



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
13.02.2019 Bulletin 2019/07

(51) Int Cl.:
E05G 1/00 (2006.01)

(21) Application number: **17778713.2**

(86) International application number:
PCT/ES2017/000039

(22) Date of filing: **07.04.2017**

(87) International publication number:
WO 2017/174837 (12.10.2017 Gazette 2017/41)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

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(30) Priority: **07.04.2016 ES 201600272**

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(54) **SAFE BOX WITH DOUBLE CYLINDRICAL CLOSURE**

(57) A safe box with a double cylindrical closure is composed of parallelepipedal case that can be embedded into a wall and has a central door in the front case wall wherein a safe box is provided with a double cylindrical closure, the double cylindrical closure consists of two cylinders, an outer cylinder and an inner cylinder concentrically arranged in a vertical position, capable of rotating and having respective slits which, when they are aligned, allow in the unlocking mode access to the contents of the inner cylinder, while in a locking mode the slit in the outer cylinder cannot be accessed through the door of the case, such that when the case door is opened, only the frame of the case and part of the smooth surface of the outer cylinder are visible, the actuation and coordination of the rotation mechanisms of the outer and inner cylinders being controlled by an outer electronic control motherboard.

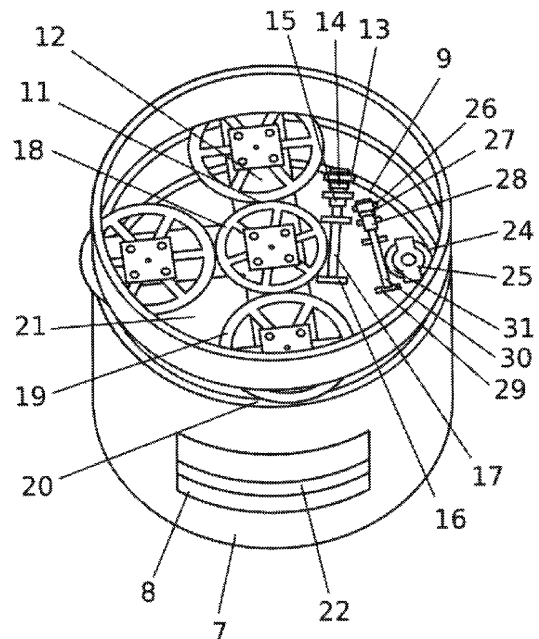


FIG 4

Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a safe box based on a double cylindrical closure that comprises two cylinders concentrically located with respect to one another with the smallest possible gap between them, vertically arranged and having respective slits on the surface thereof, enough to be able to deposit goods inside the same, which, once facing one another, allow access to the content, this assembly being installed on the inside of a preferably flush-mountable case.

[0002] This new system extraordinarily improves security in comparison to known safes or strongboxes, since it advantageously does without the conventional closure of an armored door, which contains the mechanisms of opening, security and control, and which usually have highly complex devices provided with technological advances which aim to prevent a potentially unauthorized access to the content in the strongboxes, which, likewise, has surface coatings that are also armored so as to obstruct unauthorized access to the content of said safe.

[0003] The access door installed in conventional safes is firmly joined to the frame of the same by means of hinges in accordance with the robustness of the assembly, both elements, the door and the box, making up a single body in the closed position, which obstructs a potential forced attempt at separating both elements, when, for example, the weak points that are vulnerable are attacked by using hand tools, such as levers, electric tools for machining, or by means of heat through thermal lances.

[0004] Therefore, the door is the most important part of conventional safes, not only because it comprises the opening mechanism of the system, but also because it is an element through which one may directly access the inside of the same, either once it is open by the owner, or forced by violent means, as occurs in real cases, said door potentially being the most accessible and weakest point which may be broken, due to the fact that it has a flat surface, as well as hinges, which facilitates the machining thereof by different kinds of tools.

[0005] Compared to this conventional configuration of a safe box with a swing door with hinges, the basic principle of which has not changed since the first safe boxes of this type were designed in the eighteenth century, the present invention differs by having, instead of a swinging door, two cylinders concentrically arranged with respect to one another, the first of them, the outer one, rotating on the axis thereof, mounted on a single bearing placed in the lower central and inner part of said case, while a second cylinder, the inner cylinder, since it is concentric, rotates on the same axis and is mounted on a single bearing placed centrally inside said outer cylinder.

[0006] The quadrangular case can be embedded, and is provided with an access door that opens to a truly high security system object of the present invention. The safe-

ty level of said door can be less than that of conventional safe boxes, since the door is not the part that supports the entire security system, as is the case in known strongboxes, the doors of which support the entire weight of the goods contained therein, which is why it is much easier for unauthorized persons to find the best way to break into said conventional safe boxes.

[0007] The case encloses the assembly and comprises the necessary security controls and circuits, protected by means of security systems able to prevent a potential sabotage leading to an occasional attempt to open the system by electronic means, in addition to the physical system which consists of a first or outer cylinder, vertically arranged and with the possibility of rotational movements on its own axis with the aim of changing the position of the slit thereof with respect to the door of the case and of a second, inner cylinder, concentric to the first and located inside the same, both with the same rotational axis and with a minimal gap between the two, as well as in relation to the case that contains the same, and which can rotate with respect to the outer cylinder on the axis thereof by having its own rotation mechanism, just as the outer cylinder, the movements of which are controlled and previously programmed by the electronic control board.

[0008] The principle on which the security of this new safe box is based is the combination of a new group of elements and solutions that are unknown up to the present, based on the resistance that a cylinder to be rotated has when it is locked by several independent anchoring systems, due to the fact that in the hypothetical case that the slit of the outer cylinder were manipulated to face the door of the case by the use of force, the locking of the inner cylinder with respect to the outer cylinder would prevent access to the inside, due to the fact that the inner cylinder has its own anchoring system, which is similar to that of the outer cylinder, and therefore the slit of the inner cylinder is not accessible, since the same is not aligned with the outer cylinder, such that the slit of the outer cylinder would face the smooth face of the inner cylinder, due to said lock anchoring of both cylinders in an independent way.

[0009] In the case that the thief of the safe box did not try to force the rotation of the first cylinder, or outer cylinder, but rather chose to machine a hole to destroy the resistance provided by the same, once both the active and the passive security systems comprised by the access door installed in the case were breached, the delinquent would find the curved and smooth surface of the inner cylinder, which, given that there is a minimum gap between both cylinders, would not provide support in order for the delinquent to be able to force the rotation thereof by means of a lever, which again would not allow the goods inside the safe to be accessed, but rather this new security barrier, that of the inner cylinder, which is identical to the first, that of the outer cylinder, would provide an unexpected resistance.

[0010] The existing height difference between both cyl-

inders is such that two independent systems of movement, security and control for each cylinder are advantageously housed between them: reduction motor, transmission and gears, as well as locking mechanisms and electronic control, which independently makes them rotate in one direction or another.

