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(54) **KEYED DEVICE FOR OPERATING LOCKS**

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## Description

**[0001]** The invention falls within the technical sector of high-security locks according to claim 1.

**[0002]** The need to combat increasingly skilful and evolved burglars and safebreakers does not permit respite in the search for increasingly better technical solutions so as to raise the security standard of the locks, whose inviolability often remains a relative value rather than absolute as by contrast is desirable.

**[0003]** In the field of mechanical locks, double bitted keys by now emerge as definitively outdated, even if recently ameliorative devices have been introduced, while the state of the art is today represented by the cylinder with a consolidated European profile, better if supplemented by magnets in the key. In order to externally protect the keyhole, the afore-mentioned locks with European cylinder are usually equipped with the so-called "defender", comprising a half-shell protection device, which incorporates an idle rotating bush in front of the keyhole, with anti-drill functions, while the body of the protection device is studied form-wise to prevent it being possible to enter a tube or pipe used as leverage to break said protective device and/or the cylinder. And then there are mechanical locks which are combined with complementary electromechanical or electronic devices which increase the security of the same, for example registering attempts of housebreaking and sending signals, and/or operating ancillary mechanisms aimed at blocking the lock in an irreversible manner with the normal key.

**[0004]** In addition to these, there are keyless mechanical locks, for example featuring combination dials such as those on safes, and also keyless electronic locks, featuring keypads with alphanumeric combination, or with transponders, cards with embedded chips (for example those used for hotel rooms), or further still featuring fingerprint recognition or, for the most sophisticated versions, iris recognition.

**[0005]** The aspects mentioned above represent, as is obvious, just an indication of the various types of lock on the market, since a more complete scrutiny would be extremely vast and essentially not particularly useful for contextualising the technical problem which it is intended be resolved with this invention.

**[0006]** In essence, the common denominator of the locks of a predominantly mechanical nature lies in the fact that there is a key, to be introduced in the related keyhole, more or less protected but accessible from outside, where the same key, if bearing the correct combination, acts directly for unblocking the mechanism linked to the retention devices, such as bolts, and controls the rotation in the direction of opening or closing.

**[0007]** Practically, the key represents both an opening device and a protection system; if one manages to bypass the latter, the lock is violated.

**[0008]** Also certain types of cylinder with European profile, especially the most economic models, have been forced with skill: without going into the merits of the var-

ious lock-picking techniques and/or devices, mention is made of just the so-called "bumping" which involves delivering small and repeated axial blows to a lock-picking key profiled if necessary, while the rotation is forced, so as to make the pistons of the combination hole pop out and find the opening combination.

**[0009]** For domestic or office applications, it becomes necessary to guarantee - for the lock - unflinching reliability, which does not require maintenance or periodic controls, limiting the presence of electrically-powered parts as far as possible, compatibly with the degree of security one wishes to obtain.

**[0010]** The purpose of this invention is therefore that of proposing a keyed device for operating locks, in particular combinable with euro profile cylinders, for example featuring the European profile, which makes it possible to overcome the traditional construction concept of known locks, which sees the key as the mechanical connection device which receives the manual act and directly transmits the opening (and/or closing) action to the mechanism, in this way avoiding all the inconveniences and risks associated with security which afflict the afore-mentioned well-known locks.

**[0011]** Another purpose of the invention involves envisaging a lock which is inaccessible from outside, and also protected against attacks of elevated force, in particular for that which concerns the area in which the particular key of the device presents its cuts to the mechanical combination means which must attest to the compliance, so as to permit the subsequent opening manoeuvre.

**[0012]** Another purpose of the invention concerns the desire to prevent any action aimed at the reverse detection of the correct combination cut of the key, thanks to the afore-mentioned inaccessibility of the area.

**[0013]** A further purpose of the invention envisages that the parts tasked with the passive protection of the lock, or rather those exposed to attack with devices such as drills, cutting disks or similar, can be suitably scaled, and in a variable manner according to the degree of resistance desired, as well as made of material appropriately treated to resist the cutting and/or drilling action.

**[0014]** Another additional purpose of the invention aims to obtain a key which can be contained and protected in a portable element, with said key destined to be detached from the latter so as to be inserted, in a retractable manner, in the device which is suitable for being operated by the same portable element, grasped like a device.

**[0015]** These and other purposes are fully achieved by means of a keyed device for operating locks, in particular incorporating euro profile cylinders, suitable for installation on security doors, armoured doors and the like, comprising at least one cylinder-operated deadbolt and a euro profile cylinder in which a cam can be rotated in either direction, respectively to open or close at least one deadbolt, since the following is envisaged in said device:

- one mechanism for operating the cam comprising: an actuator plug situated inside the euro profile cylinder and coaxial with the rotation axis of the cam, which causes the cam to rotate; a manipulator head, connected to the actuator plug, and which causes the plug to rotate; mechanical combination means for blocking and releasing the rotation of the manipulator head and the connected actuator plug;
- an opening/closing assembly, accessible from the exterior of the security doors, armoured doors and the like, for operating the manipulator head and the mechanical combination means, where the opening/closing assembly comprises: an outer shell, incorporating an axial pass-through cylindrical seat that houses a rotor coaxial with the manipulator head and the actuator plug, where the rotor is able to slide axially toward the manipulator head, in opposition to the spring-loaded components which retain it, when at rest, against a shoulder within the cylindrical seat; a defender block, for impeding external access to the manipulator head, supported by a pin inside the rotor, with the ability to rotate on an axis perpendicular to the rotation of the rotor, where the defender block is partially accessible externally and close to the manipulator head with its corresponding internal part, and where the defender block comprises a first profiled face that can be stably paired with a removable flat key, and a second profiled face, diametrically opposite to the first, that can be provisionally paired with a locking/unlocking device, and where the defender block is able to rotate between at least two characteristic positions, one where the first profiled face is turned outward and can receive the flat key, and another where the first profiled face is turned toward the manipulator head while the second profiled face is turned outward and can receive the locking/unlocking device, which can be manually operated on to achieve: the axial translation of the rotor - defender block - flat key assembly, so that the key engages with the mechanical combination means for releasing the rotation of the manipulator head; the rotation, in one or the other direction, of the rotor-defender block - flat key - manipulator head - actuator plug assembly, with consequent rotation in the same direction of the cam to open or close the lock.

**[0016]** The features of the invention will emerge as clear from the following description of a preferred form of realisation of the keyed device for operating locks in question, in accordance with the matters indicated in the claims and with the aid of the attached drawings, in which:

- Dwg. 1 illustrates a lateral view of the device associated with a European profile cylinder for locks;
- Dwg. 2 illustrates a frontal view of the device in Dwg. 1;
- Dwg. 3 illustrates, in magnified scale, a section ac-

- cording to the III-III plane of Dwg. 1;
- Dwg. 4 illustrates, in magnified scale, a section according to the IV-IV plane of Dwg. 2;
- Dwg. 5 illustrates an axonometric view of the portable opening/closing device, for operating the keyed device, also visible in Dwg. 4;
- Dwg. 6 illustrates an axial section of the device in Dwg. 5;
- Dwg. 7 illustrates a detachable element of the device in Dwg. 5;
- Dwg. 8 illustrates a frontal view of a flat key, transportable with the device in Dwg. 5, insertable in the device and also visible in Dwg. 3 and 4;
- Dwg. 9 illustrates a cross-section view of the flat key according to the IX-IX plane of Dwg. 8;
- Dwg. 10 illustrates an additional cross-section view according to the X-X plane of Dwg. 9;
- Dwg. 11 illustrates an axonometric view of the flat key as per Dwg. 8, 9, 10;
- Dwg. 12 illustrates, in axonometry, the device as per the previous drawings, complete with European profile cylinder and combined with a lock.

**[0017]** In the afore-listed drawings, the keyed device for operating locks in question is indicated, in its entirety, using the reference 100.

**[0018]** The keyed device (100) is suitable for being associated with locks (S), in combination with euro profiled cylinders (E), in particular those with so-called "European" profile.

**[0019]** These locks (S), with the related cylinders (E), are suitable for being installed on security doors of homes and offices, armoured doors of safes or security lockers, and the like (not illustrated), and comprising at least one deadbolt (P) with lock operated by a cam (C) of the cylinder (E) (specifically see Dwg. 12).

