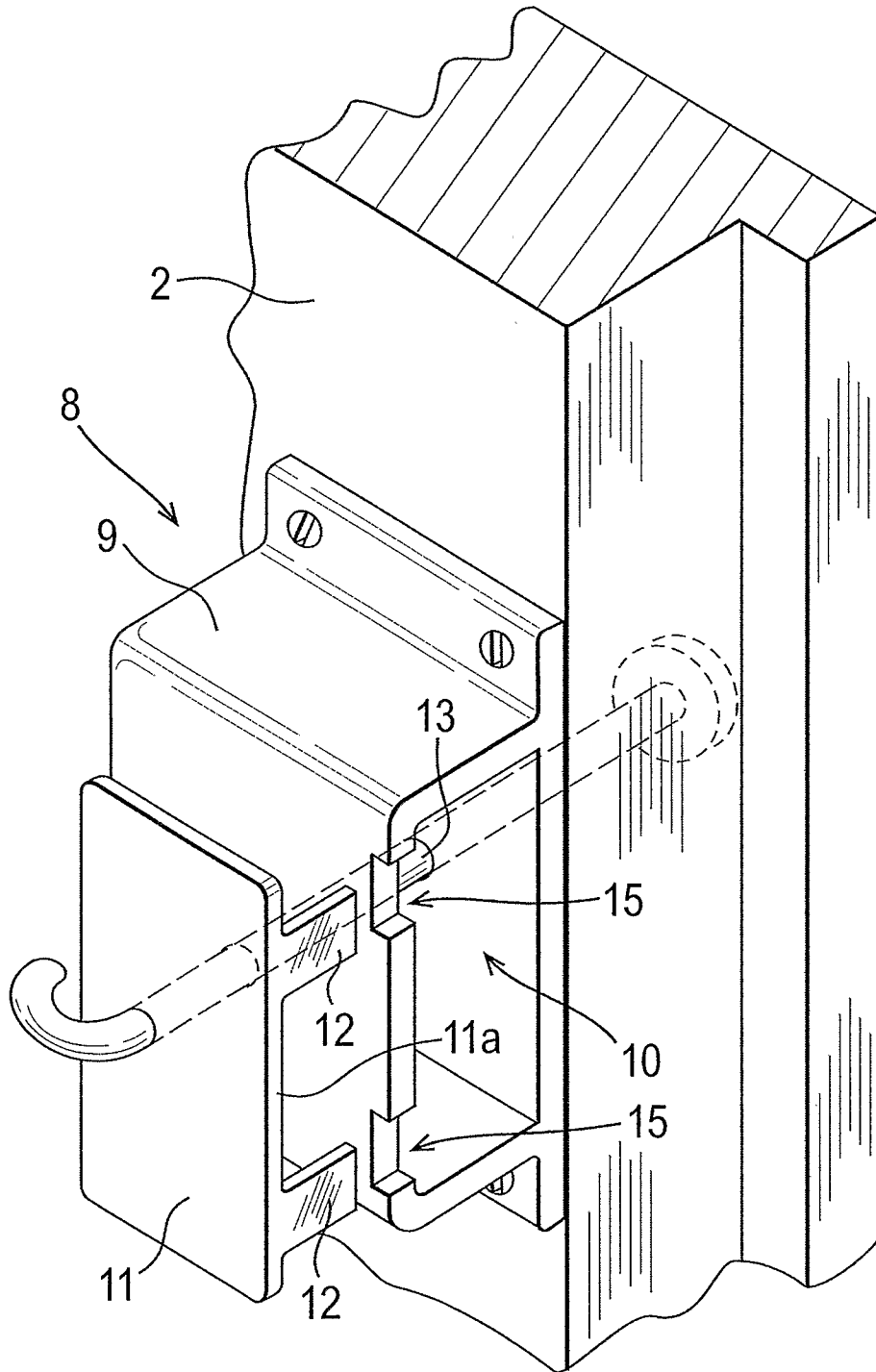


FIG. 5

