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(54) **A security and access control system for a telecommunication cabinet**

(57) The present invention relates to a security and access control system for a telecommunication cabinet with a door 1 with improved security and control attributes as well as a telecommunication cabinet with a door 1 comprising a security and access control system with improved security and control attributes. To achieve this the system comprises locking means 2, 3, 4 adapted to be moved from a first position where the door 1 is locked and cannot be opened into a second position where the door 1 can be opened, blocking means 12 adapted to be moved from a first position where the locking means 2 are secured and cannot be moved into a second position where the locking means 2 can be moved, controlling means for controlling the position of the blocking means 12, and transmitting means 11 arranged between the locking means 2 and the blocking means 12 adapted to transmit a movement of the locking means 2 into a movement of the blocking means 12 when the blocking means 12 are in its second position.

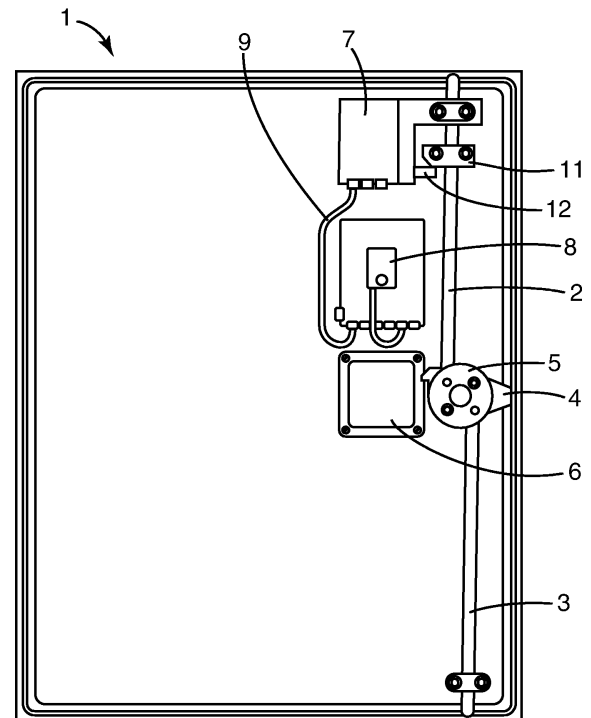


Fig. 1

Description

[0001] The invention relates to a security and access control system for a telecommunication cabinet. Moreover the invention relates to a telecommunication cabinet with a door comprising a security and access control system.

[0002] It is generally known to protect telecommunication facilities such as telecommunication cabinets against unauthorized use to prevent a wiretapping of private and/or commercial lines, usage of telecommunication services on costs of others, manipulation of data or destruction and/or theft of telecommunication modules.

[0003] EP 0 794 306 A2 discloses a telecommunication cabinet with a door and a security and access control system. The cabinet has locking means that can be moved from a first position where the door is locked into a second position where the door can be opened. It also comprises blocking means that cooperate with the locking means and help to secure the locking means in its first position. In the cabinet is integrated an electronic system, displaying the status of the door, of the locking means and of the blocking means.

[0004] A blocking device cooperating with locking means is described in DE 195 46 035 A1. This document discloses a safe with a door. The door comprises several locking bars that can be moved from a first position where the door can not be opened into a second position where the door can be opened. The door also comprises a magnetic switch with a lifting magnet and a blocking pin. When the magnetic switch is activated the lifting magnet moves the blocking pin in a position where the blocking pin is blocking a movement of the locking bars when they are in its first position so that the locking bars cannot be moved into its second position and the door cannot be opened. After reactivating the magnet switch once again the blocking pin moves back into a position where it does not interact with the locking bars.

[0005] GB 2 204 354 A discloses a locking unit with a device for detecting the position of movably arranged peaces within a locking unit. The locking unit comprises a plate that is pivotally connected to a housing of a locking unit and a sensor for detecting the angular position of the plate.

[0006] There is a need for a security and access control system for a telecommunication cabinet that is easy and cost effective to manufacture and that has at the same time improved security and control attributes. There is also a need for a security and access control system that can easily be retrofitted to an existing cabinet and that can be flexibly arranged in an existing cabinet.

[0007] The present invention provides a security and access control system for a telecommunication cabinet with a door, comprising

- locking means adapted to be moved from a first position where the door is locked and cannot be opened into a second position where the door can be opened,

- blocking means adapted to be moved from a first position where the locking means are secured and cannot be moved into a second position where the locking means can be moved,
- controlling means for controlling the position of the blocking means and
- transmitting means arranged between the locking means and the blocking means adapted to transmit a movement of the locking means into a movement of the blocking means when the blocking means are in its second position.

[0008] The invention provides a system for a telecommunication cabinet with a door that helps to secure the cabinet and with which the cabinet can be controlled. For example it can be controlled when the locking means is activated and the door can be opened as well as the other way around when the locking means are activated to lock the door. Furthermore the invention provides the possibility of controlling access to a telecommunication cabinet from a distance. This may be achieved by connecting the controlling means to a communication line or other communication device.

[0009] The system according to the invention comprises locking means that is movably arranged in the cabinet and locks the door in one position and unlocks the door in another position. For securing the locking means the mechanical module comprises blocking means that is also movably arranged within the cabinet and works together with the locking means. In a first position of the blocking means it prevents a movement of the locking means and in a second position it allows a movement of the locking means. The system according to the invention also comprises transmitting means that is designed to transmit a movement of the locking means to a movement of the blocking means so that the movement of the locking means for example from its first position into its second position causes a movement of the blocking means from one position to another position. The system typically comprises control means such as sensors, reed contacts, switches or the like to detect and display the position of the blocking means as described below. The system may also comprise means for activating parts of the mechanical module such as for example a motor. The electronic module generally further comprises a communication device to transfer information from the cabinet to a remote place and vice versa.

[0010] The system according to the invention typically provides the possibility of controlling access to the cabinet and of monitoring the status of the cabinet especially the status of the components of the mechanical module and the door of the cabinet. For example the control means may detect that the blocking means is in its first position. Whereby the locking means is secured in its first position and cannot be moved and thus the door is closed and locked. If for example the control means detects that the blocking means is in its second position then the locking means could be moved for example in

its second position and the door could be opened since it is no longer locked. If the door needs to be opened the locking means needs to be moved from its first position in its second position (otherwise the door would still be locked). Since the transmitting means transmits a movement of the locking means into a movement of the blocking means, the controlling means detecting a movement of the blocking means is thereby also able to detect a movement of the locking means and thus the status of the cabinet. In other words the system is able to detect the following different conditions:

- a) blocking means is in its first position, in this situation the locking means is in its first position as well and that the door is locked;
- b) blocking means is in its second position, that means that the locking means is not secured anymore and can be moved; locking means has not yet been moved;
- c) blocking means is moved via transmitting means in another position, i.e. in a third position, that means that the locking means is moved from its first position in its second position and the door is no longer locked

[0011] The possibility to detect every single status of parts or components of the mechanical module of the security and access control system according to the invention helps to control the cabinet. This control possibility improves the security standard of the cabinet. Further the electronic module helps granting access to the cabinet. The information provided by the access control and security system according to the invention could be useful for example for a telecommunication company to control the time between opening and closing the door and thus how long someone is working at the telecommunication cabinet. The system according to the invention can also be used in connection with an alarm system if the cabinet stays open for too long or past a certain time.