**[0020]** The cam (C) is rotated in either direction, respectively to open or close said deadbolt (P), via the mechanisms of the aforementioned lock (S).

**[0021]** According to the invention, the device (100) includes a (1) mechanism for operating said cam (C), in which the following is envisaged:

- an actuator plug (10) situated inside the euro profile cylinder (E) and coaxial with the rotation axis of the cam (C), causing the cam to rotate;
- a manipulator head (11), associated with the actuator plug (10) and intended to rotate the latter;
- mechanical combination means (12) for blocking and releasing the rotation of the afore-mentioned manipulator head (11) and the connected actuator plug (10).

**[0022]** The actuator plug (10) can slide axially, in opposition to the reaction of spring-loaded components (13), while the manipulator head (11) is inserted rotating in a cylindrical compartment (14) situated in a flange (15), with the latter integral to the afore-mentioned euro profile

cylinder (E).

**[0023]** The mechanical combination means (12) are advantageously made up of a number of combination pins (120) (of which only two visible in Dwg. 3), housed inside said manipulator head (11) and arranged in a circle according to a predefined geometry, for example a circumference, with the respective axes parallel to that of the manipulator head (11).

**[0024]** The combination pins (120) protrude from the rear of the manipulator head (11) beyond the end of the cylindrical compartment (14) and are partially inserted into corresponding holes (16) situated in the flange (15); each of the combination pins (120) is made up of two consecutive parts, the first (121) and the second (122).

**[0025]** The total emerging length of each combination pin (120) can be the same or differ with respect to that of the remaining pins (120), as can the length of the first part (121) with respect to the second part (122), or with respect to those of the other pins (120).

**[0026]** In an alternative embodiment of the mechanical combination means (12), at least one of the aforementioned combination pins (120) includes a third part (123), for example a spheroid, placed between said first and second parts (121) (122) (Dwg. 3).

**[0027]** The insertion or removal of the third part (123) makes it possible, conveniently, to modify the combination cuts of the mechanical combination means (12) at a later stage.

**[0028]** Each combination pin (120) in two parts (121) (122) (or three), is subject to the action of the spring-loaded components (124) inserted in the related hole (16), which drive it axially to protrude from the front side of the manipulator head (11), up until a pre-established position defined by a stop (17) envisaged in the latter.

**[0029]** The device (100) also comprises an opening/closing assembly (2), accessible from the external side of the aforementioned security doors, armoured doors and the like, intended to operate on the aforementioned manipulator head (11) and on the mechanical combination means (12).

**[0030]** The opening/closing assembly (2) comprises an outer shell (20), incorporating an axial pass-through cylindrical seat (21) that houses a rotor (22) coaxial with said manipulator head (11) and the actuator plug (10).

**[0031]** The outer shell (20), solidly and robustly constructed in highly-resistant steel, is integral with said euro profile cylinder (E) and protrudes at least partially outward from the related security door, armoured door, or the like.

**[0032]** The outer shell (20) is ring-shaped and externally formed with decreasing cross-section moving outward from said door, armoured door, or the like, for example tapered as illustrated in the drawings.

**[0033]** The described structure emerges as advantageous since it makes it impossible to fit a pipe or tube in the outer shell (20) used with force to break or eradicate the opening/closing assembly (2).

**[0034]** The rotor (22) is able to slide axially toward the

manipulator head (11), in opposition to the spring-loaded components (23) which retain it, when at rest, against a shoulder (24) within the afore-mentioned seat (21).

**[0035]** The shoulder (24) has a lesser diameter than that of the axial cylindrical seat (21) and is situated near the outermost end of the cylindrical seat.

**[0036]** Within the rotor (22), a defender block (25), for impeding external access to the manipulator head (11), is supported rotating, by a pin (25P) with an axis perpendicular to the rotation of the rotor (22).

**[0037]** The defender block (25) is conveniently made of highly-resistant steel, for example in alloy with molybdenum and vanadium, capable of granting the same elevated anti lock-picking and anti-drilling properties.

**[0038]** The defender block (25) is partially accessible externally and close to said manipulator head (11) with the respective internal part, and in the related lateral surface area presents a first profiled face (251) that can be stably paired with a removable flat key (26), and a second profiled face (252), diametrically opposite to the first, which can be provisionally paired with an opening/closing device (27).

**[0039]** In the preferred construction solution as per the drawings, the aforesaid defender block (25) has an essentially spherical shape where at least the first profiled face (251) is flattened and parallel to the rotation axis of the block (25) itself.

**[0040]** In order to obtain a likewise spherical housing, within the rotor (22), it is envisaged that the latter is composed of two parts (22A, 22B), joined to each other by said rotation pin (25P) of the defender block (25) (Dwgs. 3 and 4).

**[0041]** The defender block (25) is envisaged to rotate between at least two characteristic positions, one where the first profiled face (251) is turned outward and can receive the flat key (26).

**[0042]** In the second position of the defender block (25), the first profiled face (251) is turned towards the manipulator head (11) while the second profiled face (252) is turned outward and can receive said opening/closing device (27).

**[0043]** In the first profiled face (251), a male dovetail profile (261) is envisaged, which can engage with a complementary female dovetail profile (262) on the back of the flat key (26) to achieve the stable removable coupling between it and said block (25).

**[0044]** In the second profiled face (252), at least two dead holes (272) are envisaged, parallel to each other and parallel and symmetrically off-centre from the rotation axis of said rotor (22).

**[0045]** The two afore-mentioned dead holes (272) are there to accommodate corresponding plugs (270) protruding from the opening/closing device (27), to accomplish the provisional coupling between it and the defender block (25) (see in particular Dwg. 4).

**[0046]** The flat key (26), illustrated in the drawings from 8 to 11 and adapted for the spherical defender block (25), has an outer face shaped like a spherical cap, with radius

equal to that of the block (25), so as to restore the continuity of the spherical shape when they are joined together.

**[0047]** The same spherical cap-shaped outer face of the flat key (26) comprises a number of combination holes (260), of differing lengths, arranged in a circle according to a predefined geometry, for example a circumference, with their axes parallel to each other.

**[0048]** The combination holes (260) are destined to be directed toward the manipulator head (11) and parallel to its axis in concomitance with said second position of the defender block (25), and are suitable for engaging with the corresponding combination pins (120) protruding from the manipulator head (11) to push them along their predefined routes envisaged to release the head, as more fully explained further on.

**[0049]** The lateral surface of the defender block (25) envisages a number of notches (25T), that can be gripped by a fingernail or flat-blade tool, to facilitate the rotation of the block (25) between its two characteristic positions (Dwgs. 1, 2, 12).

**[0050]** In order to more fully define and stabilise the latter, respective centring means (30) have been envisaged, represented in the example by an initial circular cavity (31) made in the centre of the flat key (26) and a second circular cavity (32), identical to the first, made in the centre of the second profiled face (252).

**[0051]** Each cavity (31, 32), in relation to the position adopted by the defender block (25), is alternatively destined to elastically engage with a reference situated in the manipulator head (11), for example the headend of the actuator plug (10), protruding slightly from the latter.

**[0052]** In an initial alternative embodiment, not illustrated, the afore-mentioned defender block (25) has an essentially cylindrical shape whose axis coincides with the rotation axis of the block (25) itself; likewise, at least the first profiled face (251) is flattened and parallel to the rotation axis.

**[0053]** In a second alternative embodiment, also not illustrated, the defender block (25) has an essentially prismatic shape whose longitudinal axis coincides with the rotation axis of the block (25) itself, and where the first and second profiled faces (251, 252) coincide with the corresponding lateral faces of the prism.

**[0054]** Dwgs. 4, 5, 6, 7 illustrate the opening/closing device (27) in the form adapted for the described preferred form for creating the defender block (25).

**[0055]** Conveniently, the opening/closing device (27) can house, within it, the flat key (26) for the transportation of the same, placed in such a way so that the back is presented with the female dovetail profile (262) turned outward.

**[0056]** Therefore, the opening/closing device (27) has a main body (28), shaped to provide an ergonomic grip for the fingers of one hand, which envisages: a compartment (29) for holding, retaining and transporting the flat key (26); a cover (29C) for the closure, at least partial, of said compartment (29); coupling means (271) consist-

ing of a cavity shaped to match the second profiled face (252) of the defender block (25) and at least two parallel plugs (270).

