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Lock

The invention relates to a lock according to claim 1.

DE 30 32 086 A1 discloses a panic lock with a locking device controlling a lock latch and/or a lock bolt. An inner handle allows the locking device to be actuated in the opening direction in a panic situation. By means of a change-over device, which consists of a remotely controllable, electrically-, pneumatically-, or hydraulically-acting switching member, the panic function of the locking device can be switched off temporarily.

DE 43 40 537 C2 discloses a panic lock that is actuatable by a key and/or by an actuating handle with a split handle follower, nightlatch, tumbler, latch, and latch bolt arranged in a lock housing. An additional latch arranged between the latch bolt and the latch event protrudes, as do the latch and the latch bolt, against the restoring force of a spring element from an opening in the cuff. The additional latch is guided in a longitudinal slot on the bottom of the lock housing, and controls an automatic locking mechanism likewise arranged in the lock housing which locks the latch and the latch bolt against being pushed back when the door is closed. An actuating handle can be coupled for unlocking by an electric switching pulse.

A disadvantage is that the panic function is only provided from a lock side.

The object of the invention is to further improve a panic lock.

WO 2009/082778 A1 also describes a generic lock with a rocker switch, which can be adjusted in relation to the handle disc by means of a selector switch.

This object is achieved according through the features of claim 1.

The lock according to the invention comprises a lock mechanism which fulfils the panic function, i.e., that by actuating an actuating handle, such as a lever handle or a panic bar, both the bolt and the latch in the lock will be pulled back to enable an opening of the previously securely locked door.

The lock further has an arrangement for the releasing or the locking of the door which can be actuated electrically. As a result, it is possible to prevent an unauthorised opening of the door, but guarantees an opening of the door in case of danger. The release take place automatically, for example, through a fire alarm, as can be detected by a smoke alarm, or due to a power failure, if the release order operates in accordance with the closed current principle, wherein the release is blocked as long as the operating voltage is present. The release can also take place centrally, for example by one operator in a reception area, or by actuating an emergency button for opening the door. The emergency button is therefore advantageously arranged at or near the door.

An application in conjunction with an access control device is also possible, wherein the door can be opened with authorisation.

A divided handle follower for this purpose is arranged between the actuating handle and the

lock mechanism of the lock. It is thus also advantageous for an unlocking to take place if the actuating handle is already activated, so that before the release takes place, an energy storage is provided in which the energy introduced through the actuation up until the release is stored in the interim at least until the actuating handle is let go again.

It is envisioned that the lock is implemented for a one-way traffic, for example, in the case of an emergency and safety exit door, or for a two-way traffic, e.g., in connection with the access control device. For the two-way traffic, a three-part handle follower can be provided, each of which has a respective follower disc for each of the control handles. A control of the traffic from both sides of the door is thereby possible.

Particularly in the case of a door in escape and rescue routes that are equipped with a panic bar, it is advantageous that the lock is already released when the panic bar is actuated since a letting go and repeated actuation of the panic bar might not be possible due to persons pushing from behind.

A rocker switch interacts with the handle discs in order to release the lock and the rocker switch can be adjusted in relation to the handle disc by means of a selector switch. The selector switch according to the invention has a spindle, into which an extension of the rocker switch engages.

In a further embodiment, the lock can have a control device for the release that operates according to the working current principle, i.e., the control device, e.g., an electromagnet, is energised in order to release the lock. In the unenergised starting position, the lock is blocked. The control device can be connected to a fire or smoke alarm device in order to release the lock in case of a hazard, as can be envisioned with doors in escape and rescue routes.

It can also take place by a remote control for visitor management, for example, from a reception area, or it can be connected to an electronic access control system with the control device. Furthermore, a switch can be provided in the lock that can already be switched with light pressure on the actuating handle and thus controls the control device in order to release the lock. Alternatively, the control device can also operate according to the closed current principle. This is the lock is blocked when the control device, e.g., the electro-magnet, is energised. This is advantageous, since when used in a door in escape and rescue routes, the door will automatically be released for safety in the event of a power failure. This embodiment also can also have a switch, which however here is embodied as an opener, and upon actuation of the actuating handle interrupts the current through the electromagnets in order to release the lock.

In a further embodiment, the control device can have an arrangement with two electromagnets, wherein selection between an operating mode according to the closed current principle or the working current principle can be made by means of a selector switch. The selector switch can be embodied so as to effect the electrical switch-over from one electromagnet to the other.

In a further alternative embodiment of the lock, the electromagnet is arranged outside the lock in

the strike plate of the door, whereby advantageously no signal and power supply lines are required on the door leaf. In this way, the electromagnet acts directly on the magnetic armature thereof arranged in the area opposite the cuff in the lock, which in turn is embodied in order for release of the lock, to which end the magnet armature interacts with a trigger that releases a rocker switch in the lock.

The rocker switch is arranged to be adjustable by means of a selector switch, whereby in an embodiement with a three-part handle follower it is possible for the rocker switch to be associated with the desired follower disc and thus with the accompanying actuating handle. Independently of the release by the electromagnet, the release by the rocker switch can take place directly via the follower disc by the actuating handle. There is furthermore the possibility of placing the rocker switch in a middle position between the follower discs, whereby the release of the lock by the actuating handle is no longer possible.

In addition, a damping device can be provided, which dampens the pivoting movement of the follower disc with the result that the withdrawal of the bolt and the latch takes place with little noise.

Another embodiment of the lock has a system for bridging the storage spring, which is advantageous in opening the door in the event of a jamming of the lock, for example, due to damage or by wind pressure. Since the force to operate the lock that is available through the storage spring is limited, the actuating handle can be rigidly connected to the pressure lever by means of this system, whereby the force introduced to the actuating handle can act directly while bypassing the buffer spring on the bolt and the latch. The system for bridging the storage spring is embodied such that by releasing hold of the actuating handle, i.e., by briefly letting go and pressing the actuating handle, the direct coupling can be effected.

In a further embodiment of the lock, a time delay for the opening of the lock and/or an alarm system can be provided. In this way, both the time delay and the alarm system are embodied in a purely mechanical manner within the lock, so that no cable routing on the door leaf is required for electrical control and/or power supply lines. If the lock is actuated for opening the door by means of the actuating handle, the alarm system can effect a signal output, for example, an alarm siren, which will deter a person who wishes to use the door without authorisation. This would also alert persons in the vicinity. It is also possible to transmit a signal to a central monitoring device, e.g., in a reception area, whereby security staff can be informed.

The time delay can be started at the same time as an alarm signal by pressing down the actuating handle. The time delay effects a delay in the opening of the lock according to a certain alarm time.

The different variants can also be partially or completely combined with one another.

The dependent claims describe advantageous possible configurations of the invention.

Embodiments are described below in greater detail in the drawings found in the figures.