[0012] It is possible to use several modules for incorporating the components of the system, for example a mechanical module and an electronic module. The advantage of using several modules is that the whole system can be flexibly arranged within a cabinet.

[0013] Using different modules for building the whole system allows retrofitting the system into an existing cabinet because it increases the flexibility of arranging the modules in a cabinet.

[0014] According to one embodiment of the invention the locking means comprises at least one bar. A bar is a common component used in telecommunication cabinets for locking means. A bar is easy to manufacture and therefore cost effective. It is possible to use one bar for a one-point locking mechanism. To improve the security of the cabinet it is also possible to use more than one bar for example two bars (two-point locking mechanism). It is also possible to use at least one bar and at least one other locking means to get for example a three-point locking mechanism. The invention is independent from the

number of bars / locking means that are used. If other locking means than a bar are used it is generally necessary to adapt the mechanical components of the security and access control system cooperating with the locking means.

[0015] The bar can be slidably arranged in the cabinet. It is also possible to arrange the bar in another way e.g. pivotally. The way the bar is arranged inside of the cabinet typically depends on the geometry of the cabinet as well as on the kind of locking mechanism that is being used.

[0016] For moving or activating the bar to open the door, the bar may be connected to a handle that can be accessed from outside the cabinet. Any kind of handles can be used such as for example a turning handle or a swinging lever handle. Any kind of locking unit can be integrated in the handle or cooperate with the handle such as for example a single locking unit or a multi locking unit.

[0017] According to another embodiment of the invention the blocking means comprises at least one bar. A bar may be conveniently used as a component for transmitting movements and forces. A bar can be easily manufactured and is thus a cost effective solution.

[0018] The bar can be pivotally and/or slidably arranged within the cabinet. Both kinds of arrangements are kinematically equivalent possibilities to movable arrange a bar in a system. The kind of bar that is used typically depends on the geometry of the cabinet and the kind of locking mechanism that is used.

[0019] In another aspect, the present invention provides blocking means comprising at least one Bowden cable. A Bowden cable is a flexible device for transmitting movements and forces. The use of a Bowden cable may have the advantage that it is possible to flexibly arrange the components or modules of the access control and security system around each other and in the cabinet. The Bowden cable can transmit forces and movements over all different kind of geometric arrangements and between modules being arranged in very different ways. Especially when retrofitting the access control and security system according to the invention this is generally an advantage because the system can be integrated in all different kind of cabinets and geometric arrangements and it can be mounted in different ways.

[0020] In a particular embodiment, the blocking means may be moved by a motor. A motor is conveniently used means for an actuator. It is also possible to use any other actuation element to move or to activate the blocking means such as a piezoelectric element, lifting solenoid etc.

[0021] In a particular embodiment, the transmitting means may be fixed at the locking means. A convenient way to transmit a movement of the locking means to the blocking means can be achieved by mounting the transmitting means on the locking means. Accordingly, movement of locking means will cause movement of the transmitting means mounted on the locking means. Locking means and transmitting means typically will move in the

same direction. It is also possible to mount the transmitting means on the blocking means or to movably mount the transmitting means on the cabinet.

[0022] According to another embodiment of the invention the transmitting means comprises a receiving portion for receiving the blocking means in its first position to prevent a movement of the locking means. A very simple solution to solve this is to arrange locking means, blocking means and transmitting means so that the transmitting means are mounted at the locking means and that the blocking means in its first position abuts the transmitting means. The transmitting means may comprise a recess that prevents the movement of the locking means from its first position into its second position when the blocking means is in its first position.

[0023] The transmitting means can have a transmitting portion for converting a movement of the locking means into a movement of the blocking means. One possibility to shape the transmitting portion can be a gliding surface, on which the movement of the locking means can easily be transmitted to a movement of the blocking means since the blocking means can easily glide along the surface of the transmitting means. Any other solutions for mechanical transmitting a movement can be used as well.

[0024] To detect the position of the blocking means for example sensors can be used. The system can comprise at least one sensor to detect the position of the blocking means. Sensors typically are cost effective solutions to detect and send different kind of information. The information can be sent electronically and can be analysed in the control means of the access control and security system of the invention. The system according to the invention can also comprise at least one sensor that detects the position of the motor. The information collected by the sensors can be stored in the electronic module of the invention, it can be processed and/or sent over a telecommunication line to a remote place such as for example other facilities of a telecommunication company or a control centre.

[0025] According to a further embodiment of the invention the blocking means may comprise at least one breaking piece. Using a breaking piece allows for emergency opening the door when no electricity is supplied to the telecommunication cabinet and therefore the motor cannot be activated and cannot move the blocking means. By removing the breaking piece of the blocking means the mechanical contact between the blocking means and the transmitting means respectively the locking means is abolished and thus moving the locking means and opening the door of the cabinet is enabled, respectively.

[0026] The present invention also provides a telecommunication cabinet with a door and a security and access control system comprising

- locking means adapted to be moved from a first position where the door is locked and cannot be opened into a second position where the door can be opened,

- blocking means adapted to be moved from a first position where the locking means are secured and cannot be moved into a second position where the locking means can be moved,
- controlling means for controlling the position of the blocking means and
- transmitting means arranged between the locking means and the blocking means adapted to transmit a movement of the locking means into a movement of the blocking means when the blocking means is in its second position.

[0027] The invention will now be described in more detail with reference to the following Figures exemplifying particular embodiments of the invention:

Fig. 1 is a schematically drawing of a door of a telecommunication cabinet with a security and access control system according to the invention showing the main components of the invention;

Fig. 2 is a schematically drawing of a door of a telecommunication cabinet with a security and access control system according to the invention showing the components related to the invention in detail;

Fig. 3 a) - d) are schematically drawings of parts of a locking bar, a transmitting means and parts of a blocking bar of a security and access control system according to the invention showing different positions of the components;

Fig. 4 is a three dimensional view of another embodiment of a security and access control system according to the invention;

Fig. 5 is a top view of the security and access control system shown in Fig. 4;

Fig. 6 a) - d) are top views of parts of a locking bar, a transmitting means and a blocking bar of the security and access control system shown in Fig. 4 and Fig. 5 showing different positions of the components and

Fig. 7 is a top view of parts of a locking bar, a transmitting means and a blocking bar of the security and access control system shown in Fig. 4 to Fig. 6 that are prepared for an emergency opening.

[0028] Herein below various embodiments of the present invention are described and shown in the draw-

ings wherein like elements are provided with the same reference numerals.

[0029] In Fig. 1 the inside of a door 1 of a telecommunication cabinet is shown. The door 1 comprises a three-point locking mechanism with two slidably arranged bars 2 and 3 and with one pivotally arranged bar 4. The pivotally arranged bar 4 is fixed at the rear side of a turning handle 5. When the handle 5 is rotated - as would be the case when someone opens the door 1 - the bar 4 rotates together with the handle 5. The slidably arranged bars 2 and 3 are also connected with the rear side of the handle 5. The mechanical connection between the handle 5 and the bars 2 and 3 transfers a rotation of the handle 5 into a translational movement of the bars 2 and 3. By activating the handle 5 the bars 2 to 4 can be moved from a first position where they lock the door 1 into a second position where the door 1 is not locked and can be opened.

