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(71) Applicant: **Telefonica, S.A.**
28013 Madrid (ES)

(72) Inventor: **Martin Lopez, Antonio**
28020 Madrid (ES)

(74) Representative: **Primo de Rivera y Urquijo, Jose A.**
General Martinez Campos, 51
28010 Madrid (ES)

(54) **Locking device for public telephone strongboxes**

(57) The invention relates to a locking device for public telephone strongboxes installed in a strongbox (1) which does not outwardly show any type of mechanism corresponding to its locking or to its hinging, the real locking mechanism being carried out in a gearmotor (6) transmitting its rotational movement to a shaft (12) acting on a catch (14) that is able to project to the outside a series of balls (15) acting as blocking means on a locking part (17) joined to the inner face of the door (2), such that when the gearmotor (6) rotates in one direction the door is blocked in a locked situation, whereas when it rotates in the opposite direction the balls (15) retract allowing the release of the locking part (17) and are retained in their housings by the axial movement of a retaining ring (18) that can be moved by a spring (19), the hinges (26) are assembled on complementary hooks (24) and stops (25) that are also hidden, such that in the locked situation the door (2) is fixed in four points that cannot be detected from the outside and are virtually impossible to force.

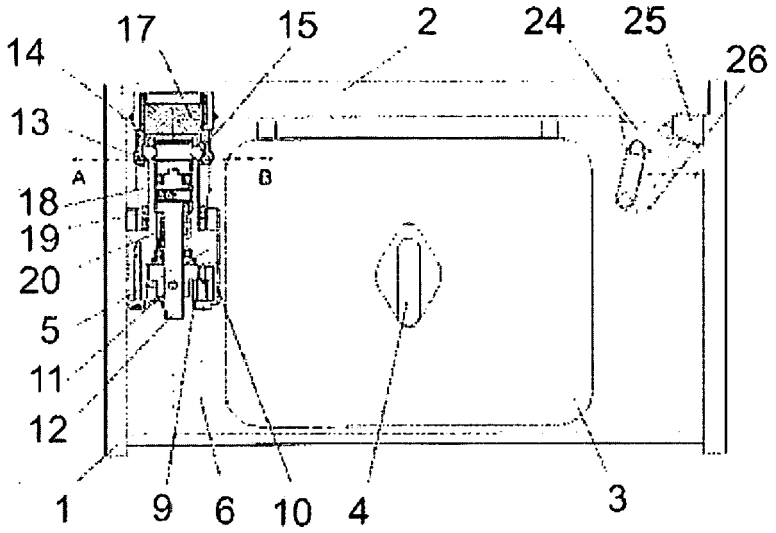

FIG. 2

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Description

Object of the Invention

[0001] The present invention relates to a locking device which has been especially designed for public telephone strongboxes but which can also be used for any other container for valuable articles requiring similar features and which may be subjected to vandalistic acts tending to steal its content.

[0002] The object of the invention is to achieve a high security lock, difficult to force, with an opening kinematic chain, which against a possible breaking thereof causes the blocking of the device in the locked situation, thus optimizing the security of the device.

Background of the Invention

[0003] Due to their usual location in public pathways, telephone booths are attractive targets to be subjected to vandalistic acts with the aim of stealing the collection.

[0004] The defense against these acts has led to structuring public telephones in two clearly distinguished parts or components, an operative or functional part corresponding to the real telephone, and a lower strongbox to which the coins access after their passage through the corresponding selector-counter, said strongbox being duly armored and reinforced to withstand external attacks to which it may be subjected.

[0005] The "weak point" of these strongboxes is in the locking thereof, as the door thereof can be forced through the hinge line or through the lock by means of suitable levering means. The breaking of any one of these elements entails the direct access to the inside of the strongbox, as such breaking involves the disablement of the locking, together with the permanent risk that vandalistic acts on the booth are carried out by introducing objects in the cylinder of the lock, making the master key for periodically collecting the collection inoperative.

Description of the Invention

[0006] The locking device proposed by the invention completely and satisfactorily solves the drawbacks set forth, on one hand by determining a security locking that is unreachable from the outside and virtually impossible to manipulate, with a hinging system that is also difficult to force, and on the other hand by maintaining the situation of the locking device and of the hinging means themselves hidden from the view of the users, with the further characteristic that against a possible breaking of the kinematic chain of the locking mechanism, the latter automatically tends by itself to the blocking situation or inaccessibility to the inside of the strongbox.

