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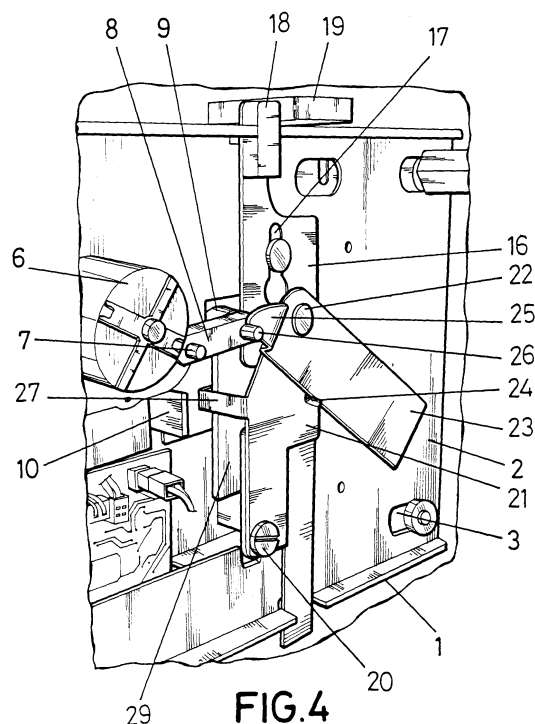
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(54) **Propelling and blocking device for the doors of safes**

(57) Applicable to doors that act as "self-locking" to which effect, besides being connected hinged to the box is capable of moving in its own plane, the device has a support (2), inside the door (1), equipped with the rotation axis (5) for the assembly of guides (3) that allow the relative movement between door (1) and support (2), being also set up on this support (2) an electric micro-motor (6) that through a connecting rod (8) acts on opposing cams (10) and (11) attached to the internal face of the door (1), causing the longitudinal movement in one or another sense of the door, micromotor commanded from an external keyboard (12) or from any other means of activation of an electronic circuit (13), for the opening maneuver, while the closing maneuver is caused by a microswitch (15) that closes in a limit position of swinging of the door and that acts on the micro-motor (6) through a time delay. Means have also been provided for locking of the door in a closing position, and to prevent that it may be opened when a manual push is given in the sense of its movement.



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Description

OBJECT OF THE INVENTION

[0001] The present invention refers to a device that has been specially created for the automatic operation of a safe door, specifically of a swing door of the type that act, as well as a closing element properly speaking, also as a bolt for self locking to the matching frame, so that after the swinging of the door to the limit situation in the frame recess, the door moves within its own plane to become fixed to the frame by at least two of its edges.

[0002] The invention device allows the automatic movement of the door within its own plane, as much for locking as for unlocking, so that only the swinging open or closed movement is carried out manually.

[0003] Also an object of the invention is the incorporation of means of locking of the door, after its closing, avoiding that an opening movement may be made by a simple manual push on the door in the sense of movement in its own plane in a closed position.

BACKGROUND OF THE INVENTION

[0004] This same applicant is holder of the Spanish patent application number 9500587, in which is described a security closure for assets and similar boxes, that is to say for what are commonly denominated safes, in which the access door to the interior of the box is able to swing on a hinging axis during the opening and closing movements, as well as of moving in its own plane, specifically in situation of closure, to lock itself relative to the matching frame, so that in a limit situation for the door, it remains sufficiently displaced with respect to the frame so that it can swing toward the opening position, while in the other limit position the two vertical edges of the door remain opposite to the vertical mountings of the frame, with which the door acts as a self locking bolt.

[0005] Furthermore, in the fore mentioned patent of invention 9500587, it was foreseen that the door adopt a trapezoidal configuration, convergent in the sense of its movement within its own plane, so that in the limit situation of locking the four edges of the door remain engaged with the respective vertical rods and crosspieces of the frame, this last also having an opening of trapezoidal configuration.

[0006] For the longitudinal movement of the door the participation of a mechanism worked by an external wheel was foreseen, so that the user of the safe had to act on this wheel to carry out maneuvers of longitudinal movement of the door in one or another sense.

DESCRIPTION OF THE INVENTION

[0007] The actuator device that the invention proposes, applicable to doors of the type described in the previous paragraph, allows that said longitudinal movement of the door, as much in one as in another sense,

be carried out automatically, specifically in an opening sense by means of the introduction of a key or by way of any other means of control of an electric micromotor, and in a closing sense by the simple swinging of the door until fitting in the recess of the frame.

[0008] Therefore and more specifically such a device is formed by an electric micromotor with a double sense of rotation, assisted by a control and time delay circuit, mounted on a support, with respect to which the door slides through appropriate guides, a micromotor that, through a reduction, transmits to a connecting rod a swinging movement in one sense or another, a movement whose size is determined by the time delay of the circuit, this connecting rod terminating in a roller pusher that acts on a pair of opposing cams suitably attached to the internal face of the door, so that when the connecting rod swings in a given sense it acts on one of this cams causing the displacement of the door in a given sense, while when it swings in the opposite sense it carries out the reverse maneuver.

[0009] The structure described is also supplemented with a microswitch also associated with the control circuit and that, fixed to the internal face of the door, is activated in a limit position of leverage of this door, so that after its swinging towards the closing position, the fore mentioned microswitch sends a signal to the control circuit that starts the electric micromotor, which causes the longitudinal movement of the often mentioned door to its self locking position.