The figures show the following:

Fig. 1 is a side view of a lock with the lateral housing cover taken off;

Fig. 2 is a sectional view along the line II – II on the cuff of the lock according to Figure 1;

Fig. 3 is a single part of the handle follower of the lock according to Figure 1;

Fig. 4 is another single part of the handle follower of the lock according to Figure 1;

Fig. 5 is the lock according to Figure 1 with the lever handle actuated, wherein the lock is not released;

Fig. 6 is the lock according to Figure 1 with the lever handle actuated, wherein the lock is released;

Fig. 7 is a view of a three-part handle follower from the cuff into the housing. The parts lying in front of the handle follower are not shown;

Fig. 8 is a view of the lock according to Figure 1 with a control device according to the working current principle for remote-controlled release of the lock, in the blocked state;

Fig. 9 is the lock according to Figure 8 in the released state;

Fig. 10 is a further embodiment of a lock with a control device according to the closed current principle, in the blocked state;

Fig. 11 is the lock according to Figure 10 in the released state;

Fig. 12 is a further embodiment of a lock with a selector switch for control according to the closed current principle or the working current principle in a first switching state;

Fig. 13 is the embodiment according to Figure 12 in a second switching state;

Fig. 14 is a further embodiment of a lock with an external control on the strike plate and an option for access and with a damping device;

Fig. 15 is a view of the lock according to Figure 14 on the selector switch for setting the access from the cuff into the housing. The parts lying in front of the selector switch are not shown;

Fig. 16 is the lock according to Figure 14 with an arrangement for bridging the storage spring in the blocked state;

Fig. 17 is the lock according to Figure 16 in the released state;

Fig. 18 is an enlarged view of the follower disc of the lock according to Figures 16 and 17;

Fig. 19 is an enlarged view of the pressure lever of the lock according to Figures 16 and 17;

Fig. 20 is another embodiment of a lock with an alarm system, and a time delay for the delayed triggering of the lock in the unactuated, blocked state;

Fig. 21 is the lock according to Figure 20 in the released, actuated state;

The examples in the Figs. 1 through 13 are not part of the invention, but rather are objects that facilitate the understanding of the invention.

In Fig. 1 is a lock 1 shown in the side view, with a housing 2 and a cuff 3, with which the lock 1

can be fixed in a lock mortise of a door leaf in a known manner. The housing 2 is shown open and substantially comprises a lock mechanism with a bolt mechanism 5 which fulfils the panic function, and when the lock 1 is actuated by an actuating handle 9, which here is embodied as a lever handle, pulls back the bolt 7 of the door that to be burglar-resistant is lockable via the locking cylinder 6. The pulling back of the bolt 7 and latch 8 is also possible by actuating the locking cylinder 6 by a mechanism not shown here. The actuating handle 9 is indicated in dashed lines in the figures to show the underlying parts. The lock mechanism also comprises a latch 8 which can also interact with the actuating handle 9. The bolt 7 and the latch 8 also engage in a strike plate 4 in the blocked state, which is arranged in a known manner in the door frames, or on the opposite facing door leaves in double-leaf doors.

Between the actuating handle 9 and the bolt mechanism 5 is arranged a divided handle follower 10. The handle follower 10 comprises a follower disc 11 and a pressure lever 12, which lie in the pivot axis of the actuating handle 9 and are arranged to be rotatable with respect to one another. The follower disc 11 and the pressure lever 12 are shown as a single part in Figs. 3 and 4.

On the follower disc 11 is a seating 13 for the seating of a mandrel of the actuating handle 9 (not shown here), usually embodied as a square and arranged to be rotationally fixed, whereby when the actuating handle 9 pivots, the follower disc 11 rotates along with the lever handle 9 in the pivot direction thereof. For the return of the actuating handle 9, the follower disc 11 is supported in the horizontal starting position with an extension 22 on a return spring 14, not detailed further here, and supported at the other end in the housing 2. A stop 23 for the extension 22 is provided in the housing 2 for the fixing thereof in the horizontal starting position of the actuating handle 9.

The pressure lever 12 comprises two lever arms 12.1, 12.2, wherein the first lever arm 12.1 of the pressure lever 12 interacts with the latch 8. The latch 8 has a guide 24, in which a pin 25 engages for the guiding of the latch 8. The latch 8 is further supported against the lever arm 12.1 on a spring 26, which enables a pushing back of the latch 8 that is required when the door leaf is closed. A pivoting of the pressure lever 12 with the lever arm 12.1 effects a pulling back of the latch 8 in the housing 2 of the lock 1, whereby the latch 8 comes out of engagement with the strike plate 4.

The second lever arm 12.2 engages in the bolt mechanism 5 for the actuation thereof. The structure of the latch mechanism 5 is thus arbitrary and therefore is not further shown. The pulling back of the bolt 7 into the housing 2 is triggered through pivoting of the pressure lever 12 with the lever arm 12.2 engaged in the bolt mechanism 5, and the bolt 7 comes out of engagement with the strike plate 4. On the pressure lever 12 is further provided an extension 22', which in its starting position is likewise in abutment with the stop 23. The return to the

starting position takes place as a result of restoring forces of the bolt mechanism 5 and/or by the return spring 14 that act on the lever arm 12.2 of the pressure lever 12.

The lock 1 has an arrangement to release or to lock out the opening of the door, which can be electrically actuated, to prevent unauthorised opening of the door but to enable opening of the door in the case of a hazard.

It is advantageous to have an emergency button to on or near the door for the release thereof. Additionally or alternatively, the release can take place automatically, for example, by a fire alarm, as can be detected by a smoke alarm. If the release device operates according to the closed current principle, wherein the release is blocked as long as the operating voltage is present, a release takes place automatically in the case of power failure. Furthermore, the release can also take place centrally, for example by an operator in a reception area, or by an access control device, e.g., in conjunction with a card reader, etc.

The release device comprises a lug 21 provided on the pressure lever 12, which interacts with an indentation on a trigger lever 18. Alternatively, a notch can also be provided in the pressure lever 12 for engagement with the trigger lever 18. The trigger lever 18 is rotatably mounted on a bearing 20 and is accommodated in a trigger 19 when there is no release. The blocked position is shown in Fig. 1, wherein the pressure lever 12 is blocked against rotation by the release device.

For the coupling of the divided handle follower 10, a storage spring 15 is arranged between the follower disc 11 and the pressure lever 12 The storage spring 15 is thus partly accommodated in a recess 16 of the follower disc 11 and in a recess 17 of the pressure lever 12, as is shown along the line II–II in the sectional view of Fig. 1, through the follower disc 11 and the pressure lever 12 in Fig. 2. The recess 16 can thus be embodied to reach completely through the follower disc 11 or only as a cavity in the follower disc 11. The recess 17 can also be embodied as a cavity in the pressure lever 12 or to reach completely through the pressure lever 12. In addition to the coil spring shown in the figures, for example, a spiral spring, plate spring, or leg spring can be used in a similar arrangement to the same effect as a storage spring 15. The return spring 14 can also be embodied accordingly. Elastomers can likewise be used as spring elements. Alternatively, also only one of the recesses 16, 17 can be provided, wherein a tappet can also be provided on follower disc 11 or the pressure lever 12, which interacts with the storage spring 15, which is particularly advantageous when a spiral spring is used. In a further configuration, the storage spring 15 washer can be arranged outside the follower disc 11 and/or the pressure lever 12, at least partially encompassing same. Also conceivable is an arrangement of a plate spring, the corresponding ends of which are fixed to the follower disc 11 and the pressure lever 12.

Fig. 5 shows the lock 1 with the actuating handle 9 held down, wherein there is no release of

the lock 1. The follower disc 11 that connected to the actuating handle 9 in a rotationally fixed manner via the recess 13 is rotated vs. the return spring 14 in a clockwise direction into the position shown in Fig. 5. Through the partial arrangement of the storage spring 15 both in the recess 16 of the follower disc 11 as well as in the recess 17 of the pressure lever 12, the storage spring 15 is compressed by the rotation of the follower disc 11 because the pressure lever 12 is blocked from rotation in that it is supported by its lug 21 on the trigger lever 18. The energy introduced by the actuation of the actuating handle 9 for the opening of the door is thus first stored in the storage spring 15.