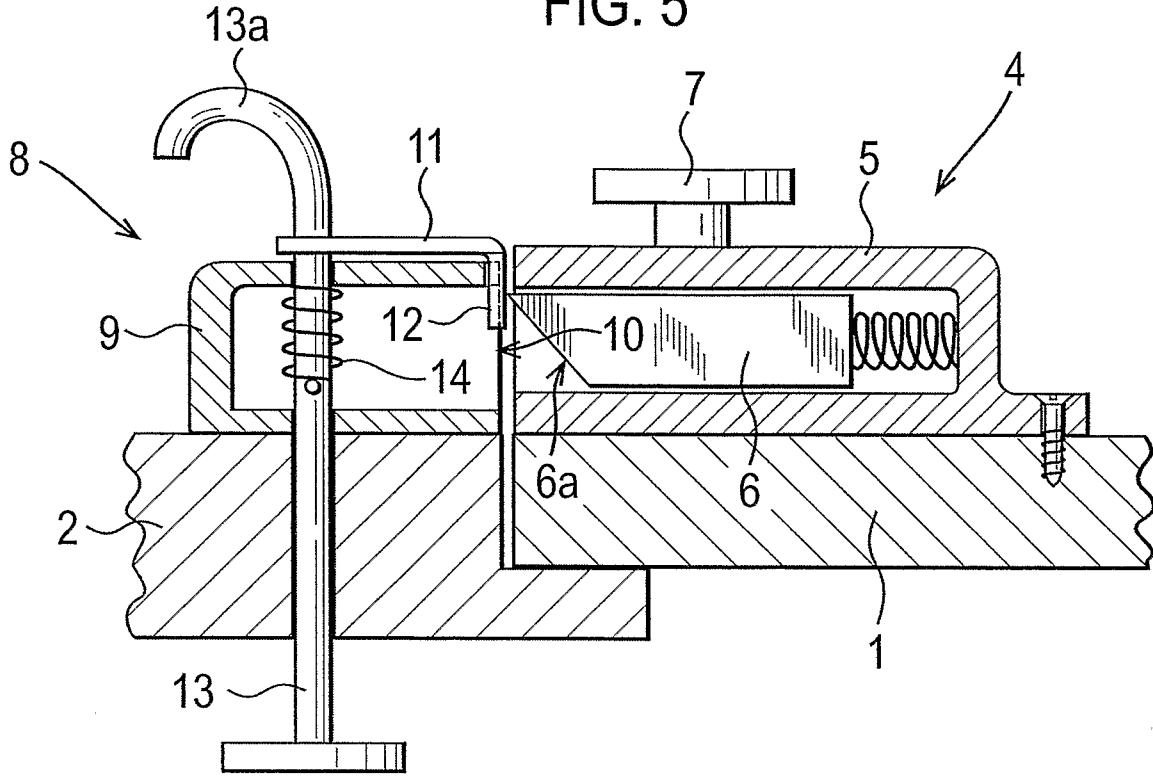
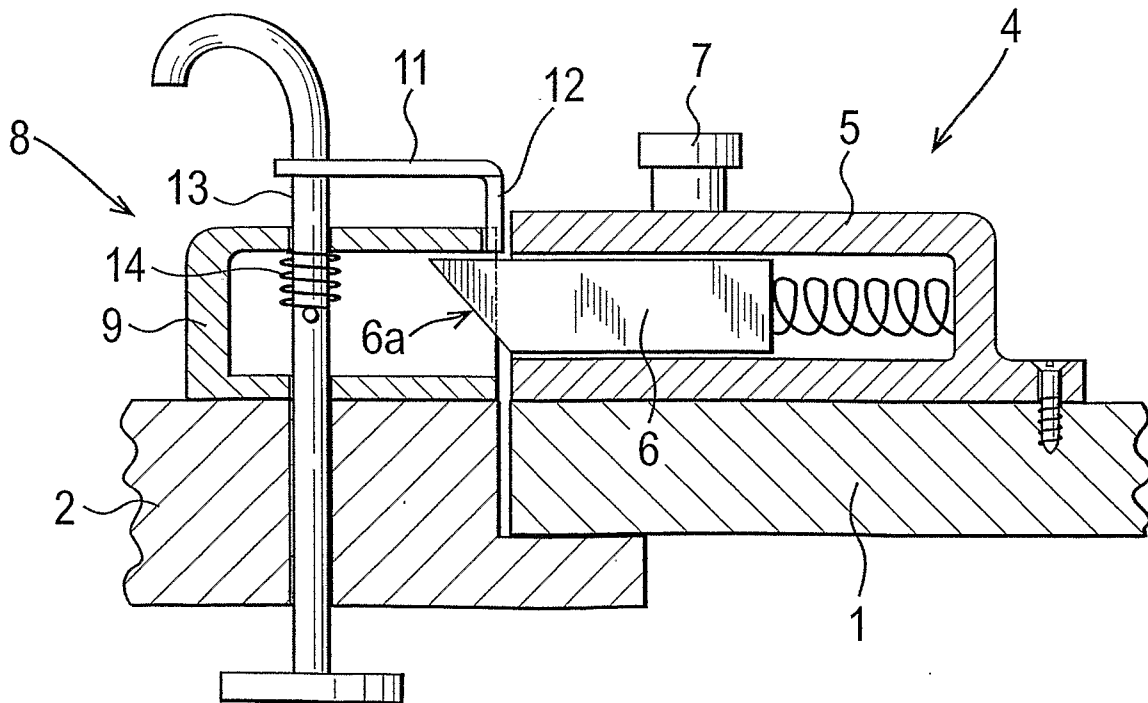