[0010] In accordance with what was previously presented and starting from a position of closure and lockage for the door, the introduction of the corresponding key through a keyboard, an action by means of a key, by means of a combination mechanism or by means of any other device able to energize the control circuit, causes the operation of the micromotor in a sense of opening of the door, which thus remains free to be able to swing toward the position of definitive opening, while its later swinging in a contrary sense makes the microswitch send to the control circuit in turn a signal in the reverse sense, that is to say a signal for operation of the micromotor in contrary sense, to cause the locking of the door.

[0011] Since during the opening movement and in a limit position of movement of the door in its own plane, the electric microswitch adopts the operating position that generates the closing movement, to avoid that the door might self lock immediately, a time delay has been foreseen in the electronic circuit that cancels the effectiveness of the mentioned microswitch for enough time to be able to begin the movement of swinging of the door, but however and with the reason that the real time that the user has to perform this maneuver might be indefinite, it has been foreseen that the door in its totality is assisted by an elastic element, as for example a spring that after the disengaging of the door from the frame it lightly projects it outwards, separating the microswitch from its corresponding activating cam.

[0012] Likewise, the device includes means that allow reaching automatically the locking position, at the end of the closing phase of the door, besides allowing manual unlocking by means of a key or another similar item, in the supposition of an exhaustion of the batteries or supply source of the electric micromotor, or perhaps by a failure in the circuit or by any other cause that impedes the normal movement of opening of the door.

[0013] More specifically, those means of locking are brought about beginning with a slide in a vertical disposition, conveniently guided in the door support and finishing off at one of its ends, preferably at the upper, in a bolt able to interfere or not in the movement of the door in their own plane, with the aid of a cam conveniently attached to the internal face of this door, a bolt that tends, by simple gravity, to the retracted or non-operating position and that is dragged toward the upper and closing position by the connecting rod of the electric micromotor or by any other appropriate means, in the first case in a limit position of swing of this connecting rod, that is, once this has caused the full movement of the door toward the closing position.

[0014] As complement to the means referred, it has been foreseen that on the lower area of the mentioned slide a lever is articulately joined, preferably flat, parallel to the slide and adapted to it, a lever that is provided with an arm bent orthogonally toward the area of influence of the key locking mechanism, so that this arm interferes in the passage of the lock plate associated with this mechanism, all in a way that in a given position for the lock, specifically in the closing situation, the door works normally in agreement with the automatic system of operation foreseen for it, remaining locked in the closed position by means of the bolt associated with the mentioned vertical slide, while when for any type of failure of the closing system manual opening is necessary, on acting with the corresponding key the lock plate is withdrawn, allowing the lateral swinging of the lever and the fall by gravity of the vertical slide toward the opening limit position of the bolt.

[0015] To achieve this effect, it has been foreseen that the upper extremity of the lever, that is to say opposite to its connection point to the slide, a second lever is connected and hinged in turn that has a double purpose, on one hand acting as a counterbalance that assures the easy swinging of the first lever, when the locking mechanism by means a key allows it, and on the other hand to constitute the means of joining of the slide to the connecting rod of the micromotor to which effect it usually rests, in a stable position, on an arm of the first lever, and it incorporates in its extremity of operation a kind of a trigger on which a stud associated with the free extremity of the connecting rod of the motor acts, so that through this trigger the slide rests on the operating connecting rod in a situation of closure, while when this connecting rod swings toward the opening situation the slide descends towards the limit position of opening of its bolt, at the same time that the assembly made up of

the two levers swings about the axis of the first in order not to interfere in the movement of the door since that, as previously has been said, one of the arms of the first lever rests in a closing situation on the slide-plate of the locking mechanism operable by means of a key. However, when this locking mechanism is acted upon with a key, the slide-plate withdraws, the pair of levers swings by its own weight, the trigger of the second lever disengages from the motor connecting rod, and consequently the vertical slide also descends by the effect of its own weight toward the opening position.

DESCRIPTION OF THE DRAWINGS

[0016] To supplement the description that is being carried out and with the object of leading to a better understanding of the characteristics of the invention, in accordance with a preferred example of its practical realization, as an integral part of this description it is accompanied by a set of drawings where in an illustrative and non-limiting way, the following have been represented:

[0017] Figure 1. - Shows a view in front perspective of a safe door provided with the actuator and locking device object of the invention.

[0018] Figure 2. - Shows an interior perspective of the same assembly of the previous figure, in locked position.

[0019] Figure 3. - Shows a similar representation to that of the figure 2, now in unlocked position.

[0020] Figure 4. - Shows an enlarged detail of that represented in the figure 2.

[0021] Figure 5. - Shows an enlarged detail of that represented in the figure 3.

[0022] Figure 6. - Shows, finally, a profile view of the assembly of figure 1.

PREFERRED EMBODIMENT OF THE INVENTION

[0023] Viewing these figures it can be observed how the actuating device for safe doors that the invention proposes separates from the mounting of the door properly speaking (1) on a support (2), with which it is related by guides (3) that allow the longitudinal movement in one and another sense of the door (1) with respect to the support (2), within the limits established by the length of these guides (3), being the support (2) that is directly related with the frame (4) or the chassis of the box, specifically by means of a swinging axis (5) conveniently attached to one of the ends of the support (2), all of this so that the door assembly (1) - support (2) is capable of swinging about the axis (5), while the door (1) it is capable of moving with respect to the support (2), to establish the limit positions its locking and unlocking with respect to the frame (4).