The release of the lock 1 for opening the door takes place by the actuated actuating handle in that the trigger 19 in Fig. 6 pivots in the counter-clockwise sense. This can be effected, for example, by switching off of one of the electromagnets, which is not further shown here in the figure. In this way, the trigger lever 18 arranged to be rotatable about the bearing 20 becomes free, and the pressure lever 12 acted upon thereby is lifted from the lug 21 by the storage spring 15 in the clockwise sense. Through the now possible rotational movement of the pressure lever 12, the lever arm 12.1 pushes the latch 8 into the housing 2 of the lock 1, and in a manner not further represented here, the lever arm 12.2 actuates the bolt mechanism 5 whereby the return of the bolt 7 into the housing 2 takes place. Since now both the bolt 7 and the latch 8 are retracted, the door is openable.

The return of the trigger lever 18 back to its starting position, wherein this is accommodated in the trigger 19 takes place through the lug 21 with reverse rotation of the pressure lever 12.

The return of the trigger lever 18 back to its starting position, wherein this is accommodated in the trigger 19 takes place through the lug 21 with reverse rotation of the pressure lever 12.

Also conceivable is a three-piece handle follower 10, wherein the respective follower disc 11, 11' is arranged on both sides of the pressure lever 12 with the correspondingly assigned return springs 14, 14' and storage spring 15, and respectively connected to an actuating handle 9, as shown in Fig. 7. Thus, for example, in connection with an access control, a control of the traffic from both sides of the door is possible, wherein the respectively assigned trigger lever 18 can be provided with trigger 19.

Figs. 8 through 11 show further examples wherein the lock 1 has a control device 27 for the release. Figs. 8 and 9 show a control device 27 which operates according to the working current principle, wherein an electromagnet 28 is energised in order to release the lock 1. The electromagnet 28 has a pivotable magnet armature 29, which is acted on by a spring 30, in order to return the metal anchor 29 to the starting position after switching off the current. The previously described trigger 19 is arranged on the magnet armature 29 or formed on this as a single piece. The lock 1 is blocked in the unenergised starting position, as has already been described above in relation to the Figs. 1 through 5, wherein the trigger lever 18 is

accommodated in the trigger 19.

If the electromagnet is energised, the magnet armature 29 is pivoted with the trigger 19 and the trigger lever 18 is released, as shown in Fig. 9. The power supply to the electromagnets 28 can be effected in various ways. In this way, the electromagnet 28 is connected with a fire or smoke alarm device, whereby the lock 1 will be released in the event of a hazard, as is provided with doors in escape and rescue routes. It can also take place by remote control for visitor management, for example, from a reception area, or it can be connected to an electronic access control system with the control device 27. A switch 31 can be provided in connection with the above-mentioned devices or alone, which can be actuated even with light pressure on the actuating handle 9, and can thus charge the electromagnets 28. This can take place by means of a contour embodied on the follower discs 11, 11' that is controlled by a switch 31 embodied as a microswitch. The switch 31 can also be embodied as a reed contact switch, wherein an assigned magnet can be arranged on or in the follower disk and can interact with the reed contact switch.

When the actuating handle 9 is held down, the return of the bolt 7 and the entry of the latch 8 will then be effected. The actuation of the actuating handle 9 only takes place after the release of the lock 1 by the energisation of the electromagnets 28, and the return of the bolt 7 and the entry of the latch 8 will then be effected by the actuation through the then already released coupling of the follower discs 11, 11' and the pressure lever 12.

In Figs. 10 and 11 is shown a control device 27 which operates according to the closed current principle. The lock 1 is thus blocked when the electromagnet 28 is energised. This is advantageous, since when used in a door in escape and rescue routes, the door will automatically be released for safety in the event of a power failure. Fig. 10 shows the pivotably mounted magnet armature 29 formed from two lever arms, whereby the trigger 19 is secured from pivoting with respect to the trigger lever 18. If the power supply to the electromagnets 28 is interrupted, the magnet armature 29 will be pivoted by the spring 30, whereby the trigger lever 18 will reach out of the recess of the trigger 19 and become free, as is shown in Fig. 11. A switch 31 can also be provided in this configuration, although it is embodied here as an opener and upon actuation will interrupt the current through the electromagnets 28 for release. It is conceivable to have an additional external switch which communicates with the switch 31, whereby the function of switch 31 is controllable and a configuration of the lock is enabled.

The trigger 19 being supported against a spring 42 is pivotally arranged on the magnet armature 29. It is thus guaranteed that, regardless of the position of the magnet armature 29, the trigger lever 18 can snap into the trigger 19 if the trigger lever 18 can be pivoted by the releasing of pressure on the actuation handle 9 and the rotating back of the pressure lever 12 by the return springs 14, 14' with the lug 21 in its locked position.

Figs. 12 and 13 show an arrangement with two electromagnets 28, 28' arranged at an angle to one another, wherein selection between an operating mode according to the closed current principle or the working current principle can be made by means of a selector switch 32. The linkage of the spring 30 can be changed with the rotatable selector switch 32 so that at least one of the lever arms of the magnet armature 29, here arranged at nearly right angles to one another, can be pressed in the direction of either the electromagnets 28 or the electromagnets 28'. The selector switch 32 can at the same time effect the electrical switching from one to the other of the electromagnets 28, 28'.

Figs. 14 and 15 show a lock according to the invention, wherein at least one of the electromagnets 28, 28' is located outside the lock 1 in the strike plate 4 of the door. The magnet armature 29 is arranged opposite the electromagnet 28, directly in the area of the cuff 3. In turn, the trigger 19 is arranged on the magnet armature 29, pivotally loaded with a spring 42. This embodiment further has a selector switch 33 that interacts with a rocker switch 34 which is embodied as a pivotably mounted, two-armed lever. A first lever arm interacts with the trigger 19, while the second lever arm interacts with the follower discs 11, 11', which are embodied as cam discs, through which the rocker switch 34 is pivotable with respect to a spring 35. Furthermore, am extension 40 is arranged on the rocker switch 34 which engages in a spindle 41 of the selector switch 33. The extension 40 of the rocker switch 34 - and thus the rocker switch 34 itself - is adjustable in its position along the pinion shaft 41 with respect to the follower discs 11, 11' by rotating the selector switch 33. In an embodiment of a lock 1 with a three-part handle follower, as is described in Fig. 7, this enables the triggering of the trigger 19 alternatively assigned to the follower disc 11 or the follower disc 11' and thus to the associated actuating handle 9. Independently of the release by the electromagnet 28, the release by the rocker switch 34 can take place directly via the follower discs 11, 11' by the actuating handle 9. Another possibility is to adjust the rocker switch 34 to a position outside the range of one of the follower discs 11, 11', for example, in a middle position between the follower discs 11 and 11', whereby the release of the lock 1 by the actuating handles 9 would no longer be possible.

Fig. 14 furthermore shows a damping device 36, which dampens the pivoting movement of the follower disc 12 with the result that the withdrawal of the bolt 7 and the latch 8 takes place with little noise. To this end, a piston 37 is guided into a cylinder 38 which has a piston rod 39 that is guided through a front wall of the cylinder 38 in a sealing manner. The piston rod 38 is connected with the pressure lever 12 and engages lever arm 12.2. Alternatively, the piston rod 39 can also engage in the area of the lever arm 12.1 or otherwise on the pressure lever 12. The damping device 36 is location independent and can, for example, be arranged vertically.

