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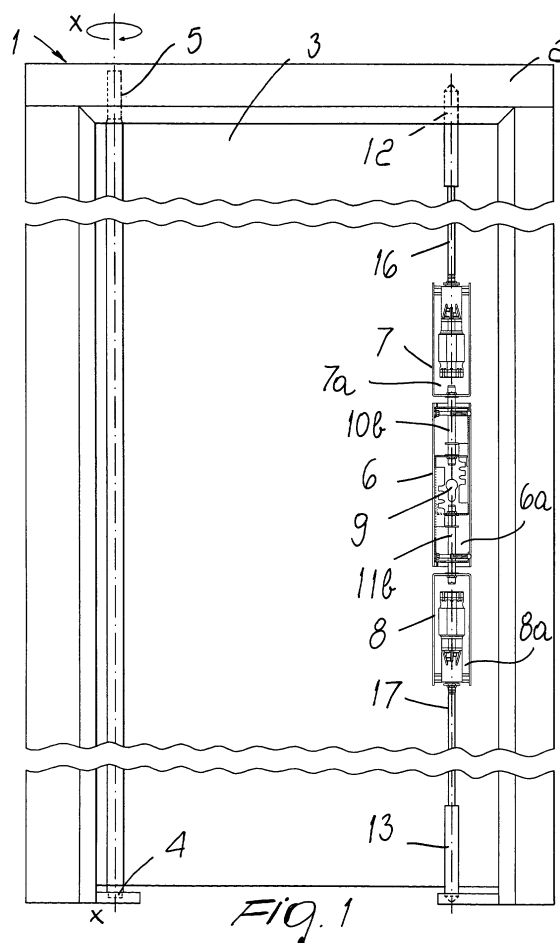
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(54) **Actuation device for motorized locking-release of a door or entrance door**

(57) A closure device for armored doors or the like, in which the wing or leaf (3) is provided with a metallic reinforcement frame, comprising a metallic tubular element (6) that acts as a reinforcement for the metallic frame and delimits internally a seat (6a,7a,8a), a lock (9) arranged in the seat, and a traction element (10b, 11b) actuated by the lock for the movement of a respective locking-release bolt (12,13) for the leaf.



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Description

[0001] The present invention relates to an actuation device for the motorized locking-release of a door or entrance door.

[0002] It is well-known that with doors and entrance doors in which locking and release is actuated by a motor, in case of malfunction or of electric power outage it is necessary to intervene in various manners on the locking-release mechanisms with tools or other means in order to allow opening or closure, and this is often neither practical nor easy to do, for example if the operator or user is an elderly and/or totally inexperienced person.

[0003] In such cases it is almost always necessary to request the intervention of an expert technician, and this, in addition to being expensive, causes delays and unpleasant waste of time.

[0004] The aim of the present invention is to provide a solution to the above described problem in a simple, efficient and quick way, such solution being also competitive from the point of view of production and maintenance costs.

[0005] This aim and these and other objects that will become better apparent hereinafter are achieved by a closure device according to the invention for armored doors or the like in which the leaf is provided with a metallic reinforcement frame, characterized in that it comprises at least one metallic tubular element that acts as a reinforcement for the metallic frame and delimits internally a seat or a respective seat, at least one lock arranged in said seat and at least one traction element actuated by the lock, or by a respective lock, for the movement of at least one respective locking-release bolt for said leaf.

[0006] Advantageously, between the or each lock and the or each traction element there is a remotely controllable actuator.

[0007] Further characteristics and advantages of the present invention will become better apparent from the description of some embodiments thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a front elevation view of an armored door provided with the closure device (shown in phantom lines) according to the invention;

Figure 2 is an enlarged-scale view of a detail of Figure 1;

Figure 3 is a view of another embodiment of the device of Figures 1 and 2;

Figure 4 is a sectional view, taken along the line IV-IV of Figure 3;

Figure 5 is a partially sectional perspective view of still another embodiment of the device according to the invention; and

Figure 6 is a front elevation view of the device of Figure 5.

[0008] Initially with reference to Figures 1 and 2, the reference numeral 1 generally designates an armored or clad door, which comprises a fixed peripheral frame 2 and a movable wing or leaf 3, which is mounted so that it can rotate about its own rotation axis x-x by means of two aligned pivots, a lower one 4 and an upper one 5, which are rotatably seated in respective seats provided in the fixed frame 2.