**[0057]** In the example illustrated, the cover (29C) (Dwg. 7) is extractable, but it is possible to envisage a version in which the same is joined via hinge to the main body (28).

**[0058]** In the case in question, the cavity of the coupling means (271) adopts a concave form with a spherical radius equal to that of the defender block (25) and contains, appropriately positioned and protruding outward, the afore-mentioned plugs (270) which, as already mentioned above, can be inserted in the aforesaid dead holes (272) in the second profiled face (252), so as to accomplish the provisional coupling between said device (27) and the defender block (25).

**[0059]** The sequence of operations necessary for opening the lock (S) by means of the described keyed device (100) is now described, along with the functioning of the latter, already partly intuitable from the previous structural description.

**[0060]** The user observes the defender block (25) to check which of the related profiled faces (251, 252) is turned outward.

**[0061]** In the event that it is not already the first face (251), they take steps to appropriately rotate the defender block (25), possibly with the aid of the notches (25T).

**[0062]** Then, they extract the opening/closing device (27), for example from their pocket or bag, and remove the cover (29C), uncovering the back of the flat key (26).

**[0063]** Using the device (27), they take steps to engage the female dovetail profile (262) of the flat key (26) in the complementary male dovetail profile (261) envisaged in the first profiled face (251).

**[0064]** Disengaging the device (27), the flat key (26) remains stably engaged in the defender block (25), which is subsequently rotated, again with the possible aid of the notches (25T), in its afore-mentioned second position, in which the same flat key (26) is drawn inside, in front of the manipulator head (11).

**[0065]** The slight click by means of which the actuator plug (10) engages in the cavity (31) at the centre of the flat key (26), signals the achievement of the correct position.

**[0066]** Gripping the device (27), the plugs (270) engage in the dead holes (272) of the second profiled face (252), until the concave cavity joins the spherical defender block (25).

**[0067]** At this point, acting with suitable manual action on the opening/closing device (27), the following is implemented in order:

- the axial translation of the rotor (22) - defender block (25) - flat key (26) assembly, achieving the reaction of the spring-loaded components (23) and with a corresponding sliding of the actuator plug (10), in opposition to the reaction of the respective spring-loaded components (13); the combination holes (260) of

- the flat key (26) are thus made to couple with the corresponding combination pins (120) protruding from the manipulator head (11), and to push them along their predefined routes envisaged to release the rotation of the latter; the release is achieved when the diametral plane, on which the adjoining first and second parts (121, 122) of each combination pin (120) meet, is flush with the end of the compartment (14), thus all the second parts (122) of the pins (120) are completely inserted in the related holes (16) and emerge as flush with the end of said compartment (14); in this condition, the rotation of the manipulator head (11) is permitted, which causes the angular separation of all the first parts (121) from the respective second parts (122) of the combination pins (120), which remain inside the holes (16) in the flange (15);
- the rotation, in the appropriate direction, of the rotor (22) - defender block (25) - flat key (26) - manipulator head (11) and actuator plug (10) assembly, with consequent rotation in the same direction of said cam (C) to open the lock (S).
  - the release of the pressure on the device (27) and the disengagement of the later from the defender block (25);
  - the opening of the door or hatch or the like;
  - the rotation of the defender block (25) and the extraction of the flat key (26).

**[0068]** Obviously, the closure of the lock (S) is performed by means of a similar procedure, which has not been described.

**[0069]** All the innovative aspects of the keyed device proposed emerge from the above, radically changing the construction concept adopted to-date.

**[0070]** The most important of these aspects involves having removed - from the key - the function of mechanical connection device which receives the manual act directly and transmits the opening and closing action of the lock to the mechanism, delegating it to the opening/closing device which also acts as container and protection for said key when not in use.

**[0071]** Another advantage derives from having made the area in which the flat key of the device presents its cuts to the mechanical combination means inaccessible from outside, as well as well protected from attacks of elevated force.

**[0072]** The construction-related aspect just mentioned also prevents any action aimed at the reverse detection of the correct combination cut of the key, with a considerable increase in security.

**[0073]** The construction-related attention dedicated to the "passive" protection of the lock is of particular significance, envisaging the parts subject to attack as generously sized and made of highly-resistant steel, neutralising lock-picking attempts using devices such as drills, cutting disks or the like, or at least making them very difficult.

**[0074]** The structure of the keyed device described

makes it possible to combine it with additional accessory devices, both mechanical and electromechanical, aimed at further increasing the security of the same.

**[0075]** It is therefore understood that the aspects described are by way of example but not limited to, therefore any detail changes which might become necessary for technical and/or functional reasons, are considered to fall from this point on within the same protective sphere defined by the claims made below.

## Claims

1. Keyed device for operating locks (S), incorporating euro profile cylinders (E), suitable for installation on security doors, armoured doors and the like, and comprising at least one cylinder-operated deadbolt (P), where the cylinder (E) comprises a cam (C) that can be rotated in either direction, respectively to open or close at least one deadbolt (P), and where the device in question (100) comprises:

- one mechanism (1) for operating the cam (C) comprising: an actuator plug (10) situated inside the euro profile cylinder (E) and coaxial with the rotation axis of the cam (C), which causes the cam to rotate; a manipulator head (11), connected to the actuator plug (10), and which causes the plug to rotate; mechanical combination means (12) for blocking and releasing the rotation of the manipulator head (11) and the connected actuator plug (10);
- an opening/closing assembly (2), accessible from the exterior of the security doors, armoured doors and the like, for operating the manipulator head (11) and the mechanical combination means (12), where the opening/closing assembly (2) comprises: an outer shell (20), incorporating an axial pass-through cylindrical seat (21) **characterized in that**

the axial pass-through cylindrical seat (21) houses a rotor (22) coaxial with the manipulator head (11) and the actuator plug (10), where the rotor (22) is able to slide axially toward the manipulator head (11), in opposition to the spring-loaded components (23) which retain it, when at rest, against a shoulder (24) within the cylindrical seat (21); a defender block (25), for impeding external access to the manipulator head (11), supported by a pin (25P) inside the rotor (22), with the ability to rotate on an axis perpendicular to the rotation of the rotor (22), where the defender block (25) is partially accessible externally and close to the manipulator head (11) with its corresponding internal part, and where the defender block (25) comprises a first profiled face (251) that can be stably paired with a removable flat key (26), and a second profiled face (252), diametrically opposite to the first,

that can be provisionally paired with a locking/unlocking tool (27), and where the defender block (25) is able to rotate between at least two characteristic positions, one where the first profiled face (251) is turned outward and can receive the flat key (26), and another where the first profiled face (251) is turned toward the manipulator head (11) while the second profiled face (252) is turned outward and can receive the locking/unlocking tool (27), which can be manually operated on to achieve: the axial translation of the rotor - defender block - flat key assembly (22, 25, 26), so that the key engages with the mechanical combination means (12) for releasing the rotation of the manipulator head (11); the rotation, in one or the other direction, of the rotor-defender block - flat key - manipulator head - actuator plug assembly (22, 25, 26, 11, 10), with consequent rotation in the same direction of the cam (C) to open or close the lock (S).

2. Keyed device according to claim 1, **characterised by the fact that** in the operation mechanism (1) the actuator plug (10) can slide axially, in opposition to spring-loaded components (13), in concomitance with the aforesaid axial translation of the rotor - defender block - flat key assembly (22, 25, 26), where manipulator head (11) is inserted and can rotate inside a cylindrical compartment (14) situated in a flange (15) incorporated into the euro profile cylinder (E), and where the mechanical combination means (12) consist of a number of combination pins (120), housed inside the manipulator head (11), arranged in a circle according to a predefined geometry, with their axes parallel to that of the manipulator head (11), and protruding from the rear of the head beyond the end of the cylindrical compartment (14) and partially inserted into corresponding holes (16) in the flange (15), where each of the combination pins (120) is composed of two consecutive parts, a first (121) and a second (122), such that the total overall length can be the same as or differ from that of the remaining pins (120), and where the combination pin (120) composed of two parts (121, 122) is subjected to the action of spring-loaded components (124) and is pushed axially, in opposition to the spring-loaded components, over a predefined travel distance determined by the cuts of the flat key (26), to reach a position where the diametral plane, on which the adjoining first and second parts (121, 122) of the pins meet, is flush with the end of the cylindrical compartment (14), thereby allowing the manipulator head (11) to rotate together with the actuator plug (10), angularly separating all the first parts (121) of the combination pins (120) from their respective second parts (122), which remain inside the holes (16) in the flange (15).
3. Keyed device According to claim 1, **characterised by the fact that** in the opening/closing assembly (2)

the outer shell (20) is integral with the euro profile cylinder (E) and protrudes at least partially outward from a security door, armoured door, or the like, with the outer shell (20) having a ring-shaped exterior with decreasing cross-section moving outward from the door, armoured door, or the like, where the shoulder (24) has a lesser diameter than the axial cylindrical seat (21) and is situated near the outermost end of the cylindrical seat.