[0024] In the support (2) an electric micromotor is set up (6), equipped with a double sense of rotation and assisted by a reducer that gives the exit axis (7) a slow rotation movement, in one or another sense, of a size

preferably of the order of 90°, being conveniently attached to this axis (7) a connecting rod (8) finishing off in a roller (9) that switches between two cams (10) and (11) conveniently attached to the internal face of the door (1), so that the swinging of the connecting rod in one sense causes the movement of the door toward its unlocked position with regard to the frame, and the swinging of the connecting rod in the opposite sense causes the opposite same effect.

[0025] The mentioned motor (11) is activated in an opening sense with the assistance of an external keyboard (12) that acts on an electronic circuit (13) fed by a set of batteries (14), so that this electronic circuit (13), when receiving the appropriate key of the keyboard (12), puts into operation the micromotor (6) to cause the movement of the door (1) in an opening sense, this circuit being (13) also assisted by a microswitch (15), conveniently set up on the internal face of the door (1) so that in its closing situation it is activated on contacting with a cam operatively set up within the box, so that this microswitch (15), after the leverage of the door (1) about the axis (5) and toward the closing limit position, causes the activation of the circuit (13) so that the micromotor (6) is put into operation, with the rotation sense corresponding to locking the door.

[0026] The electronic circuit (13) must be equipped with a time delay to retard the signal generated by the microswitch (15), with the object of avoiding that during the opening maneuver of the door and after the operation in this sense of the micromotor (6) by the introduction of the code through the keyboard (12), its immediate closing doesn't take place, allowing enough time to begin the swinging movement, the beginning of which preferably will also be carried out automatically, by means of the setting up, for example between the support (2) and the body of the safe, of an elastic element, such as a spring, not represented in the drawings that tends to swing in the opening sense.

[0027] As has already been said previously the keyboard (12) can be substituted by any other means of activation of the electronic circuit (13), and the structure described will be supplemented with a locking element (16), also worked by the electric micromotor (6) that on finishing the self locking phase of the door (1), onto the frame (4), it may maintain this stable position preventing that a movement of the door in the contrary sense (1), aimed at its opening, can be carried out by means of direct manual action on this door.

[0028] The device is also supplemented with some locking means made up beginning with a vertical slide (16) mounted through guides (17), also vertical, on the support (2) and that slide finishing off (16) in its upper extremity in a bolt (18) that constitutes the real locking element for the door (1), with the assistance of a cam (19) coming from its internal face.

[0029] To the lower area of the slide (16), specifically through the axis (20), a lever is articulately joined (21) that is moveable in vertical sense, accompanying the

slide (16) in its movements, but being also susceptible to swinging in the lateral sense, receiving articulately by its upper extremity and through another axis (22), a second lever (23) whose center of gravity stays noticeably eccentric with regard to the swinging axis (22), so that under normal conditions the second lever (23) adopts a stable position resting on a arm (24) of the first lever (21), the second lever being terminated (23), at its extremity next to the connecting rod (8) in a trigger (25) that rests in turn on a stud (26) coming from this connecting rod (8), so that during the closing maneuver and at the end of the swing phase of this connecting rod (8), after the closing of the door (1), the lever is raised (23) and, this being associated with the slide (16) by the first lever (21), the raising of this slide (16) toward the locking position of the bolt (18) on the cam (19).

[0030] The first lever (21) also incorporates a second arm (27), bent towards a locking mechanism (28), as seen in the figure 6, operable by means of a key and conveniently attached to the internal face of the door (1), specifically resting on the lock slide-plate (29) of this mechanism, which acts as a stabilizer that maintains the lever (21) stable in the locking limit position, against the tendency to lateral swinging of both levers, with the imbalance in this sense of its centre of gravity, that doesn't prevent the necessary swinging of these levers during the opening maneuver but that, when said lock slide-plate (29) withdraws, when the corresponding key is used, it causes the parallel swinging of the levers (21) and (23), in the sense of separation of the trigger (25) from the stud (26) of the connecting rod (8), with which both levers, together with the slide (16), descend by gravity passing the bolt (18) to the unlocked position. This allows, in agreement with another of the objectives of the invention, that the door (1) may be unlocked and opened manually, when it cannot be opened automatically due to exhaustion of the batteries, failure in the electronic circuit or any other cause.

[0031] Obviously those means of locking don't unavoidably require the system of automatic operation by means of the electric micromotor (6) in that the device activator of the present invention is based, since obviously its functionality remains unaffected when this micromotor and the corresponding connecting rod (8) are substituted by an electromagnet or by any other means of appropriate activation that gives to the stud (26) on which rests the trigger (25), a similar movement to that described.