[0030] The cabinet could comprise receiving means for receiving the bars 2 to 4 for locking the door 1 when the locking bars 2 to 4 are moved into their first position. The receiving means could comprise a recess in the frame of the door 1 or any other mechanical means that prevents a movement of the bars 2 to 4 into the opening direction of the door 1 when the bars 2 to 4 are in their first position and thus lock the door 1.

[0031] The handle 5 also interacts with a commonly known locking unit 6 with a key (not shown). The handle 5 and the locking unit 6 can also be designed as one part, e.g. the locking unit 6 is integrated in the handle 5. The locking unit 6 can be a single locking unit or a multiple locking unit. The locking unit can also be integrated in the handle 5. By locking the locking unit 6 with a key a rotation of the handle 5 can be disabled. When the bars 2 to 4 are in their first position where the door 1 is locked the cabinet cannot be opened the locking unit 6 is locked. For opening the cabinet the locking unit 6 has to be unlocked so that the handle 5 can be moved and that the bars 2 to 4 also can be moved into their second position. Further details of the locking unit 6 will not be described in connection with this invention since they are known by those skilled in the art.

[0032] Two modules 7 and 8, for example a mechanical and an electronic module are mounted in the upper right corner of the door 1 in Fig. 1. They are connected via a Bowden cable 9 and will be described in detail with reference to Fig. 2. It is also possible to integrate all components of the invention in one module. The use of two or more modules has the advantage that the system can be flexibly arranged within a cabinet. Therefore the system according to the invention can be used for retrofitting a cabinet. In Fig. 1 a transmitting means 11 is also shown. It is fixed at the locking bar 2 and interacts with a blocking means 12. The functionality of the system according to the invention especially the interaction of the transmitting means 11 and the blocking means 12 will also be described in detail with reference to Fig. 2 as well as Fig. 3a) to d). In the described embodiment one blocking means is used that interacts with the transmitting means

11 of one bar. To raise the level of security two or more blocking means 12 can be provided to interact with two or more transmitting means 11 or locking means.

[0033] In Fig. 2 the inside of a door 1 of a telecommunication cabinet is schematically shown. The door 1 comprises a hinge 13 connecting the door 1 pivotally to the telecommunication cabinet (not shown). As already described with reference to Fig. 1 the door 1 also comprises a turning handle 5 connected with two slidably arranged bars 2 and 3. The way the handle 5 and the bars 2 and 3 are arranged at the door 1 a rotation of the handle 5 results in a movement of the bars 2 and 3. The bars 2 and 3 are each fixed with brackets 14 and 15 at the door 1 near the edge of the door 1. The brackets 14 and 15 are installed in a way that they do not influence the movement of the bars 2 and 3. An adapter 16 is fixed at the upper end of the bar 2.

[0034] Since the access control and security system according to the invention should also be suitable for retrofitting to existing telecommunication cabinets the receptacle of the adapter 16 for the bar 2 is designed to fit to all different kinds of shapes of bars, for example to bars with a round, a rectangular or a square profile. That is achieved by shaping the receptacle so it can be fixed around all kinds of common bar shapes, e.g. by integrating a triangular shaped groove into the receptacle that extends in the same direction as the axis of the bar 2. The adapter 16 can be fixed at the bar 2 by screws, by welding or any other commonly known fixing technology.

[0035] In Fig. 2 modules 7 and 8 that are connected via a Bowden cable 9 are also shown. Module 8 comprises a motor 17, sensors S1, S2, S3, S4 and S5 and the left end of the Bowden cable 9. Module 7 comprises the right end of the Bowden cable 9. Blocking means 12 in the shape of the Bowden cable 9 abuts upon the adapter 16 with its right end side. The blocking means 12 is in its first position where it prevents the locking means from moving. The other end of the Bowden cable 9 that extends into the module 8 of the access control and security system interacts with a motor 17 arranged within the module 8. Spring elements 25 act on this end of the Bowden cable 9 and force it towards the adapter 16. In the module 8 sensors S1 to S5 are arranged whose function will be described below. The motor 17 can be switched between two different stages. In a first stage of the motor 17 the motor 17 is in an open stage and spring elements 25 forces the Bowden cable 9 into its first position - as shown in Fig. 2. In that stage the Bowden cable 9 prevents the bar 2 from moving and thus blocks the bar 2. From Fig. 2 can be seen that the Bowden cable 9 in this position abuts the adapter 16. The adapter 16 comprises a recess 18 preventing the bar 2 from moving, when the Bowden cable 9 abuts the adapter 16. The sensor S2 detects when the motor 17 is in its open stage. The Bowden cable 9 provides a little connector 19 at the end that extends into the module 8. The position of the connector 19 is detected by sensors S4 and S5. When the Bowden cable 9 is in its first position the connector 19 is next to sensor

S4 so that the sensor S4 detects when the Bowden cable 9 is in its first position. Thus the sensor S4 also detects when the bar 2 is in its first position and the door 1 is locked.

[0036] When the motor 17 is activated and moves into its open stage it is working against the force of the spring elements 25 and moves the Bowden cable 9 along a little distance into the direction of the module 8 into its second position where the bar 2 can be moved (not shown in Fig. 2). A further movement of the Bowden cable 9 into the direction of the module 8 is achieved by opening the door and an interaction between the bar 2, the adapter 16 and the blocking means 12 (Bowden cable 9) as described with reference to Fig. 3a) to d). In the open stage of the motor 17 the sensor S1 detects that the motor is in its second position. The connector 19 of the Bowden cable 9 moves away from the sensor S4 when the Bowden cable 9 is moved into its second position. The sensor S4 therefore recognizes when the Bowden cable 9 is in its second position and the bar 2 can be moved.

[0037] With reference to Fig. 3a) to d) the interaction between the bar 2, the adapter 16 and the blocking means 12 is described. In Fig. 3 a) a part of the slidably arranged bar 2 is schematically shown. The adapter 16 is fixed at the bar 2. The adapter 16 has a receiving portion 21 and a transmitting portion 22. The receiving portion 21 comprises an abutment area 23 and a recess or a nose 24. The transmitting portion 22 comprises a gliding surface 22.

[0038] When the blocking means 12 is in its first position - as shown in Fig. 3 a) - the right end side of the blocking means 12 abuts the abutment area 23 of the adapter 16. In this situation the motor 17 is in its open stage and the spring elements 25 push the blocking means 12 against the adapter 16. With one side the blocking means 12 contacts the nose 24. The nose 24 prevents that the bar 2 can be moved downward into its second position while the Bowden cable 9 abuts the abutment area 23 of the adapter 16. Therefore the nose 24 is arranged at the gliding surface to seat the blocking means 12 in its first position at a lower end of the adapter 16 (see arrow A in Fig. 3 c)).

[0039] When the blocking means 12 is moved into its second position - as shown in Fig. 3 b) - the right end side of the blocking means 12 does not contact the adapter 16 any more and thus does not contact the nose 24 of the adapter 16. Therefore the bar 2 now can be moved into the direction of the arrow A (from its first position into its second position).