[0011] Access doors installed in conventional safe boxes could be implemented in this system for exclusive models, and this double cylinder model could especially be installed inside of said safe boxes with the proper adaptations to combine the advantages of both concepts, such that a hybrid system would be created with special qualities, which could be specially standardized to safeguard, for example, samples that were potentially dangerous, such as biological samples, chemical products, as well as radioactive materials or any contaminating material, as well as military material with highly historical and artistic value, or any material which requires a special arrangement and double security with a crucial factor of surprise for a potential attacker.

[0012] For safeguarding contaminating elements, elements that are potentially dangerous or that have a special biological value, the cases thereof would be conveniently lined and isolated with the necessary materials that would prevent any type of radiation or leakage outside of the safe, guaranteeing by means of proper standardization, the necessary seal so that outer contamination, or inner contamination coming from the outside, of these extremely dangerous or valuable materials or products is reduced to the lowest degree possible.

[0013] Likewise, in a different embodiment, the case comprises one or several air inlets for air ventilation or extraction, either forced or from an external system for controlling moisture, temperature, or other environmental factors, including the relative pressure or vacuum so as to provide this new device with the means to, through sufficient gaps existing between both cylinders and the slits thereof, can allow the treated air, if applicable, to enter so as to standardize the quality of the same for the special goods or products that are particularly vulnerable and which would require specific conditions for the conservation thereof, thereby preventing the expiry, deterioration or inner or outer contamination thereof.

[0014] The necessary movement for aligning the slits of the two cylinders allowing access to the content of the safe box is generated by a reduction motor, which by means of the inner gears thereof, transfers the reduction force to a worm screw that is integral to said reduction motor, which then moves a cogwheel arranged in the center of the cylinder and which, in turn, transmits the movement to three or more cogwheels in an equidistant arrangement.

[0015] Said cogwheels pass through the outer cylinder through slots, transmitting the movement to the outer stationary ring that forms part of the case, generating an opposite force that causes the rotation of the cylinder assembly.

[0016] In a hypothetical unauthorized attempt at rotat-

ing the cylinders, the transmission of the forced movement generated in the outer cylinder would in turn pass to two different assemblies, which would provide a strong resistance to the rotation by force.

[0017] On the one hand, a system made up of three or more cams equidistantly arranged and actuated by means of the respective electromagnets thereof, which engage in the ring of the case through hollows in the surface of the outer cylinder at the height of said ring, would maintain the outer cylinder locked without providing even the smallest possibility of a forced rotation.

[0018] On the other hand, if each one of the mechanisms that actuates the electromagnets were deactivated, the reduction that is generated by the gears of the reduction motor would actuate. If in the end this force is overcome, the perpetrator would then be met with the resistance of the electro brake which forms part of said reduction motor.

[0019] In another alternative embodiment, two cams for each cogwheel transmitting to the ring of the case, arranged on each side of said cogwheels, would in turn engage with said ring, as well as with each one of them, by means of a widening in the slots, which would cause a double effect: The retention of the outer cylinder with respect to the case, as well as the irreversible grounding of the cogwheels with respect to the same.

[0020] The industrial application of the present invention lies within the industrial sector of safe boxes or strongboxes, particularly safe boxes with vertical concentric double cylinders.

BACKGROUND OF THE INVENTION

[0021] Although document ES2G13148A6 refers to a hydraulic or pneumatic closure for security doors, which comprises one or several closure cylinders that are movable by pneumatic or hydraulic means, arranged on a door frame assembly, in such a way that electrically through a compressor or pump the necessary pressure is obtained in order to maintain the closure in the position thereof, with a switch providing electric connection, and the valve that discharges the circuit a valve provided with a lock closure, it is actually very different from the concentric cylinders of the invention applied for, which, furthermore, in addition to not being hydraulic, open and close, making the slits thereof coincide or not by mechanical means.

[0022] Document ES2053930T3 describes a lock for a safe box that is electromagnetically controlled, with a codable release control and a handle for actuating the latch, the case of which houses the latch and a closure mechanism in a slit of the front face, while in a hole on the rear part of the case an electromagnet is mounted, the armature of which rests on a locking lever provided with a locking protrusion, which is arranged to rotate on a control lever, a rotational pin being moved by the latch with the locking protrusion and actuating an operating lever stud moved by the latch on the control lever, which

contains a formation of the locking protrusion in such a way that rotational pin crashes against the locking protrusion, both in the introduction and in the separation of the latch in the case that the electromagnet is not energized, and above the latch a control slider is mounted coupled to the same, to which the rotational plug and the operating lever stud are fastened.

[0023] In the compared invention, a rotation pin is claimed to be able to close the safety box, while in the proposal said box closes with the system of concentric cylinders.

[0024] ESG2S7G48U proposes a safe box that has a hollow cylindrical door, with bases of appropriate resistance and thickness, which has, in the proximity of the periphery thereof, uniformly distributed, four through holes, on which four numbered dials are applied which individually actuate each eccentric, provided with a triangular protrusion on the periphery thereof, able to fit in the corresponding triangular notches for such purpose on the door frame, said protrusions able to protrude out of the peripheral surface of the cylinder that forms the door thanks to the presence, in the same, of the corresponding windows, being possible to remove the door only when the four dials allow for the correct position of the triangular protrusions and, in turn, when by means of rotating on itself, the position of the door allows for the coincidence of the aforementioned protrusions with the notches of the frame, constituting a specific angular position of the door, the fifth secret, which cannot be modified.

[0025] ES22G8790T3 describes an electromagnetically controlled lock, specifically for safe boxes, with a manually activated latch and with an electromagnet that locks or releases the latch by means of control and locking elements, and a tourniquet manually actuated drags the control slider out of the latch which moves a transverse slider by means a control cam, which is coupled by the electromagnet with the locking slider, the bolt of the latch fitting in the passage channel of the same.

[0026] The compared invention consists of a magnetically controlled lock while the proposed invention consists of a system for safe boxes that consists of concentric cylinders.

[0027] Conclusions: As can be understood from the research carried out, none of the documents found solves the problems set forth as the proposed invention does.

DESCRIPTION OF THE INVENTION

[0028] The safe box with a double cylindrical closure object of the present invention is made up of case that can be embedded into a wall and has a central door in the front case wall, which retains the outer parallelepipedal form of conventional safe boxes, not providing such a robust protection against penetration due to the fact that inside said case the device object of the invention is located, which consists of two cylinders, an outer cylinder and an inner cylinder concentrically arranged with re-

spect to one another in a vertical position, capable of rotating movements and having respective slits which, when they are conveniently aligned, allow access to the contents of the inner cylinder. From the door of the safe box, access is denied, in locking mode, to the slit of the outer cylinder, to prevent that the same may be used as a support for tools that may bring about a forced rotation of the outer cylinder, such that when the door to the case is opened, only the frame of the same and part of the smooth surface of the outer cylinder is in sight.

[0029] The actuation mechanism is made up of an electronic control motherboard, reduction motor, electro brake and worm screw, as well as of a set of cogwheels that transmit movement to each one of the cylinders, thereby achieving the programmed rotation.