[0009] On the opposite side with respect to the rotation axis x-x, the wing or leaf 3 has a built-in metallic tubular element or, as shown in the drawings, a sequence of three metallic tubular segments, an intermediate segment 6 and two lateral segments 7 and 8, which are aligned for example parallel to the axis x-x and at the same time delimit internally a respective seat 6a, 7a, 8a.

[0010] The tubular segment 6 is fixed in any suitable manner, for example welded, to a metallic armoring or reinforcement frame (not shown in the drawings) of the wing, so that it directly acts as a reinforcement element for the metallic frame. In the seat 6a there is a lock with a keyhole, generally designated by the reference numeral 9, that can be actuated by way of an appropriate key and actuates, for example, a gear (not shown in the drawings) that in turn actuates at least one rack 10 provided so that it can slide on the opposite side with respect to the keyhole 9.

[0011] More particularly, the device shown in Figures 1 and 2 has two mutually opposite racks 10 and 11 that are rigidly coupled to a respective engagement element 10a, 11a, in which one end is fixed to a respective rod or traction element 10b, 11b and the other end is adjustably anchored, by means of a locking element, to the wall of the tubular segment 6.

[0012] The locking element or elements comprise, for example, a respective ball 10c, 11c loaded elastically by a respective spring 10d, 11d that reacts against a respective bolt 10e, 11e supported by the engagement element. The traction elements 10b, 11b protrude from the tubular element, if necessary, by passing through an appropriately provided opening 10f, 11f in the engagement elements 10a, 11a.

[0013] The adjustable anchoring of the engagement elements 10a, 11a to the tubular element 6 allows to adjust the stroke of the racks 10 and 11 according to the requirements of the practical case.

[0014] The traction elements 10b, 11b can be connected directly to a respective bolt 12 or 13 for locking-releasing the wing 3.

[0015] As an alternative, the traction elements 10b, 11b are connected, externally with respect to the tubular element 6, to the segment 7 and to the segment 8 respectively, in order to transmit their movement thereto. Each segment 7, 8 accommodates a respective actuator that is anchored therein: said actuator is for example a very small reversible electric motor, designated by the reference numerals 14 and 15 respectively, which is electrically connected by means of a cable, not shown

in the drawings, to the electric power distribution network. The output shaft of the electric motors 14 and 15 is kinematically connected to a respective gearmotor 14a, 15a, for example of the epicyclic or worm-screw type, which in turn is connected, by way of a kinematic connection 14b, 15b that transmits translational motions but provides rotational disengagement, to a respective rod 16, 17 that actuates its own bolt 12 and 13.

[0016] The electric motors 14 and 15 are provided with a control unit, generally designated by the reference numerals 14c and 15c, of any suitable type, which is provided with a card for receiving remote commands for the simultaneous activation of the electric motors 14 and 15 for the locking-release of the bolts 12, 13, depending on the direction of rotation of said motors.

[0017] In case of an electric power outage or of a malfunction of the electrical system, the locking-release of the bolts 12, 13 can be performed easily and rapidly by hand by using an ordinary key that can be inserted in the lock 9, so that the closure device according to the invention is capable of working in any circumstance, since an ordinary key can be used by anyone even without technical skills.

[0018] Figures 3 and 4 illustrate another embodiment according to which it is possible to transmit the translational motion of the vertical rods 16 and 17 also to a respective pair of mutually opposite rods 18 and 19 for the actuation of a respective horizontal bolt, not shown in the drawings, for example by means of a unit with a gear 20 that is mounted so that it can rotate about a horizontal axis 21 and three racks 16a, 18a, 19a.

[0019] Figures 5 and 6 illustrate still another embodiment of the device for closing armored doors according to the invention.

[0020] In particular, the metallic tubular segment 6 has, at the seat 6a, a lock with a keyhole 9 that is suitable, as in the previously described examples, to actuate a gear that is in turn connected to a sliding rack 10.

[0021] The rack 10 engages a guiding element 21 that is connected, for example by means of a lever system 22, to an engagement element 10a.

[0022] In this case, the engagement element 10a has a first end that is articulated to the lever system 22 and another end that is connected kinematically to a rod or traction element 10b.

[0023] The traction element 10b is connected, by means of a connection and actuation element 23, to a bolt 24, which in this example of embodiment is horizontal.