[0040] When the bar 2 is moved into the direction of the arrow A - as shown in Fig. 3 c) - the gliding surface 22 contacts the end of the blocking means 12. Moving the bar 2 further down the gliding surface 22 of the adapter 16 pushes the blocking means 12 back. Spring elements 25 are arranged at the other end of the blocking means 12 pushing the blocking means 12 against the adapter 16 so the blocking means 12 always contact the adapter 16. The spring elements 25 can be seen for ex-

ample in Fig. 2. With other words a movement of the bar 2 into the direction of the arrow A results in a movement of the blocking means 12 into the direction of the arrow B against the force of the spring element 25. The adapter 16 converts the movement of the bar 2 into a movement of the blocking means 12.

[0041] In Fig. 3 d) the situation is shown when the bar 2 has reached its third position. In this situation the blocking means 12 abuts the adapter 16 at a second abutment area 26. Going back to Fig. 2: when the door 1 is opened, the bar 2 is moved into the direction of the arrow A, the Bowden cable 9 or blocking means 12 is pushed back by the adapter 16, the Bowden cable 9 or the blocking means 12 gets next to the sensor S3 and the sensor S3 detects this status.

[0042] The motor 17 always moves back into its first closed stage. That can happen after a certain amount of time has passed by. In this position the motor can be used again as an actuator to move the blocking means from its first position into its second position. For closing the door the bar 2 has to be moved back from its second position into its first position thereby moving the adapter 16 as well. Since the motor 17 is in its closed stage again and the spring elements 25 are working into the direction of the adapter 16 the blocking means 12 will also move back into its first position abutting the adapter 16 at the abutment area (see Fig. 3 d) to a)).

[0043] It is also possible to work the system according to the invention without spring elements 25 by moving the blocking means 12 by the motor 17 only.

[0044] The following is a recapitulation of the whole process of opening and closing a door 1 of a telecommunication cabinet with an access control and security system according to the invention:

- the door 1 is closed; bar 2 is in its first position; blocking means 12 are in its first position (detected by sensor S4) and the motor 17 is in its closed stage (detected by sensor S2);
- someone wants to open the door 1; a signal is send to the motor 17; the motor is activated and moves into its open stage (detected by sensor S1); blocking means 12 is moved into its second position (detected by sensor S4); the bar 2 can now be moved;
- the bar 2 is moved into its second position; that forces the blocking means 12 further back into its third position (detected by sensor S3); the door 1 can now be opened;
- motor is activated again and moves back into its closed stage (detected by sensor S2), the door 1 is still open, the bar 2 is still in its second position;
- the bar 2 is moved back into its first position thereby moving the adapter 16 as well, blocking means 12 moves back into its first position (detected by sensor S4) blocking the bar 2 again.

[0045] The functionality of the sensor S5 is described in detail with reference to Fig. 7.

[0046] In Fig. 4 another embodiment of a security and access control system according to the invention is shown. The embodiment shown in this Figure differs from that shown in Fig. 2 and 3 in that the blocking means 12 are pivotally attached and that the electrical module and the mechanical module are integrated in one module. In the drawing the same reference numbers are used for the same components as in the Figures before. The security and access control system comprises a slidably arranged bar 2. The bar 2 is fixed at the door 1 with a bracket 14 (door is not shown in Fig. 4). The bar 2 comprises transmitting means in the shape of an adapter 16. The adapter 16 is fixed at the bar with screws 27. Since the security and access control system according to the invention is designed for retrofitting the screws 27 fix the adapter 16 using a fixing arrangement 28 with a clamping force at the bar 2. That has the advantage that it is very easy to retrofit the inventive system into a telecommunication cabinet. It is not necessary to undertake complex fixing arrangements of the components, like drilling holes or even dwelling components together. In Fig. 4 motor 17 is shown which is connected to a rod 29 transmitting the movement of the motor 17 to a lever 31. The lever 31 is connected via a leg spring 32 to the blocking means 12. The blocking means 12 are a pivotally attached blocking bar 37 that rotates around a bolt 36 (see Fig. 6 a)). The lever 31 is also fixed at the bolt 36 and rotates around it. This is a very space saving arrangement. The leg spring 32 is arranged to push the blocking means 12 against the adapter 16. All the described components of the security and access control system according to this embodiment of the invention are arranged on a mounting plate 33. The mounting plate 33 simplifies retrofitting of the system into a telecommunication cabinet because all the components are preassembled and its only necessary to fix the adapter 16 of the bar 2 and to fix the mounting plate 33 to the door.

[0047] It is also possible to work the system according to the invention without a leg spring 32 by moving the blocking means 12 by the motor 17 only.

[0048] Fig. 5 does show the same embodiment as Fig. 4 in a top view. The slidably arranged bar 2 is shown together with the adapter 16. The screws 27 fixing the adapter 16 at the bar 2 via a fixing arrangement 28 are shown as well as the motor 17, the rod 29, the lever 31 and the blocking means 12.

[0049] The bracket 14 is fixed at the door 1 (door not shown in Fig. 5) of the telecommunication cabinet with three screws 34. Two of them go through the bracket 14 itself and into the door 1. One of them goes through the bracket 14, through the mounting plate 33 and then into the door 1. The mounting plate 33 has an elongated hole 35 for receiving the screw 34. The elongated hole 35 helps to compensate tolerances when retrofitting the security and access control system to an existing telecommunication cabinet.

[0050] In Fig. 4 and Fig. 5 sensors S3, S4, S4' and S5 are shown. They have the same function as the sensors

described in connection with the Figures 1 to 3 and will be described again in detail below.

[0051] With reference to Fig. 6a) to d) the interaction between the bar 2, the adapter 16 and the blocking means 12 is described for this embodiment of the invention. In Fig. 6 a) a detail of Fig. 5 is shown. The slidably arranged bar 2 is shown together with the adapter 16 fixed thereon. The adapter 16 has a receiving portion 21 and a transmitting portion 22. The receiving portion 21 comprises an abutment area 23 and a nose 24. Due to the different kinematical conditions in this embodiment (blocking means 12 are pivotally attached and do not move translational) abutment area 23 and nose 24 are moved together at the receiving portion 21. They cannot clearly be defined separately as in Fig. 3. The transmitting portion 22 comprises a gliding surface 22.

[0052] When the blocking bar 37 is in its first position - as shown in Fig. 6 a) - the outer edge of the bar 37, which lies opposite of the bolt 36, abuts the receiving portion 21 of the adapter 16. With one side the blocking bar 37 contacts the nose 24. The nose 24 prevents that the bar 2 can be moved into its second position in the direction of the arrow A in Fig. 6 while the blocking bar 37 abuts the abutment area 23 of the adapter 16.

[0053] When the blocking bar 37 is moved by the motor 17 into its second position the outer edge of the bar 37 does not contact the adapter 16 any more. This situation is not shown in Fig. 6a) to d) it is equivalent to the situation shown in Fig. 3 b). The bar 2 now can be moved from its first position into its second position (arrow A). When the bar 2 is moved into its second position - as shown in Fig. 6 b) - the gliding surface 22 contacts the outer edge of the blocking bar 37. On the way of moving the bar 2 from its first position into its second position the gliding surface 22 pushes the blocking bar 37 into the direction of the arrow B, thereby gliding along the surface 22. The leg spring 32 is pushing the blocking bar 37 against the adapter 16 so the blocking bar 37 always contacts the adapter 16 as can be seen in Fig. 4. With other words a movement of the bar 2 from its first position into its second position (arrow A) results in a rotation of the blocking bar 37 around the bolt 36 against the force of the leg spring 32 (arrow B) into its third position.