[0007] To that end and more specifically, the locking device is formed from a small electric gearmotor which can be actuated from a distance by means of an alphanumeric key and which, duly joined to the body of the strongbox, acts on a cam causing the movement of a transmission arm which acts in turn on a pair of end actuators located on the wall of the main body opposite to the hinging line of the lid. Each of the actuators acts on a catch allowing the retraction or causing the radial propulsion or removal of a set of balls acting as retaining means for a locking part. Said part is carried out in a tubular body conveniently joined to the inner face of the door, such that the rotation of the gearmotor in one direction causes the blocking of each locking part through the respective set of balls, whereas the rotation in the opposite direction causes the release of said locking part. A retaining ring accompanies said release in the opening movement of the door, which retaining ring is actuated by a spring preventing the exit of the balls when the latter are released from the locking part.

[0008] A torsion spring which is prestressed by the drag shaft transmitting the rotational movement to the catch makes said shaft rotate in the locking direction when the kinematic chain breaks, such that a pin housed inside said drag shaft is aligned with a hole of the main body and is in turn pushed axially by an inner spring, causing the blocking of the main shaft and consequently the blocking of the locking parts.

[0009] Two parts, a hook and a stop that are respectively joined to the inner face of the door and to the inner face of the corresponding side wall of the main body, are used for the hinging of the door, both parts being linked by the real hinge which is also located inwardly and is inaccessible from the outside.

Description of the Drawings

[0010] In order to complement the description which is being made and for the purpose of facilitating the interpretation of the features of the invention according a preferred practical embodiment thereof, the following drawings are attached where the following has been represented with an illustrative and non-limiting character:

Figure 1 shows a rear elevational view of a public telephone strongbox provided with the locking device object of the present invention, in which the body of the strongbox is sectioned to show the mentioned locking device also from the rear.

Figure 2 shows a plan view of the assembly shown in the previous figure, also sectioned transversally at the level of the locking device and with the door in the locked position.

Figure 3 shows a cross-sectional detail of the locking device according to section line A-B of figure 2, with the bolt in the locked position.

Figure 4 shows a cross-section of the device in the self-blocking position of the bolt.

Figure 5 shows a side elevational and sectional view of the same assembly shown in Figures 1 and 2, also in the locked position.

Figure 6 shows a representation similar to figure 1,

with the device in the open position.

Figure 7 shows a representation similar to figure 2, also with the device in the open situation.

Figure 8 finally shows a detail similar to the section of figure 3, with the bolt in the open position.

Preferred Embodiment of the Invention

[0011] The mentioned figures show a conventional strongbox for public telephones based on a body 1 and a door 2 and housing in its inside a strongbox 3 receiving the coins through a slot 4, such that the operations for collecting the full strongbox in order to be replaced by another empty strongbox are carried out without the operator having access to its content.

[0012] According to the invention, a support 5 is fixed to the body 1 by any conventional means and in a suitable place, such as for example in correspondence with the middle point of the edge of the entrance of the body 1 opposite to the hinging of the door 2 as observed in figure 2. An electric gearmotor 6 is joined to said support 5 preferably by screwing, a cam 8 being integral with the output shaft 7 of the gearmotor, which cam is able to adopt two positions offset by 180º as shown in figures 1 and 6 and acts on a transmission arm 9 which makes a pair of actuators 10-10' located at both sides of the motor 6 and acting on respective blocking elements rotate.

[0013] Each actuator 10, by means of a pin 11, transmits the rotational movement to a main shaft 12 which, through an intermediate part 13, transmits it in turn to a catch 14 intended to act on a plurality of balls 15 located in housings 16 of the support 5 and intended to block or not block, according to whether they are protruding or not, a locking part 17 conveniently joined to the door 2, there logically being two locking parts 12 corresponding to the two aforementioned actuators 10-10'.