Figs. 16 and 17 show a further embodiment configuration of the lock 1 with a system to bypass the storage spring 15. Should the lock 1 jam, for example, due to damage or wind pressure, it is

possible by this system for the actuation handle 9 to be rigidly connected with the pressure lever 12, whereby the force introduced to the actuation handle 9 can act directly on the bolt 7 and the latch 8. In this way, rotational movements with respect to one another of the follower discs 11, 11' and the pressure lever 12 of the divided handle follower 10 can be blocked.

When the actuating handle 9 is pressed, in the manner described above, tension is first applied to the storage spring 15, which can be released for opening by the control device 27. If, for the above reasons, opening is not possible despite the release because the spring force of the storage spring 15 is insufficient to withdraw the bolt 7 or the latch 8, the bypass of the storage spring 15 can be effected by releasing hold of the actuating handle 9.

The system for bypassing the storage spring 15 is formed by means of a pivotably arranged catch 44 that is tensioned by a spring 45. The catch 44 is arranged in the follower discs 11, 11' and engages in a guide 47 of the pressure lever 12. The tensioning of the catch 44 by the spring 45 is directed outward, i.e., away from the centre of the follower disc 12. In the blocked condition of the lock 1, wherein the trigger lever 18 is accommodated in the trigger 19, the catch 44 is held down against the force of the spring 45 by a slider 43 arranged on the trigger lever 18. If the actuating handle 9 is pressed, the catch 44 moves in the guide 47, to which end the catch 44 is stepped in the area of the guide 47, as is shown in Fig. 19. Fig. 19 shows a cross-section of the catch 44 in the plane of the pressure lever 12.

If the lock 1 is released by the control device 27, the catch 44 cannot initially pivot outwards because the when the actuating handle 9 is pressed the catch 44 is accommodated in a narrow region of the guide 47, in the right-hand area of the guide 47 in Figure 19. If the bolt 7 or latch 8 is not now withdrawn, since the spring force of the storage spring 15 is insufficient, once releasing hold of the actuating handle 9, i.e., once the actuating handle 9 is let go, the catch 44 in the vicinity of the starting position of the actuating handle 9 is in an expanded region to the left of the lug 46 in the guide 47 and can pivot outwards. Then, due to the spring 45 embodied as a leg spring, the catch 44 reaches behind the lug 46 on the pressure lever 12. Several lugs 46 can be arranged in a stepped manner, whereby releasing hold of the actuating handle 9 in several steps becomes possible.

A renewed pressing down of the actuating handle 9 through this engagement of the catch 44 on the lug 46 has the effect that the follower discs 11, 11' are connected directly, i.e., are coupled, to the pressure lever 12 to the exclusion of the storage spring 15. The force of the actuating handle 9 is thus introduced directly to the pressure lever 12 via the follower discs 11, 11', the catch 44, and the lug 46, which can withdraw the latch 8 and/or the bolt 7 with the lever arm 12.1 or 12.2. A pin 48 is furthermore also arranged, which is provided so that once the actuating handle 9 is let go, the catch 44 will pivot back in the inwards direction against the spring 45 toward the centre of the follower discs 11, 11'. After blocking the lock 1 by the control device 27,

the catch 44 is again held down by the slider 43, whereby the follower discs 11, 11' and the pressure lever 12 are decoupled and an actuation of the actuating handle 9 will once again tension the storage spring 15.

Figs. 20 and 21 show a further embodiment of the lock 1 wherein a time delay 49 for the opening of the lock 1 and an alarm system 50 are provided, resulting in a pre-alarm before the opening is possible. In this way, both the time delay 49 and the alarm system 50 are embodied within the lock 1 in a purely mechanical manner, so that no cable routing on the door leaf is required for electrical control and/or power supply lines. However, an external arrangement for the electronic time delay is also conceivable. When the lock 1 is actuated for opening the door by means of the actuating handle 9, a signal output can thus be effected by the alarm system 50. This can be, for example, an alarm siren, which will possibly deter a person who wishes to use the door without authorisation, or would trigger a signal to a monitoring device in a reception area, whereby security staff would be informed.

To this end, the alarm device 50 has in the lock 1 a magnet 52 that is slidably mounted against a spring 51, which interacts with a magnetic field sensor 53, for example, a reed contact or a Hall element, which can be arranged in the strike plate 4 on the side of the frame. The spring 51 and the magnet 52 are managed in a sleeve 54 fixed in the lock 1. The magnet 52 is connected with a traction rod 55 that has a traction head 56 at the end thereof, which in resting position of the actuating handle 9 bears against an extension 57 of the follower disc 11, 11', whereby the magnet 52 is moved away from the cuff 3 against the force of the spring 51 and the magnetic field sensor 53 is not activated.

If the extension 57 of the follower disc 11, 11' pivots due to an actuation of the actuating handle 9 clockwise sense, as is shown in Fig. 21, the magnet 52 moved in the direction of the cuff 3 by the spring 51, whereby the magnetic field sensor 53 is activated to output a signal.

At the same time as this alarm signal is output, the time delay 49 is started by actuating the actuating handle 9, which serves to delay the time of opening the lock 1 so that the alarm is first output for a certain period of time before the opening. To this end, it is envisioned that the time delay 49 introduces into the lock mechanism the energy stored in the storage spring 15 with a delay after pressing the actuating handle 9. The purely mechanical time delay 49 consists of a damping element in a cylinder 58 with a slidably arranged piston 59 on which a traction rod 60 is arranged. The traction rod 60 likewise has a traction head 56 at the end thereof which interacts with the extension 57 of the printer disc 11, 11'. On the traction rod 60 is furthermore arranged a tappet 61, which interacts with rocker switch 34 into which it is designed to fit. It is also possible to use alternative damping elements.

If the actuating handle 9 is pressed so that the extension 57 of the printer disc 11, 11' pivots in the direction of the cuff 3, the piston 59, tensioned by the spring 62, that is in the cylinder 58

likewise moves in the direction of the cuff 3. The piston 59 is guided with a small gap to the inner wall of the cylinder, whereby a damping of the sliding movement of the piston 59 is effected due to forced slow overflow of air from one side of the piston to the other side of the piston in the cylinder 58, to which end a borehole or a valve can be provided in the piston 59. A damping medium other than the ambient air can also be envisioned, e.g., oil. Through the sliding movement of the piston 59 and traction rod 60, after a certain period of time the tappet 61 reaches abutment with the rocker switch 34 and pivots same clockwise. As a result, the trigger 19 is actuated and the trigger lever 18 becomes free, whereby the lock 1 is now released after a time delay with respect to the actuation of the actuating handle 9, and the bolt 7 and the latch 8 are retracted.

Upon the letting go of the actuating handle 9, a pivoting back of the extension 57 of the follower disc 11, 11' is effected by the return spring 14. As a result, the extension 54 reaches abutment with the traction heads 56 of the traction rod 55 of the alarm system 50 and of the traction rod 60 of the time delay 49, whereby the magnet 52 and the piston 59 are each moved back to the respective starting positions thereof.

To this end, a valve arrangement can be provided in the piston 59 of the time delay 49 which permits a slight backward movement into the starting position with the actuating handle 9 unactuated, while a larger opening in the piston 59 is released.

At the same time, the tappet 61 on the traction rod 60 disengages with the rocker switch 34, whereby the re-locking of the lock 1 is enabled by the trigger lever 18 snapping into the trigger 19.

Of course, the variants shown in the various exemplary embodiments can be combined with one another.