[0054] In Fig. 6 c) the situation is shown when the bar 2 has reached its third position. In this situation the blocking bar 37 abuts the adapter 16 at a second abutment area 26. In the situation shown in Fig. 6 c) the motor 17 is still open. Compared with Fig. 6 a) where the lever 31 points with its outer edge, which is opposite of the bolt 36, to the left the lever 31 is pushed into a position where it points to the right in Fig. 6 c). In Fig. 6 d) the motor 17 is closed, the lever 31 is rotated back into the position of Fig. 6 a) (arrow C). The control unit of the system according to the invention can be programmed in the way that the motor 17 always will move back into its closed stage after a certain amount of time has passed by. In that position the motor can be used again as an actuator to move the blocking means from its first position into its

second position.

[0055] No sensors are integrated in this embodiment to detect the stage of the motor 17. Sensor S4 detects when the bar 37 is in its first position (Fig. 6 a)). Sensor S4' detects the same situation as sensor S4 at another point in the system. It detects when the bar 2 is in its first position by contacting the fixing arrangement 28 of the adapter 16. The sensor S3 detects when the bar 37 was moved by the adapter 16 into its third position (Fig. 6 c)). The function of the sensor S5 will be described in connection with Fig. 7.

[0056] In Fig. 7 the situation is shown when the security and access control system is prepared for an exit in the case of an emergency, for example when the electricity is out. In this case, the pivotally arranged bar 37 is destroyed. The outer edge of the bar 37 (breaking piece) is eliminated. That can for example be achieved by drilling through the door 1 and the mounting plate 33 at a defined spot. Because of the leg spring 32 the destroyed bar 37 is pushed into the direction of the arrow D. Hence the bar 37 does not contact the adapter 16 any more and the bar 2 can be moved into the direction of the arrow A giving the door free.

[0057] Although the invention has been described and illustrated with reference to specific illustrative embodiments thereof, it is not intended that the invention be limited to those illustrative embodiments. Those skilled in the art will recognize that variations and modifications can be made without departing from the true scope of the invention as defined by the claims that follow. It is therefore intended to include within the invention all such variations and modifications as fall within the scope of the appended claims and equivalents thereof.

REFERENCE NUMBERS

[0058]

1 door

2, 3 slidably arranged bar

4 pivotally arranged bar

5 handle

6 locking unit with a key

7 module

8 module

9 Bowden cable

11 transmitting means

12 blocking means

13 hinge

14, 15 bracket

5 16 adapter

17 motor

18 recess

10 19 connector

21 receiving portion

15 22 transmitting portion / gliding surface

23 abutment area

24 nose

20 25 spring elements

26 abutment area

25 27 screw

28 fixing arrangement

29 rod

30 31 lever

32 leg spring

35 33 mounting plate

34 screw

35 elongated hole

40 36 bolt

37 blocking bar

45 S1 sensor

S2 sensor

S3 sensor

S4 sensor

S4' sensor

50 S5 sensor

A arrow (movement of bar 2)

B arrow (movement of bar 37)

C arrow (movement of bar 37)

55 C arrow (movement of bar 37 in the event of an emergency entry)

Claims

1. A security and access control system for a telecommunication cabinet with a door (1), comprising locking means (2, 3, 4) adapted to be moved from a first position where the door is locked and cannot be opened into a second position where the door can be opened, blocking means (12) adapted to be moved from a first position where the locking means are secured and cannot be moved into a second position where the locking means can be moved, controlling means for controlling the position of the blocking means, and transmitting means (11) arranged between the locking means and the blocking means adapted to transmit a movement of the locking means into a movement of the blocking means when the blocking means are in its second position. 5
2. A security and access control system according to claim 1, wherein the locking means (2, 3, 4) comprises at least one bar (2). 10
3. A security and access control system according to claim 1 or 2, wherein the bar (2) is slidably arranged in the cabinet. 15
4. A security and access control system according to any one of claims 1 to 3, wherein the bar (2) is connected to at least one handle (5). 20
5. A security and access control system according to any of the claims 1 to 4, wherein the blocking means (12) comprise at least one bar. 25
6. A security and access control system according to any of the claims 1 to 5, wherein the bar is slidably arranged within the security and access control system. 30
7. A security and access control system according to any of the claims 1 to 5, wherein the bar (37) is pivotally arranged within the security and access control system. 35
8. A security and access control system according to any of the claims 1 to 7, wherein the blocking means (12) comprises at least one Bowden cable (9). 40
9. A security and access control system according to any of the claims 1 to 8, wherein the blocking means (12) includes a motor for causing movement of blocking means. 45
10. A security and access control system according to any of the claims 1 to 9, wherein the transmitting means (11) is fixed at the locking means. 50
11. A security and access control system according to any of the claims 1 to 10, wherein the transmitting means (11) comprises a receiving portion (21) for receiving the blocking means (12) in its first position. 55
12. A security and access control system according to any of the claims 1 to 10, wherein the receiving portion (21) comprises a recess (24) preventing the locking means from moving when the blocking means (12) are in its first position.
13. A security and access control system according to any of the claims 1 to 12, wherein the transmitting means (11) has a transmitting portion (22) for converting a movement of the locking means into a movement of the blocking means (12).
14. A security and access control system according to any of the claims 1 to 13, wherein the transmitting portion (22) comprises at least one gliding surface (22).
15. A security and access control system according to any of the claims 1 to 14, wherein the system comprises at least one sensor (S3, S4, S5) that detects the position of the blocking means (12).
16. A security and access control system according to any of the claims 9 to 15, wherein the system comprises at least one sensor (S1, S2) that detects the position of the motor (17).
17. A security and access control system according to any of the claims 1 to 16, wherein the blocking means (12) comprises at least one breaking piece.
18. Telecommunication cabinet with a door (1) and a security and access control system as defined in any of claims 1 to 17.