4. Keyed device according to claim 1, **characterised by the fact that** the defender block (25) has an essentially spherical shape where at least the first profiled face (251) is flattened and parallel to the rotation axis of the block (25) itself.
5. Keyed device according to claim 1 or 4, **characterised by the fact that** the flat key (26) has an outer face shaped like a spherical cap, with radius equal to that of the block (25), so as to form a complete spherical shape when they are joined together, where the same outer face of the flat key (26) comprises a number of combination holes (260), of differing lengths, arranged in a circle according to a predefined geometry, with their axes parallel to each other, and which are directed toward the manipulator head (11) and parallel to its axis in concomitance with the second position of the defender block (25), so that the combination holes (260) engage the corresponding pins (120) protruding from the manipulator head (11) to push them along their predefined travel to release the head.
6. Keyed device according to claim 1 or 4, **characterised by the fact that** the rotor (22) is composed of two parts (22A, 22B), joined to each other by the rotation pin (25P) of the defender block (25).
7. Keyed device according to claim 1, **characterised by the fact that** the defenders block (25) has an essentially cylindrical shape whose axis coincides with the rotation axis of the block (25) itself, and where at least the first profiled face (251) is flattened and parallel to the rotation axis.
8. Keyed device according to claim 1, **characterised by the fact that** the defender block (25) has an essentially rectangular-prism shape whose longitudinal axis coincides with the rotation axis of the block (25) itself, and where the first and second profiled faces (251, 252) coincide with the corresponding faces of the rectangular prism.
9. Keyed device according to any one of the preceding claims, **characterised by the fact that** the lateral surface of the defender block (25) comprises a number of notches (25T), that can be gripped by a fingernail or flat-blade tool, to cause the rotation of the block

(25) between its two characteristic positions.

10. Keyed device according to any one of the preceding claims, **characterised by** the fact that the first profiled face (251) of the defender block (25) has a male dovetail profile (261), which can engage with a complementary female dovetail profile (262) on the back of the flat key (26) to achieve the stable removable coupling between it and the block (25).
11. Keyed device according to any one of the preceding claims, **characterised by** the fact that the second profiled face (252) of the defender block (25) has at least two dead holes (272), parallel to each other and symmetrically off-centre from the rotation axis of the rotor (22), where the at least two dead holes (272) can accommodate corresponding plugs (270) protruding from the locking/unlocking tool (27), to accomplish the provisional coupling between it and the block (25).
12. Keyed device according to any one of the preceding claims, **characterised by** the fact that the flat key (26) and the second profiled face (252) both have centring means (30), identical to each other, that can alternately elastically engage with a reference situated in the manipulator head (11), to define and stabilise the two characteristic positions of the defender block (25).
13. Keyed device according to any one of the preceding claims, **characterised by** the fact that the main body (28) of the locking/unlocking tool (27) has a compartment (29) for holding, retaining and transporting the flat key (26), and a cover (29C) for at least partially closing the compartment (29).
14. Flat key (26) for use with a keyed device (100) for operating locks (S) according to any one of the claims 1 to 10, **characterized by** the fact that it comprises: a number of combination notes (260), of differing lengths, arranged in a circle according to a predefined geometry, with their axes parallel to each other, and which can be directed toward the manipulator head (11) and parallel to its axis, in concomitance with the second position of the defender block (25), where the combination holes (260) can couple with the corresponding combination pins (120) projecting from the manipulator head (11) to push them along the predefined distances for releasing the head; a female dovetail profile (262), along the back of the flat key (26), can couple with a complementary male dovetail profile (261), in the defender block (25) to establish a stable and removable coupling between them.
15. Locking/unlocking tool (27) for use with a keyed device (100) for operating locks (S) according to any

one of the claims 1 to 10, **characterised by** the fact that it has a main body (28), shaped to provide an ergonomic grip for the fingers of one hand and comprising: a compartment (29) for holding, retaining and transporting the flat key (26); coupling means (271) consisting of a cavity shaped to match the second profiled face (252) of the defender block (25) and at least two parallel plugs (270), that project outward and can be inserted into corresponding dead holes (272) in the second profiled face (252), for achieving the provisional coupling between the tool (27) and the block (25).

## 15 Patentansprüche

1. Schlüsselvorrichtung zum Betätigen von Schlössern (S), die Euro-Profilzylinder (E) enthalten, zum Einbau in Sicherheitstüren, Panzertüren und dergleichen geeignet sind und mindestens einen zylinderbetätigten Schließriegel (P) umfassen, wobei der Zylinder (E) einen Mitnehmer (C) umfasst, der in beide Richtungen gedreht werden kann, um den mindestens einen Schließriegel (P) zu öffnen beziehungsweise zu schließen, und wobei diese Vorrichtung (100) umfasst:

- einen Mechanismus (1) zum Betätigen des Mitnehmers (C), umfassend: eine in dem Euro-Profilzylinder (E) angeordnete und mit der Drehachse des Mitnehmers (C) koaxiale Antriebswelle (10), die bewirkt, dass sich der Mitnehmer dreht; einen Steuerkopf (11), der mit der Antriebswelle (10) verbunden ist und die Drehung der Welle bewirkt; mechanische Kombinationsmittel (12) zum Blockieren und Freigeben der Drehung des Steuerkopfs (11) und der angeschlossenen Antriebswelle (10);

- eine Öffnungs-/Schließenanordnung (2), die von der Außenseite der Sicherheitstüren, Panzertüren und dergleichen zum Betätigen des Steuerkopfs (11) und der mechanischen Kombinationsmittel (12) zugänglich ist, wobei die Öffnungs-/Schließenanordnung (2) umfasst: eine äußere Schale (20), die einen axial durchlaufenden zylindrischen Sitz (21) enthält, **dadurch gekennzeichnet, dass** der axial durchlaufende zylindrische Sitz (21) einen Rotor (22) beherbergt, der koaxial mit dem Steuerkopf (11) und der Antriebswelle (10) ist, wobei der Rotor (22) axial in Richtung des Steuerkopfs (11) entgegen den federbeaufschlagten Elementen (23) gleiten kann, die ihn im Ruhezustand gegen eine Schulter (24) in dem zylindrischen Sitz (21) zurückhalten; einen Schutzblock (25) zum Verhindern des Zugangs von außen zum Steuerkopf (11), der von einem Zapfen (25P) in dem Rotor (22) getragen wird und imstande ist, sich auf ei-