[0014] A retaining ring 18 surrounding the support 5 and which is permanently pressed in an axial direction due to the effect of a spring 19 tends to obdurate the housings 16 for the balls 15 when the door 2 is tilted in the opening direction and the locking pieces 17 are separated from the support 5, preventing the fall of the balls 15, whereas the rotational movement of the main shaft 12 is carried out against the stress of another spring 20 which acts in torsion. Said spring 20 is loaded by means of the operation for opening the device, and against a possible breaking of the kinematic chain thereof it tends to make said shaft 12 rotate towards the locking situation which is blocked, as shown in figure 4, by means of a pin 21 arranged in a diametric housing of the shaft 12. Said pin 21 tends to be projected towards the outside due to the effect of a small axial spring 22 which is normally retained by the support 5 but which in the rotation caused by the torsion spring 20 faces a hole 23 in the support 5, making it penetrate in the latter and causing the blocking of the main shaft 12, causing the self-blocking of the locking device as a whole.

[0015] As a complement to the described structure, a hook 24 is rigidly fixed to the inner face of the door 2 and in the side area and a stop 25 is rigidly fixed to the inner face of the body 1 of the strongbox, causing a tongue and groove coupling between these elements, as seen in figure 7, determining a high degree of security as regards the locking of the strongbox in this area. The hook 24 and the stop 25 are linked to each other by means of the hinge 26, made up based on small articulated connecting rods, clearly visible in figure 2. There will preferably be two hinging elements in the end areas of the edge corresponding to the body and the door of the strongbox, in correspondence with the two locking parts located in the opposite edge of said door.

[0016] As deduced from that set forth above and as has already been commented above, the strongbox offers a completely smooth outer surface, without the hinging means or the opening means being visible to the observer, which confers a high degree of security which is enhanced by the solid fixing described in four points close to the vertices of the door.

Claims

1. A locking device for strongboxes, preferably for public telephones, said strongbox comprising a body (1) provided with a front entrance to which a preferably hinged door (2) is coupled, **characterized in that** it incorporates a support (5) joined to the body (1) of the strongbox and on which an electric gearmotor (6) is assembled the output shaft (7) of which acts, through a cam (8), on a transmission arm (9) transmitting the rotational movement of the motor to at least one actuator (10-10') which in turn supplies the rotational movement to a main shaft (12) which in turn acts on a catch (14) housed inside the support (5) and acting in turn on a plurality of balls (15) capable of emerging radially to block a locking part (17) joined to the lid (2) of the strongbox.

2. A locking device according to claim 1, **characterized in that** in correspondence with the locking part (17), the support (5) incorporates housings (16) for the balls (15) which allow the exit to the outside of said balls pushed by the catch (14), a retaining ring (18) being arranged on said support (5) in the axial direction of each locking part (17), which ring tends to be projected outwardly by a spring (19) preventing the fall of the balls (15) when the door (2) is opened with the subsequent separation of the locking part (17).

3. A locking device according to the previous claims, **characterized in that** the rotation of the main shaft (7) at the cost of the gearmotor (6) occurs against a torsion spring (20) surrounding the shaft (12) itself, said shaft (12) having a diametric housing for a pin (21) capable of facing a hole (18) located in the support (5) and of being projected towards the inside of

said hole (18) by the effect of a spring (22), such that against a breaking of one of the elements of the device, the automatic blocking of the main shaft (12) occurs in the blocking situation for the locking part (17), i.e. in the self-blocking situation for the device.

4. A device according to the previous claims, **characterized in that** it acts in combination with hinging means of the door (2) of the strongbox located therein and formed by at least one hook (24) and one stop (25), joined to each other by small articulated connecting rods and coupled by tongue and grooving in a locked situation.