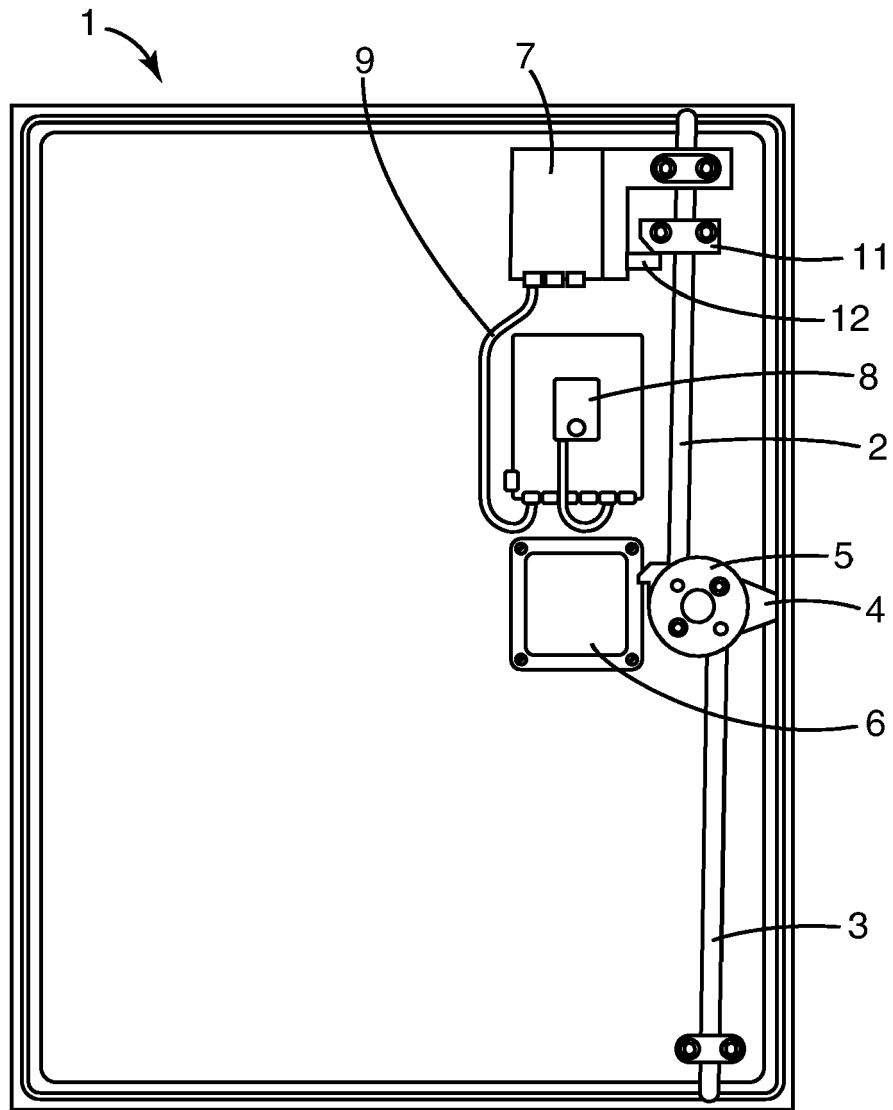


Fig. 1

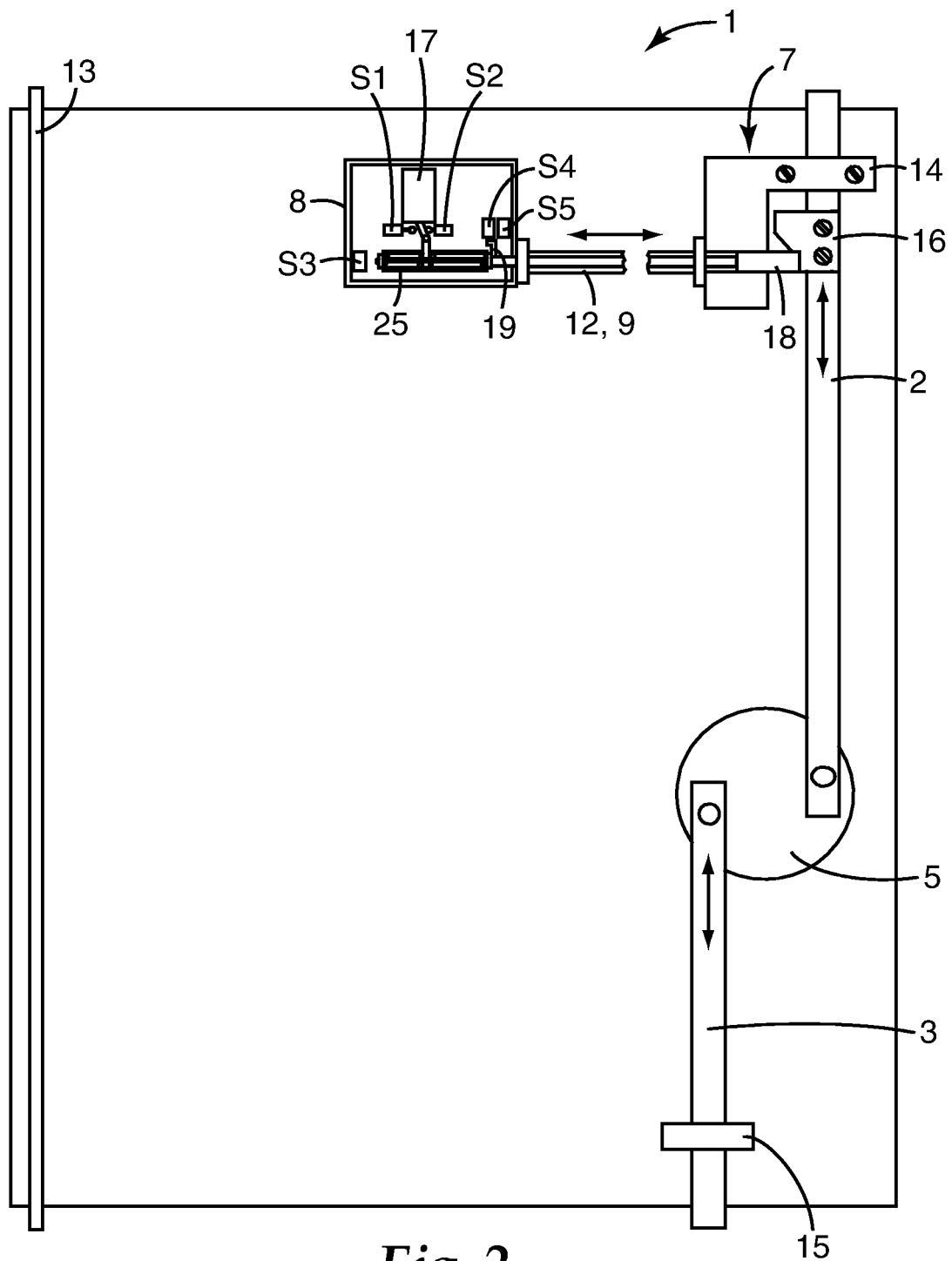
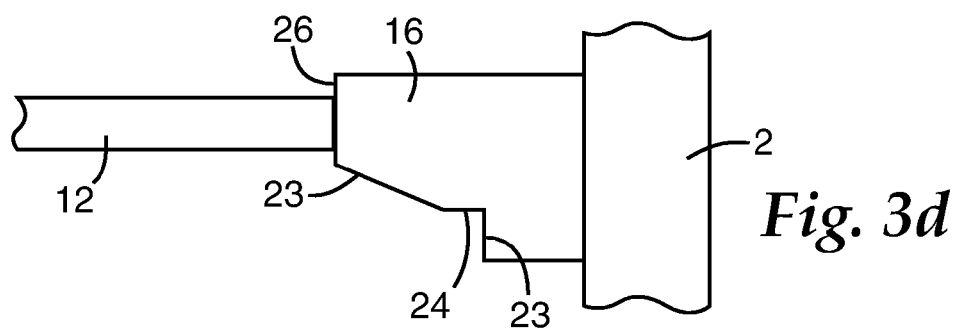
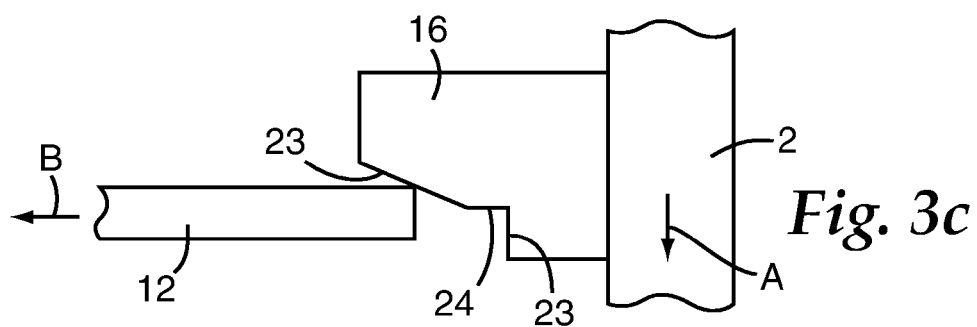
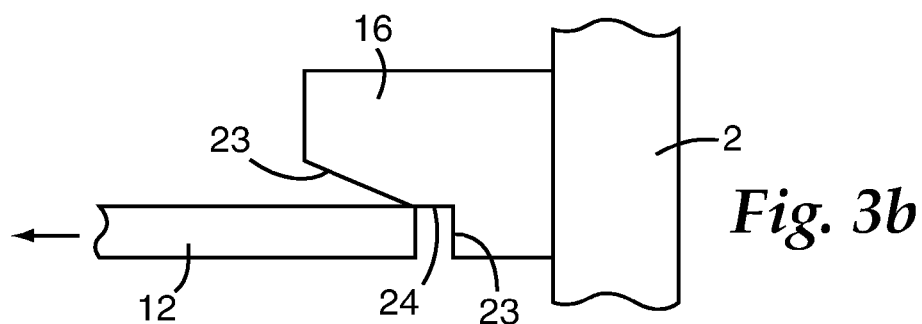
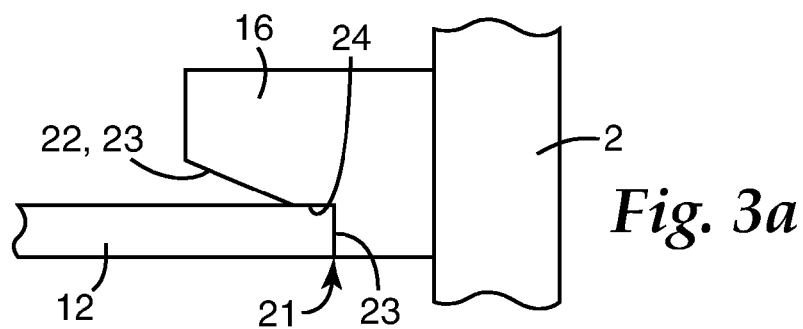