List of Reference Symbols

1	Lock
2	Housing
3	Cuff
54	Strike plate
5	Bolt mechanism
6	Locking cylinder
7	Bolt
8	Latch
109	Actuating handle
10	Handle follower
11, 11'	Handle disc
12	Pressure lever
12.1	Lever arm
1512.2	Lever arm
13	Seating
14, 14'	Return spring
15	Storage spring
16	Recess
2017	Recess
18, 18'	Trigger lever
19	Trigger
20	Bearing
21	Lug
2522, 22'	Extension
23	Stop
24	Guide
25	Pin
26	Spring
3027	Control device
28,28'	Electromagnet
29	Magnet armature
30	Spring
31	Switch
3532	Selector switch
33	Selector switch

34, 34' Rocker switch
35 Spring
36 Damping element
37 Piston
538 Cylinder
39 Piston rod
40 Extension
41 Spindle
42 Spring
1043 Slider
44 Catch
45 Spring
46 Lug
47 Guide
1548 Pin
49 Time delay
50 Alarm system
51 Spring
52 Magnet
2053 Magnetic field sensor
54 Sleeve
55 Traction rod
56 Traction head
57 Extension
2558 Cylinder
59 Piston
60 Traction rod
61 Tappet
62 Spring

Lås

Patentkrav

1. Lås (1), med en låsemekanik, der styrer en falle (8) og/eller en rigel (7), med i det mindste et betjeningsgreb (9), der kan kobles til låsemekanikken til betjening af fallen (8) og/eller af riglen (7) ved hjælp af en frigivelsesanordning, hvor betjeningsgrebet (9) er forbundet drejefast med i det mindste en håndtagsskive (11, 11‘) i en håndtagsspindel (10), hvor en vippekontakt (34) samvirker med håndtagsskiven (11, 11‘) til frigivelse af låsen (1), og hvor vippekontakten (34) kan indstilles i forhold til håndtagsskiven (11, 11‘) ved hjælp af en omskifter (33),
kendetegnet ved, at omskifteren (33) er forsynet med en spindel (41), som en forlængelse (40) på vippekontakten (34) griber ind i.

2. Lås ifølge krav 1,
kendetegnet ved, at håndtagsskiven (11, 11‘) er udformet som en knastskive.

3. Lås ifølge krav 1 eller 2,
kendetegnet ved, at skiftevippen (34) samvirker med en udløser (19) til frigivelse af låsen (1), hvorved der foretages en frigivelse ved hjælp af det tilordnede betjeningsgreb (9).

4. Lås ifølge krav 1,
kendetegnet ved, at indstillingen af vippekontakten (34) i forhold til håndtagsskiven (11, 11’) foretages ved hjælp af omskifteren (33) ved drejning.

5. Lås ifølge krav 1,
kendetegnet ved, at vippekontakten (34) kan indstilles uden for området af en håndtagsskiverne (11, 11‘), idet en frigivelse af låsen (1) ved hjælp af et af betjeningsgrebene (9) ikke er mulig.

6. Lås ifølge krav 5,
kendetegnet ved, at vippekontakten (34) kan indstilles til en midterstilling mellem håndtagsskiverne (11, 11’).

7. Lås ifølge et af kravene 1 til 6,
kendetegnet ved, at betjeningsgrebet (9) er koblet til låsemekanikken til betjening af fallen (8) og/eller af riglen (7) ved hjælp af i det mindste en lagerfjeder (15), hvor lagerfjederen (15) oplades ved betjening af betjeningsgrebet (9), og hvor overførslen af energien, der er lagret i lagerfjederen (15), til betjening af låsemekanikken frigives med frigivelsesanordningen i åbningsretningen.

Fig. 1

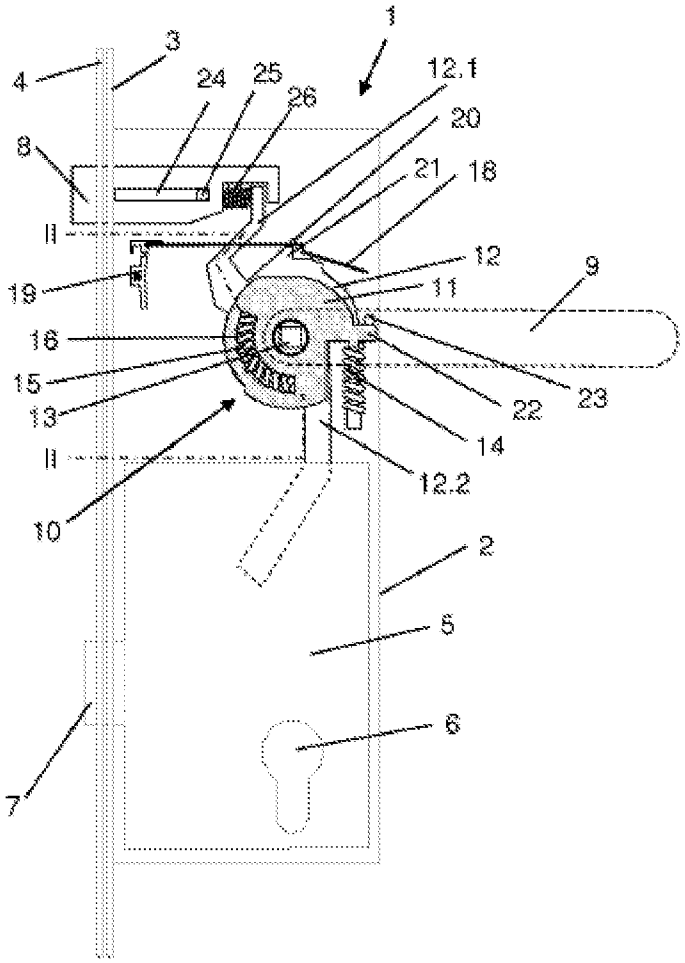


Fig. 2

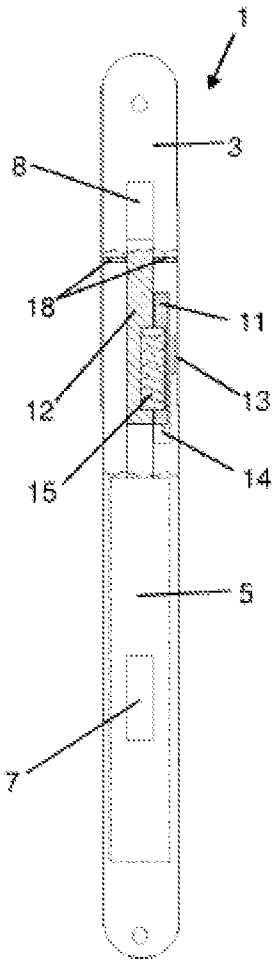
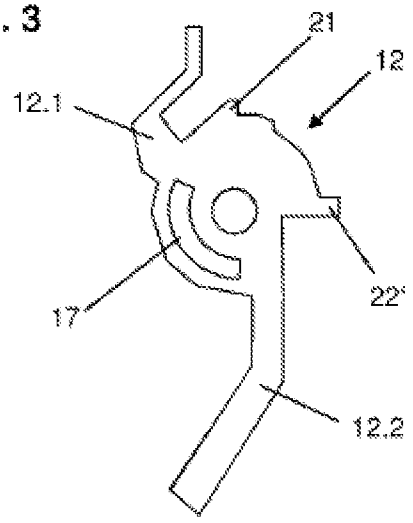


Fig. 3



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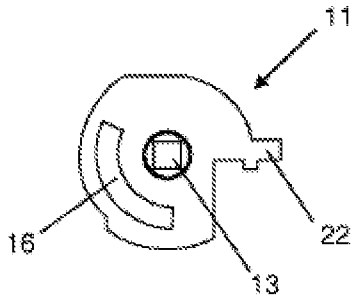