- ner zur Drehung des Rotors (22) perpendikula-  
ren Achse zu drehen, wobei der Schutzblock  
(25) teilweise von außen zugänglich ist und sich  
mit seinem entsprechenden Innenteil nahe dem  
Steuerkopf (11) befindet und wobei der Schutz-  
block (25) eine erste profilierte Fläche (251), die  
stabil mit einem entfernbar Flachschlüssel  
(26) zusammengepasst werden kann, und eine  
der ersten diametral gegenüberliegende zweite  
5 profilierte Fläche (252) umfasst, die provisorisch  
mit einem Verriegelungs-/Entriegelungswerk-  
zeug (27) zusammengepasst werden kann, und  
wobei sich der Schutzblock (25) zwischen min-  
destens zwei charakteristischen Stellungen dreh-  
en kann, einer, in der die erste profilierte Fläche  
(251) nach außen gedreht ist und den Flachs-  
schlüssel (26) aufnehmen kann, und einer an-  
deren, in der die erste profilierte Fläche (251)  
zum Steuerkopf (11) hin gedreht ist, während  
die zweite profilierte Fläche (252) nach außen  
gedreht ist und das Verriegelungs-/Entriege-  
lungswerkzeug (27) aufnehmen kann, das von  
Hand betätigt werden kann, um Folgendes zu  
bewirken: die axiale Verstellung der Gruppe Rotor/  
Schutzblock/Flachschlüssel (22, 25, 26) der-  
art, dass der Schlüssel in die mechanischen  
Kombinationsmittel (12) eingreift, um die Dreh-  
ung des Steuerkopfs (11) freizugeben; die Dreh-  
ung, in der einen oder der anderen Richtung,  
der Gruppe Rotor/Schutzblock/Flachschlüs-  
sel/Steuerkopf/Antriebswelle (22, 25, 26, 11, 10)  
mit daraus resultierender Drehung in der glei-  
chen Richtung des Mitnehmers (C) zum Öffnen  
oder Schließen des Schlosses (S).
2. Schlüsselvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Antriebswelle (10) in dem Betätigungsmechanismus (1) entgegen federbeaufschlagten Elementen (13) und gleichzeitig mit der vorgenannten axialen Verstellung der Gruppe Rotor/Schutzblock/Flachschlüssel (22, 25, 26) axial gleiten kann, wobei der Steuerkopf (11) eingeführt ist und sich in einer zylindrischen Aufnahme (14) drehen kann, die sich in einem Flansch (15) befindet, der in den Euro-Profilzylinder (E) eingebaut ist, und wobei die mechanischen Kombinationsmittel (12) aus einer Reihe von Kombinationsstiften (120) bestehen, die in dem Steuerkopf (11) untergebracht sind, in einem Kreis gemäß einer vorgegebenen Geometrie mit ihren Achsen parallel zu der des Steuerkopfs (11) angeordnet sind und von der Rückseite des Kopfs über das Ende der zylindrischen Aufnahme (14) hinaus vorstehen sowie teilweise in entsprechende Löcher (16) in dem Flansch (15) eingefügt sind, wobei jeder der Kombinationsstifte (120) derart aus zwei aufeinanderfolgenden Teilen, einem ersten (121) und einem zweiten (122), besteht, dass die Gesamtlänge gleich der der übrigen Stifte (120) sein kann oder sich davon unterscheiden kann, und wobei der aus zwei Teilen (121, 122) bestehende Kombinationsstift (120) der Wirkung von federbeaufschlagten Elementen (124) ausgesetzt ist und entgegen den federbeaufschlagten Elementen axial über eine vorgegebene Weglänge, die von den Einschnitten des Flachschlüssels (26) bestimmt wird, geschoben wird, um eine Position zu erreichen, in der die diametrale Ebene, in der die benachbarten ersten und zweiten Teile (121, 122) der Stifte aufeinandertreffen, bündig mit dem Ende der zylindrischen Aufnahme (14) ist, wodurch es dem Steuerkopf (11) ermöglicht wird, sich zusammen mit der Antriebswelle (10) zu drehen und alle ersten Teile (121) der Kombinationsstifte (120) von ihren jeweiligen zweiten Teilen (122) winklig zu trennen, die in den Löchern (16) in dem Flansch (15) verbleiben.
3. Schlüsselvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die äußere Schale (20) in der Öffnungs-/Schließanordnung (2) einstückig mit dem Euro-Profilzylinder (E) ist und zumindest teilweise von einer Sicherheitstür, Panzertür oder dergleichen nach außen vorsteht, wobei die äußere Schale (20) ein ringförmiges Äußeres mit in Richtung der Außenseite der Tür, Panzertür oder dergleichen abnehmendem Querschnitt aufweist, wobei die Schulter (24) einen kleineren Durchmesser als der axiale zylindrische Sitz (21) hat und nahe dem äußersten Ende des zylindrischen Sitzes angeordnet ist.
4. Schlüsselvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Schutzblock (25) eine im Wesentlichen sphärische Form hat, bei der zumindest die erste profilierte Fläche (251) abgeflacht und parallel zur Drehachse des Blocks (25) ist.
5. Schlüsselvorrichtung nach Anspruch 1 oder 4, **dadurch gekennzeichnet, dass** der Flachschlüssel (26) eine Außenfläche hat, die wie eine sphärische Kappe mit einem Radius, der gleich dem des Blocks (25) ist, geformt ist, um eine vollständige Kugelform zu bilden, wenn sie miteinander verbunden sind, wobei dieselbe Außenfläche des Flachschlüssels (26) eine Reihe von Kombinationslöchern (260) unterschiedlicher Tiefe umfasst, die in einem Kreis gemäß einer vorgegebenen Geometrie mit ihren Achsen parallel zueinander angeordnet sind, und die zum Steuerkopf (11) hin gerichtet und parallel zu seiner Achse in Übereinstimmung mit der zweiten Stellung des Schutzblocks (25) sind, sodass die Kombinationslöcher (260) mit den entsprechenden Stiften (120), die von dem Steuerkopf (11) vorstehen, in Eingriff sind, um sie entlang ihrem vorgegebenen Weg zu schieben, um den Kopf freizugeben.
6. Schlüsselvorrichtung nach Anspruch 1 oder 4, **da-**

- durch gekennzeichnet, dass der Rotor (22) aus zwei Teilen (22A, 22B) besteht, die vom Drehbolzen (25P) des Schutzblocks (25) miteinander verbunden werden.
7. Schlüsselvorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass der Schutzblock (25) eine im Wesentlichen zylindrische Form hat, deren Achse mit der Drehachse des Blocks (25) zusammenfällt, und wobei zumindest die erste profilierte Fläche (251) abgeflacht und parallel zur Drehachse ist.
8. Schlüsselvorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass der Schutzblock (25) im Wesentlichen die Form eines rechteckigen Prismas hat, dessen Längsachse mit der Drehachse des Blocks (25) zusammenfällt, und wobei die erste und die zweite profilierte Fläche (251, 252) mit den entsprechenden Flächen des rechteckigen Prismas übereinstimmen.
9. Schlüsselvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Seitenfläche des Schutzblocks (25) eine Reihe von Kerben (25T) umfasst, in die mit einem Fingernagel oder einem Werkzeug mit flacher Klinge eingegriffen werden kann, um die Drehung des Blocks (25) zwischen seinen zwei charakteristischen Stellungen zu bewirken.
10. Schlüsselvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die erste profilierte Fläche (251) des Schutzblocks (25) ein männliches Schwalbenschwanzprofil (261) aufweist, das in ein komplementäres weibliches Schwalbenschwanzprofil (262) auf der Rückseite des Flachschlüssels (26) eingreifen kann, um die stabile lösbare Verbindung zwischen ihm und dem Block (25) herzustellen.
11. Schlüsselvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die zweite profilierte Fläche (252) des Schutzblocks (25) mindestens zwei Sacklöcher (272) aufweist, die parallel zueinander und symmetrisch außermittig zur Drehachse des Rotors (22) sind, wobei die mindestens zwei Sacklöcher (272) entsprechende Stecker (270) aufnehmen können, die aus dem Verriegelungs-/Entriegelungswerkzeug (27) herausragen, um die provisorische Verbindung zwischen ihm und dem Block (25) herzustellen.
12. Schlüsselvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass der Flachschlüssel (26) und die zweite profilierte Fläche (252) beide einander identische Zentriermittel (30) aufweisen, die wechselweise elastisch in eine Referenz eingreifen können, die sich im Steuerkopf (11) befindet, um die zwei charakteristischen Stellungen des Schutzblocks (25) zu definieren und zu stabilisieren.
13. Schlüsselvorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass der Hauptkörper (28) des Verriegelungs-/Entriegelungswerkzeugs (27) ein Fach (29) zum Aufnehmen, Zurückhalten und Transportieren des Flachschlüssels (26) und eine Abdeckung (29C) zum zumindest teilweisen Verschließen des Fachs (29) aufweist,
14. Flachschlüssel (26) zur Verwendung mit einer Schlüsselvorrichtung (100) zum Betätigen von Schlössern (S) nach einem der Ansprüche 1 bis 10, dadurch gekennzeichnet, dass er umfasst: eine Reihe von Kombinationslöchern (260) unterschiedlicher Tiefe, die in einem Kreis gemäß einer vorgegebenen Geometrie mit ihren Achsen parallel zueinander angeordnet sind und die zum Steuerkopf (11) hin und parallel zu seiner Achse in Übereinstimmung mit der zweiten Stellung des Schutzblocks (25) gerichtet sein können, wobei sich die Kombinationslöcher (260) mit den entsprechenden Kombinationsstiften (120), die vom Steuerkopf (11) vorstehen, verbinden können, um sie entlang den vorgegebenen Wegen zum Freigeben des Kopfs zu schieben; wobei sich ein weibliches Schwalbenschwanzprofil (262) entlang der Rückseite des Flachschlüssels (26) mit einem komplementären männlichen Schwalbenschwanzprofil (261) in dem Schutzblock (25) verbinden kann, um eine stabile und lösbare Verbindung zwischen ihnen herzustellen.
15. Verriegelungs-/Entriegelungswerkzeug (27) zur Verwendung mit einer Schlüsselvorrichtung (100) zum Betätigen von Schlössern (S) nach einem der Ansprüche 1 bis 10, dadurch gekennzeichnet, dass es einen Hauptkörper (28) hat, der derart geformt ist, dass er einen ergonomischen Griff für die Finger einer Hand bereitstellt, und der umfasst: ein Fach (29) zum Aufnehmen, Zurückhalten und Transportieren des Flachschlüssels (26); Verbindungsmittel (271), die aus einem Hohlraum, der derart geformt ist, dass er mit der zweiten profilierten Fläche (252) des Schutzblocks (25) zusammenpasst, und mindestens zwei parallelen Steckern (270) bestehen, die nach außen vorstehen und in die entsprechenden Sacklöcher (272) in der zweiten profilierten Fläche (252) eingeführt werden können, um die provisorische Verbindung zwischen dem Werkzeug (27) und dem Block (25) herzustellen.