Fig. 2



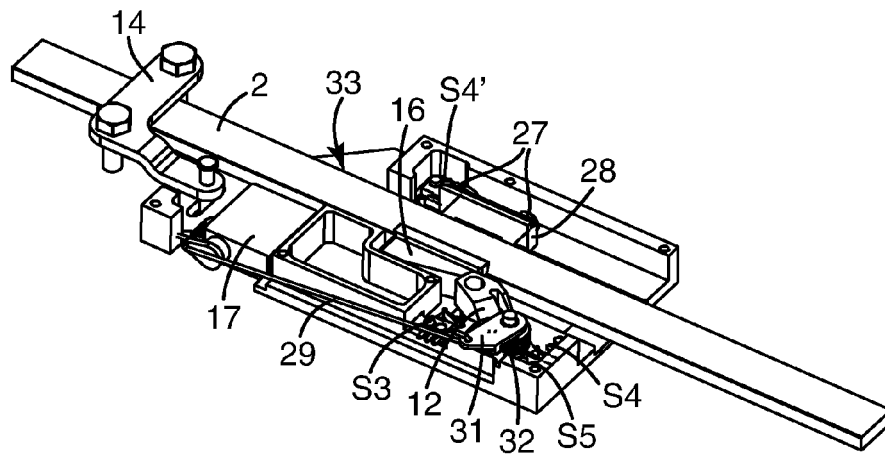


Fig. 4

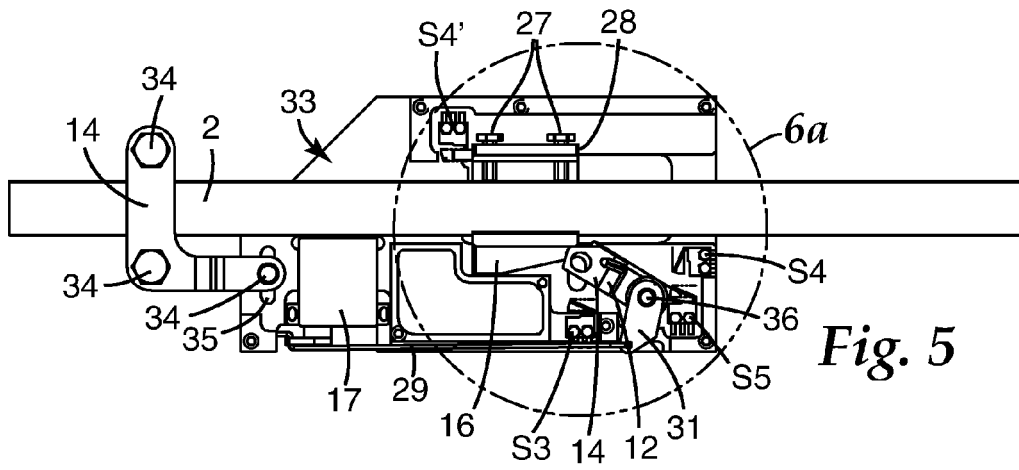


Fig. 5

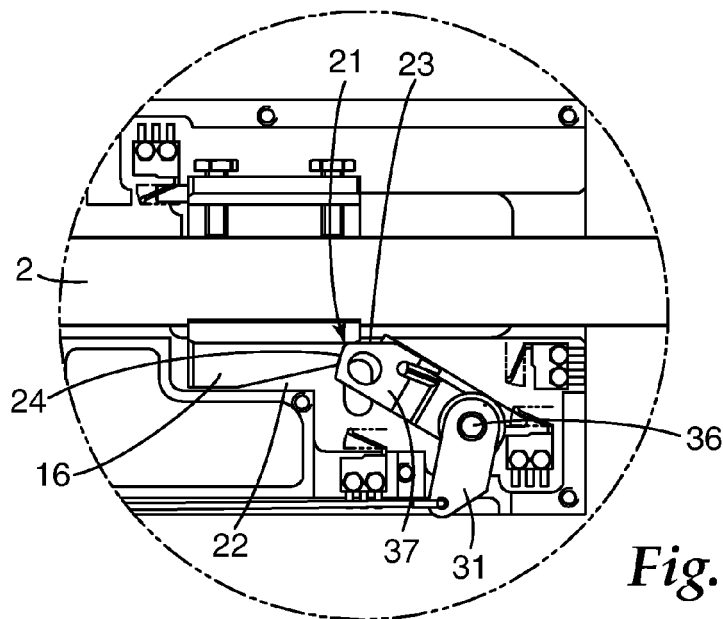


Fig. 6a

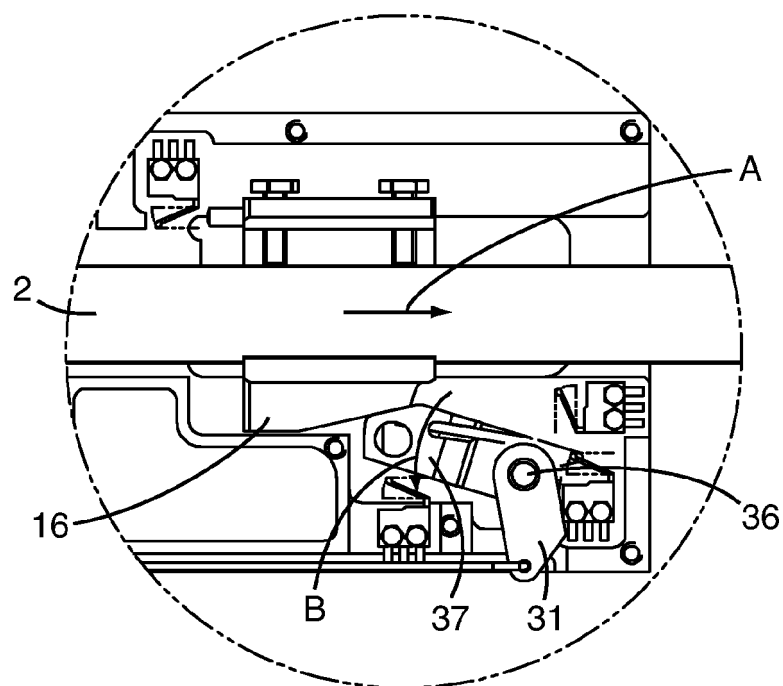


Fig. 6b

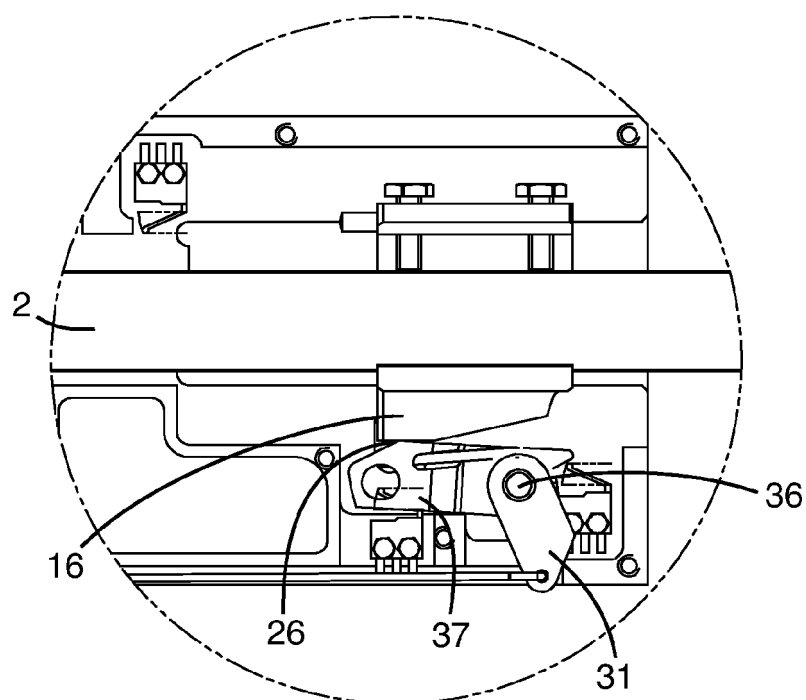