FIG. 6



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FIG. 7

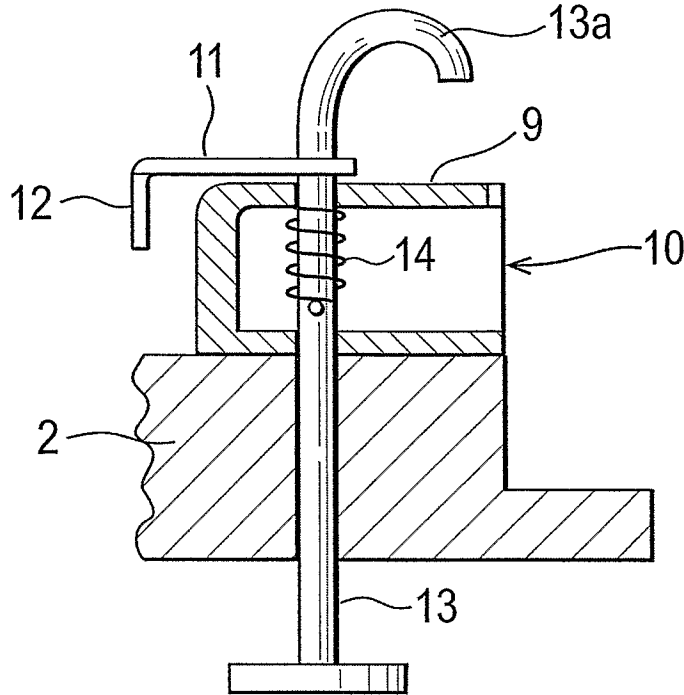