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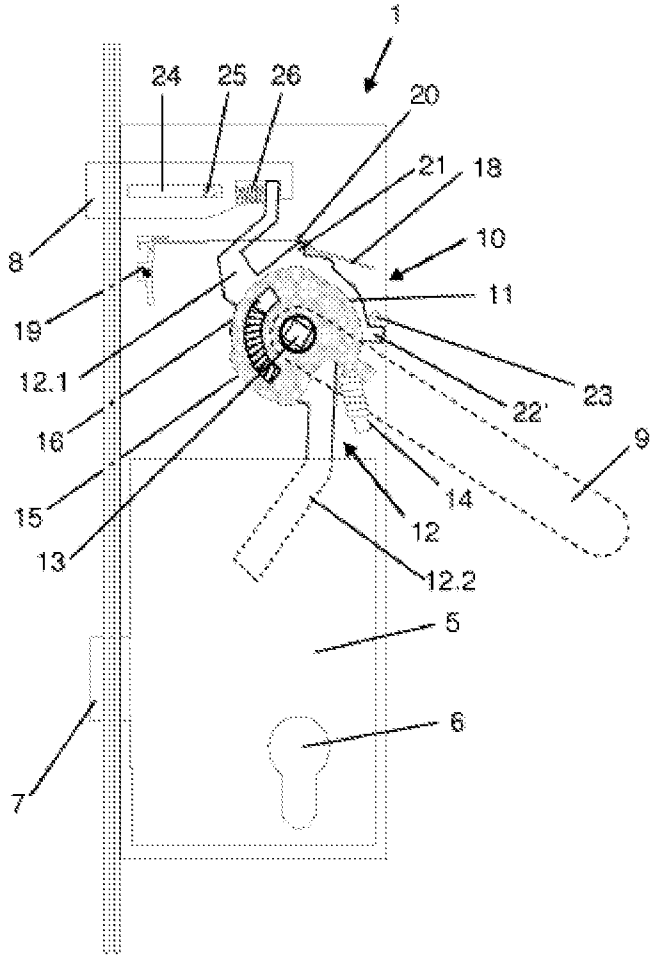

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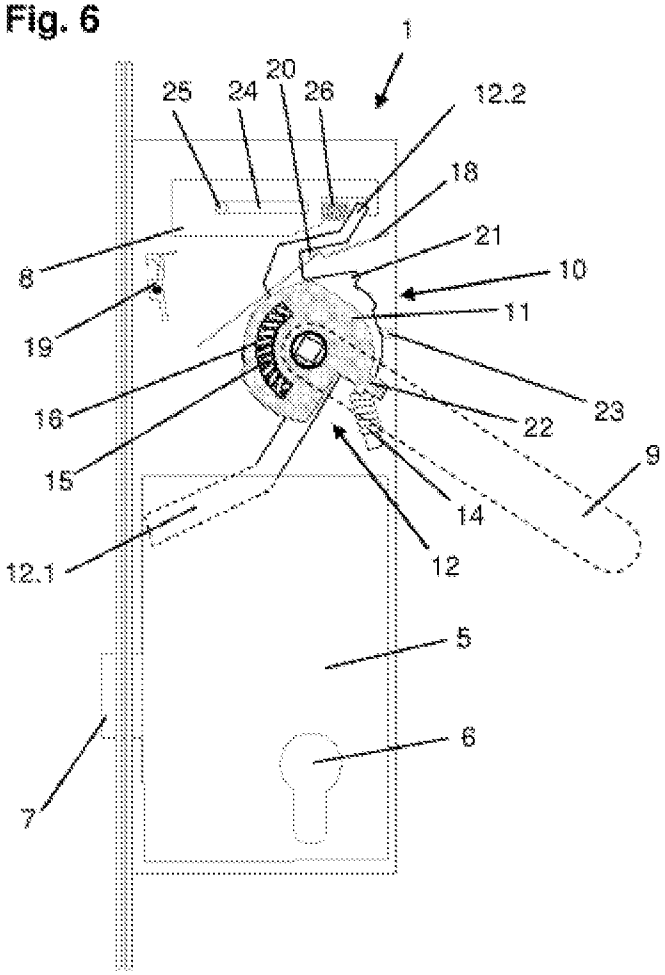
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12.2
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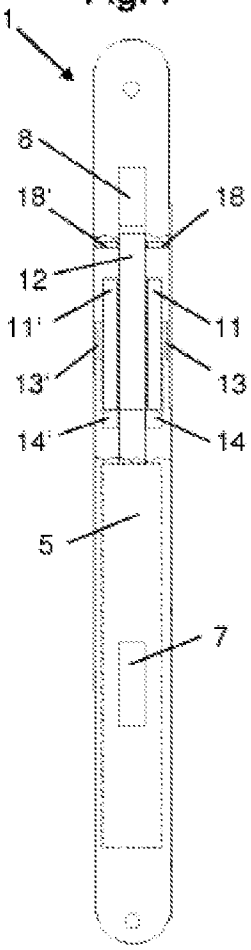
Fig. 7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11'
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14'
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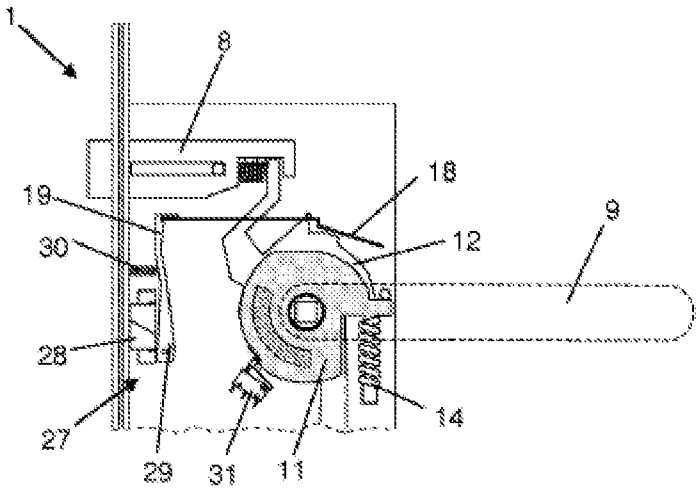
Fig. 8



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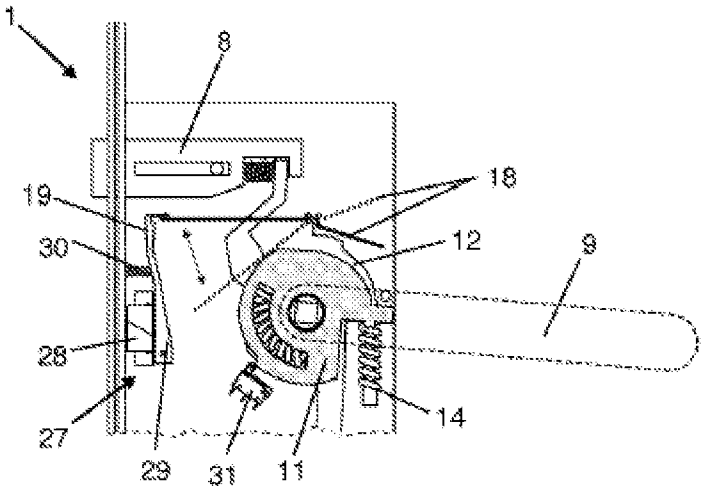