#### 55 Revendications

1. Dispositif à clé pour l'actionnement de serrures (S) équipées de cylindres (E) à profil standard européen,

lesdites serrures convenant pour être installées sur des portes blindées, de sécurité et similaires, et comprenant au moins un pêne dormant (P) à manœuvre par cylindre, où ledit cylindre (E) comprend une came (C) qui peut être actionnée en rotation dans un sens comme dans l'autre pour entraîner respectivement, l'ouverture ou la fermeture d'au moins un pêne dormant (P), ledit dispositif (100) comprenant :

- un groupe d'actionnement (1) de ladite came (C), comprenant: un arbre de commande (10), placé à l'intérieur dudit cylindre européen (E) et coaxial à l'axe de rotation de ladite came (C), prévu pour engager cette came dans un mouvement de rotation ; une tête de manœuvre (11), associée audit arbre de commande (10) et prévue pour actionner ce dernier en rotation ; des moyens à combinaison mécanique (12) pour verrouiller et déverrouiller la rotation de ladite tête de manœuvre (11) et de l'arbre de commande qui y est associé (10) ;

- un groupe d'ouverture/fermeture (2) accessible du côté extérieur desdites portes blindées, de sécurité et similaires, prévu pour actionner ladite tête de manœuvre (11) et lesdits moyens à combinaison mécanique (12), ledit groupe d'ouverture/fermeture (2) comprenant : une coquille externe (20) pourvue d'un siège cylindrique axial et traversant (21) **caractérisé en ce qu'il** abrite un rotor (22) coaxial à ladite tête de manœuvre (11) et audit arbre de commande (10), ce même rotor (22) pouvant se déplacer dans le sens axial vers ladite tête de manœuvre (11) en s'opposant à l'action d'organes élastiques (23) en mesure de maintenir le rotor, lorsqu'il est au repos, en butée sur un épaulement (24) réalisé dans ledit siège (21) ; un bloc de protection (25) prévu pour empêcher l'accès de l'extérieur à ladite tête de manœuvre (11), soutenu par un goujon (25P) à l'intérieur dudit rotor (22), pouvant tourner sur un axe perpendiculaire à l'axe de rotation du rotor (22) lui-même, ledit bloc de protection (25) étant partiellement accessible de l'extérieur et proche de ladite tête de manœuvre (11) du côté de sa partie interne, où ledit bloc de protection (25) comprend une première face profilée (251) qui peut être couplée de manière stable à une clé à plaquette amovible (26), et une deuxième face profilée (252), diamétralement opposée à la première, qui peut être couplée de manière provisoire à un outil d'ouverture/fermeture (27), le bloc de protection (25) étant prévu pour tourner sur deux positions caractéristiques au moins, la première où ladite première face profilée (251) est tournée vers l'extérieur et peut recevoir ladite clé à plaquette (26), et la deuxième où ladite première face profilée (251) est tournée vers ladite tête

de manœuvre (11) tandis que ladite deuxième face profilée (252) est tournée vers l'extérieur et peut recevoir ledit outil d'ouverture/fermeture (27), ce dernier pouvant être actionné manuellement pour entraîner : la translation axiale de l'ensemble rotor-bloc-clé à plaquette (22, 25, 26), cette dernière étant positionnée pour s'accoupler avec lesdits moyens à combinaison mécanique (12) pour débloquer la rotation de ladite tête de manœuvre (11) ; la rotation, dans un sens ou dans l'autre, de l'ensemble rotor-bloc-clé à plaquette-tête de manœuvre-arbre de commande (22, 25, 26, 11, 10), avec par conséquent la rotation dans le même sens de ladite came (C) pour l'ouverture ou la fermeture de ladite serrure (S).

2. Dispositif à clé selon la revendication 1, **caractérisé en ce que** ledit arbre de commande (10) dans ledit groupe d'actionnement (1) peut coulisser dans le sens axial, en opposition à la réaction d'organes élastiques (13), en phase avec ladite translation axiale de l'ensemble rotor-bloc-clé à plaquette (22, 25, 26), où ladite tête de manœuvre (11) est insérée de manière à tourner dans un logement cylindrique (14) réalisé dans une bride (15) solidaire dudit cylindre européen (E), et où lesdits moyens à combinaison mécanique (12) sont constitués d'un certain nombre de goupilles de combinaison (120), logées à l'intérieur de ladite tête de manœuvre (11), disposées en cercle selon une géométrie préétablie, leurs axes respectifs étant parallèles à celui de la tête de manœuvre (11) elle-même, et faisant saillie à l'arrière de cette dernière au-delà du fond dudit logement cylindrique (14) et partiellement insérées dans des trous correspondants (16) réalisés dans ladite bride (15), chacune desdites goupilles de combinaison (120) étant constituée de deux parties consécutives, une première (121) et une deuxième (122), de sorte que la longueur totale résultante peut être homogène ou différente de celle des goupilles restantes (120), la goupille de combinaison (120) constituée de deux parties (121, 122) étant soumise à l'action d'organes élastiques (124) et poussée dans le sens axial, en opposition à ces derniers, pour une course préétablie déterminée par le codage de ladite clé à plaquette (26), jusqu'à une position où le plan diamétral, sur lequel la première et la deuxième partie des goupilles (121, 122) se rejoignent, est coplanaire audit fond du logement cylindrique (14), permettant ainsi à ladite tête de manœuvre (11) de tourner en même temps que ledit arbre de commande (10), en séparant de manière angulaire toutes les premières parties (121) des goupilles de combinaison (120) de leurs deuxièmes parties (122), qui restent à l'intérieur desdits trous (16) dans la bride (15).