Claims

1. Operating and locking device for doors of safes, being applicable to those type of doors that act as a closing element and as a self-locking bolt to the matching frame, to which effect said door is capable as much as swinging about a hinged axis as of moving transversely in its own plane to remain locked

- in the frame, by at least two of its opposite edges, distinctive because it consists on an electric micromotor (6), conveniently set up on a support (2) having an axis (5) of the door rotation (1) with respect to the box and equipped also with guides (3) through which above this support (2) the door is mounted (1) with the possibility of relative movement between both elements, having been provided that said micromotor (6), provided with an appropriate reducer, incorporates attached to its outgoing axis (7) a connecting rod (8) terminating in a roller (9) acting as a thrust element for the door (1), acting specifically on opposing cams (10) and (11) conveniently attached to the internal face of the mentioned door (1), this micromotor being (6) assisted by an electronic circuit (13) for its control and activated by an external keyboard (12) or by any other media capable of generating an electric signal for activating the micromotor (6); with the particularity of including means of association with the operating connecting rod (8) that allow the locking of the door (1) in its position for closing, to prevent its opening by a simple manual push.
2. Activating and locking device for doors of safes, according to claim 1, characterized in that in the internal face of the door (1) a microswitch is appropriately set up (15) that in a closing situation for this door (1) it impacts on a fixed cam on the box structure, a microswitch (15) connected to the electronic circuit (13) that generates the activation signal of the micromotor (6) in sense of longitudinal movement of the door (1) towards its locking position; having provided that the electronic circuit (13) incorporates a time delay that delays the action of the microswitch (15) with the aim that, during the opening maneuver, the signal generated by the microswitch (15) doesn't cause the immediate movement of the door (1) toward the locking position, a time delay that allows in turn the beginning of the movement of rotation of the door (1) in that the microswitch (15) separates from the corresponding cam or seat.
 3. Activating and locking device for doors of safes, according to claim 2, characterized in that between the support (2) or the door (1) and the frame (4) or the body of the box, an elastic element is set up, as, for example, a spring, that starts the swinging of the door automatically (1) in an opening sense, when the its unlocking takes place.
 4. Activating and locking device for doors of safes, according to previous claims, characterized in that the micromotor (6), through its operating connecting rod (8), acts besides on the door (1) also on the means of locking that prevent the manual movement of the door toward the opening position.
 5. Activating and locking device for doors of safes, according to previous claims, characterized in that the means of locking of the door (1) consisting of, beginning with a vertical slide (16) moveable with respect to the support (2), through guides (17), also vertical, terminating on top in a bolt (18) that in a raised position interferes with the trajectory of a cam (19) associated with the internal face of the door (1), causing its blockade; having allowed that the slide (16) tends to the locking limit position, defined by the guides (17), by their own weight, being dragged in a rising situation towards the locking position, in the end phase of movement of the connecting rod (8), after reaching the door (1) the closing position.
 6. Activating and locking device for doors of safes, according to claim 5, characterized in that in the lower area of the vertical slide (16) a swinging lever is joined (21), projected upwards, that on its upper extremity receives articulately a second lever (23) that, by its own configuration, tends to swing both levers in opposition to the actuating connecting rod (8), the second lever resting (23) on the first lever (21) through an arm (24) of this last, while both levers rest on a slide-plate (29) corresponding to the activation mechanism of locking by means of a key, through a second arm (27) of the first lever (21) that, conveniently bent, rests on the edge of the mentioned slide plate (29), at the same time that the second lever (23) terminating at its extremity close to the actuating connecting rod (8) in a trigger (25) resting on a stud (26) conveniently attached to the connecting rod (8), all so that through this stud (26) and the trigger (25) the connecting rod (8), causes the raising of the slide (16) toward the locking position of the bolt (18).
 7. Activating and locking device for doors of safes, according to claims 5 and 6, characterized in that in the activation by means of key of the corresponding locking mechanism (28), the locking slide-plate (29) of this mechanism moves in opposition to the connecting rod (8), moving the retention cam for the arm (27) of the first lever (21), with which both levers (21) and (23) swing in opposition to this connecting rod (8) disengaging the trigger (25) of the bolt (26), with which the assembly made up of both levers (21) and (23) and the slide itself (16) the bolt remains unlocked (26), this assembly descending by gravity towards the limit position defined by the guides (17), in which the bolt (18) withdraws with regard to the cam (19), leaving the door (1) in a condition of being moved manually in the recess of its own plane.