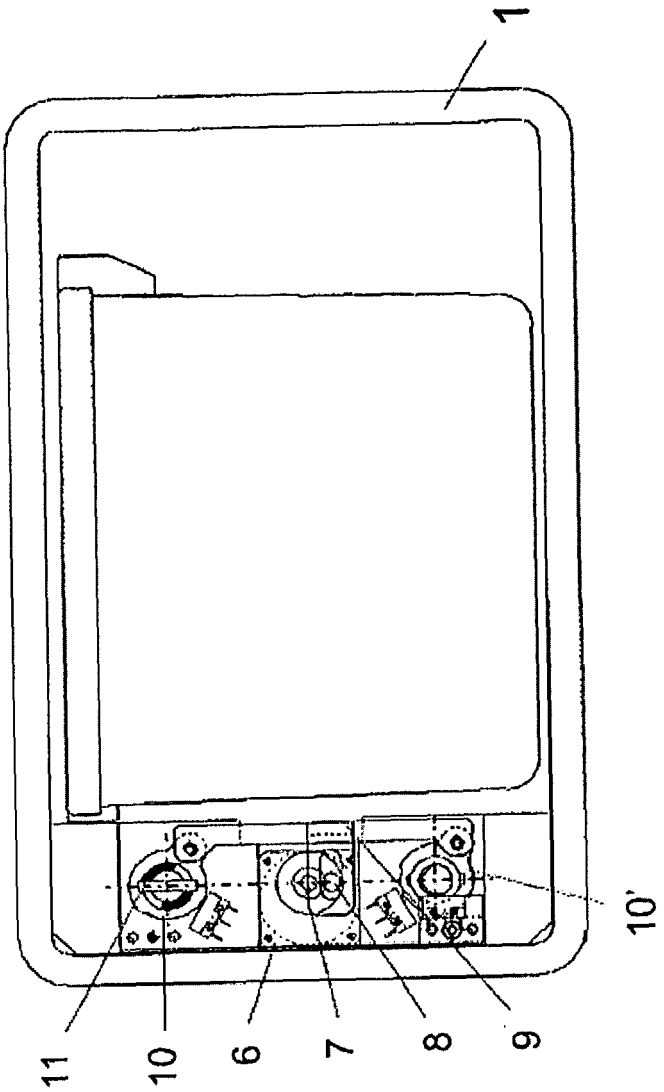

FIG. 1

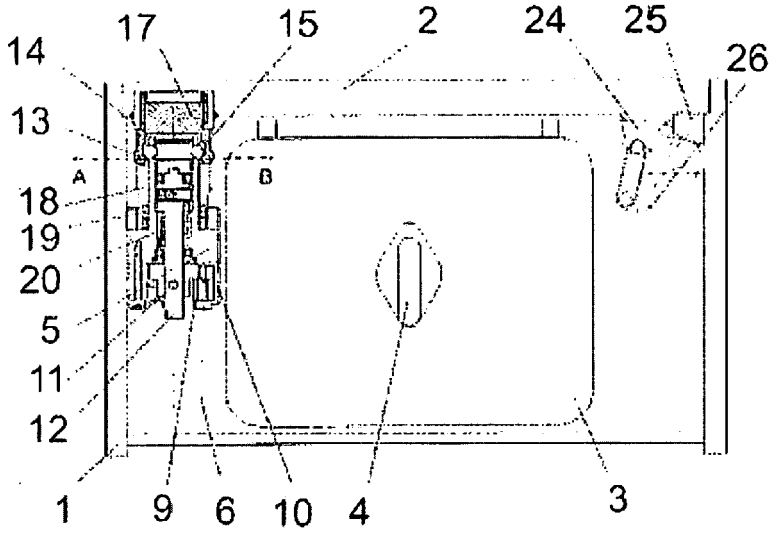

FIG. 2

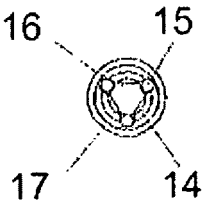

FIG. 3
A-B

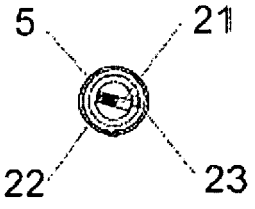

FIG. 4