3. Dispositif à clé selon la revendication 1, **caractérisé**

- en ce que** ladite coquille externe (20) dans ledit groupe d'ouverture/fermeture (2), est rendue solidaire dudit cylindre européen (E) et fait saillie au moins partiellement vers l'extérieur d'une porte blindée, de sécurité ou similaire, la coquille externe (20) étant de forme annulaire et profilée selon une section décroissante vers l'extérieur de ladite porte blindée, de sécurité ou similaire, et **en ce que** l'épaulement (24) présente un diamètre réduit par rapport au diamètre dudit siège cylindrique axial (21) et qu'il est réalisé en correspondance de l'extrémité extérieure de ce dernier.
4. Dispositif à clé selon la revendication 1, **caractérisé en ce que** ledit bloc de protection (25) présente une forme essentiellement sphérique où ladite première face profilée au moins (251) est aplatie et parallèle à l'axe de rotation du bloc (25) lui-même.
5. Dispositif à clé selon la revendication 1 ou la revendication 4, **caractérisé en ce que** ladite clé à plaquette (26) présente un côté extérieur profilé en forme de calotte sphérique, dont le rayon est égal au rayon dudit bloc (25), de manière à ce que la forme sphérique soit rétablie lorsque la clé est couplée audit bloc, et où le même côté extérieur de la clé à plaquette (26) comprend un certain nombre de trous de codage (260), de différentes profondeurs, disposés en cercle selon une géométrie préétablie, leurs axes respectifs étant mutuellement parallèles, et qui sont tournés vers ladite tête de manœuvre (11), mais aussi parallèles à l'axe de cette tête, en phase avec ladite deuxième position du bloc de protection (25), lesdits trous de codage (260) s'accouplant avec les goupilles de combinaison correspondantes (120) qui font saillie de ladite tête de manœuvre (11) pour pousser ces goupilles selon les courses préétablies prévues pour déverrouiller la tête.
6. Dispositif à clé selon la revendication 1 ou la revendication 4, **caractérisé en ce que** ledit rotor (22) est constitué de deux pièces (22A, 22B), rendues mutuellement solidaires par ledit goujon de rotation (25P) du bloc de protection (25).
7. Dispositif à clé selon la revendication 1, **caractérisé en ce que** ledit bloc de protection (25) présente une forme essentiellement cylindrique, son axe coïncidant avec l'axe de rotation dudit bloc (25) et où ladite première face profilée au moins (251) est aplatie et parallèle audit axe de rotation.
8. Dispositif à clé selon la revendication 1, **caractérisé en ce que** ledit bloc de protection (25) présente une forme essentiellement prismatique, son axe longitudinal coïncidant avec l'axe de rotation dudit bloc (25) et où lesdites première et deuxième faces profilées (251, 252) coïncident avec les faces latérales correspondantes dudit prisme.
9. Dispositif à clé selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'il** comprend un certain nombre d'encoches (25T) sur la surface latérale dudit bloc de protection (25), encoches qui peuvent être agrippées avec l'ongle ou un outil à lame plate pour entraîner la rotation dudit bloc (25) sur ses deux positions caractéristiques.
10. Dispositif à clé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite première face profilée (251) du bloc de protection (25) comprend un profil mâle à queue d'aronde (261), auquel peut s'accoupler de manière complémentaire un profil femelle à queue d'aronde (262), réalisé au dos de ladite clé à plaquette (26) pour créer ledit accouplement stable et amovible de cette clé avec le bloc (25) lui-même.
11. Dispositif à clé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite deuxième face profilée (252) du bloc de protection (25) comprend deux trous borgnes (272) au moins, mutuellement parallèles, mais aussi symétriquement décentrés par rapport à l'axe de rotation dudit rotor (22), lesdits deux trous borgnes (272) au moins pouvant recevoir les broches correspondantes (270) qui font saillie dudit outil d'ouverture/fermeture (27), pour entraîner ledit accouplement provisoire de ce dernier avec le bloc (25).
12. Dispositif à clé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite clé à plaquette (26) et ladite deuxième face profilée (252) comprennent des moyens de centrage respectifs (30), identiques entre eux, pouvant s'engager alternativement de manière élastique dans un repère présent sur ladite tête de manœuvre (11), pour réaliser et stabiliser lesdites deux positions caractéristiques du bloc de protection (25).
13. Dispositif à clé selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le corps principal (28) dudit outil d'ouverture/fermeture (27) comprend un logement (29) pour recevoir, retenir et transporter ladite clé à plaquette (26), et un couvercle (29C) pour fermer, au moins partiellement, ledit logement (29).
14. Clé à plaquette (26) à utiliser avec un dispositif à clé (100) pour actionner les serrures (S) selon l'une quelconque des revendications de 1 à 10, **caractérisée en ce qu'elle** comprend : un certain nombre de trous de codage (260), de différentes profondeurs, disposés en cercle selon une géométrie préétablie, ayant leurs axes parallèles les uns par rapport aux autres, et qui peuvent être orientés vers ladite

tête de manoeuvre (11), et parallèles à l'axe de celle-ci, en phase avec ladite deuxième position du bloc de protection (25), lesdits trous de codage (260) s'accouplant avec les goupilles de combinaison (120) correspondantes qui dépassent de ladite tête de manoeuvre (11) pour pousser ces goupilles selon les courses préétablies prévues pour déverrouiller la tête ; un profil femelle à queue d'aronde (262), réalisé au dos de ladite clé à plaque (26), pouvant s'accoupler avec un profil mâle à queue d'aronde complémentaire (261), réalisé dans ledit bloc de protection (25) pour créer entre eux un accouplement stable et amovible.

15. Outil d'ouverture/fermeture (27) à utiliser avec un dispositif à clé (100) pour actionner des serrures (S) selon l'une quelconque des revendications de 1 à 10, **caractérisé en ce qu'il** présente un corps principal (28), profilé de manière à créer une prise ergonomique pour les doigts d'une main et comprenant : un logement (29) pour recevoir, retenir et transporter ladite clé à plaquette (26) ; des moyens d'accouplement (271) constitués d'une empreinte de forme complémentaire à ladite deuxième face profilée (252) du bloc de protection (25) et d'au moins deux broches (270) parallèles, faisant saillie vers l'extérieur et pouvant s'engager dans les trous borgnes correspondants (272) réalisés dans la même deuxième face profilée (252), pour créer ledit accouplement provisoire entre ledit outil (27) et le bloc (25).