[0030] A ring gear anchored to the case that surrounds the outer cylinder on the upper part thereof is engaged by several planetary cogwheels, located inside the outer cylinder which, arranged on the same plane, equidistant among each other and at the same height as the ring gear of the outside, make said meshing possible through horizontal slots on the surface of the cylinder.

[0031] Said reduction motor actuates an integral worm screw, which transmits movement to a central cogwheel, which in turn transmits movement to said planetary cogwheels which, engaging by means of the slots of the outer cylinder with the ring gear that externally surrounds the same, the rotational movement of said outer cylinder is produced.

[0032] The entire aforementioned assembly is directly anchored to the upper inner surface of the aforementioned outer cylinder.

[0033] The mechanism that makes the locking possible is made up of the reduction generated by the inner gears of the reduction motor, the opposition to be rotated of the electro brake which forms part of the motor, as well as a system made up of several double coil electromagnets integral to the same base, wherein the actuating mechanism of which a semi-gear forms part is supported which, by means of slots or holes that pass through the outer cylinder, just as the cogwheels themselves that produce the rotation, act on the outer ring gear when it is in locking mode, locking the system and preventing any possible rotation. Said electromagnets can be substituted or complemented by other locking systems, especially those in the shape of a wedge, in an independent electronic circuit, to reinforce that which was previously defined, an example of the same being an electromagnet that releases the spring of the shaft which ends at a single tooth semi-gear which acts as a ratchet by engaging in the outer ring gear of the case.

[0034] The transmission and locking system of the inner cylinder is based on the same working principle that as that of the outer cylinder, and is located on the upper outer surface of the inner cylinder, anchored to the same, leaving the mechanism for moving said outer cylinder above the same. The system consists of a reduction motor that transmits movement to a worm screw, which in

turn connects to a cogwheel integral to the inner wall of the outer cylinder, thereby achieving a relative movement of the inner cylinder with respect to the outer cylinder.

[0035] The support of both concentric cylinders is achieved by means of two single bearings which surround the shaft of the aforementioned cylinders, with which the centering of the same is guaranteed, as well as a minimal gap between the cylinders, a first axial needle roller bearing being housed between the bases of the two cylinders, thereby allowing for the relative rotation of both, while the second bearing is exterior, resting directly against the case and on the inside thereof, the same having to support the weight of both cylinders, which is why it cannot be only axial, but rather it is a swivel joint roller bearing that ensures the stability of the system and allows for the free rotation of the cylinders.

[0036] To allow access to the goods safeguarded in the safe box, the two slits of both cylinders must coincide with the door of the case. Once the closure of the safe box has been initiated, an automatic program is activated which is aimed at achieving the unalignment of the slits of both cylinders with respect to the door of the case, as well as in relation to both, controlled so that the resting position is random for each use, likewise, in the resting position the electro brakes of both reduction motors and the locking latches or cams that act directly on the two ring gears that control the movement of both cylinders are automatically activated.

[0037] The electronic control systems are programmed on the motherboard that is divided into two parts, one of which housed in the inner part of the case and the other in the inner space where the movement and locking mechanisms are located, such that access is denied to the system and thereby preventing manipulations aimed at breaching the security system of the same.

[0038] Said base plate has opening, closing and maneuvering controls by means of electronic components designed for said purpose, as well as an amperometric circuit that can detect out of range consumption, which is why it would be a complementary control for non-authorized or unforeseeable locking movements, which would avoid accidents due to compression and which would set off the normal alarms to which the conventional safe boxes are connected.

[0039] To avoid a possible electric sabotage that allows the unauthorized opening of the safe, the installation that powers the motherboard contains a security system that prevents the actuation of the motors and the unlocking of the latches in an independent way, since said installation is duly protected and coded by digital means that are already present in state-of-the-art conventional safe boxes.

[0040] The rotation of both cylinders is controlled by inductive-type revolution sensors, which by means of a hole made on each cylinder, counts the turns, speed and rotation direction to determine the functioning thereof as well as an attempt at a forced rotation or errors in the

same, complemented by a system of amperometric sensors that would control the consumption of the motors which would at the same time determine in a combined way both factors which, along with the conventional high security alarm system associated with safe boxes, would activate the alarms of active and passive protection.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] To provide a greater understanding of the description, this specification is provided with drawings that represent a preferred embodiment of the present invention.

Figure 1: A conventional perspective view of the case with the door closed.

Figure 2: A conventional perspective view of the case with the door open through which one can see the slit of the outer cylinder aligned with the inner cylinder.

Figure 3: A conventional perspective view of the case with the door open through which one can see that the slit of the outer cylinder is not aligned with the door of the case (closed safe).

Figure 4: A conventional perspective view from above of the outer cylinder with gears, reduction motor, worm screw, central cogwheel, planetary cogwheels, slits.

Figure 5: A conventional perspective view of the structure, wherein one can see the ring gear integral to the case and which makes the movement of the outer cylinder possible.

Figure 6: A conventional perspective view of the outer cylinder wherein one can see the slots through which the cogwheels that engage with the ring gear of the case pass.

Figure 7: A plan view of the system comprising the movement of the previously defined outer cylinder.

Figure 8: A cross-sectional view of the system of movement of the inner cylinder, housed in the outer upper part of the inner cylinder, the cogwheel of which engages in the ring gear integral to the outer cylinder.

Figure 9: A conventional perspective view of the bearing which supports and allows for the centered and rotational support of the inner cylinder.

Figure 10: A conventional perspective view of the bearing which supports, and allows for, the support, centering and rotation of the outer cylinder and the assembly thereof.

Figure 11: A cross-sectional view of the case, with both bearings and both cylinders.

Figure 12: A conventional perspective view of the ratchet in the locking position.

Figure 13: A conventional perspective view of the ratchet when released.

[0042] The numerical references that appear in the fig-

ures correspond to the following elements that constitute the invention:

1. Case
2. Case door
3. Case window
4. Ring gear of the case
5. Outer electronic control motherboard
6. Systems for controlling the opening and rotation, and alarm
7. Outer cylinder
8. Slit of the outer cylinder
9. Inner ring gear of the outer cylinder
10. Bearing of the outer cylinder
11. System of movement of the outer cylinder
12. Support for the gears anchored to the inner upper part of the outer cylinder.
13. Support of the reduction motor of the outer cylinder
14. Reduction motor of the outer cylinder
15. Electro brake of the reduction motor of the outer cylinder
16. Support of the worm drive of the outer cylinder
17. Worm screw of the outer cylinder
18. Central cogwheel of the outer cylinder
19. Planetary cogwheels of the outer cylinder
20. Slits of the cylinder for the planetary cogwheels
21. Inner cylinder
22. Slit of the inner cylinder
23. Bearing of the inner cylinder
24. System of movement of the inner cylinder
25. Support for the gear anchored to the outer upper part of the inner cylinder.
26. Support for the reduction motor of the inner cylinder
27. Reduction motor of the inner cylinder
28. Electro brake of the reduction motor of the inner cylinder
29. Support of the worm screw of the inner cylinder
30. Worm screw of the inner cylinder
31. Cogwheel of the inner cylinder
32. Electromagnet
33. Spring
34. Shaft
35. Ratchet