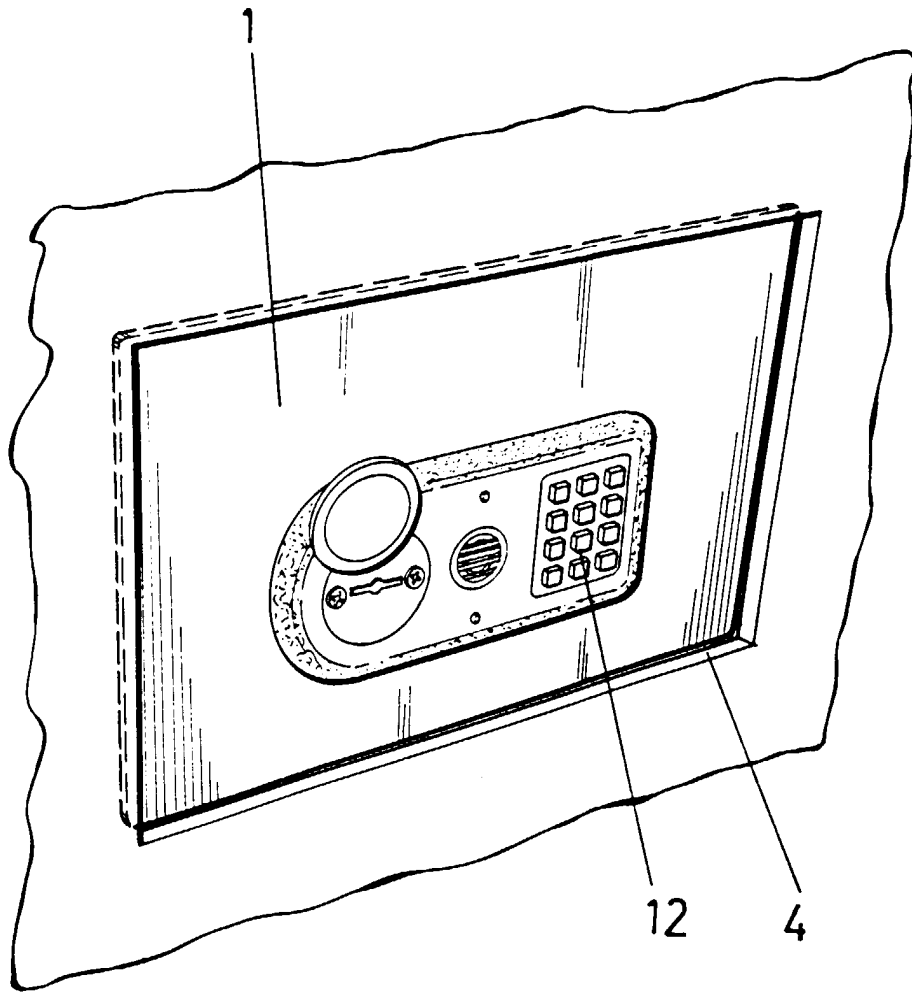
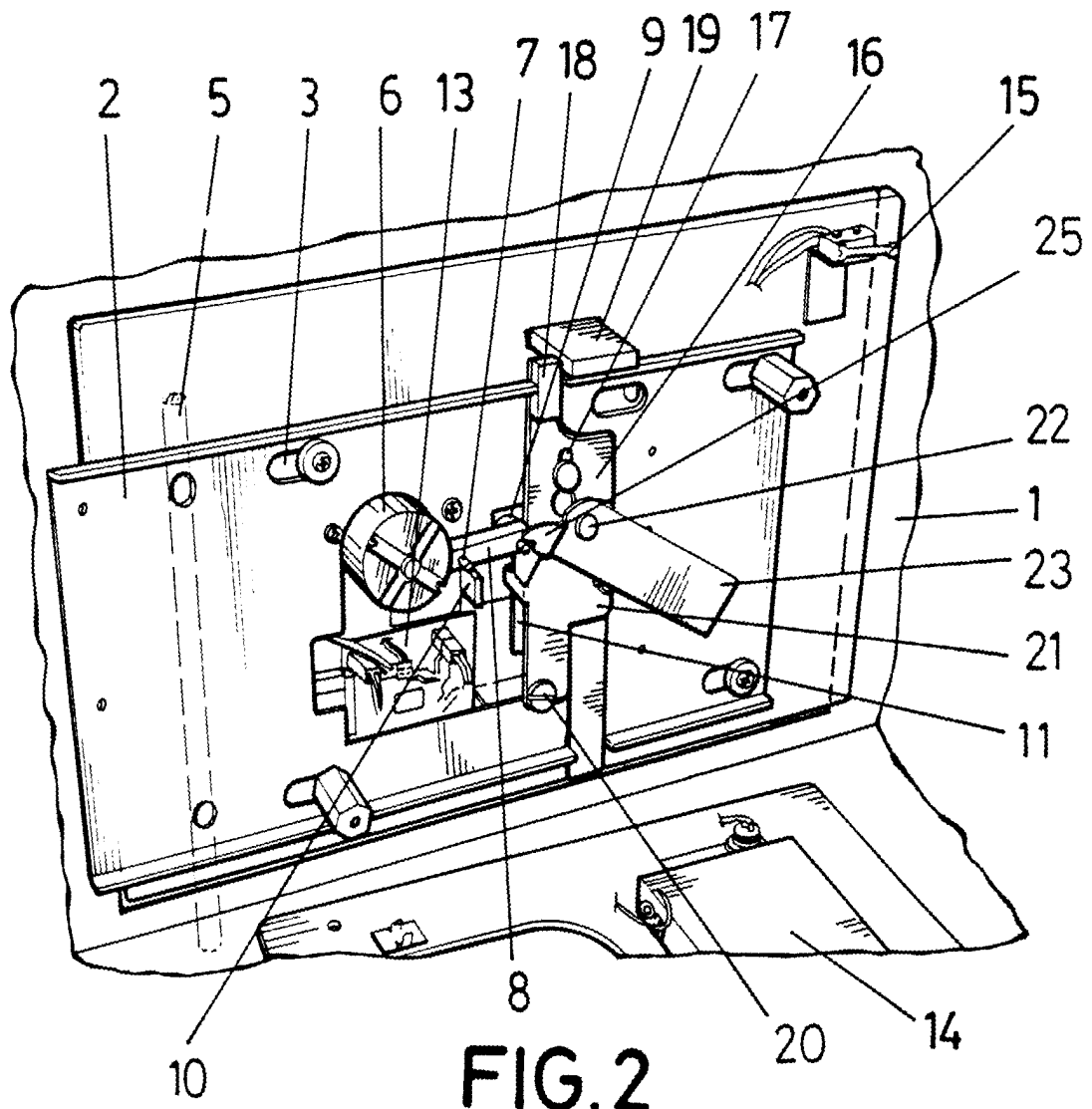