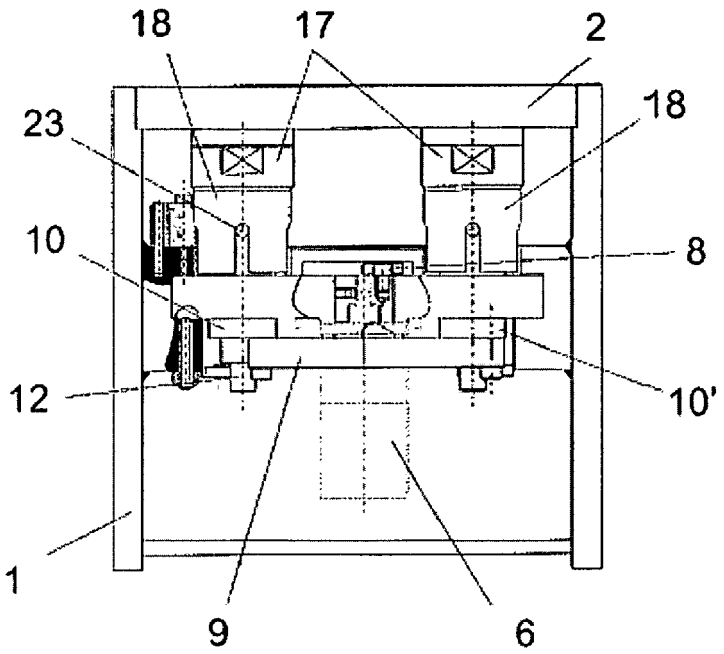

FIG. 5

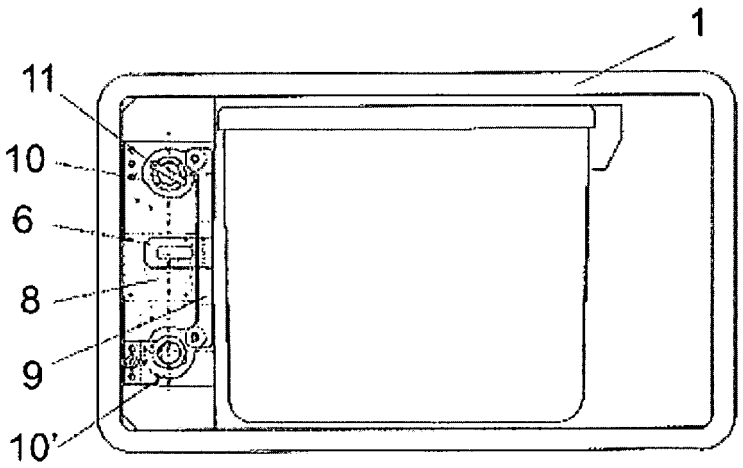

FIG. 6

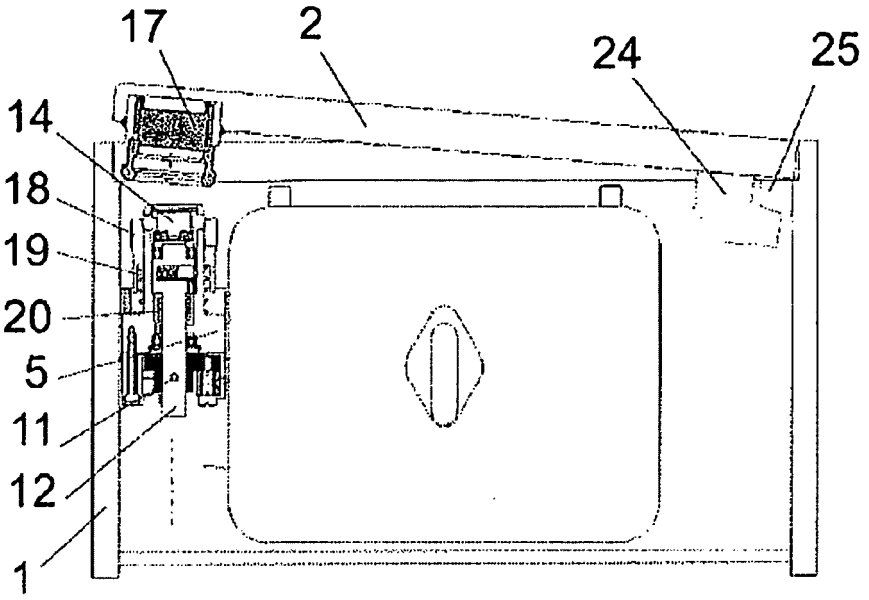

FIG. 7

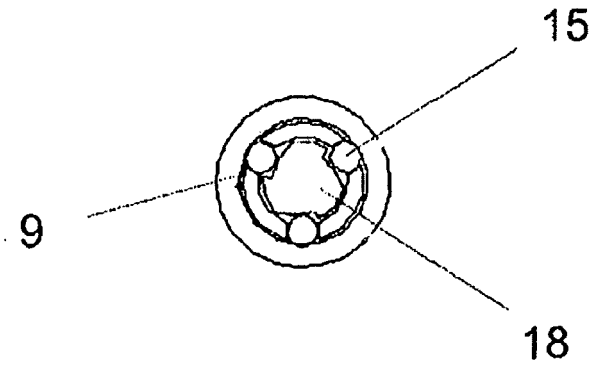

FIG. 8