DESCRIPTION OF A PREFERRED EMBODIMENT

[0043] A preferred embodiment of the present invention can be based on a case (1) that can be embedded into a wall and has a central door (2) in the front case wall, with an outer parallelepipedal form of conventional safe boxes, said case (1) not provided with such a robust protection against penetration, due to the fact that inside said case (1) is where the double cylinder safe box object of the invention is actually located, consisting of two cylinders (7 and 21), an outer cylinder (7) and another inner cylinder (21) concentrically arranged with respect to one

another in a vertical position, capable of rotating movements and having respective slits (8 and 22) such that when they are conveniently aligned, access to the contents of the inner cylinder (21) is made possible. From the door (2) of the safe box (1), access is denied, in locking mode, to the slit of the outer cylinder (8), to prevent the same from being used as a support for tools that can cause a forced rotation of said outer cylinder (7), such that when the door (2) to the case (1) is opened, only the frame of said case (1) and part of the smooth surface of the outer cylinder (7) is in sight.

[0044] An outer electronic control motherboard (5) controls the actuation and coordination of the rotation mechanisms of the outer (7) and inner (21) cylinders.

[0045] The outer cylinder (7) is made up of a cogwheel (4) anchored to the case (1) which surrounds said outer cylinder (7) on the upper part thereof, being engaged by several planetary cogwheels (19), located inside said outer cylinder (7) which, arranged on the same plane, equidistant among each other and at the same height as the aforementioned ring gear (4) of the outer cylinder (7), make said meshing possible through horizontal slots on the surface of said outer cylinder (7).

[0046] Said reduction motor (14) of the outer cylinder (7) actuates an integral worm screw (17), which transmits movement to a central cogwheel (18), which in turn transmits movement to the aforementioned planetary cogwheels (19) which, by engaging through the horizontal slots of the outer cylinder (7) with the ring gear (4) that externally surrounds the same, produces rotational movement of said outer cylinder (7). The entire aforementioned assembly is directly anchored to the inner upper surface of the aforementioned outer cylinder (7).

[0047] The mechanism that makes the locking possible is based on reduction generated by the inner gears of the reduction motor (14), as well as on the resistance of the electro brake (15) of said reduction motor (14) to be rotated, and on a system made up of at least a double coil electro brake (15) integral to the base, wherein the actuating mechanism of which a semi-gear forms part is supported which, by means of slots that pass through the outer cylinder (7), just as the cogwheels themselves (19) which produce the rotation, act on the outer ring gear (18) when it is in locking mode, locking the system and preventing any possible rotation. In a different embodiment said electro brake (15) can be substituted or complemented by other locking systems, especially those in the shape of a wedge, in an independent electronic circuit that reinforces the previously described one, such as, for example, an electromagnet (32) that releases the spring (33) of the shaft (34) which ends at a single tooth semi-gear which acts as a ratchet by engaging in the toothed ring gear of the case (4).

[0048] The transmission system and inner locking cylinder (21) is based on the same working principle as that of the outer cylinder (7), and is located on the upper outer surface of the inner cylinder (21), anchored to the same, below the mechanism for moving the aforementioned

outer cylinder (7). The system consists of a reduction motor (27) of the inner cylinder (21) that transmits movement to a worm screw (30) of the inner cylinder (21), which in turn connects to a cogwheel (31) integral to the inner wall of the outer cylinder (7), thereby achieving a relative movement of the inner cylinder (21) with respect to the outer cylinder (7).

[0049] The support of both concentric cylinders (7 and 21) is achieved by means of two single bearings (10 and 23) which surround the shaft of the aforementioned cylinders (7 and 21), with which guarantees the centering of the same as well as a minimal gap between the cylinders, a first axial needle roller (10) bearing being housed between the bases of the two cylinders (7 and 21), thereby allowing for the relative rotation of both, while the second bearing (23) is exterior, resting directly against the case and on the inside thereof, the same having to support the weight of both cylinders (7 and 21), which is why it cannot be only axial, but rather it is a swivel joint roller bearing that ensures the stability of the system and allows for the free rotation of the cylinders (7 and 21).

[0050] To allow access to the goods safeguarded in the safe box, the two slits (8 and 20) of both cylinders (7 and 21) must coincide with the door of the case. Once the closure of the safe box has been initiated, an automatic program is activated which is aimed at achieving the unalignment (8 and 20) the slits of both cylinders (7 and 21) with respect to the door of the case (1), as well as in relation to both slits (8 and 20), controlled so that the resting position is random for each use, and likewise, in this resting position the electro brakes (15 and 28) of both reduction motors (14 and 27) and the locking latches or cams that act directly on the two ring gears (9 and 31) that control the movement of both cylinders (7 and 21) are automatically activated.

[0051] The electronic control systems (8) are programmed on the motherboard (5) which is divided into two parts, one of which houses the inner part of the case (1) and the other in the inner space where the movement and locking mechanisms are located, such that access to the system is denied and manipulation aimed at breaking the security system is prevented.

[0052] Said motherboard (5) has opening, closing and maneuvering controls by means of electronic components designed for said purpose, as well as an amperometric circuit that can detect out of range consumption which is why it would be a complementary control for non-authorized or unforeseeable movements or locks which would avoid accidents due to compression, setting off the normal alarms to which the conventional safe boxes are connected.

[0053] To avoid a possible electric sabotage that allows the unauthorized opening of the safe, the installation that powers the motherboard (5) contains a security system that prevents the actuation of the reduction motors (14 and 27) and unlocking of the latches in an independent way, since said installation is duly protected and coded by digital means that are already present in conven-

tional safe boxes.

[0054] The rotation of both cylinders (7 and 21) is controlled by inductive-type revolution sensors, which by means of a hole made on each cylinder (7 and 21), count the turns, speed and rotation direction to determine the functioning thereof and attempts at forced rotation or errors in the same, complemented by a system of amperometric sensors that control the consumption of the motors which would at the same time determine in a parallel and combined way both factors which, along with the conventional high security alarm system associated with safe boxes, activate the alarms of active and passive protection.