FIG.1



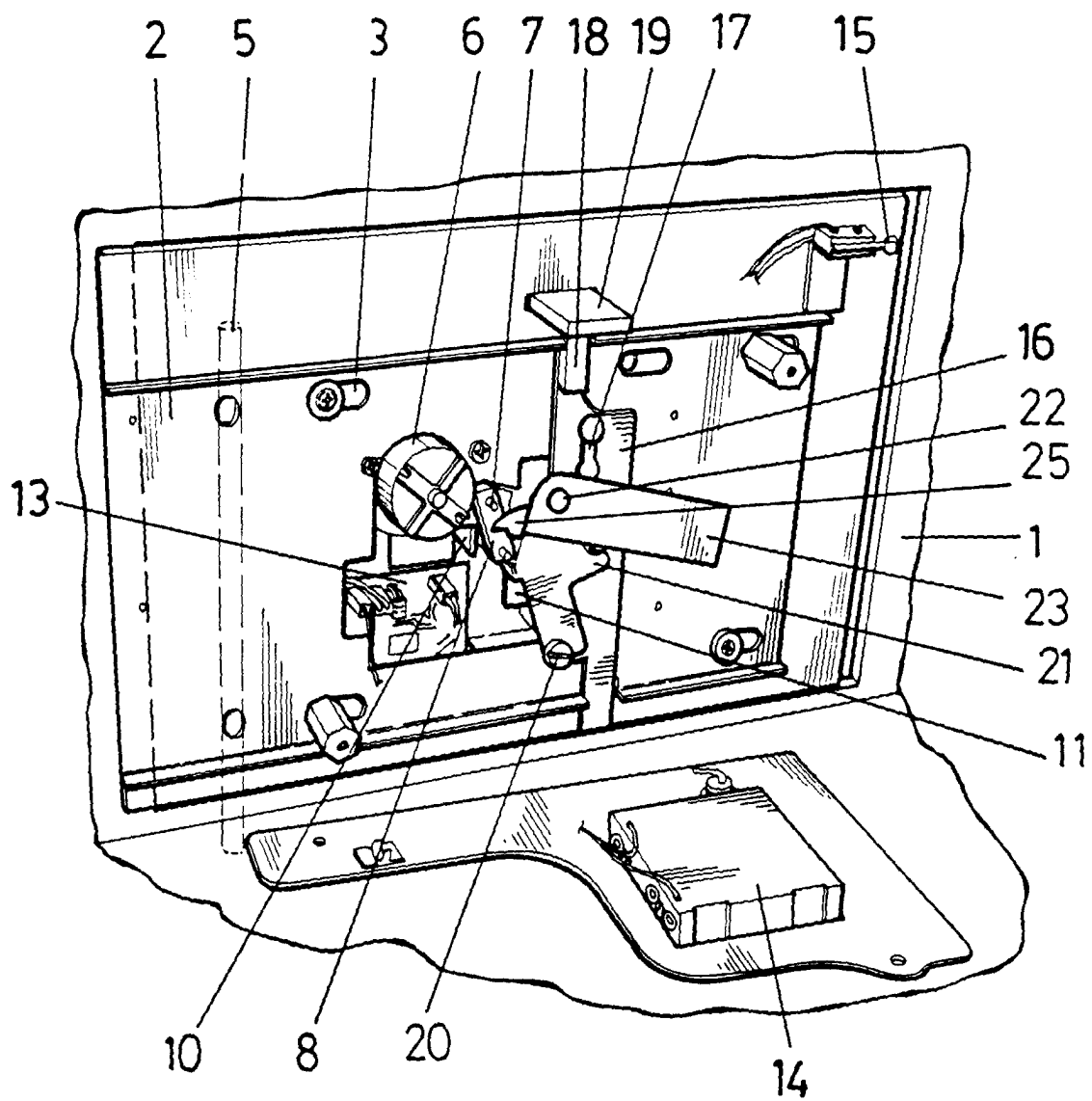