[0024] The device shown in Figures 5 and 6 has further a reversible electric motor 14 in which the output shaft is connected to a gearmotor 14a which, as in the previously described examples, is connected to the bolt 24, in this case by means of the connection and actuation element 23.

[0025] In particular, the connection and actuation element 23 is further connected, by means of a connecting rod 25, to a second bolt 26 that is arranged opposite

the bolt 24 with respect to the lock 9.

[0026] This type of embodiment allows to use a single reversible electric motor 14.

[0027] Furthermore, the presence of the lever system 22 between the guiding element 21 and the engagement element 10a allows to adjust easily the stroke of the bolts 24 and 26 depending on the length of the lever system and on the angle thereof with respect to a direction that is substantially vertical during use.

[0028] The above described invention is susceptible of numerous modifications and variations, all of which are within the protective scope defined by the content of the appended claims.

[0029] Thus, for example, the segments 6, 7 and 8 together with the rods 16 and 17 and partially the bolts 12 and 13 can be in turn inserted in a common tubular seating element fixed to the internal reinforcement frame of the wing 3.

[0030] The materials and the dimensions may be any according to requirements.

[0031] The disclosures in Italian Utility Model Application No. VR2000U000049 from which this application claims priority are incorporated herein by reference.

[0032] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A closure device for armored doors or the like in which the wing or leaf is provided with a metallic reinforcement frame, **characterized in that** it comprises at least one metallic tubular element that acts as a reinforcement for the metallic frame and delimits internally a seat or a respective seat, and at least one lock arranged in said seat and at least one traction element actuated by the lock, or by a respective lock, for the movement of at least one respective locking-release bolt for said leaf.
2. The device according to claim 1, **characterized in that** said lock comprises a gear that can be actuated by means of a key, at least one rack that engages said gear, an engagement element that can be actuated by said at least one rack, which has an end that is fixed to a respective rod, which is in turn connected to a bolt, and another end that is adjustably anchored to the wall of said tubular segment.
3. The device according to claim 2, **characterized in that** it comprises an element that provides locking in an adjustable position in said seat for each engagement element.

4. The device according to claim 3, **characterized in that** said locking element comprises an elastically loaded ball, which is carried by a respective engagement element and can detachably engage a plurality of seats provided in said seat. 5
5. The device according to one or more of the preceding claims **characterized in that** said lock comprises a gear that can be actuated by means of a key, at least one rack that engages said gear, a guiding element that can be actuated by said at least one rack, and a rod that is articulated to said at least one guiding element and is in turn connected to a bolt. 10
6. The device according to claim 5, **characterized in that** it comprises a lever system for articulation between said rod and said at least one guiding element. 15
7. The device according to one or more of the preceding claims, **characterized in that** it comprises an element for connection between said rod and said bolt. 20
8. The device according to one or more of the preceding claims, **characterized in that** it comprises a rod for connection between said connection element and a second bolt. 25
9. The device according to one or more of the preceding claims, **characterized in that** said lock comprises a pair of racks arranged mutually opposite with respect to said gear. 30
10. The device according to one or more of the preceding claims, **characterized in that** between the or each lock, and a or each traction element, there is an actuator that can be controlled remotely for the automatic locking-release of its bolt or bolts independently of said lock. 35
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11. The device according to one or more of the preceding claims, **characterized in that** said leaf has a built-in metallic tubular segment for accommodating each actuator arranged in axial alignment with said at least one tubular element for containing said lock. 45
12. The device according to one or more of the preceding claims, **characterized in that** the or each actuator is a reversible electric motor provided with a card for receiving remote commands. 50
13. The device according to one or more of the preceding claims, **characterized in that** the kinematic connection between the or each actuator and the respective bolt actuation rod is suitable to transmit only axial movements. 55
14. The device according to one or more of the preceding claims, **characterized in that** a traction element for actuation is provided between said tubular seating element for each actuator and said lock.
15. The device according to any one of the preceding claims, **characterized in that** it comprises at least one transmission assembly for transmitting the translational motion of at least one of said rods to a respective pair of auxiliary rods for the actuation of a respective auxiliary bolt.
16. The device according to one or more of the preceding claims, **characterized in that** each transmission assembly comprises a gear that is mounted so that it can rotate on a rotation axis and three racks that mesh with it.
17. The device according to one or more of the preceding claims, **characterized in that** it comprises a tubular element for containing at least a significant portion of said device, fixed to said internal reinforcement frame of said wing.