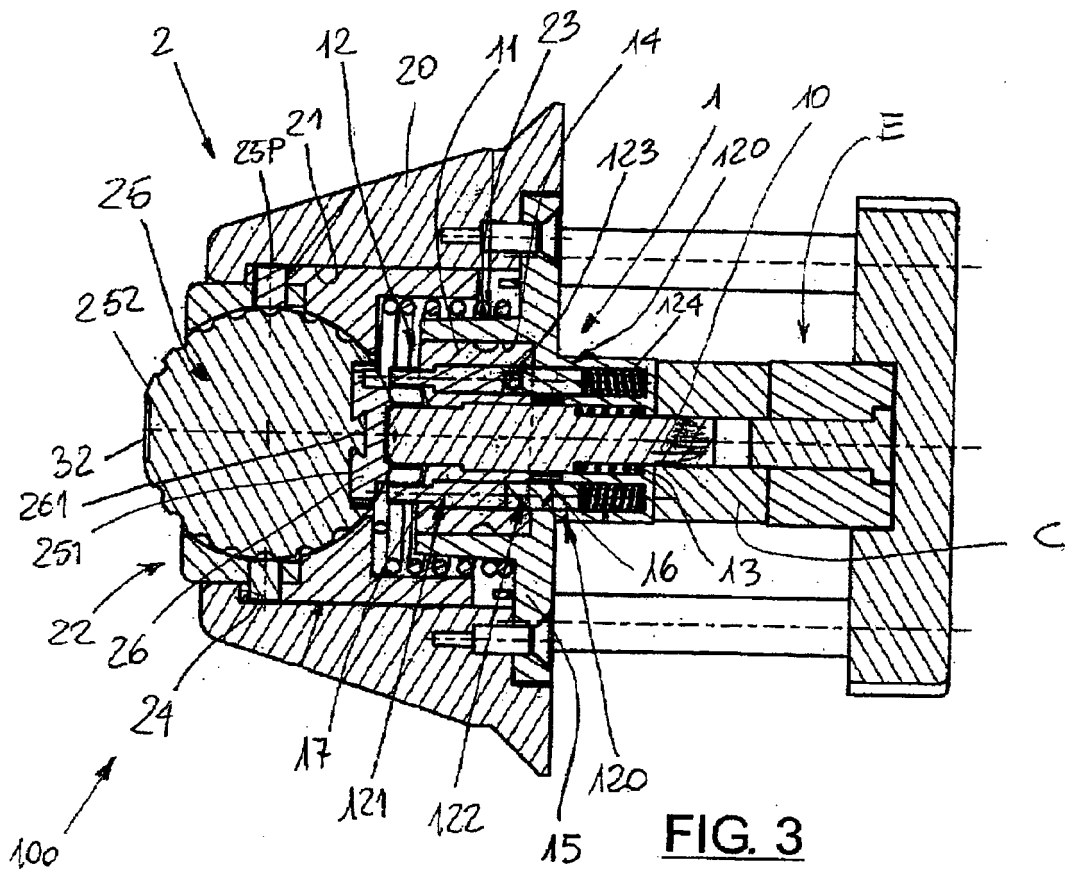
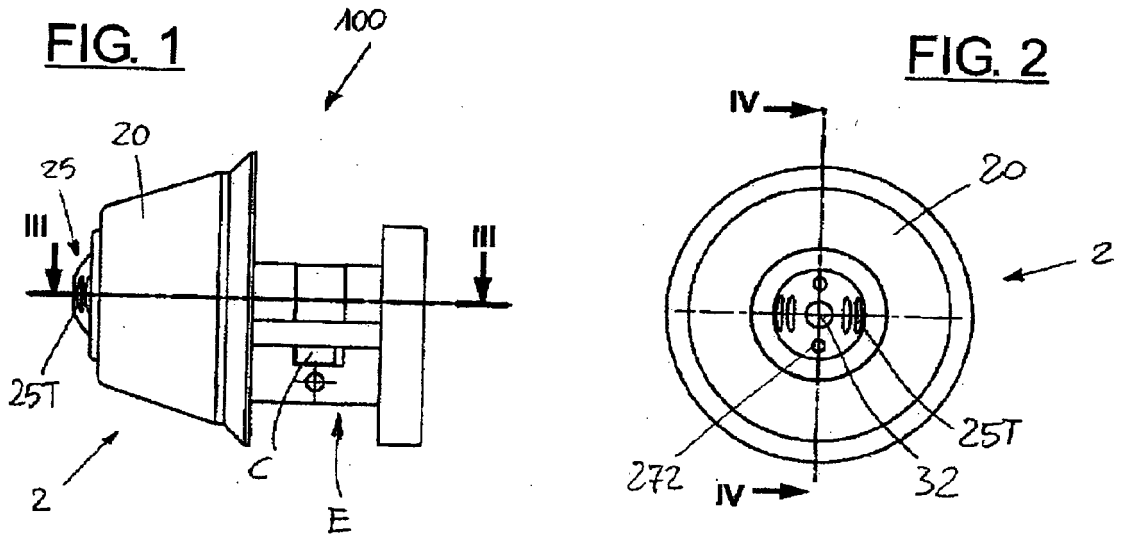
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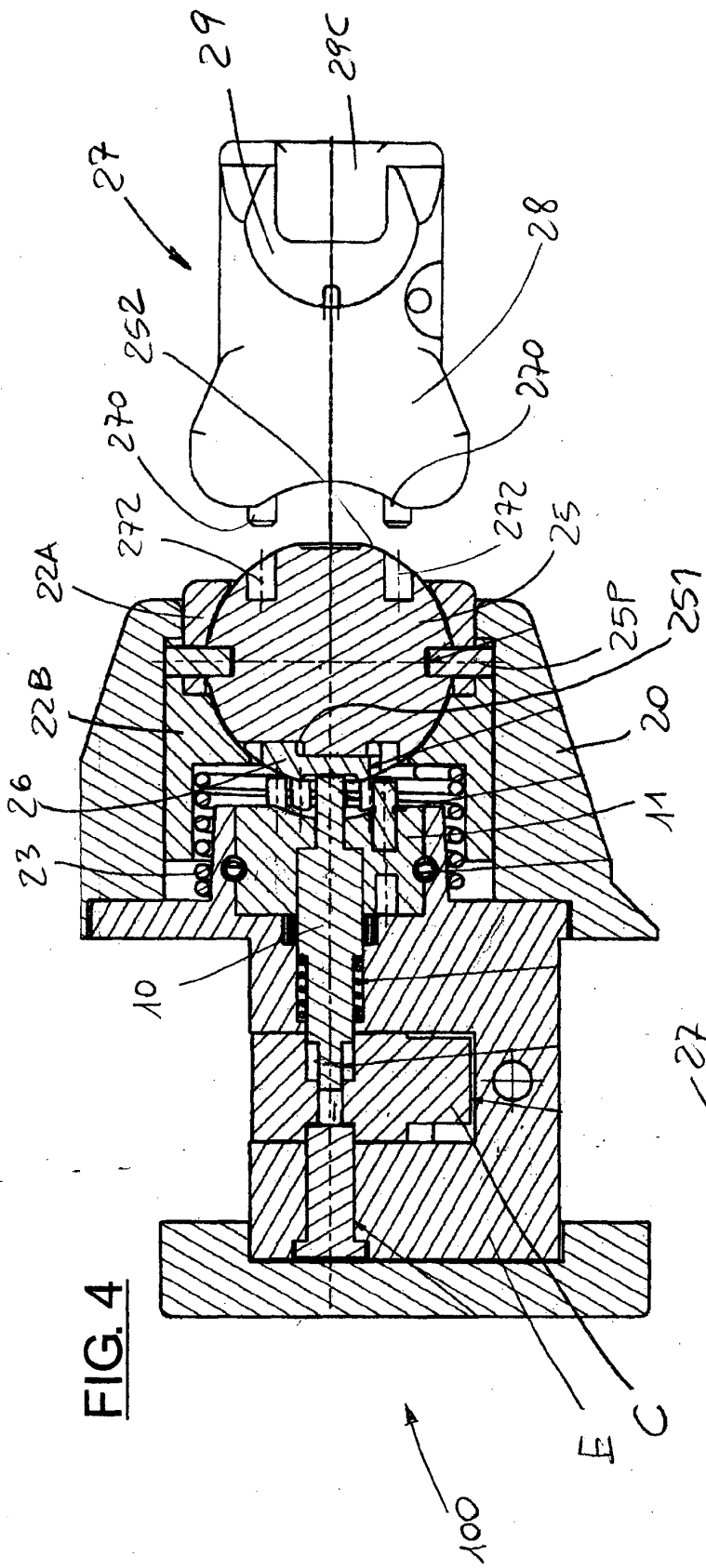
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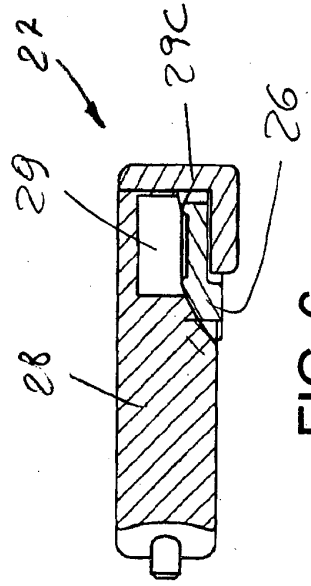
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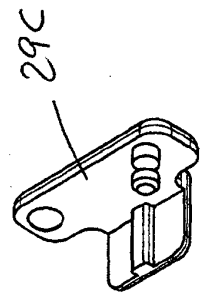




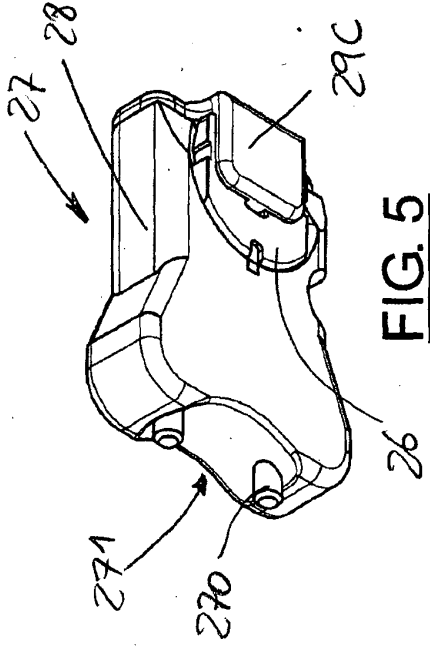
**FIG. 4**



**FIG. 6**



**FIG. 7**



**FIG. 5**