Fig. 6c

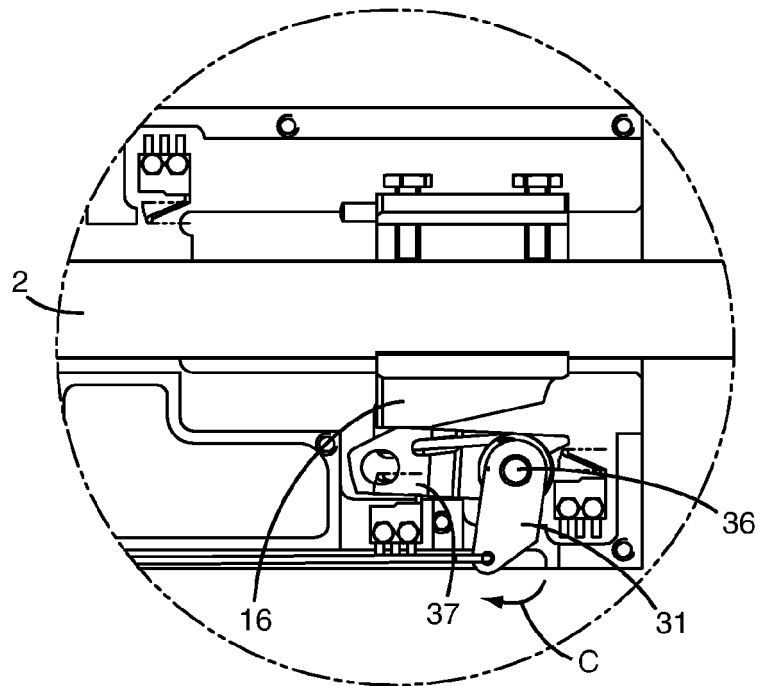


Fig. 6d

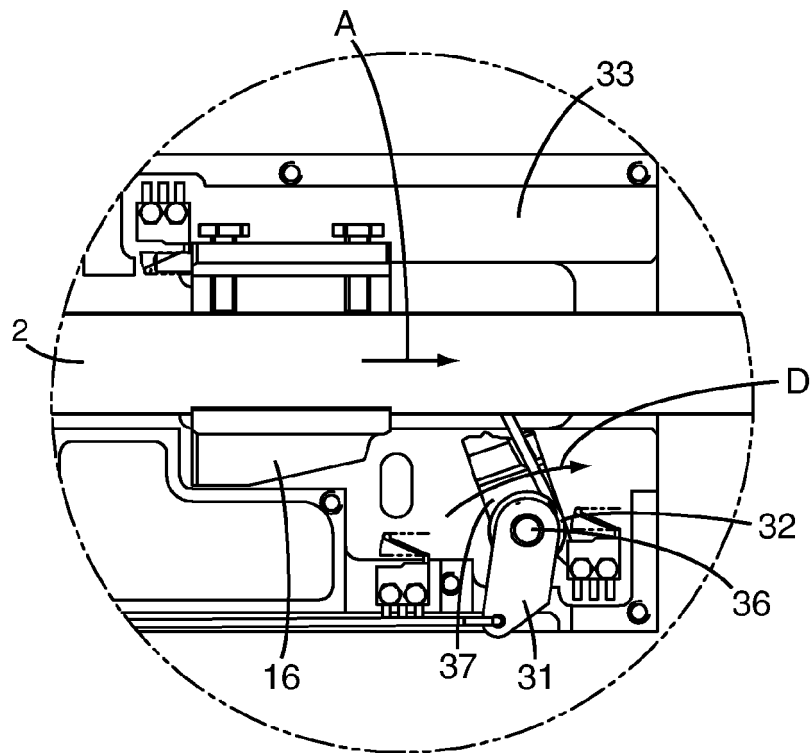


Fig. 7



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EUROPEAN SEARCH REPORT

Application Number
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