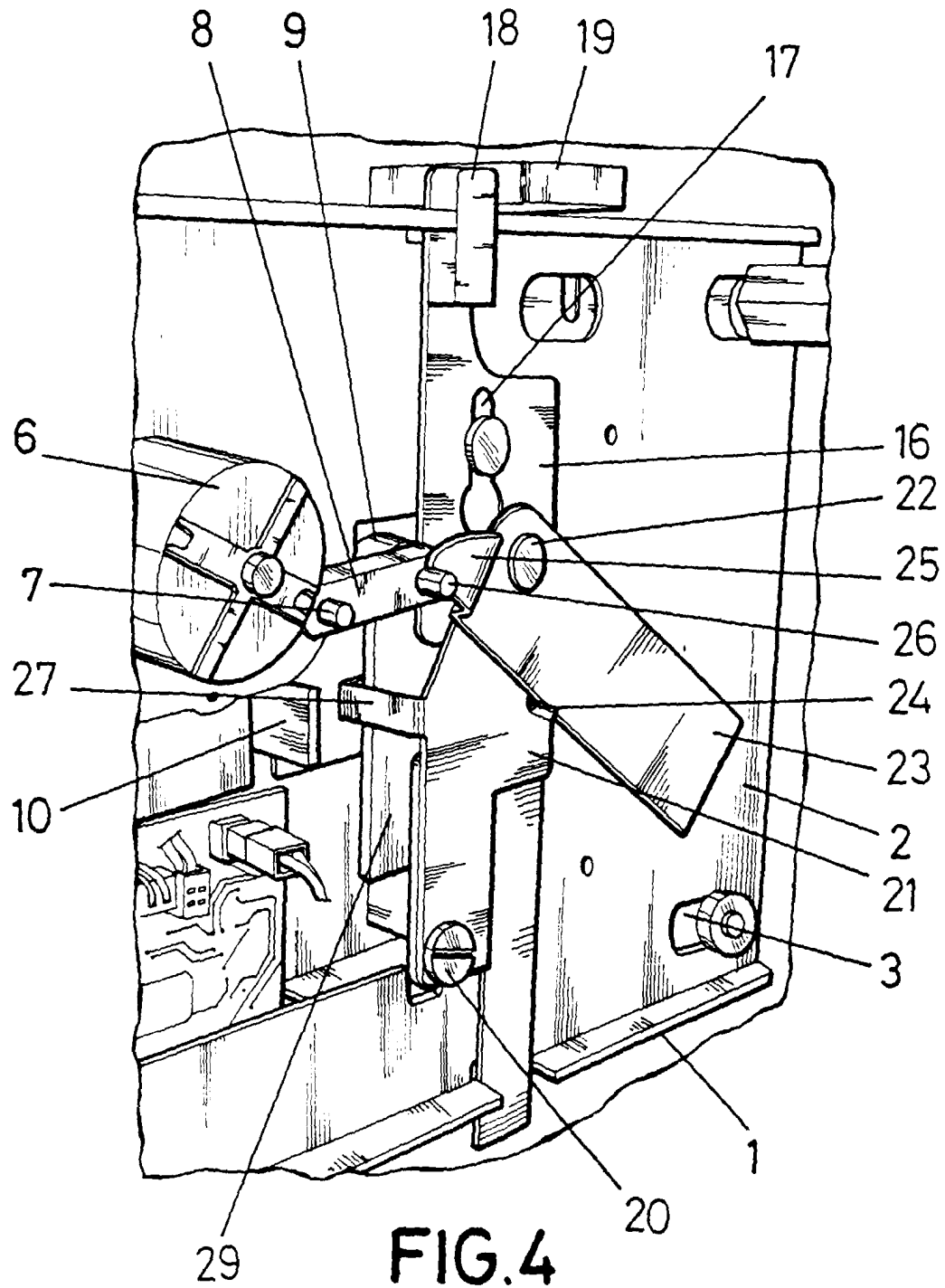
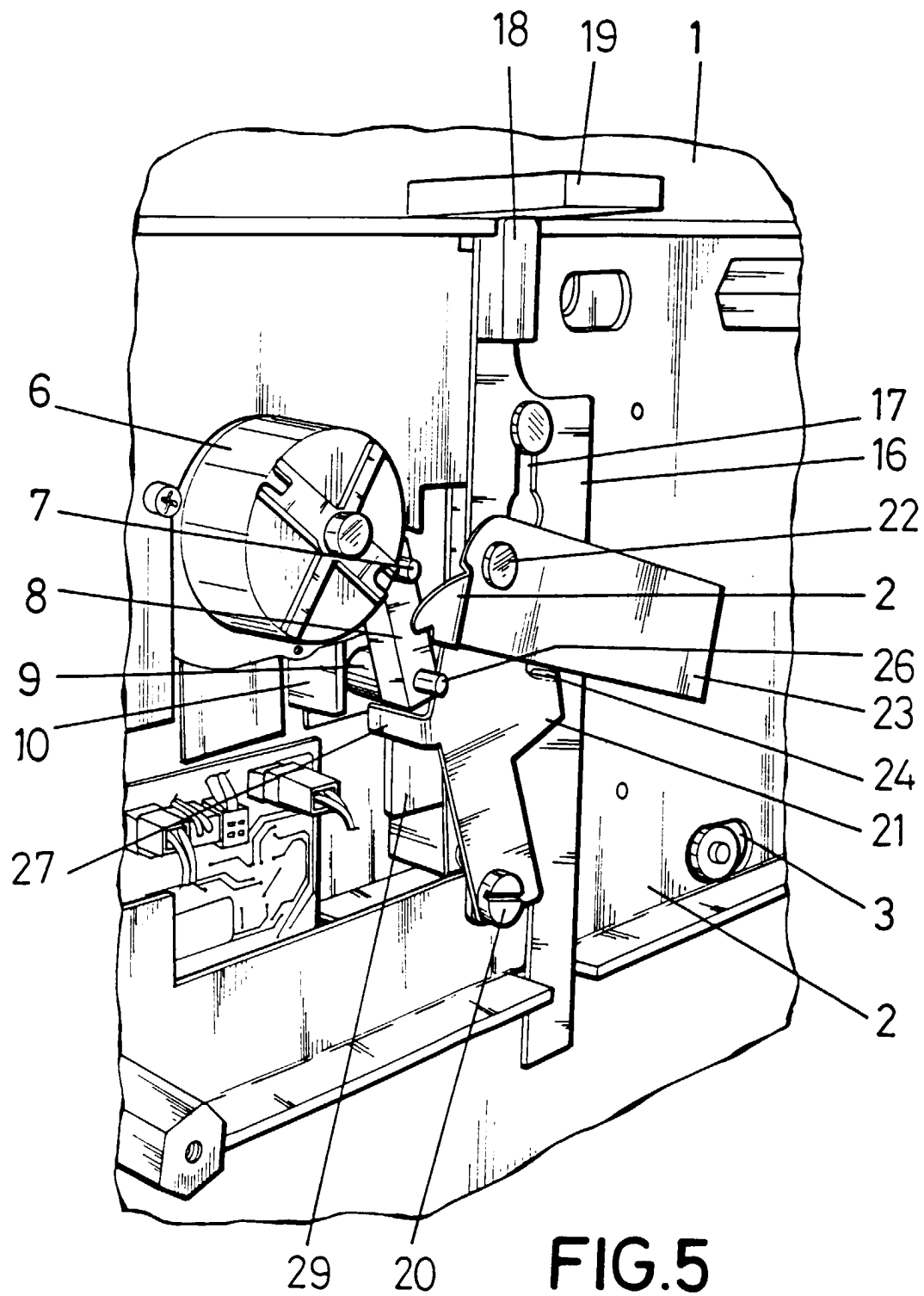