Claims

1. A safe box with a double cylindrical closure, composed of a parallelepipedal case (1) that can be embedded into a wall and has a central door (2) in the front case wall, **characterized in that** inside said case (1) is a safe box is provided with a double cylindrical closure, the double cylindrical closure consisting of two cylinders (7, 21), an outer cylinder (7) and an inner cylinder (21) concentrically arranged with respect to one another in a vertical position, capable of rotating and having respective slits (8, 22) which, when aligned, allow in the unlocking mode access to the contents of the inner cylinder (21), while in a locking mode the slit in the outer cylinder cannot be accessed through the door (2) of the case (1), such that when the case (1) door (2) is opened, only the frame of the case (1) and part of the smooth surface of the outer cylinder (7) are visible, the actuation and coordination of the rotation mechanisms of the outer (7) and inner (21) cylinder being controlled by an outer electronic control motherboard (5).
2. The safe box with a double cylindrical closure, according to claim 1, **characterized in that** the outer cylinder (7) is made up of a ring gear (4) anchored to the case (1) which surrounds said outer cylinder (7) on the upper part thereof, being engaged by several planetary cogwheels (19), located inside said outer cylinder (7) which, arranged on the same plane, equidistant among each other and at the same height as the aforementioned ring gear (4) of the outer cylinder (7), make said meshing possible through horizontal slots on the surface of said outer cylinder (7).
3. The safe box with a double cylindrical closure, according to claims 1 and 2, **characterized in that** a reduction motor (14) of the outer cylinder (7) actuates an integral worm screw (17), which transmits movement to a central cogwheel (18), which, in turn, transmits movement to the aforementioned planetary cogwheels (19) which, engaging by means of the

horizontal slots of the outer cylinder (7) with the ring gear (4) that externally surrounds the same, produces the rotational movement of said outer cylinder (7), the entire aforementioned assembly being directly anchored to the inner upper surface of the aforementioned outer cylinder (7).

4. The safe box with a double cylindrical closure, according to claims 1 to 3, **characterized in that** the locking mechanism is based on reduction generated by the inner gears of the reduction motor (14), as well as on the opposition of the electro brake (15) of said reduction motor (14) to be rotated, and on a system made up of at least a double coil electromagnet (32) integral to the base, wherein the actuating mechanism of which a semi-gear forms part is supported, which, by means of slots that pass through the outer cylinder (7), just as the cogwheels themselves (19) which produce the rotation, act on the outer ring gear (18) when it is in locking mode, locking the system and preventing any possible rotation, said electromagnets (32) in different embodiments able to be substituted or complemented by other wedge locking systems, in an independent electric circuit that reinforces that which was previously described, such as for example an electromagnet (32) that releases the spring (33) of a shaft (34) that ends at a single tooth semi-gear that acts as a ratchet (35) by engaging in the ring gear of the case (4).
5. The safe box with a double cylindrical closure, according to claims 1 to 4, **characterized in that** the transmission and locking system of the inner cylinder (21) is based on the same working principle as that of the outer cylinder (7), being located on the outer upper surface of the inner cylinder (21), anchored to the same, below the movement mechanism of the outer cylinder (7), said system consisting of a reduction motor (27) of the inner cylinder (21) which transmits movement to a worm screw (30) of the inner cylinder (21), which in turn connects to a cogwheel (31) integral to the inner wall of the outer cylinder (7), thereby achieving a relative movement of the inner cylinder (21) with respect to the outer cylinder (7).
6. The safe box with a double cylindrical closure, according to claims 1 to 5, **characterized in that** the support of both concentric cylinders (7, 21) is achieved by means of two single bearings (10, 23) which surround the shaft of the aforementioned cylinders (7, 21), a first axial needle roller (10) bearing being housed between the bases of the two cylinders (7, 21), thereby allowing for the relative rotation of both, while the second bearing (23) is exterior, resting directly against the case, the same having to support the weight of both cylinders (7, 21), this second bearing (23) being a swivel joint roller bearing.

7. The safe box with a double cylindrical closure, according to claims 1 to 6, **characterized in that** the aforementioned motherboard (5) has controls for opening, closing and maneuvering by means of electronic components, as well as an amperometric circuit, able to detect out of range consumption, and trigger conventional alarms, comprising the installation that powers the motherboard (5), a security system that prevents the actuation of the reduction motors (14, 27) and unlocking of the locks in an independent way.

8. Use of the previously claimed safe box with a double cylindrical closure, **characterized in that**:

- a) To allow access to the goods safeguarded in the safe box, the two slits (8, 20) of both cylinders (7, 21) must coincide with the door of the case;
- b) Once the closure of said safe box is initiated, an automatic program (8) is activated aimed at achieving the unalignment of the slits (8, 20) of both cylinders (7, 21) with respect to the door of the case (1), as well as in relation to both slits (8, 20) controlled so that the resting position thereof is random for each use, likewise automatically activating in this resting position the aforementioned electro brakes (15, 28) of both reduction motors (14, 27) and the locking latches or cams that act directly on the two rings (9, 31) that lock the movement of both cylinders (7, 21);
- c) The electronic control systems (8) are programmed on the motherboard (5), which is divided into two parts, one of which is housed in the inner part of the case (1) and the other in the inner space where the movement and locking mechanisms are located, such that access to the system is denied, thereby preventing manipulation aimed at breaching the security system;
- d). The rotation of both cylinders (7, 21) is controlled by inductive-type revolution sensors, which by means of a hole made on each cylinder (7, 21), count the turns, speed and rotation direction to determine the functioning thereof and attempts at forced rotation or errors in the same, complemented by a system of amperometric sensors that control the consumption of the motors which at the same time determine both factors in a parallel and combined way.