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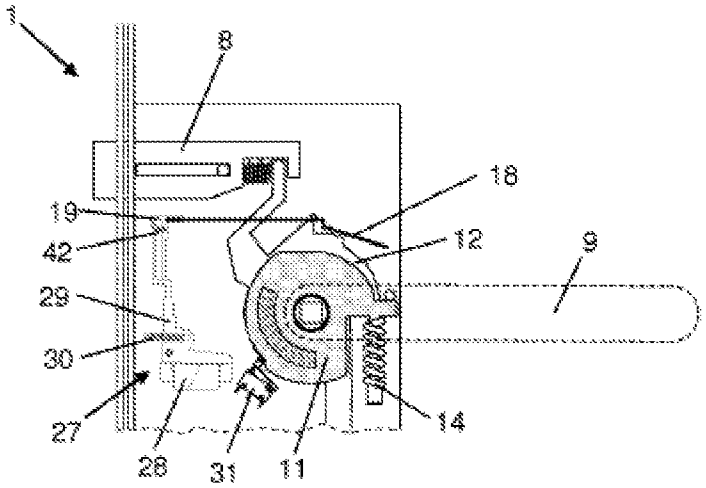
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Fig. 11

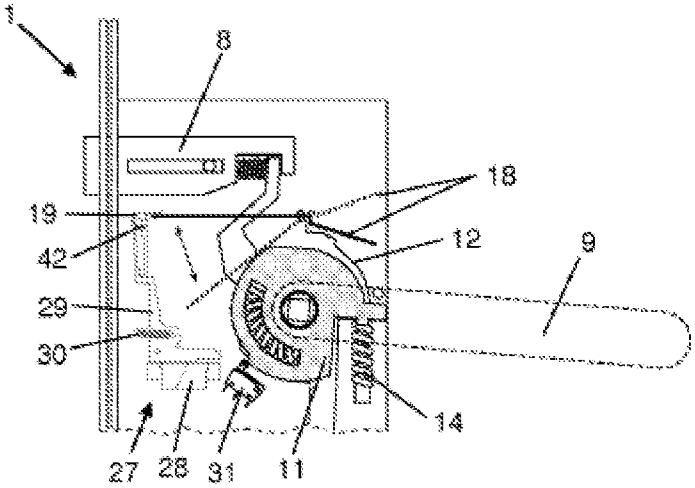
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Fig. 12

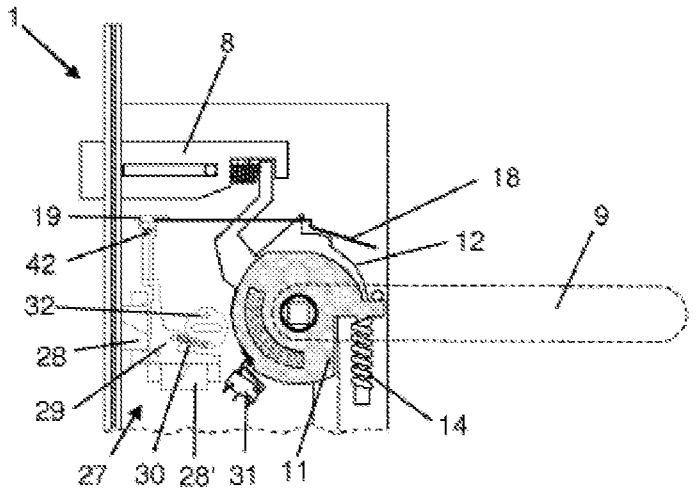
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Fig. 13

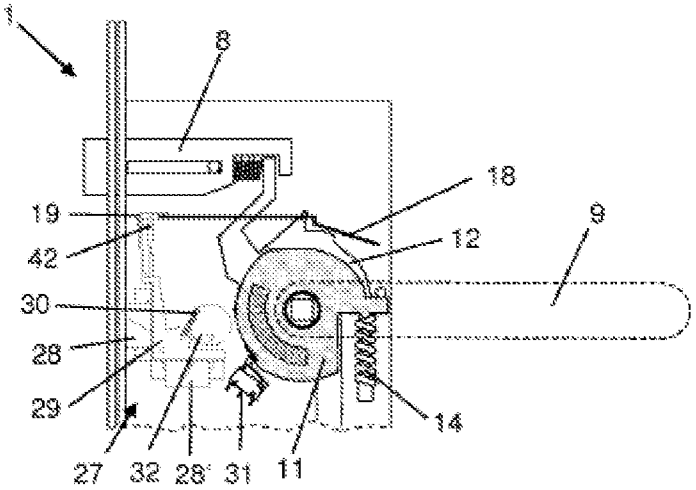
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Fig. 14

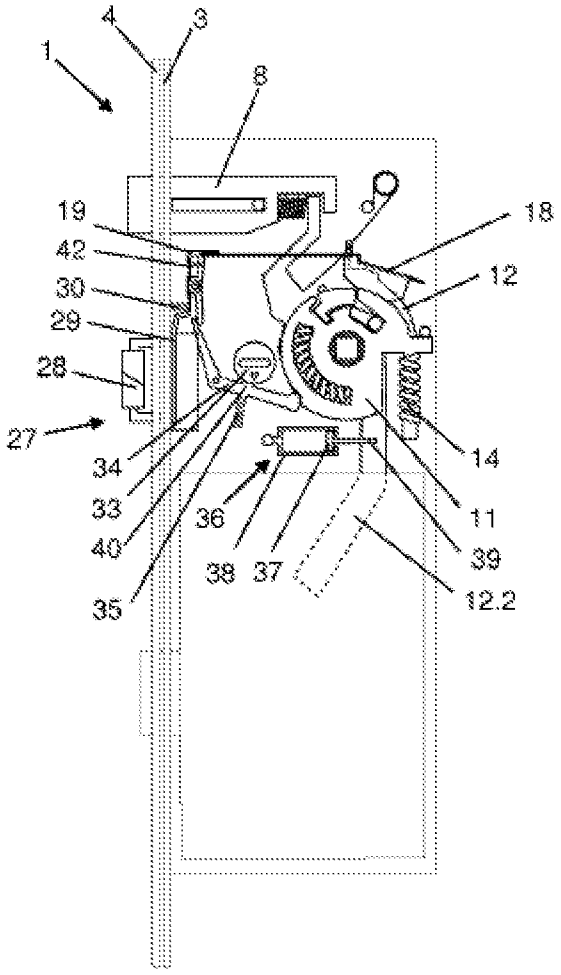
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Fig. 15