FIG.3





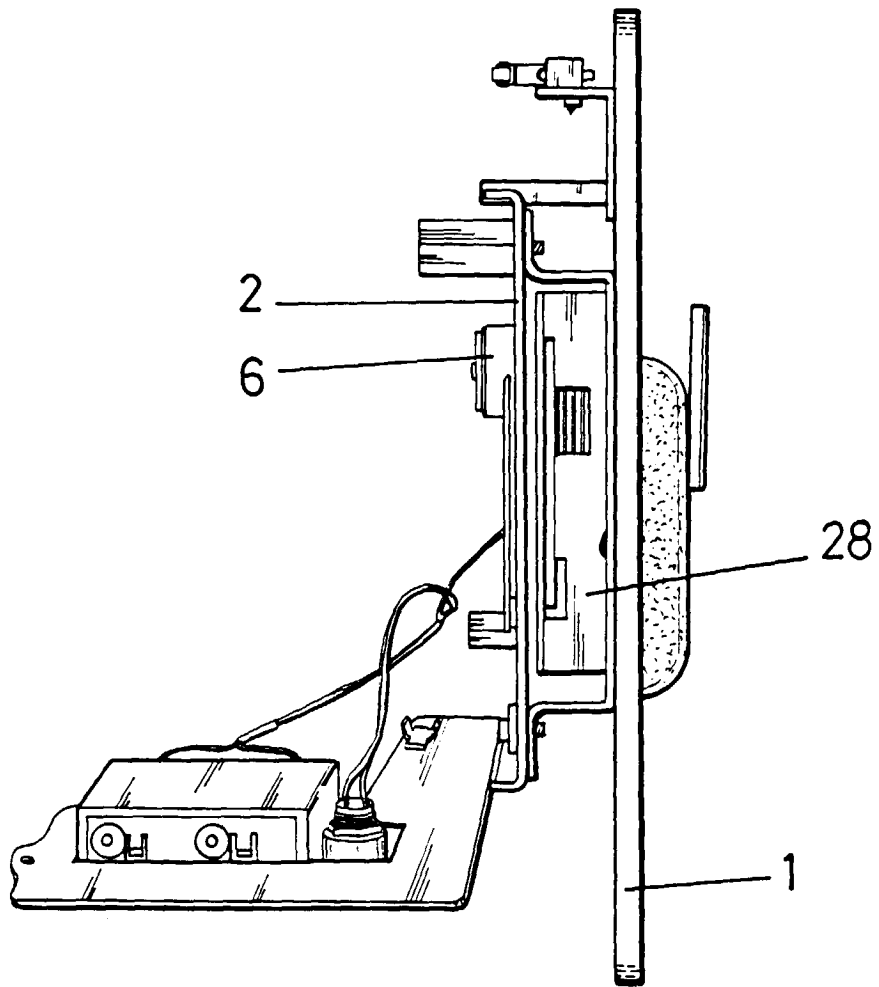


FIG.6



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EUROPEAN SEARCH REPORT

Application Number
EP 00 50 0170

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 4 932 160 A (SPERKO) 12 June 1990 (1990-06-12) * abstract; figures *	1	E05B47/00 E05D15/58
A	EP 0 327 145 A (OMEN METAL PRODUCTS) 9 August 1989 (1989-08-09) * the whole document *	1,4,5,7	
A	EP 0 665 356 A (PATENTES FAC SA) 2 August 1995 (1995-08-02) * the whole document *	1	
A	EP 0 246 989 A (FELIX PÈRE & FILS SA) 25 November 1987 (1987-11-25)		
A	GB 2 249 805 A (CLARKE) 20 May 1992 (1992-05-20)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05B E05D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 October 2000	Examiner Van Beurden, J
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EP 00 50 0170

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19-10-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4932160 A	12-06-1990	NONE	
EP 0327145 A	09-08-1989	IL 85307 A	30-06-1991
		IL 88567 A	16-02-1992
		US 5010751 A	30-04-1991
EP 0665356 A	02-08-1995	AU 1134295 A	03-08-1995
		BR 9500502 A	17-10-1995
		CA 2140612 A	27-07-1995
		JP 7217314 A	15-08-1995
EP 0246989 A	25-11-1987	FR 2599079 A	27-11-1987
		AT 61079 T	15-03-1991
		DE 3768142 D	04-04-1991
GB 2249805 A	20-05-1992	NONE	

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