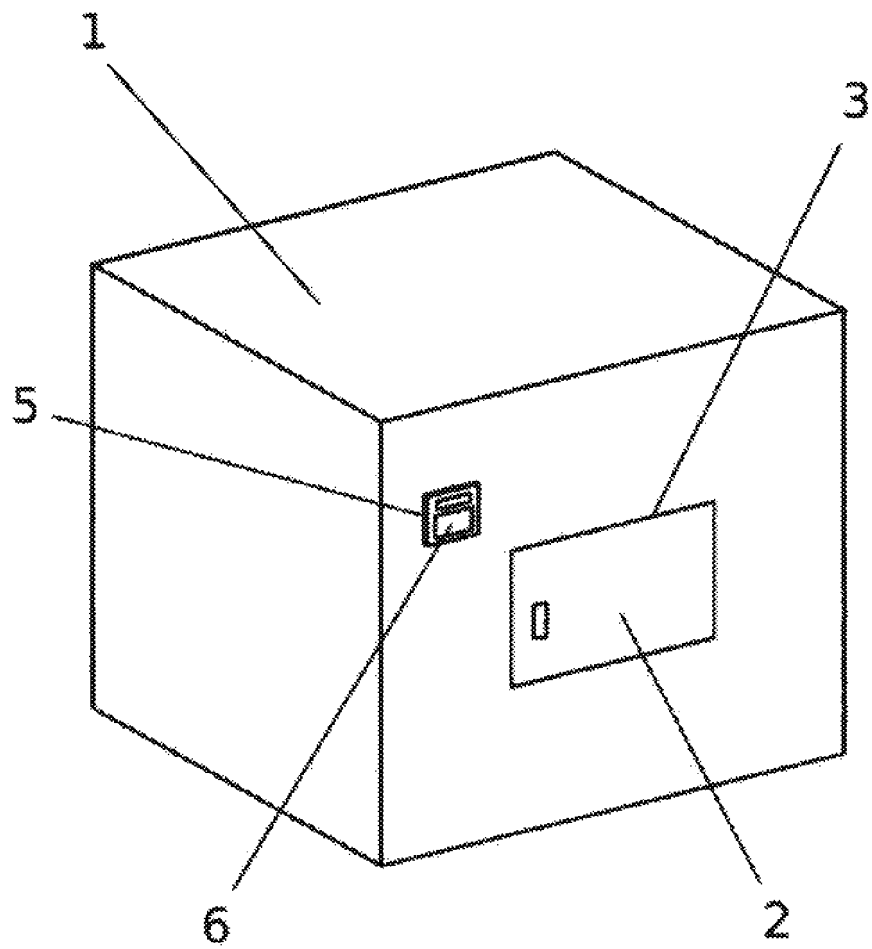


FIG 1

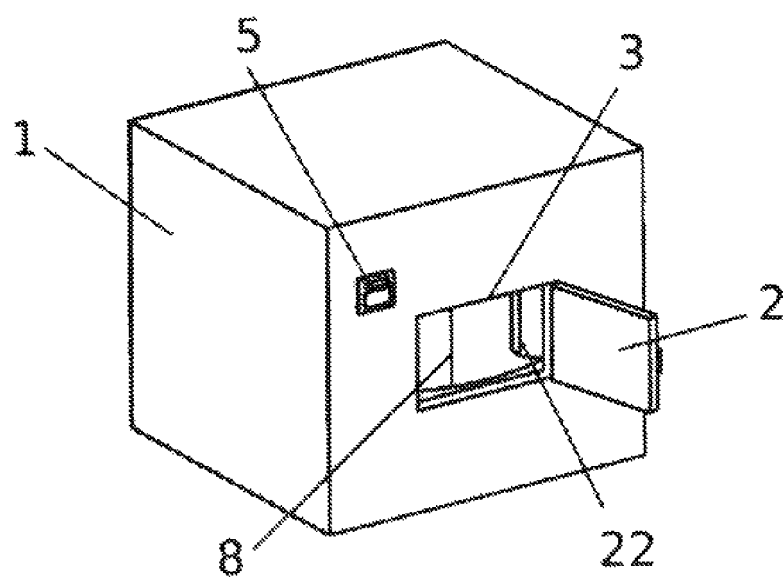


FIG 2

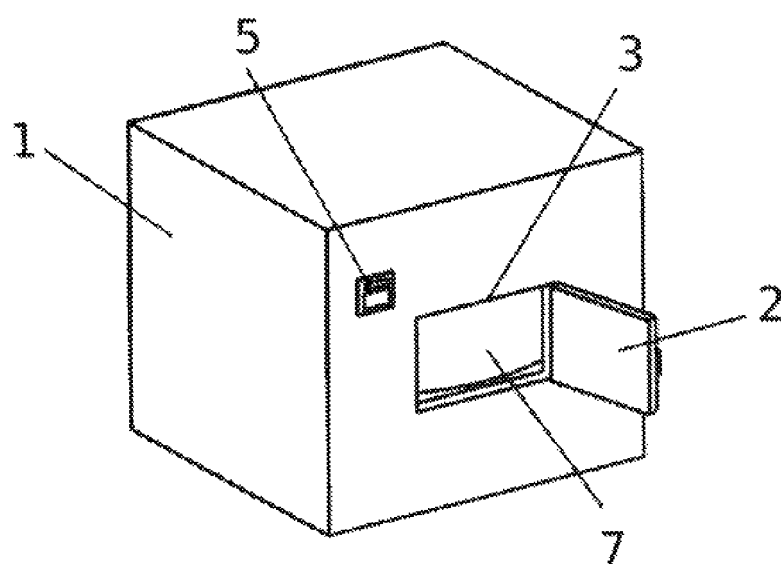


FIG 3

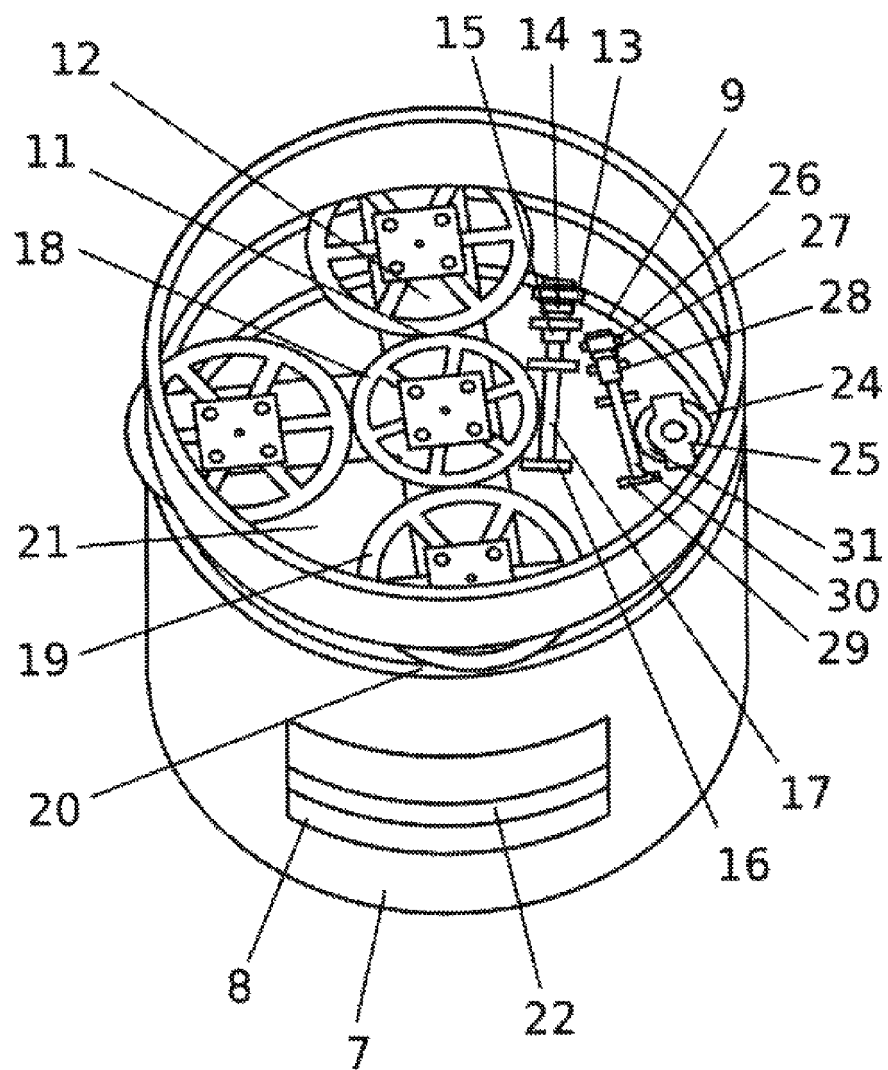


FIG 4

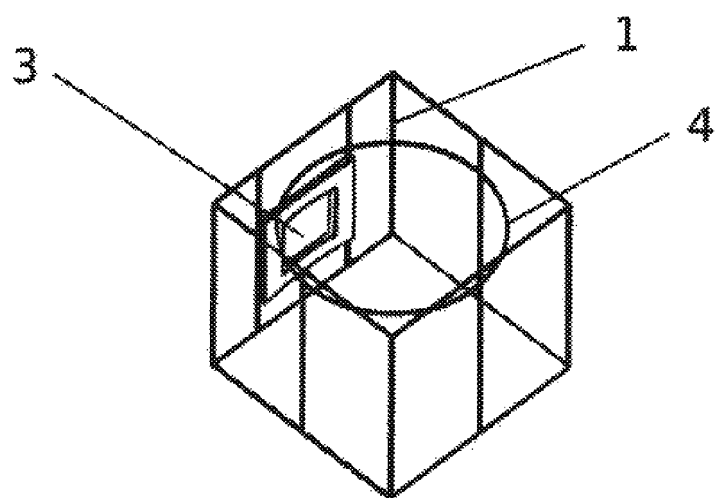


FIG 5

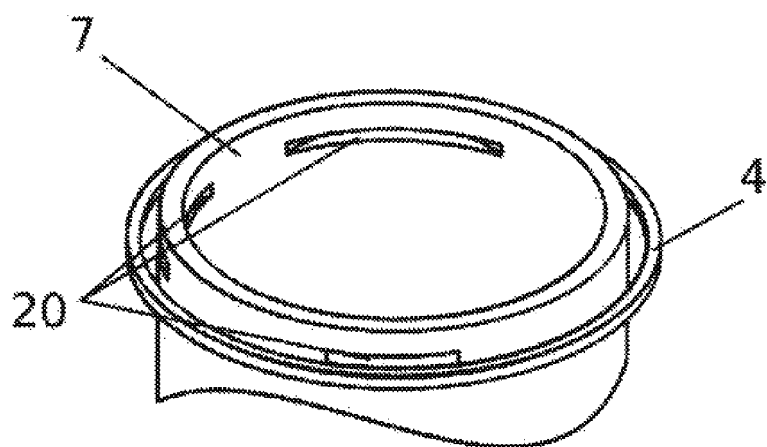


FIG 6

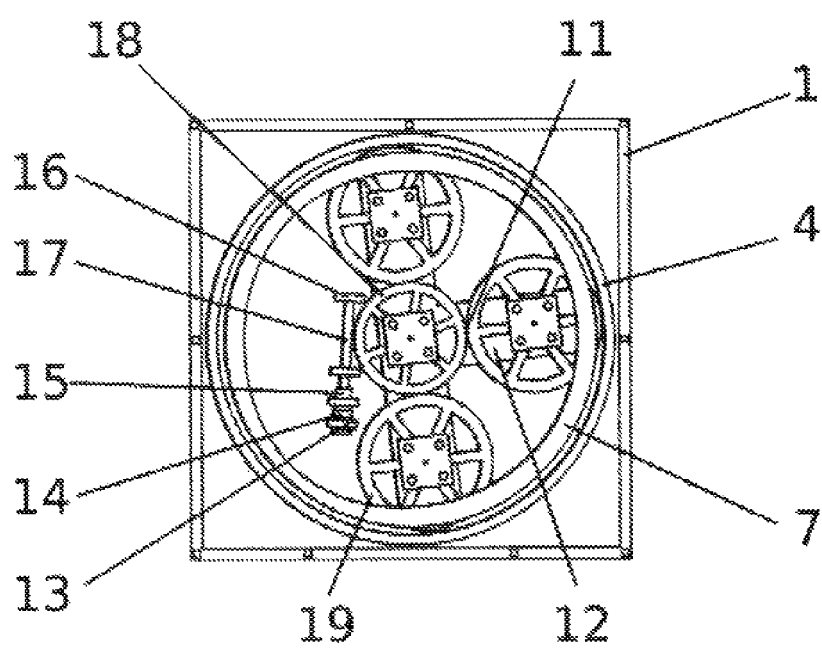


FIG 7

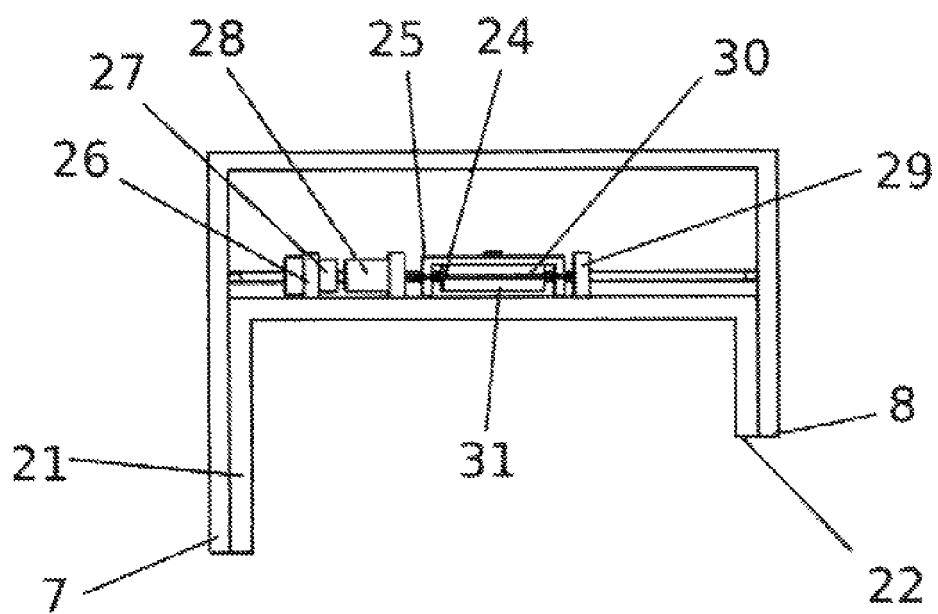


FIG 8

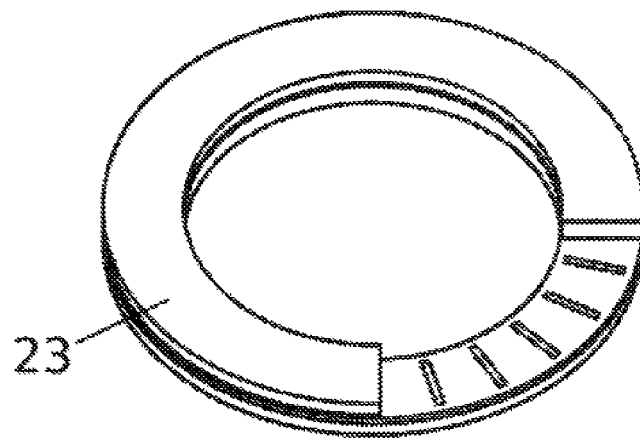


FIG 9

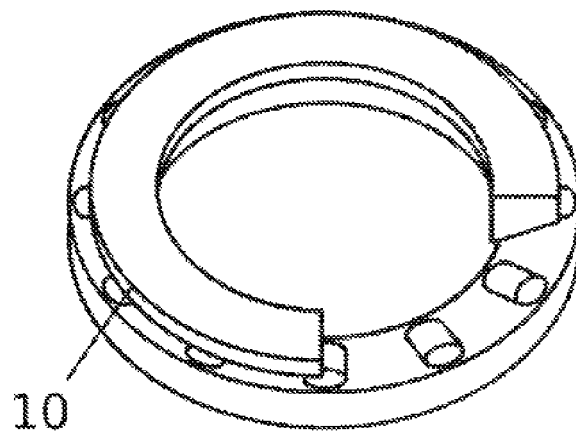


FIG 10

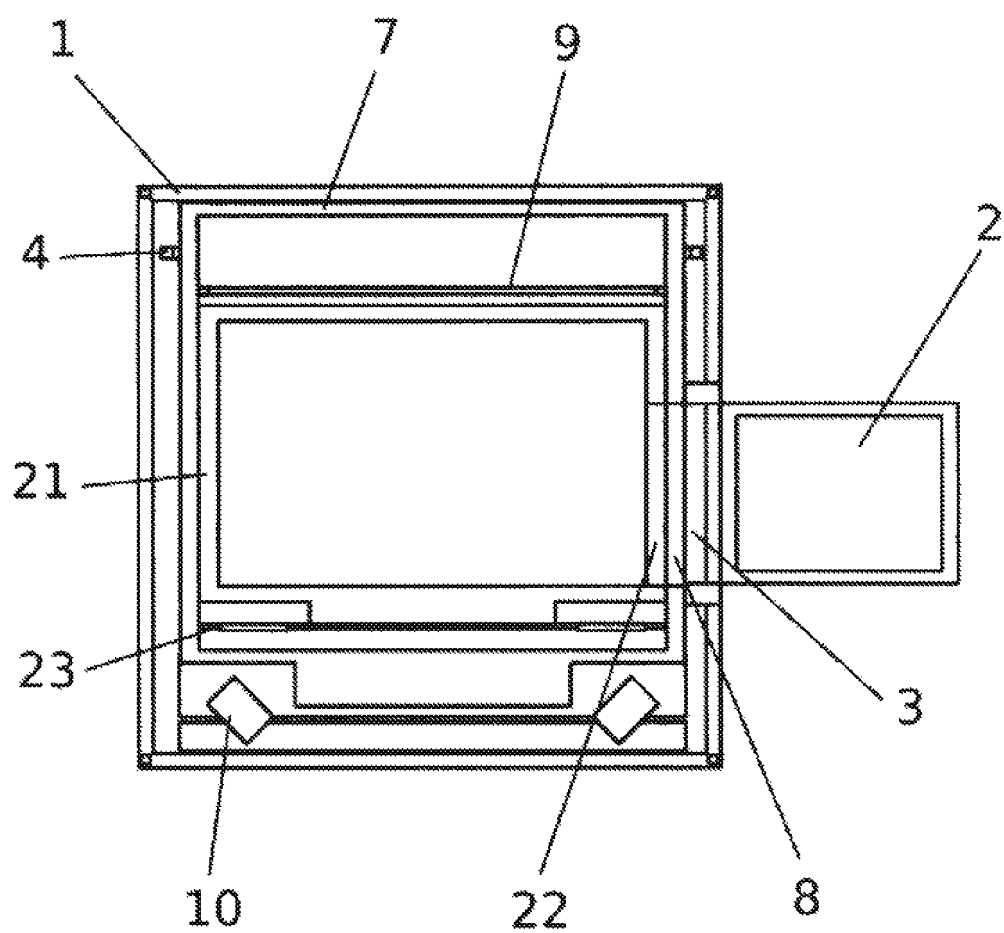


FIG 11

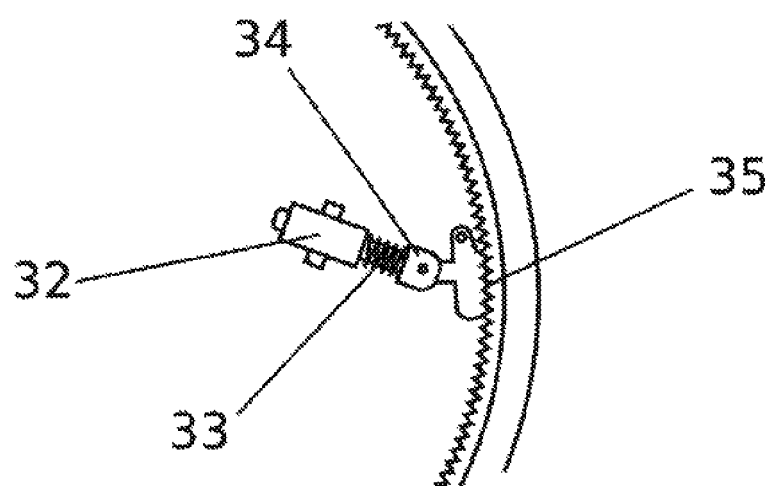


FIG 12

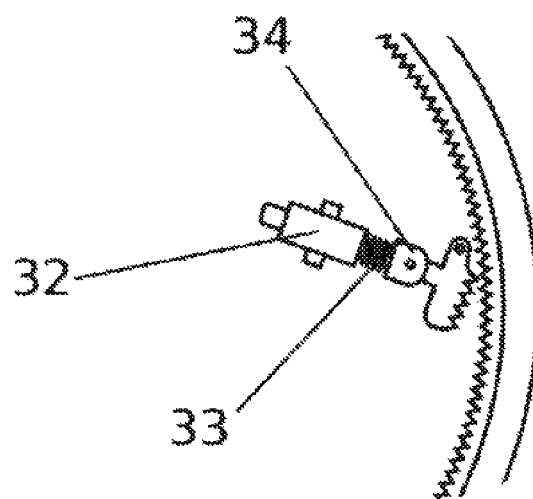


FIG 13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2017/000039

A. CLASSIFICATION OF SUBJECT MATTER

E05G1/00 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E05G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 202013005903U U1 (SMIRNOV TATJANA) 27/08/2013, paragraphs [0004]-[0009]; figures)	1
Y	CN 103510791 A (NING XIAOYING) 15/01/2014, the whole document	1
A	WO 9412752 A1 (HEDON ELECTRONIC DEV VOF ET AL.) 09/06/1994, the whole document	1,2,8
A	US 561086 A 02/06/1896, the whole document	1,2
A	US 1570882 A (ADDISON ELLISON LUTHER) 26/01/1926, the whole document	1,2
A	US 2016053526 A1 (DITTRICH H JASON) 25/02/2016, the whole document	1,8

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance.	
"E" earlier document but published on or after the international filing date	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"O" document referring to an oral disclosure use, exhibition, or other means.	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents, such combination being obvious to a person skilled in the art
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
22/06/2017

Date of mailing of the international search report
(23/06/2017)

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2017/000039

C (continuation).	DOCUMENTS CONSIDERED TO BE RELEVANT	
Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Form PCT/ISA/210 (continuation of second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2017/000039

Information on patent family members

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US2016053526 A1	25.02.2016	NONE	
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REFERENCES CITED IN THE DESCRIPTION

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