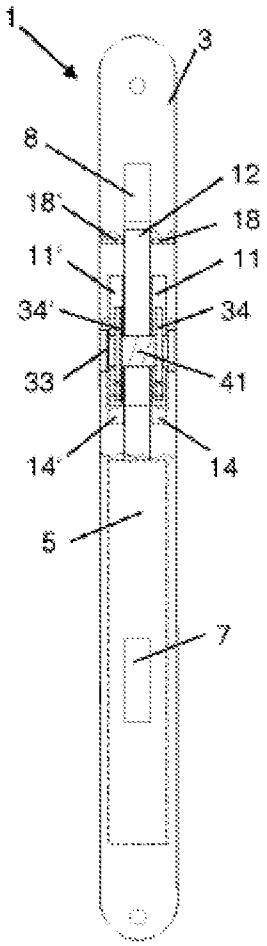
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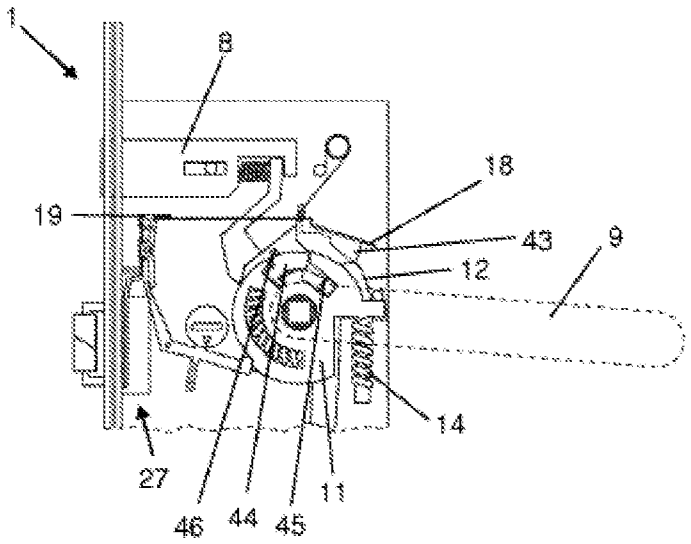
Fig. 16



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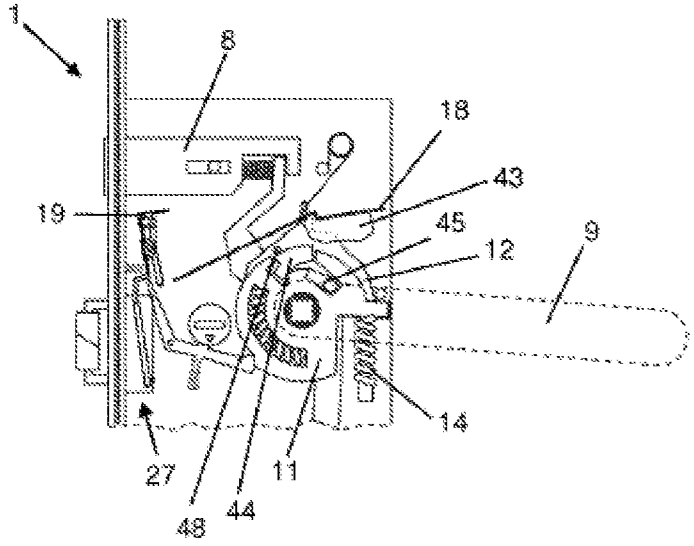


Fig. 18

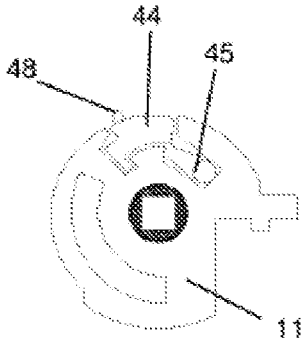
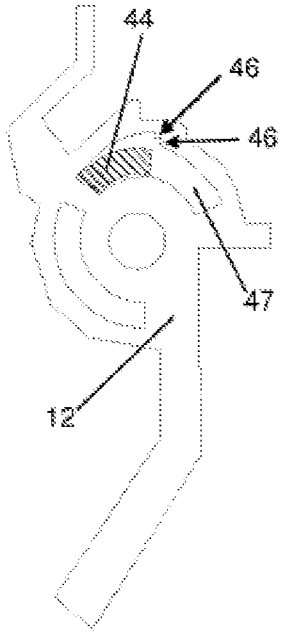


Fig. 19



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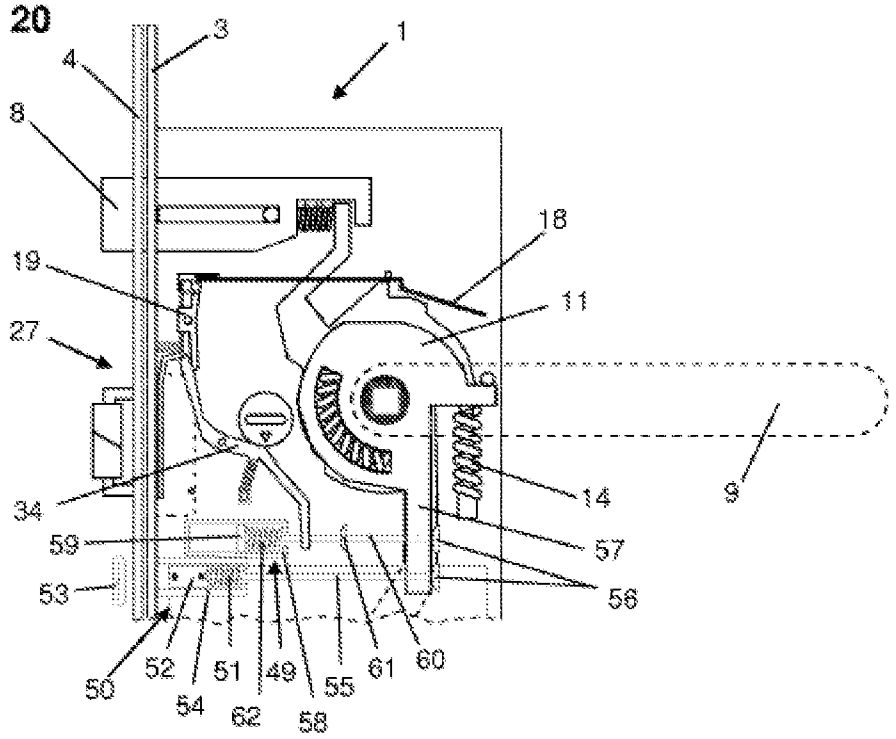
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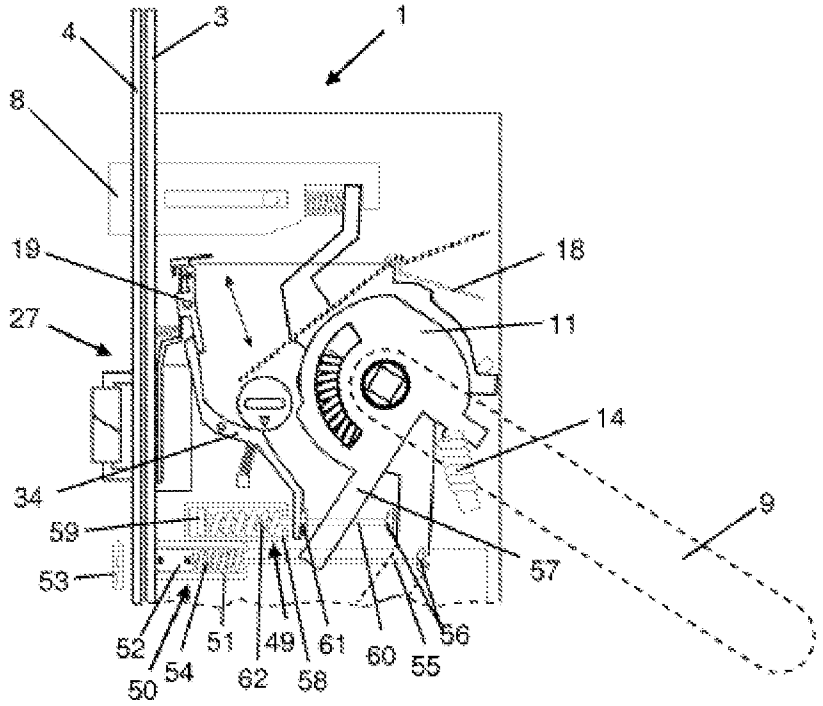
Fig. 21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