FIG. 8

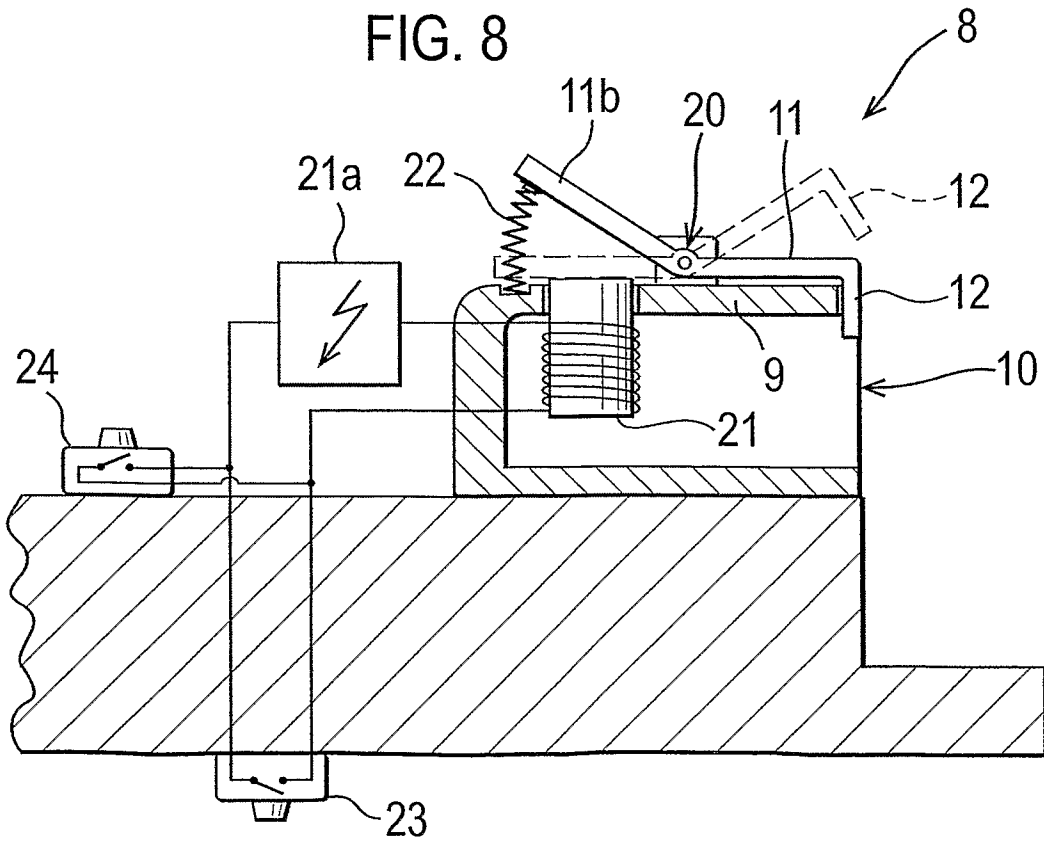


FIG. 9

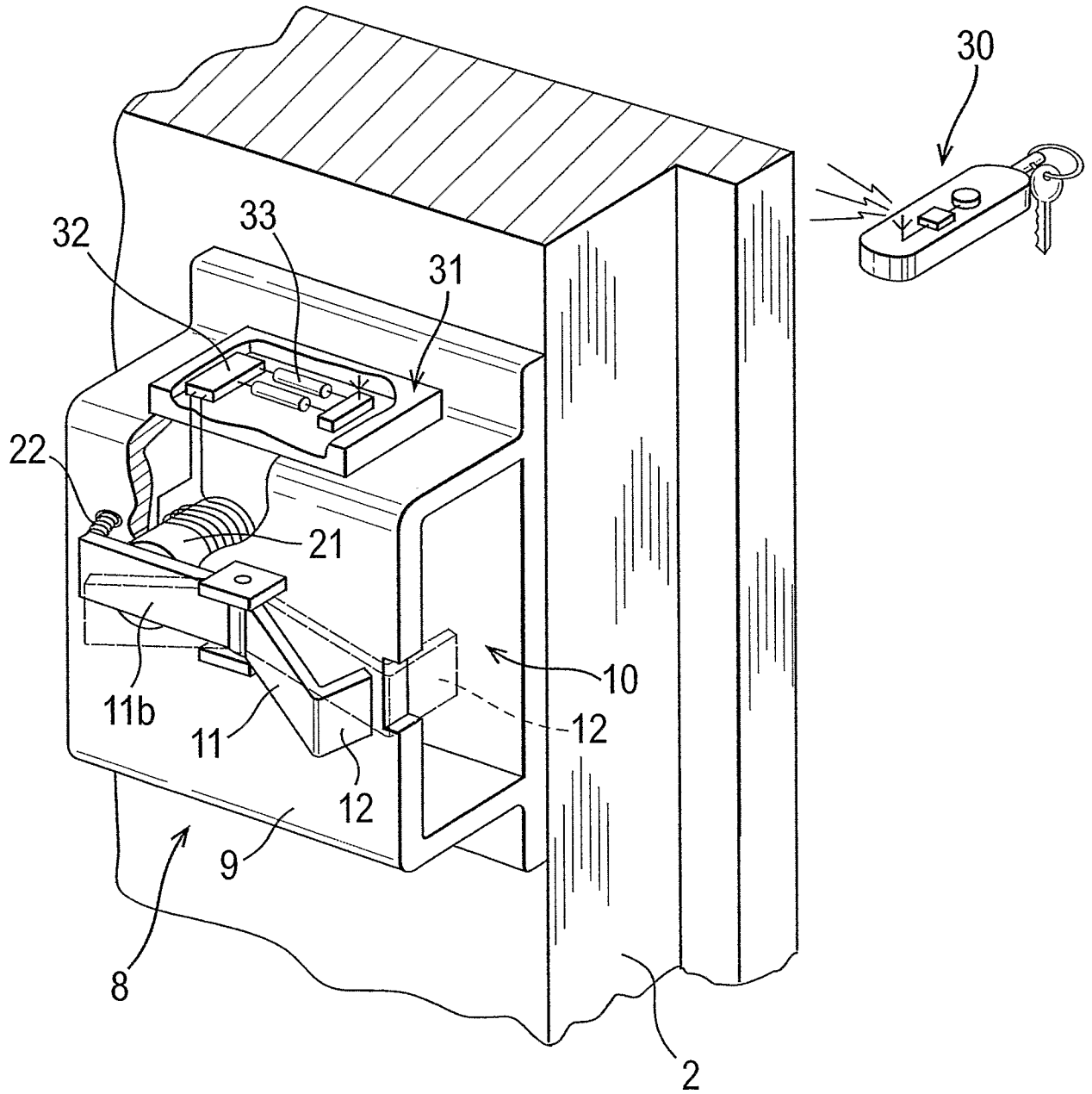


FIG. 10

